

**Project Title:** Project Implementation: Port Wing Wastewater Pond Restoration

**WDNR Project Lead(s):**

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**Project Start/End Date:** July 2019 – Dec 2021

**Place of Performance:** Port Wing, WI

**Project Location:** HUC 12 040203000300; -91.3985 46.77945

**Brief Project Description:**

The Town of Port Wing operated sewage treatment ponds constructed in a slough of the Flag River estuary on Lake Superior. When the ponds were abandoned as part of a facility upgrade, the sewage sludge was removed and pond dikes were breached, but wetland habitat was not restored. Previously awarded funds through GLRI supported design and implementation work, however project costs have shown to be higher than estimated. This proposal requests supplemental funding to continue implementation in 2019 and conduct follow up maintenance on the project for two years.

**Outcome(s):**

Restore large complex sedge meadow habitat for a variety of flora and fauna.

**Narrative of Proposed Work:**

**Project Summary and Approach:**

The Flag River is a Class I trout stream on the Bayfield peninsula that drains to Lake Superior. The estuary at the mouth of the Flag River has a direct surface water connection to Lake Superior. The lower reaches of the Flag River and its associated wetlands and shoreline complex provide important habitat for numerous species of waterfowl and migratory birds. The coastal bog contains a number of species not typically found in this kind of bog, such as buckbean, mud sedge, white and sooty beak-rushes, livid sedge and speckled alder. The area supports a rich fishery including panfish and northern pike in the 14-foot-deep Bibon Lake. Two rare plants and two rare invertebrates inhabit the wetlands: leafy white orchis (*Platanthera dilatata*), common bog arrow-grass (*Triglochin maritima*), black meadowhawk dragonfly (*Sympetrum danae*) and bog copper butterfly (*Lycaena epixanthe*).



Figure 1. Port Wing project site

Settling ponds for the Town of Port Wing's wastewater treatment system were constructed in the estuary in 1968 by removing clay from a borrow pit on the Town property to the south of the ponds and building berms approximately 8 feet high and 30 feet wide around two holding cells that measure 325 feet by 650 feet, or approximately 10 acres. The facility was shut down in 2011 when the Town upgraded their facility and began using an alternate sludge treatment method. The wastewater and sludge were removed from the cells and the exterior berm was partially breached for both cells at the north end of the ponds. There is not good water exchange between the cells and the surrounding

wetland. The ponds have some standing water (approximately 1 – 2 feet) and are dominated by both broad and narrow leaf cattail. High quality sedge meadow habitats are present outside the ponds in the adjacent wetland areas.

With GLRI funding support, the Town of Port Wing retained Stantec as oversight engineer in fall 2016 to develop restoration design plans at the site. A multidisciplinary project team was convened to provide guidance in establishing design plans that meet local community and natural resource needs for the site. Project goals were established by consensus as follows:

**Project Goal:** Restore wetland habitat that is hydrologically connected to the Flag River wetland complex and Lake Superior.

**Project Objectives:**

- 1: Prevent the spread of invasive plant species, especially reed canary grass into existing sedge meadow communities.
- 2: Maximize restoration of sedge meadow habitat
- 3: Provide some open water to provide access from Bibon Lake for esocids (pike) spawning and rearing habitat.
- 4: Provide some small patches for scrub shrub habitat (and use of berm material).
- 5: Provide access via small boat to Bibon Lake.
- 6: Include a walking trail and observation area for bird watching/site access.

Stantec conducted extensive field investigations on site to inform development of design plans. Site reconnaissance and review of historic air photos and original design plans for the ponds determined that the water channel to the south of the ponds was not Larson Creek, a navigable channel as originally thought. It is a drainage ditch constructed during pond establishment. Field investigations confirmed that Larson Creek flows outside of the project area to the east. Water level recorders were installed in two locations to determine the extent to which Lake Superior water levels influence hydrology at the site (Appendix B). This work determined that watershed inputs have limited influence on site hydrology; Lake Superior water levels and seiche effects have a much greater influence on water levels at the site. Soil borings determined that the berm material is a mixture of sand, clay and loam. Borings within the ponds determined that the liner is made up of clay. Borings outside the pond in the surrounding wetland show a thick mat of organic topsoil overlying clay and sand. Vegetation communities were mapped, including the location of invasive plants, throughout the project site and in a 200-foot buffer around the

ponds. Reed canary grass is the primary invasive species surrounding the project site. A topographic survey was conducted and combined with lidar data to map elevations at the site and estimate berm material volume. A wetland determination and delineation of the project site and access road from the south was conducted by Stantec and approved by WDNR. Results from all of these surveys are available upon request.

The project team developed several design alternatives to achieve the goal and objectives through extensive discussion, review of field survey data and review of preliminary design plans. Through consensus, the team selected the preferred design alternative. In general, the project will include 1) disposal of the berm material, including re-use of the material for construction of an observation area and improved access route for public use, 2) re-grading the site to depths that will support sedge meadow communities 3) distribution of salvaged organic wetland soils throughout the project area to serve as a seed bank for revegetation and 4) completion of field surveys to inform supplemental planting and invasives control for two growing seasons.

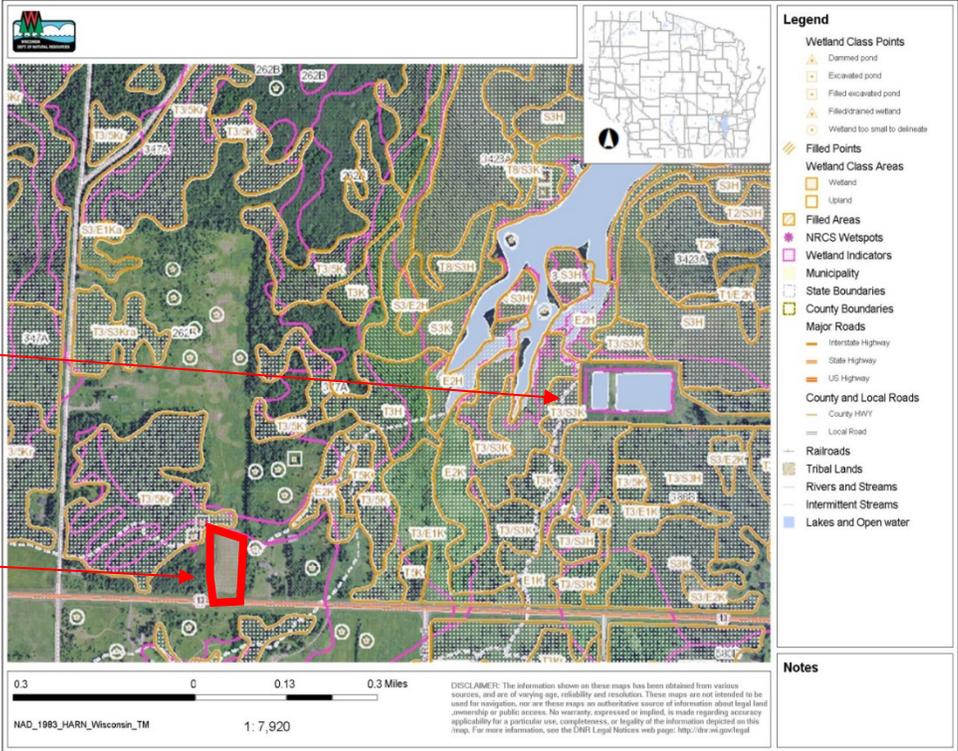
**Organic wetland soils**

Adequate depth of quality topsoil (weed free and high organics) is a major part of the project. These soils will provide a seed bank of native wetland vegetation to encourage quick establishment of a native plant community resilient to encroachment of invasives. A volume of 5,400 cubic yards of organic wetland fill is needed for the project. In June 2017, the WDNR project manager and Stantec consultant conducted extensive reconnaissance throughout the region to identify a source of organic wetland soils within a reasonable (and therefore affordable) distance to the project site. A weed free, source of wetland soils with many desirable native species was identified and purchased for the project using a sole source justification (Appendix C). Town leaders secured an agreement with a local landowner to use their property (Gustafson property) for storage of organic wetland soils. WDNR wetland layers were referenced and show upland areas suitable for disposal of material at the field (Figure 2). Field indicators during a site visit by WNR staff were consistent with available wetland maps.

Figure 2. WDNR Wetland layers, location of organic wetland soils storage and berm material disposal site.

Project Site

Gustafson property



## Disposal of berm material, observation platform and access road improvement

Site surveys estimated that the berms contained 16,410 cubic yards of material. Approximately 10,600 yards will be re-used on site (Table 1). Berm material will be used to create an observation platform that will provide an elevated view of the site. Some berm material will be used to establish the necessary elevation for sedge meadow communities within the existing ponds. A ditch to the south of the ponds will be filled. The existing access road from the south will be improved to allow for truck traffic to the site during restoration and public access following restoration. Nine equalization culverts will be placed under the roadway to allow for water exchange between the eastern and western portions of the road. A gate will be installed to prevent unauthorized vehicle use of the site but can be opened to allow for school groups or others to access the site. There will also be 2 pull off locations constructed along the road. Pull off locations were placed in areas identified as uplands during the wetland delineation to minimize wetland impacts. These pull offs will provide passing lanes for trucks during construction and will provide additional parking after restoration is completed.

After all possible berm material is reused on the site, there will still be 5,810 cubic yards of material that needs to be removed from the site. The remaining berm material will be permanently disposed of at the Gustafson property after organic wetland soils have been removed from that site. After berm material is spread across the Gustafson's field, the site will be graded and seeded with native vegetation.

Table 1. Estimates of berm material re-use and disposal needs.

<b>PROJECT CONSTRUCTION ASSUMPTIONS (Cut/Fill Balance):</b>	<b>Volume (yds<sup>3</sup>)</b>
Cut volume for berm removal	16,410
Fill volume re-used on site for observation deck, southern ditch and interior ponds	8,300
Fill volume for constructed access road	2,300
<b>Total Volume for Disposal</b>	<b>5,810</b>

## Site grading

Water elevation is a major determinant of plant community distribution in wetland systems. Using the surrounding area as a guide, elevations for restoration were set to encourage sedge meadow communities. The Project Team decided to incorporate variable elevations within the project footprint to accommodate fluctuating water levels anticipated with changing climate. A restoration specialist or engineer will be present during all restoration work to ensure that desired elevations are achieved consistent with design plans.

## Post installation monitoring/wetland plant restoration

Berm material removal, site grading and distribution of organic wetland soils are the main construction elements of this project. Following construction, the site will be monitored to determine wetland community response to restoration. Protocols will be developed that will monitor the composition and density of native and invasive plant species. These protocols will be designed so that the local community through school groups can contribute to monitoring of the site over the long term. Initially, monitoring will determine the need for supplemental plantings at the site if needed in the spring of 2020. Monitoring will also identify if invasive species control is needed. Invasives control will occur in 2020 and 2021 through this project.

**Results:**

Acres coastal wetland restored: This project will create an additional 10 acres of sedge meadow coastal wetland habitat. The desired habitat will be achieved by implementation oversight and follow up maintenance. During implementation over the summer of 2019, Wisconsin DNR staff, Stantec and the Town of Port Wing will provide oversight to ensure that grading is within tolerances of desired elevations. Field surveys for 2 summers following implementation will determine if habitat quality targets to maximize native species cover and minimize reed canary grass encroachment have been met.

**Collaboration and Plans:**

The WDNR and the Town of Port Wing are partnering on this project. The proposed project will occur on property owned by the Town of Port Wing. As the landowner, the Town has the final decision-making authority at the property.

The Town of Port Wing was designated in 2016 as a Bird City in the Bird City US program. The Port Wing Area Business Association (PWABA) is developing information on the Port Wing website, for bird watching opportunities. This restoration project will expand opportunities in the Town for bird watching. <http://portwingwi.com/places/port-wing/things-to-do/birding-in-port-wing/>

This project will work with the local community through engaging teachers and students at the Port Wing school in the project. Through field trips and inclass presentations by Project Team members, students and teachers will learn more about wetland ecosystems and prepare content for signage at the site that will describe important habitat features, species that rely on them and the effects of the restoration project. Additional school activities may include establishment of a selfie station, yearbook articles, filming pre, during and post installation footage of the project and propagation of wetland plants for site restoration. Students help to create signage at the site

The LAMP's Biodiversity Conservation Strategy (Lake Superior Binational Program 2015), developed and approved by state, federal, tribal and provincial governments, ranked coastal development as a high threat to biodiversity in embayments of Lake Superior. The Strategy recommends protection and restoration of coastal wetlands as a priority, and the regional plan for this area specifically lists restoration of the wastewater treatment ponds near Port Wing as a priority. <http://www.natureconservancy.ca/assets/documents/on/A-Biodiversity-Conservation-Strategy-for-Lake-Superior.pdf>

The project also helps achieve objectives in Wisconsin's recently completed [Master Plan for this area](#) to "Protect and restore natural community types, especially sedge meadow coastal wetland."

**Outputs/Deliverables:**

This project will create an additional 10 acres of sedge meadow coastal wetland habitat. A final report for the project will be submitted.

**Deliverables & Timeline:**

Task	Milestone/Deliverable	Timeline
Complete restoration design plans	Plans complete and approved by Town board	DONE 6/2017
Conduct pre-restoration monitoring (by coastal wetlands consortium – no funds requested for this work)	Fisheries, macroinvertebrate and water quality monitoring conducted	DONE
Distribute RFB for implementation contractor	Consultant selected and under contract	DONE 4/19
Complete permits for restoration <ul style="list-style-type: none"> <li>- Army Corp of Engineers: 404</li> <li>- WDNR: Wetland fill permit</li> <li>- WDNR: Wetland restoration permit</li> <li>- WDNR: Stormwater permit</li> </ul>	Permits granted	DONE DONE DONE By May 2019
Site restoration <ul style="list-style-type: none"> <li>- Dispose of berm material</li> <li>- Site grading</li> <li>- Distribute in organic topsoil</li> <li>- Final site preparation</li> </ul>	Material removed Appropriate elevations for sedge meadow achieved 6 inches of topsoil throughout project site Parking areas constructed, Seeding exposed soils at observation tower and road.	By Nov 2019
Post restoration monitoring <ul style="list-style-type: none"> <li>- Coastal Wetlands Consortium, no funds requested for this work</li> <li>- Post-construction vegetation maintenance</li> </ul>	Fisheries, macroinvertebrate and water quality monitoring conducted Supplemental planting as needed	By Sept 2020 By Sept 2020 By Sept 2021
Develop content for signage on site	Installed signage	By Sept 2021
Grant reporting and project close-out	Reports completed	By December 31, 2021