



**Maritime Bluff and Shoreline
Restoration Plan**

City of Manitowoc, Wisconsin

Prepared for:

Lakeshore Natural Resource Partnership
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and

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1.0 INTRODUCTION AND PURPOSE

Lakeshore Natural Resource Partnership (LNRP), in cooperation with the City of Manitowoc (the "City"), is proposing ecological restoration and enhancement activities within a portion of the Maritime Drive bluff and shoreline communities at Lakeview and North Lakefront Parks in the City of Manitowoc, Manitowoc County Wisconsin (the "Project"). These activities are focused on removing invasive plant species and establishing and maintaining appropriate native plant communities to the unique natural shoreline and bluff features of the Project area. Stantec Consulting Services Inc. (Stantec) has prepared this Restoration Plan on behalf of LNRP and the City as a resource guide for restoration planning and implementation. This plan includes background information, restoration goals and objectives, and an implementation plan to restore native habitats within the Project area.

2.0 BACKGROUND INFORMATION

General information about the Project site and its historic and existing environmental conditions presented herein is based on preliminary investigations conducted by Stantec staff in June 2021 and January 2022. These investigations included two site visits to perform reconnaissance of existing conditions, as well as research and analysis of publicly available GIS data, historic information, and natural resources records. As such, these findings are limited to the information available at the time of the investigation and should be considered preliminary.

2.1 SITE CONTEXT AND CURRENT LAND USES

Lakeview and North Lakefront Parks are maintained public areas owned and operated by the City of Manitowoc, providing users a variety of amenities. They are bisected from north to south by Maritime Drive, a paved public roadway which separates the shoreline parklands from the bluff. Park areas east of Maritime Drive offer public shoreline access, pavilions, parking areas, historic markers and interpretive elements, and a paved trail which parallels the shore. These areas are widely used for public recreation such as birdwatching, running/walking, picnicking, and sunbathing. The proposed restoration units include approximately 3 acres of steeply sloped bluff lands west of Maritime Drive from its intersection with Chicago Street and North Lake Street north to its intersection with Huron Street (Bluff Unit - see attached Figure 1 in Appendix A) and 0.4 acres of shoreline to the northeast, between Maritime Drive and the Lake Michigan shoreline (Shoreline Unit). The Bluff Unit is bound to the west by North Lake Street along its southern portion, and by residential properties and Madison Elementary School in the northern sector. This narrow strip of land consists of a steep, heavily vegetated bluff which descends from topographic highs of approximately 620 feet above mean sea level (msl) at its western shoulder to approximately 590 feet above msl where its toe meets Maritime Drive. The Bluff Unit is largely undeveloped, with the exception of overhead/underground electric utilities, storm sewer infrastructure, and a retaining wall/sidewalk adjacent to Maritime Drive in the southern portion. The Shoreline Unit is bound to the west by turfgrass and Mariners Trail, and to the east by Lake Michigan. The proposed restoration units (3.4 total acres) are not currently being managed for recreation, wildlife habitat, or other typical public land uses beyond regular mowing of narrow strips of turfgrass along portions of the bluff shoulder and toe and regular mowing along portions of the Lake Michigan shoreline.

2.2 GEOLOGICAL HISTORY AND SOILS

The Project area is situated within a zone of complex surficial geology, owing to its position at the terminus of the most recent advances of the Wisconsin Glaciation. More specifically, the modern-day shoreline in this area was shaped during the final readvance of the glacier roughly 14,600 years ago, which deposited a generally well-sorted sand and gravel known as Valders and Chilton tills over the previously deposited till and outwash plains. The steep bluffs within the Bluff Unit resulted from a series of post-glacial fluctuations in the Lake Michigan water level, during which the bluff and beach terraces were eroded by wave action (Mickelson, 2017).

Natural Resources Conservation Service (NRCS) soil mapping indicates the soils within the Bluff Unit are primarily loamy fine sands and fine sandy loams which represent a mix of glacial till layers. Typically, these till layers are well-stratified along the Lake Michigan bluff slopes, and may vary to include clayey silts, gravel, and larger stone depending upon the dynamic series of erosion processes at any given location. Throughout much of the site, the organic upper soil horizons appear to have been lost to relatively recent oxidation and erosion.

NRCS soils mapped within the Shoreline Unit consist of previously disturbed and/or fill material containing variable soil components consisting of moderately coarse textured soil material with few small areas of medium textured material. Currently, the shoreline is stabilized with a layer of riprap.

2.3 HYDROLOGY AND DRAINAGE

No wetlands, defined channels, or other significant surface water features were observed within the Bluff Unit during the preliminary assessment. The Shoreline Unit is located directly adjacent to Lake Michigan. Furthermore, no wetlands or waterways are recognized within the Project site by Wisconsin's Surface Water Data Viewer (SWDV). Although small portions of the tablelands do drain directly over the bluff shoulder, the majority of storm water is contained within the municipal storm sewer system.

Although no groundwater seeps, springs, or discharge areas were observed during the preliminary site assessment, such features are common along Lake Michigan bluff slopes and ravines. It is typical to see seeps where groundwater runs over clayey substrates which are exposed along the eroded bluff slope. Such seeps often result in localized changes in the plant constituents, and can contribute to soil instability, slumping, and slope failure.

2.4 HISTORIC AND EXISTING VEGETATION PATTERNS

Stantec performed an analysis of historic aerial imagery to determine general vegetation patterns at the Project site over time. Imagery dating back to 1937 indicates that the site has seen a gradual transition from a largely non-wooded landscape to one dominated by a scattered tree canopy and understory of turf lawn, invasive shrubs and small trees. Early aerial imagery indicates that one small grove of canopy trees existed historically – at the site's southern extent, near the terminus at State Street. Outside of the wooded groves, the historic landscape of the Project area appears to have had moderate to heavy cover from herbaceous vegetation, with inclusions of bare ground, sand, and shrubs. All evidence considered; the Bluff Unit is likely to have historically been a very dynamic ecosystem similar to clay seepage bluff. In these systems, pioneering grasses, sedges, and forbs dominate open (often actively eroding) slopes. Clay seepage bluffs can also contain a strong and diverse shrub component, characterized by species such as buffalo-berry (*Shepherdia canadensis*), alders (*Alnus spp.*), red osier dogwood (*Cornus sericea*),

ninebark (*Physocarpus opulifolius*), northern bush-honeysuckle (*Diervilla lonicera*), ground juniper (*Juniperus communis*), and various willows (*Salix* spp.).

The present-day vegetation of the Project area is best characterized as a herbaceous community with a mix of shrubs which have low affinity to any specific native plant community. This condition is characteristic of areas where invasive species pressure is high, and where a variety of disturbances are severe or ongoing. The resultant landscape within the Bluff Unit is a mix of scattered tree canopy dominated by ash (*Fraxinus* spp.), Norway maple (*Acer platanoides*), black walnut (*Juglans nigra*), white poplar (*Populus alba*), honey locust (*Gleditsia triacanthos*), willow (*Salix* spp.), and box elder (*Acer negundo*), and upland shrub-scrub communities dominated by invasive/native shrubs and small trees including box elder, willow, white poplar, exotic bush honeysuckles (*Lonicera* spp.), common buckthorn (*Rhamnus cathartica*), European highbush cranberry (*Viburnum opulus*), common ninebark (*Physocarpus opulifolius*), elderberry (*Sambucus* spp.), red osier dogwood (*Cornus alba*), and American red raspberry (*Rubus idaeus*). Ground plane vegetation ranges from sparse to dense stands of pioneering herbaceous species. Dominants vary according to soil moisture and include crown vetch (*Securigera varia*), Japanese knotweed (*Polygonum cuspidatum*), Canada goldenrod (*Solidago canadensis*), Kentucky bluegrass (*Poa pratensis*), orchard grass (*Dactylis glomerata*), smooth brome (*Bromus inermis*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), Dame's rocket (*Hesperis matronalis*), reed canary grass (*Phalaris arundinacea*), common burdock (*Arctium minus*), common tansy (*Tanacetum vulgare*), wood sedge (*Carex blanda*), various sedges (*Carex* spp.), little bluestem (*Schizachyrium scoparium*), and garlic mustard (*Alliaria petiolata*).

Current vegetation within the Shoreline Unit consists of turf grasses with a sparse to dense stand of Japanese knotweed. The Shoreline Unit vegetation was mowed prior to the field investigation; therefore, plant identification was limited.

3.0 PROJECT GOALS AND OBJECTIVES

The primary objective of the Project is to restore ecological function and value by controlling problematic invasive species and establishing sustainable native plant communities which are representative of historic (pre-settlement) conditions, are easy to manage and adaptable to future climate conditions. This objective includes the following restoration and management goals:

- Reduce tree canopy and understory brush coverage to increase light levels reaching the ground plane – to support establishment of herbaceous communities.
- Remove invasive species from the Project area.
- Revegetate the Project area with native plants, including shrubs, and herbaceous species which are characteristic of clay seepage bluffs and similar remnant bluff and shoreline plant communities.
- Develop and implement short-term and long-term site management programs which provide for ongoing environmental monitoring, invasive species control, site stewardship, and vegetation enhancement.
- Increase biodiversity, specifically herbaceous habitat to support declining population of pollinators.

A secondary objective of the Project is to provide additional opportunities for public access, recreation, education, and outreach. While specific outcomes will be developed in coordination with Project stakeholders, general goals associated with this objective include:

- Improve access to portions of the bluff.

- Provide educational and cultural opportunities through the addition of interpretive signage and public art, and through coordination with local school groups, non-profit organizations and neighborhood associations.
- Foster community involvement through volunteer program development (site stewardship) and hosting of community events which promote the Project objectives.

4.0 SITE ASSESSMENT AND PLANNING

Recommendations provided within this Restoration Plan are based on preliminary assessment of the existing conditions at the Project site. The restoration implementation process should be conducted alongside planning efforts and adapted to respond to additional findings, system responses, and local community input. Site assessment and planning tasks are anticipated to include the following:

- Site Improvement Planning – Project stakeholders should work collaboratively to develop plans for improvements to access routes, site furnishings, signage, and other features as appropriate.
- Community Outreach – Project stakeholders should partner with community leaders, schools, neighborhood associations and local governments to develop plans for public education and outreach. Efforts to promote awareness of ecological issues affecting the site, foster community support, and engage volunteer stewards will work toward the Project goals.

5.0 RESTORATION IMPLEMENTATION PLAN

Restoration implementation will involve the removal of selected trees and shrubs, invasive plant control through targeted herbicide applications, installation of native seed and plant material, and monitoring and management to ensure continued success. The plan will rely on volunteer support and professional restoration services, pending funding availability.

5.1 PROPOSED MANAGEMENT UNITS

The Project is proposed to be implemented based on geographic management unit divisions. For this purpose, the Project area has been divided into two proposed management units (see Figure 1). The Bluff Unit includes approximately 3 acres of east facing bluff aspects which are currently dominated by turf lawn, weedy herbaceous vegetation and/or invasive shrub thickets. The Shoreline Unit includes approximately 0.4 acres of open ground (lacking a significant tree canopy) on the shoreline of Lake Michigan with a mix of weedy herbaceous vegetation.

5.2 SELECTIVE TREE AND SHRUB REMOVAL

The primary focus of initial restoration efforts will be removing non-native trees and shrubs, as well as thinning selected native trees from the canopy. While some native trees should remain, it is recommended the majority of woody material present within the Bluff Unit be removed. Based on the preliminary plant inventory and observed woody species in the management unit, targeted species for removal should consist of box elder, exotic bush-honeysuckle, European highbush cranberry, buckthorn and white poplar.

Tree and shrub removal will be completed through a combination of hand cutting (chainsaws and brush saws) and mechanical removal using forestry equipment. Based on the site's steep topography and proximity to public roadways, it is recommended the majority of the tree removal be completed by hand. Target trees and shrubs will be cut within three inches of the ground surface. Stumps and root structures shall be left intact and will be treated with any appropriate herbicide within two hours of cutting to prevent

re-sprouting. Woody debris will be disposed of on-site via brush pile burning or will be chipped and disposed of in an off-site location. If desired, larger logs may be stockpiled for use or sale by the City or other project stakeholders as firewood or saleable timber.

It is anticipated that tree and shrub removal will be performed by a combination of resources – potentially exploiting the City’s capabilities for large tree removal, pruning, and traffic control while utilizing a professional restoration contractor for ecological oversight and removal of invasive brush. While final responsibilities are yet to be determined, efficient and cost-effective execution of this task will require a coordinated approach.

5.3 SITE PREPARATION

Following the initial removal of undesirable trees and shrubs, invasive and exotic species will be treated throughout the Project area in preparation for revegetation with native plants. Treatment methods will include application of both non-selective and selective herbicides a minimum of three times during the first growing season following woody clearing. Herbicide applications will target all exotic and invasive species, that will prohibit establishment of desirable native species. Within areas of the site which contain consistent native groundcover or more conservative native species, spot spraying or wicking methodologies may be utilized to protect native plants from damage. In those areas dominated by invasive species, herbicide treatments are likely to be made via broadcast application, and adjacent natives may be sacrificed in the process. Target species will include all non-native species encountered and will focus particularly on persistent perennial and biennial species such as crown vetch, common tansy, garlic mustard, Japanese knotweed, reed canary grass, Dame’s rocket and various woody saplings. Aggressive native species, particularly Canada goldenrod, will also be targeted for reduction or removal. Based on the existing dominant coverage by exotic, invasive, and aggressive species, it is anticipated that the majority of existing vegetation in the herbaceous strata will be removed in order to prepare the Project area for revegetation with native plants.

5.4 NATIVE SEEDING

Following initial removal of invasive species for site preparation, the entirety of the Project area will be seeded with a mix of native species. Recommended species for seeding are included in Appendix B. These include grasses, sedges, rushes, and forbs which are characteristic of lakeshore bluff and shoreline plant communities, clay seepage bluffs, and sedge meadow communities of the region. The seed mix will also include pioneering native species and annual cover crops which are adapted for early establishment following disturbance, and which are capable of providing short-term soil stabilization.

Native seed will be sown via hand-broadcast. The seed bed may be prepared by mowing, burning, raking, or other means of removing thatch and excessive organic debris prior to seed distribution. In order to limit the potential for erosion, care should be taken to avoid excessive soil disturbance during the preparation process – thatch should be removed only as needed to ensure sufficient seed-soil contact. It is anticipated that seeding will occur during the early dormant season following site preparation (October-November) to allow for establishment of annual cover crops prior to hard frost.

5.5 TEMPORARY EROSION CONTROL

Immediately following the installation of native seed, it is recommended all seeded areas be mulched to provide for temporary erosion control, weed suppression, and soil moisture retention. Mulch shall be a

hydraulically applied erosion control product (hydromulch) designed for application on slopes up to 70% (1.5H:1V). Hydromulch may consist of any combination of organic fibers (excelsior, recycled paper, cotton), synthetic fibers, and tackifiers, provided that the product meets the trade standards for a fiber reinforced matrix (FRM) or bonded fiber matrix (BFM) designed for steep slope applications. Hydromulch shall be applied strictly according to the manufacturer's directions and allowed proper curing time following installation. Native seed shall not be applied in the hydromulch slurry, rather it shall be hand-broadcast prior to mulching.

In areas of concentrated surface water flow, on excessively steep exposures, erosion control matting may be required for mulching native seed. Requirements for erosion control matting will be determined according to additional site assessment following tree and shrub removal. It is anticipated that a small percentage of the Project area will require erosion control matting. Materials shall conform to the Wisconsin Department of Transportation Product Acceptability List (PAL). Installation shall be performed according to the manufacturer's directions.

5.6 NATIVE TREE AND SHRUB INSTALLATION

Following the initial establishment of native seed and annual cover crops, the restored native plant community will be enhanced through the installation of native shrubs and trees on selected portions of the Bluff Unit only. The intent of tree and shrub planting is to approximate the canopy structure and open shrub-scrub character of the historic bluff plant community. As such, native trees will be installed in groves or small groupings associated with shadier aspects, seeps, and minor depressions. Shrubs will be installed in groupings scattered throughout the Project area and will be located to provide a heterogeneous mix of woody structure without over-shading herbaceous groundcover. Planting of native trees and shrubs will also serve to replace important wildlife habitat provided by the canopy and understory, particularly for migratory birds which utilize the bluff and shoreline for seasonal foraging, perching, and nesting habitat. Recommended species and quantities for tree and shrub planting are provided in Appendix B. Final tree and shrub planting locations will be determined following additional site assessment and will be marked in the field prior to installation.

5.6.1 Post-Planting Maintenance

Once installed, native trees and shrubs will require some maintenance to become established. Typically, post-planting maintenance involves watering, pruning, mulching, and protecting installed plant materials from herbivory. Depending upon the final timing of installation, it is anticipated that up to six watering events will be required for all trees and shrubs. Watering will be completed using conventional methods (water tanks, pumps, and hoses) to apply water directly to each plant or to a watering bag. In order to decrease the potential for soil erosion, methods such as remote watering (spraying), flooding, and sprinkler irrigation will be avoided.

Pruning, mulching, and herbivory protection will be performed on an as-needed basis to respond to site conditions. Pruning should be performed only to remove dead or diseased wood, or to benefit overall plant survivability. Mulching is not required but may be beneficial for retaining soil moisture and reducing weed competition during the establishment period. Herbivory protection may be required to protect woody plants from browsing by deer, rabbits, and other small mammals. Depending upon the herbivory pressure and site conditions, plants may be protected by exclusion fencing or deterrent spraying.

5.7 SITE STEWARDSHIP

Following preliminary restoration activities, the Project site will be maintained to promote the successful establishment of native plant communities. Because weed competition and other disturbance vectors are most impactful during the early stages of native plant development, maintenance needs are typically highest during the establishment period. This initial establishment period typically lasts up to three years but should continue until the desired cover of native vegetation has been achieved. Once target plant communities have been substantially established, a long-term maintenance plan will be adopted to provide for periodic monitoring and management. Cost estimates for this task assume three years of site stewardship.

5.7.1 Adaptive Management

Stewardship of the Project site will follow an adaptive management approach, whereby maintenance, repair, and enhancement activities are responsive to changing site conditions over time. The Project site is a relatively dynamic ecosystem and is likely to respond variably to restoration inputs. Potential corrective measures may include erosion repair and slope stabilization, overseeding, live plant installation, and/or changes to the monitoring and maintenance requirements.

5.7.2 Invasive Species Management

The primary focus of site stewardship activities will be the ongoing control of invasive species within the Project area. Invasive species control will be performed on an adaptive basis according to site conditions and system responses encountered at various portions of the Project area over time. As such, target species, treatment timing, and treatment methods will be determined by periodic monitoring. Typically, these methods include hand pulling of shallow-rooted weeds where they occur as scattered individuals; spot herbicide treatment of biennial and perennial weeds via low-pressure spray, wicking, or stump treatment; and herbicide treatment of heavy infestation of persistent weeds via pistol-spraying or broadcast application.

Based on preliminary observations of the site and existing vegetation patterns, Table 1 provides management guidance for invasive species which are present or have high potential to occur within the Project area.

Table 1. Proposed Treatment Methods for Target Invasive Species

Common/Species Name	Treatment Method	Timing
Woody Species		
Various (includes re-sprouts, saplings, and woody vines)	Cut-stump treatment	Any time (dormant season preferred)
	Spot herbicide application (seedlings, small saplings, and resprouts)	Plant actively growing and fully leafed out
Grasses		
Smooth brome (<i>Bromus inermis</i>), Kentucky Bluegrass (<i>Poa pratensis</i>)	Spot herbicide application	Plant actively growing and fully leafed out.

Common/Species Name	Treatment Method	Timing
Reed canary grass (<i>Phalaris arundinacea</i>)	Foliar herbicide application (spot or broadcast depending on size of population)	Spring (prior to seed production) or fall (can mow first and allow for appropriate regrowth prior to treating).
Forbs		
Crown vetch (<i>Securigera varia</i>),	Foliar herbicide application (spot or broadcast depending on size of population)	Early spring when plant is actively growing.
Canada thistle (<i>Cirsium arvense</i>), bull thistle (<i>Cirsium vulgare</i>)	Spot herbicide application	Flower bud to early flowering stage, or to rosettes in the fall as long as leaves are green.
Dame's rocket (<i>Hesperis matronalis</i>), Garlic mustard (<i>Alliaria petiolata</i>)	Spot herbicide application	Treat rosettes in spring or fall, or treat flowering plants.
	Hand pull	Bolting or flowering plants – flowering plants should be bagged and removed from site (recommended only for small populations).
Japanese knotweed (<i>Polygonum cuspidatum</i>)	Mow / Spot herbicide application	Mow or cut the plant two times during the growing season (in spring and again when plant flowers); apply herbicide to foliar regrowth in the fall (when plant reaches 3 feet high).
	Alternative method: cut- stump	When plant is actively growing.
Common Tansy (<i>Tanacetum vulgare</i>)	Spot herbicide application	Spring, when fully leafed out and actively growing to early bud stage.
Sweet clovers (<i>Melilotus</i> spp.), Queen Anne's Lace (<i>Daucus carota</i>)	Mowing, spot herbicide application	Mow during early flowering as soon as basal leaves senesce, or foliar spray basal rosettes in spring/early fall.

5.8 MONITORING AND REPORTING

The monitoring period will commence after initial installation of native plant materials is complete. The purpose of monitoring is to evaluate the status of the restoration and native plant establishment, and to determine the need for maintenance or remedial action. The restored plant communities will be monitored throughout the establishment period, until sufficient native cover is achieved. Vegetation will be monitored annually during the growing season using a pedestrian survey to evaluate developing native plant cover and distribution of invasive species. Monitoring will also provide general observations related to slope stability, soil erosion, or changing hydrologic impairments.

As requested, the results of site monitoring shall be summarized in an annual report to the Project stakeholders which provides a narrative description of observed site conditions, vegetation monitoring data in tabular form, a record of management actions performed, and recommendations for future site stewardship.

5.9 IMPLEMENTATION SCHEDULE

Initial restoration is planned for years one and two with maintenance planned for two years following restoration completion. A proposed implementation schedule is provided in Table 2.

Table 2. Proposed Implementation Schedule

Restoration Task	Proposed Timeline			
	Year 1	Year 2	Year 3	Year 4
Bluff Management Unit				
Tree and Shrub Removal	■			
Hydro / Slope Stabilization		■ ■		
Site Preparation	■ ■	■		
Native Seeding		■		
Native Plant Installation		■	■	
Site Stewardship			■ ■	■ ■
Shoreline Management Unit				
Site Preparation	■ ■			
Native Seeding		■ ■		
Native Plant Installation		■	■	
Site Stewardship			■ ■	■ ■

6.0 COST ESTIMATE

A preliminary estimate of probable costs associated with the proposed planning and restoration implementation tasks is included in Table 3. Implementation of the Project will likely require budget flexibility to respond to final funding availability, volunteer contribution, and support from the City or other Project stakeholders. Contributions from the City and volunteer groups have the potential to greatly decrease the overall restoration costs associated with the Project. Depending upon the capabilities and availability of these resources, there are a number of work tasks which may be suitable for them to assist with or lead. These are indicated in Table 3. Cost estimates provided herein are provided for Project planning purposes only.

Cost estimates do not include costs associated with the implementation of cultural / recreational site improvements or public outreach tasks which may be pursued as part of the Project. The scope of such tasks is yet to be determined. However, cost allowances for professional consultation are included in the Site Assessment and Planning estimate to assist Project stakeholders in coordination and conceptual plan development.

Table 3. Estimated Project Costs

Restoration Task	Potential City / Volunteer Task	Preliminary Cost Estimate
Bluff/Shoreline Management – 3.4 acres		
Tree and Shrub Removal	✓	\$10,000
Hydro / Slope Stabilization		\$10,200
Site Preparation		\$16,000
Native Seeding		\$9,000
Native Plant Installation	✓	\$17,000
Post Planting Maintenance (Years 3 and 4)	✓	\$20,000
Site Stewardship (3 Years)	✓	\$37,400
Monitoring and Reporting (3 Years)		\$11,000
	Total	\$130,600

7.0 REFERENCES

Mickelson, D.M. and Socha, B.J., 2017, Quaternary geology of Calumet and Manitowoc County, Wisconsin: Wisconsin Geological and Natural History Survey Bulletin 108, 60 p., 2 pls.

Wisconsin Department of Natural Resources (WDNR), 2017, The ecological landscapes of Wisconsin: an assessment of ecological resources and a guide to planning sustainable management, PUB-SS-1131 2015, Madison.

RESTORATION PLAN

Maritime Bluff and Shoreline Restoration Plan
Appendix A Figures

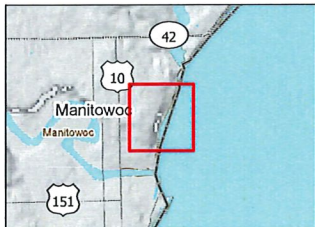
Appendix A FIGURES

RESTORATION PLAN

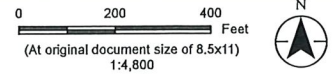
Maritime Bluff and Shoreline Restoration Plan
Appendix B Proposed Seeding and Planting Lists

Appendix B PROPOSED SEEDING AND PLANTING LISTS

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- Legend**
- Bluff Restoration Boundary (3.0 ac)
 - Shoreline Restoration Boundary (0.4 ac)
 - Parcel Boundary



Project Location T19N, R24E, S20 C. of Manitowoc, Manitowoc Co., WI
 Prepared by AJS on 2022-02-18
 TR by XXX on 2022-XX-XX
 IR by XXX on 2022-XX-XX

Client/Project Lakeshore Natural Resource Partnership
 Maritime Bluff and Shoreline Restoration Plan
 193708810

Figure No. 1
DRAFT

Title
Project Location

- Notes**
1. Coordinate System: NAD 1983 StatePlane Wisconsin South FIPS 4803 Feet
 2. Data Sources: SCO, WsDOT, WDNR
 3. Orthophotography: NAIP 2018

