

Nebagamon Creek Abandoned Railroad Grade and Culvert Removal Project
Douglas County, Wisconsin

Quality Assurance Project Plan (QAPP)

NOAA Grant Funding Source: Great Lakes Restoration Initiative

Grant #: NA22NMF4630144

Wisconsin Department of Natural Resources
Fisheries Management Bureau
Lake Superior Fisheries Team



SECTION 1: BACKGROUND/OVERVIEW

Title and Approval Sheet

Nebagamon Creek Abandoned Railroad Grade and Culvert Removal Project

Wisconsin Department of Natural Resources
1701 N. 4th Street
Superior, WI 54880
paul.piszczek@wisconsin.gov

Award Number: NA22NMF4630144

Effective Date: December 15, 2022

Approval:

Date:



12/15/2022

Paul Piszczek, DNR Lake Superior Tributaries Fisheries Biologist



12/15/2022

Bradley Ray, DNR Lake Superior Fisheries Team Supervisor



12/16/2022

Jeff Tyson, GLFC Fisheries Management Project Manager

Terry Heatlie, NOAA Technical Monitor

Rina Studds, NOAA Federal Program Officer

Table of Contents

Section 1: Background/Overview	2
Title and Approval Sheet	2
Table of Contents	3
Distribution List	4
Project/Task Organization	4
Problem Definition/Background	5
Project/Task Description	6
Data Collection	6
Personnel	6
Equipment	7
Work Schedule	7
Maps	8
Section 2: Data Collection & Quality Standards	8
Field Data Collection Requirements	8
Sampling Frequency and Schedule	9
Sampling Methods	9
Engineering Survey	9
Fishery Surveys	9
Photographic Monitoring	10
Quality Objectives & Criteria for Measurement Data	10
Instrument/Equipment Testing, Inspection, Calibration, & Maintenance	12
Section 3: Data Management & Reporting	12
Data Handling/Storage	12
Data Review, Validation, & Verification	13
Validation and Verification Methods	13
Reconciliation with User Requirements	14
Documentation & Records	14
Appendix A: Approved Tier 1 Monitoring Plan & Data Management Plan	15
Appendix B: Project Site Map	19
Appendix C: Wisconsin DNR Wadable Stream Fish Assessment Data Sheet	20

Distribution List

The following individuals and their organizations will receive copies of this approved QAPP and any revisions. This includes people responsible for implementation.

Name	Organization	Telephone Number	Email
Terry Heatlie	NOAA – Technical Monitor	(734) 741-2211	terry.heatlie@noaa.gov
Paul Piszczek	Wisconsin DNR – Fisheries Biologist	(715) 392-7990	paul.piszczek@wisconsin.gov
Bradley Ray	Wisconsin DNR – Fisheries Supervisor	(715) 779-4036	bradley.ray@wisconsin.gov
Jeff Tyson	GLFC – Program Manager	(734) 649-2033	jtyson@glfc.org
Rina Studds	NOAA – Federal Program Officer	(301) 427-8651	rina.studds@noaa.gov

Project/Task Organization

Name	Organization	Roles and Responsibilities
Paul Piszczek	Wisconsin DNR	Project Manager and point-of-contact; QAPP development and implementation; Contractor selection and oversight; Fieldwork oversight
Bradley Ray	Wisconsin DNR	Project funding and coordination; Contractor/bid document development
Jeff Tyson	GLFC	Program coordination; Grant administration; QAPP technical guidance
Terry Heatlie	NOAA	Monitoring, QAPP and project technical guidance
Rina Studds	NOAA	Project oversight

Problem Definition/Background

Wisconsin DNR will permanently remove from Nebagamon Creek a fish passage barrier (four-foot-high cascading falls) and sedimentation risk (over 20,000 cubic yards) caused by a deteriorating, abandoned railroad grade and appurtenant culvert in Douglas County. The work consists primarily of excavating a 600-foot long by 110-foot wide (maximum width at culvert) by 40-foot high (maximum height at stream corridor) section of the grade and excavating the 110-foot long by 13-foot wide by 10-foot high concrete culvert through which Nebagamon Creek flows. Consistent with the morphological dimensions and character of the abutting segments upstream and downstream from the work area, the channel and its floodplain will be returned to their daylighted, natural hydrologic conditions after nearly 150 years of confinement by the grade and culvert. The channel will consist of a new channel excavated adjacent to the existing culverted channel to facilitate culvert removal. A remnant of the historic Duluth South Shore & Atlantic Railway, the grade was abandoned when rails, ties, and appurtenances were removed in the 1930s. The grade persists as a grassed surface with numerous trees along the side slopes, underlain by sand, clay, and gravel soils.

DNR's intent to excavate and remove the grade soils and culvert prompts its need to fortify the existing gravel haul road from the grade site to the disposal site to accommodate the hundreds of dump truck loads of grade material. Sections of the existing haul road are underlain legacy corduroy, constructed decades ago through lowland areas. DNR will gather construction data and information to fortify the haul road and hydraulic connection needs in the low-lying areas that the road traverses in accordance with the previously completed Hydrologic & Hydraulic study results and permitting requirements. Regulatory oversight will occur from the U.S. Army Corps of Engineers and Douglas County (through DNR Waterways Program and Floodplain Program) and DNR Stormwater Program.

As documented in the approved NOAA Tier 1 Monitoring Plan dated December 15, 2022 (Appendix A), DNR will collect environmental data through engineering surveys and fishery surveys to document post-construction site conditions. No pre-construction data for the railroad grade and culvert site will be collected, as those data already exist from surveys conducted prior to applying for and receiving the NOAA grant. All post-construction data will be collected using methods similar to the respective pre-construction data, then compared to the pre-construction data to verify the engineering design specifications were met during construction and the extent of any changes to the fish community following construction. Engineering data will be collected using common engineering survey methods by experienced contractors, whereas fish community data will be collected using common fishery survey methods by experienced DNR Fisheries personnel.

Project/Task Description

Data Collection

Data will be collected consistent with the approved NOAA Tier 1 Monitoring Plan dated December 15, 2022, and further discussed in Section 2 of this QAPP.

- Post-construction engineering survey of the railroad grade site: channel length, and width will be measured using standard surveying equipment and methods. Channel and floodplain slopes/profiles and cross-sections will be developed and channel jump heights will be computed from these data and subsequently used to verify consistency with Project design. The data will be used produce stream bed and water surface elevation profiles that will extend at least 100 feet upstream and 100 feet downstream of the abandoned railroad grade-stream crossing.
- Post-construction fishery survey at the railroad grade site: Presence/absence surveys of coldwater species such as Brook Trout and DNR rotational stream fishery surveys will be conducted using standard electrofishing gear. Fish species composition, size structure, and relative abundance will be determined after identifying, measuring (total length), and enumerating all fish. Surveys will be conducted upstream and downstream, at similar locations to the pre-construction surveys. The pre- and post-Project data will be compared to determine the extent of any changes in species composition, size structure (i.e., length-frequency), and relative abundance potentially influenced by the Project.
- Photographic Monitoring: Photographic monitoring stations will be established at the railroad grade site by Wisconsin DNR Fisheries staff. Photographs will be taken using trail cameras mounted on nearby trees or installed posts and will be programmed for hourly recording prior to construction, during construction, and after construction. All photographs will be retained by DNR Fisheries. Though not a Tier 1 monitoring requirement, monitoring photographs will be provided to meet the Outreach and Communication Special Award Condition for this NOAA award and will be provided on the GLFC website.

Personnel

The Project Manager will oversee data collection and retention. Wisconsin DNR contractor(s) will collect and manage all engineering data from the pre- and post-construction surveys, whereas Wisconsin DNR Fisheries staff will collect and manage all post-construction fish community survey data. Wisconsin DNR Fisheries staff will also conduct the photographic monitoring.

Equipment

Engineering surveys will be conducted with commonly used and accepted equipment, instrumentation, and supplies:

- Total station and/or surveyor's level
- Stadia rods and receivers
- Tape measures
- Electronic and paper data sheets
- Handheld GPS unit
- Handheld digital camera
- Personal protective equipment such as safety vests and hard hats
- First aid kit(s)
- Waders and muck boots

Fishery surveys will be conducted with commonly used and accepted equipment and supplies:

- Backpack electrofishing units with anodes, cathodes, and batteries (e.g., lithium)
- Dip nets
- Plastic buckets
- Measuring boards (metric and English units)
- Handheld spring scales (metric)
- Electronic and paper data sheets
- Handheld thermometer (F)
- Handheld GPS unit
- Personal protective equipment such as ear protection
- First aid kit(s)
- Waders

Photographic monitoring will be conducted with retail-grade digital cameras, trail cameras, batteries (alkaline or lithium), and memory cards.

The equipment, instrumentation, and supplies will be used under the field conditions typical to the sites and will be inspected, maintained, and cleaned to ensure proper functionality. Any malfunctioning or otherwise inoperable equipment, instrumentation, and supplies will either be repaired prior to use or replaced with properly functioning equipment.

Work Schedule

Engineering and fishery surveys will be conducted during daylight hours of normal business days, with fair weather being the target ambient condition. Further, the surveys will be conducted during normal or low stream flows and not during high or flood flows to limit any influence the adverse conditions may affect data collection. The post-construction survey for the railroad grade and reconstructed stream channel will be conducted over the course of one to three working days

during summer 2023 within five days of the Project's substantial completion. The fishery surveys will be conducted over the course of one to two days during summer and fall 2023 following the Project's substantial completion, and in spring, summer, and fall 2024.

Photographic monitoring at the railroad grade site will commence within 48 hours prior to construction, continue through the entire construction period, and cease within 48 hours after construction of the stream channel.

Maps

A Project area map with references to specific work sites is provided in Appendix B.

SECTION 2: DATA COLLECTION & QUALITY STANDARDS

Field Data Collection Requirements

The sampling design consists of methods, equipment, and timeframes specific to demonstrating that Nebagamon Creek's channel and floodplain were returned to their daylighted, natural hydrologic conditions following long-standing confinement by the grade and culvert. Post-construction data will be collected for the railroad grade site and Nebagamon Creek to verify the grade and stream channel were constructed as designed and to document the extent of any changes to the fish community following construction. For example, a total station or level and a stadia rod with a receiver will be used to measure the dimensions and elevations of the grade site and stream channel following construction. The data will then be uploaded to software such as AutoCAD to develop cross-sections and longitudinal profiles from which to verify with the design drawings. Measurements will be made with comparable equipment and methods following construction to verify the post-construction dimensions and elevations. All engineering field data will be collected by trained engineers and technicians, whereas all fishery survey data will be collected by trained biologists and technicians.

The data collection locations for the grade and Nebagamon Creek surveys were selected previous to this Project award, and these will be used again for the post-construction survey comparison. The fishery survey locations were previously GPS-referenced. Other equipment needs were listed previously (see Equipment Section on Page 7 of this QAPP). All survey data will be retained and managed by the respective contractor(s) and DNR in paper and electronic files, and the respective equipment and supplies used to collect the data will be retained in the offices and storage facilities operated by contractors and DNR Fisheries staff. The Project Manager will compile and share all data with the Great Lakes Fishery Commission for its publicly accessible projects page as a part of the data management plan.

Sampling Frequency and Schedule

Work Site	Task	Frequency	Timeframe
RR grade	Post-construction engineering survey	Once	Summer 2023
Nebagamon Creek	Post-construction fishery survey	Once	Summer-Fall 2023
		Once	Spring 2024
		Once	Summer 2024
		Once	Fall 2024
		Once	

Sampling Methods

Engineering Survey

The post-construction survey at the grade site will be conducted using a total station or level and stadia rod with receiver. The total station or level will be situated at as many stations (i.e., turning points) as necessary along the stream channel to establish a clear sight line with the stadia rod and receiver. All stations will be geo-referenced among one another with a known or otherwise established base elevation. Regularly spaced longitudinal intervals along the stream channel will be established as transect locations, which will span perpendicular to the stream channel. At each transect, the channel’s bed elevation, water surface elevation, and width will be measured to the nearest 0.01 foot by holding the stadia rod vertically and manually adjusting its height until the receiver completes its communication with total station or level. The measurements will be recorded electronically or on paper, then uploaded or entered into computer software such as AutoCAD to calculate cross-sectional areas of each transect and create a longitudinal profile for the channel that will show post-construction jump heights.

Fishery Surveys

The post-construction fishery surveys will be conducted using standard, DNR-owned electrofishing equipment: (1) backpack electrofishing units with pulsed DC current; and (2) stream barge unit with AC current. Two stations will be surveyed downstream from the grade site and two stations will be surveyed upstream from the grade site, consistent with the methods used for these GPS-referenced stations in years 2015 and 2017. Specifically, the downstream and upstream stations nearest the grade site will be surveyed with two backpack units, where each of two DNR staff carry and operate a backpack unit (one anode per unit) and collect all stunned fish, and a third DNR staff will also collect stunned fish and transfer fish from the backpack staff to a bucket to hold the fish until completing the survey. The downstream and upstream stations furthest from the grade site will be surveyed with a single stream barge unit (two anodes), where each of two DNR staff handle an anode and a dip net and collect all stunned fish, and a third DNR staff tows the barge, collects stunned fish, and transfers fish from the anode staff to the barge’s on-board holding tank until completing the survey. Regardless of fish collection method, all fish will be identified to species, measured to the nearest 0.1-inch, weighed to the nearest gram, recorded either on a paper data sheet or an electronic tablet, and returned to the stream. If

recorded on paper, such as on DNR's Wadable Stream Fish Assessment sheet (Appendix C), the data will be transcribed onto a MS Excel worksheet, reviewed for transcription errors, and uploaded directly into the DNR Fisheries Information System database. If recorded on the tablet, the data will be reviewed for errors and automatically transferred to the DNR Fisheries Information System database.

Photographic Monitoring

The photographic monitoring will be conducted with DNR-owned retail-grade trail cameras by trained DNR staff immediately (within 48 hours) prior, throughout the duration (potentially up to eight weeks), and immediately (within 48 hours) after substantial completion of the Project. DNR staff will install the cameras in existing trees or on posts to optimize the upstream and downstream views of the grade site. The batteries and memory card for each camera will be checked for full operation and storage at the onset of monitoring. The cameras will be programmed to photograph the site at hourly intervals. The cameras will be inspected and maintained during their periods of use, with the batteries and memory cards being changed, as necessary. The cameras will be removed following substantial completion of the Project, and all photographs will be transferred to external hard drives at the DNR Superior office. The photographs will then be collated in a MS PowerPoint or equivalent software to produce a time-lapse record of Project construction.

Quality Objectives & Criteria for Measurement Data

The Project for which the data are being collected will restore fish passage, remove a sedimentation risk, and return Nebagamon Creek's channel and floodplains to a daylighted, natural hydrologic condition after nearly 150 years of confinement by the railroad grade and culvert. Data will be of sufficient quality to:

- provide measurements to demonstrate that the grade and channel were modified as designed, particularly as an open channel with jump heights and open floodplains without the existing cascading falls within the channel;
- document the fish community following Project construction, specifically relative to the presence of migratory species in the newly opened channel; and
- to provide a visually based record for outreach and for planning future projects.

Site Passability is the primary Implementation Monitoring (IM) Metric that the data will address, as referenced in the approved Tier 1 Monitoring Plan. Various channel characteristics will define Site Passability and are described as follows:

IM Metric	Assessment Target
Site passability: Channel width (feet)	New channel built as designed: wetted width, bankfull width, and floodplain width match the upstream and downstream channel segments
Site passability: Average channel slope (%)	Sloped as designed: slope matches that of the upstream and downstream channel segments
Site passability: Maximum jump height (feet)	Height reduced from existing four-foot cascading falls to less than 0.5 feet.

Precision and Accuracy: Neither duplicate nor replicate measurements will be made during the grade and stream channel surveys, fishery surveys, and photographic monitoring. The total station or level, and stadia rod and receiver are anticipated to function normally and therefore produce precise and accurate data. Any indication of erroneous measurements (e.g., excessively higher or lower channel bed elevations compared to previous measurements) will immediately be corrected by the survey crew. The fishery surveys are one-time efforts that are not repeated, due to the lack of opportunity for survey replication at the specific stations of interest in Nebagamon Creek. Following capture, all fishes will be identified either through the knowledge of the specific fish handler or by the collective knowledge of the field personnel. If necessary, fish will be vouchered and returned to the laboratory for identification. Individual fish measurements will be repeated if miscommunications occur between the fish handler(s) and data recorders. Photographs will be taken by trail cameras mounted on fixed structures (e.g., tree or post) that will remain in place and will maintain the same viewing area through the duration of the Project. Precision and accuracy are therefore not applicable.

Representativeness, Comparability, and Sensitivity: Total stations or levels and stadia rods with receivers are commonly used and accepted equipment from which to measure grade elevations and stream channel dimensions; no simulated grades or stream channels will be used for measurements. Similarly, backpack and stream barge electrofishing equipment and catch-per-effort surveys are commonly used and accepted methods to capture fish for wadable stream fishery assessments, particularly for producing representative data across survey stations and pre- and post-construction timeframes; no simulated streams will be used for fish collection, enumeration, measurement, and identification. Photographs will be taken by trail cameras mounted on fixed structures such as a tree or post that will remain in place and will maintain the same viewing area through the duration of the Project.

Completeness: All surveys are expected to be completed in the prescribed timeframes. Complete engineering data sets will be those with at least 80% of all required measurements to verify the grade site was built as designed. The fishery data will be complete if at least two stream barge stations or two backpack stations are surveyed, 75% of the survey station length is surveyed, and 90% of all fish collected are accurately identified, measured, weighed, and enumerated. The photographic monitoring record will be deemed complete regardless of the numbers of photographs taken, as the monitoring is not necessary to complete the Project.

Instrument/Equipment Testing, Inspection, Calibration, & Maintenance

The data objectives will be met through standardized methods and repeated use of properly functioning and calibrated equipment. Instrumentation will be inspected and calibrated daily before each use and cleaned as necessary. In the engineering surveys for example, the total station or level and stadia rod and receiver will be used according to manufacturer's specifications and guidelines, starting with turning the units on and allowing any self-calibration procedures to run as designed. Once on, the equipment will be repeatedly used for each data point. Loss of battery power is the only anticipated potential interruption to the surveys, and any occurrence will be remedied by changing the batteries. Should the equipment malfunction beyond the batteries, the equipment will be replaced with comparable equipment, again following manufacturer's specifications and guidelines prior to use. The fishery surveys will follow similar concepts. The electrofishing equipment will be tested for functionality by turning the units on and immersing the anodes in the water immediately before the survey. Any loss of power to the electrofishing units during the surveys will be remedied by changing the batteries or using comparable replacement units. The trail cameras will be inspected and maintained during their periods of use; the batteries and memory cards will be changed, as necessary.

SECTION 3: DATA MANAGEMENT & REPORTING

Data Handling/Storage

All engineering and fishery survey data will be recorded immediately upon collection, either on paper or electronic forms, as noted in the approved NOAA Tier 1 Monitoring Plan dated December 15, 2022 (Appendix A). Data on paper forms will be transcribed to computer software such as MS Excel, proofed for transcription errors, and corrected as necessary by the individuals who collected the data and the Project Manager. The data will then be uploaded to respective analytical programs and databases. For example, the fishery survey data will be uploaded to DNR's Fisheries Information System, where it will be retained indefinitely and retrieved for analysis to compare the fish community prior to and after construction. Analyses will be conducted using MS Excel, Program R, or other comparable analytical software. Paper data sheets will be retained in DNR Fisheries files. Engineering data will be compiled and analyzed using AutoCAD or comparable software to develop design plans and verify as-built conditions of the grade and stream channel. All data will be shared with the Great Lakes Fishery Commission for its publicly accessible projects page as a part of the data management plan. The Project Manager will oversee all data handling and storage and will prepare any summary reports, which will include the following NOAA disclaimer:

“These data and related items of information have not been formally disseminated by NOAA and do not represent any agency determination, view, or policy.”

Data Review, Validation, & Verification

DNR's contractors for the grade and stream channel surveys will review, validate, and verify all data immediately at the time of collection, while producing the grade and stream channel as-built drawings, and after all data collection has ceased. Any inconsistencies (e.g., variable stream bed elevations) will either be corrected or rejected from use in the as-built drawings. The Project Manager will instruct the contractor(s) to collect additional data, if necessary. The Project Manager will also examine the initial design drawings (e.g., 30%) for any inconsistencies in the drawings that could be attributed to the data, at which time will communicate the inconsistencies to the contractor(s). The Project Manager will review, validate, and verify all fishery survey data by comparing at least 25% of all data recorded in the field versus those transcribed to MS Excel or other software prior to uploading to the DNR Fisheries Information System. All errors will be corrected or rejected based on communications with the individuals who collected and entered the data. The Project Manager will review the photographic record for any inconsistencies, particularly for absent or out-of-sequence photographs that do not produce the desired time-lapse record. Any inconsistencies will be discussed with staff who maintained the cameras and processed the photographs.

Validation and Verification Methods

All data will be validated and verified by contractor(s) and the Project Manager by written confirmation with contractors and survey personnel that:

- the data were collected with instrumentation and equipment specific to the measurement tasks, such as total station, stadia rod with receiver, surveyor's tape measures, backpack or stream barge electrofishing units, measuring boards, programmable trail cameras;
- the data were recorded on paper or electronic forms specific to the measurement tasks;
- erroneous data were corrected prior to use or rejected;
- the fishery data
 - were collected during summer and fall to encounter fish during non-migration and migration seasons;
 - consisted of species common to the Nebagamon Creek watershed or northwestern Wisconsin; and
 - consisted of individual lengths and weights common to each species observed (e.g., a data record of a five-inch Brook Trout that weighed 100 grams requires reconciliation, as five-inch Brook Trout typically weigh approximately 20 grams).
- the photographs showed the grade and stream channel work area; and
- the data were compiled for submission to the Great Lakes Fishery Commission.

Reconciliation with User Requirements

The Project Manager will reconcile the data, including those that may have influenced grade and stream channel design verification, by screening the field data sheets (paper and electronic forms) and grade and stream channel as-built drawings for errors. The Project Manager will discuss with contractors any errors or inconsistencies to determine whether to retain or reject the data and request modifications to the grade and stream channel as-built drawings. All engineering data are expected to be fully usable to demonstrate the channel and its floodplains were returned to their daylighted, natural hydrologic conditions after nearly 150 years of confinement by the grade and culvert. Further, all fishery data are expected to be fully usable to demonstrate fish passage through the new stream channel.

Documentation & Records

All data will be retained indefinitely by contractor(s) and DNR Fisheries. The Project Manager will write a report that describes the types of data collected and any respective errors and corrections. The report will also comment on any problems encountered during data collection, review, and analysis. The report will be retained in electronic files by DNR Fisheries and shared with GLFC and NOAA staff. All data will also be compiled by DNR Fisheries, retained in DNR's Project files, and shared with GLFC for its publicly accessible projects page as a part of the data management plan.

Appendix A: Approved Tier 1 Monitoring Plan & Data Management Plan

NOAA Great Lakes Fish Habitat Restoration Partnership Project Grant
Nebagamon Creek Abandoned Railroad Grade and Culvert Removal Project

December 15, 2022

Monitoring and Data Management Plan

Monitoring Plan

Project Goals and Objectives

The Nebagamon Creek Abandoned Railroad Grade and Culvert Removal Project in Nebagamon Creek and the Bois Brule River Watershed will permanently remove a section of an abandoned earthen railroad grade, permanently remove an existing concrete culvert, and return the Nebagamon Creek channel to a permanent unobstructed, daylighted condition, with the goal of restoring fish passage in and removing a significant sedimentation threat to Nebagamon Creek and the Bois Brule River. Specifically, Wisconsin DNR plans to improve in-stream habitat on a 500' long by 130' wide section of Nebagamon Creek by excavating approximately 29,000 cubic yards of railroad grade soils, excavating the approximate 110' L x 13' W x 10' H concrete culvert, including its collapsed headwall fragments that impede fish passage, excavating a new stream channel consistent with the characteristics of the segments upstream and downstream from the culvert, and transporting the material to a disposal site via a 13,000' long gravel haul road to be fortified as part of the Project. Project success will be tracked through Tier 1 monitoring following NOAA guidance. Monitoring metrics outlined below will be compiled in a QAPP for approval prior to commencing data collection efforts.

Implementation Monitoring Metrics

Site-passability

Method:

Wisconsin DNR contracted the pre-construction survey and abandoned railroad grade site design plans prior to being aware of and applying for the Partnership Grant. Therefore, the data already exist and were collected by DNR's engineering design contractor, a Licensed Professional Engineer using standard survey techniques. The survey measured existing channel slopes, channel widths, and jump heights. The survey also included a longitudinal stream bed and water surface profile extending at least 100 feet upstream and 100 feet downstream of the abandoned railroad grade-stream crossing. The profile included:

- the railroad grade and culvert;
- channel cross-sections referenced to bankfull elevation flagged by the Engineer at three cross-sections upstream and three cross-sections downstream; and
- profiles, sections, and dimensions of the abandoned railroad crossing at the upstream side, downstream side, and center of the crossing.

A post-construction survey will be conducted using techniques consistent with the pre-construction survey, following substantial completion of the Project. Resulting channel slopes, channel widths, and jump heights will be determined from the as-built post-construction survey and compared to the design target measurements and dimensions for these metrics and values calculated from pre-construction survey data. The as-built survey will be conducted by a Wisconsin DNR contractor or partner.

Schedule:

The post-construction as-built survey will be conducted within five days of the Project's substantial completion. Construction is expected to be substantially complete by October 30, 2023.

Metric Target:

Channel slope, channel width, and jump height consistent with design plans.

Estimated Cost:

Year 1 – \$10,000 DNR engineering contractor

Presence of Target Fish Species

Method:

Wisconsin DNR conducted electrofishing surveys upstream and downstream from the railroad grade prior to being aware of and applying for the Partnership Grant. Therefore, the data already exist. The surveys were conducted to determine presence/absence of coldwater species such as Brook Trout and as part of DNR's statewide rotational stream fishery survey program, which includes data for fish species composition, size structure, and relative abundance. Similar upstream and downstream surveys will be conducted following the conclusion of the Project. The pre- and post-Project data will be compared to determine the extent of any changes in species composition, size structure (i.e., length-frequency), and relative abundance potentially influenced by the Project.

Schedule:

Fish surveys will be conducted in summer and fall 2023, following the Project's substantial completion. Additional surveys will be conducted in spring, summer, and fall 2024; once target fish are detected upstream from the project site post-implementation, however, monitoring for this measure is complete.

Metric Target:

Increased downstream and upstream presence, size structure, and relative abundance of cold-water fish species such as Brook Trout

Estimated Cost:

Year 1 – \$3,400 Wisconsin DNR

Year 2 – \$3,300 Wisconsin DNR

Year 3 - \$3,300 Wisconsin DNR

Operation and Maintenance Costs

Method:

The Project will have neither Operations nor Maintenance costs. The abandoned railroad grade site persists in an unpopulated, forested area, and will be passively managed by the private landowners as it was prior to the Project. The haul road is a rural gravel road that will be managed by its owner (Town of Brule) as it was prior to the Project.

Schedule:

None

Metric Target:
None

Estimated Cost:
None

Public Safety

Method:

Public safety improvements will be incidental from this Project.

- The abandoned railroad grade site is exclusively on private property in an unpopulated, forested area. The Project will remove from the railroad grade site the existing perched culvert, collapsed wingwalls, backwaters, and eroding side slope, which will eliminate any negative downstream impacts of plug water flow and sediment release in the event of the grade's collapse.
- The haul road site is an approximate 13,000-foot-long public road that traverses lowland wetlands/marsh, upland forest, and pasture lands. The Project will fortify the road's existing condition to provide additional capacity for heavy trucking. Road fortification will include any new culverts to replace the presently existing culverts that drain the predominantly wetland area.

Schedule:

Construction at the railroad grade site is expected to be substantially complete by July 30, 2023. The post-construction as-built survey will be conducted within five days of the Project's substantial completion. The haul road will be fortified prior to and/or during construction at the railroad grade site beginning in spring 2023.

Metric Target:

Railroad grade and stream channel consistent with design plans.

Estimated Cost:

Year 1 – \$10,000 DNR engineering contractor

Data Management Plan

The Nebagamom Creek Abandoned Railroad Grade and Culvert Removal Project will generate post-Project environmental data from engineering surveys and fisheries surveys. These data will be used to evaluate Project outcomes by comparing with design targets and pre-construction data. Environmental and monitoring data will be shared with GLFC, who will make the data available on the GLFC website and update the website as necessary. No technical publications are planned for the data.

The following environmental data will be collected for the Project, with costs referenced in the Monitoring Plan:

- Post-construction engineering survey at the railroad grade site: Channel slopes, channel widths, and jump heights will be measured using standard surveying equipment and techniques. These data will be used produce stream bed and water surface elevation profiles that will extend at least

100 feet upstream and 100 feet downstream of the abandoned railroad grade-stream crossing. The data will also produce six channel cross-sections (three upstream, three downstream) referenced to bankfull width. All post-construction survey data will represent the as-built dimensions of the new channel and floodplain. Post-construction engineering surveys and data will be included on the GLFC website.

- Post-construction fisheries survey at the railroad grade site: Presence/absence surveys of coldwater species such as Brook Trout and DNR rotational stream fishery surveys will be conducted using standard electrofishing gear. Fish species composition, size structure, and relative abundance will be determined after identifying, measuring (total length), and enumerating all fish. Surveys will be conducted upstream and downstream, at similar locations to the pre-construction surveys. The pre- and post-Project data will be compared to determine the extent of any changes in species composition, size structure (i.e., length-frequency), and relative abundance potentially influenced by the Project. Post-construction engineering surveys and data will be included on the GLFC website.
- Photographic Monitoring: Photographic monitoring stations will be established by Wisconsin DNR. Photographs will be taken on a regular basis prior to construction, during construction and after construction by DNR Fisheries staff. All photographs will be retained by DNR Fisheries. Though not a Tier 1 monitoring requirement, monitoring photographs will be provided to meet the Outreach and Communication Special Award Condition for this NOAA award and will be provided on the GLFC website.
- Progress Reports: Tier 1 data and derived information will be shared on a quarterly basis as part of the NOAA progress reporting system.
- Details regarding how data will be collected, including sampling frequency and collection methodologies, the standards to be used for data/metadata format and content, including a quality control process, and the approximate total volume of data to be collected will be developed for the QAPP and updated in the Monitoring plan and Data Management Plan once the QAPP is complete.

Appendix B: Project Site Map



