

**LITTLE MANITOWOC RIVER CONSERVANCY AND COASTAL WETLAND
RESTORATION**

PROJECT WORKPLAN / QUALITY ASSURANCE PROJECT PLAN (QAPP)

for

**U.S. EPA's Great Lakes National Program Office and the
National Fish and Wildlife Foundation**

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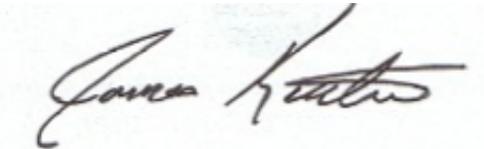
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Quality Assurance Project Plan Identification and Approval Form

Quality Assurance Project Plan – 0501.14.043983: Little Manitowoc Coastal Wetland Restoration (WI)

Grant Number: 43983

Approval:



James Kettler

Date: 2/6/15

Project Manager, Lakeshore Natural Resource Partnership



2/17/2015

Caroline Oswald

Date

Program Manager, National Fish and Wildlife Foundation

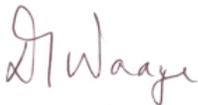


2/17/2015

Todd Hogrefe

Date

Quality Manager, National Fish and Wildlife Foundation



2/17/2015

Donn Waage

Date

Central Partnership Office Director, National Fish and Wildlife Foundation

Table of Contents

Project Abstract	2
Distribution List.....	3
Organization of Project Participants.....	3
Quality System Documentation.....	4
Problem Statement/Definition/Background	5
Proposed Work	5
Project Implementation and Outcomes	6
Data Quality Objectives	6
Special Training Requirements or Certifications.....	7
Documentation and Records	8
Design/Methods for Data Use or Collection.....	8
Analytical Methods Requirements	8
Quality Control Requirements/Data Management	8
Instrument Testing, Maintenance, and Calibration; Inspection of Supplies	9
Use of existing Environmental Data.....	10
Management Assessment and Oversight	10
Data Review, Validation, Verification, and Reconciliation with Data Quality Objectives.....	10
References and Appendices.....	10

Project Abstract

On June 12, 2008 the City of Manitowoc experienced an extreme storm event that caused the Little Manitowoc River to rise 4.5 feet in less than 24 hours. Following this flood, the Little Manitowoc River coastal wetland drained to become an exposed mud flat. The mud flat is now inhabited by cattails, reed canary grass, *Phragmites*, and Japanese knotweed. Initial studies have been completed to identify and treat *Phragmites* as well as complete a topographic survey and hydraulic analysis of the watershed to assist with development of a restoration plan. The Little Manitowoc River Partnership would like to develop a complete habitat assessment of the wetlands that quantifies existing impairments of the wetland, establish benchmark water quality and macroinvertebrate analysis, complete a public participation plan allowing stakeholders to buy into a restoration plan, prepare a preliminary restoration plan, remove accumulated sediment, modify existing monotypic wetland surface to provide a variety of inundation depths, control invasive plant species, seed and plant native plant species, re-contour the stream to reflect pre-flood conditions, and place riffle structures in the stream to facilitate seasonal fish migration.

A3. Distribution List

James Kettler, Project Coordinator and LNRP Executive Director

Dan Koski, Project Administrator, City of Manitowoc

Jon Gumtow, Project Scientist, Stantec

Richard Hein, Faculty, UW-Manitowoc

Peter Ziegler, Project Consultant, Wisconsin Waterfowl Association

Jennifer Powell, Coordinator, Lakeshore Invasive Species Management Area

Todd Hogrefe, Quality Manager, National Fish and Wildlife Foundation

Caroline Oswald, Program Manager, National Fish and Wildlife Foundation

Donn Waage, Director, NFWF Central Partnership Office

A4. Organization of Project Participants

Project Management: Will provide overall project management acting as liaison to the City of Manitowoc and all stakeholders

- James Kettler, Executive Director, Lakeshore Natural Resource Partnership
- Jon Gumtow, PWS, PSS, Wetland Scientist, Stantec
- Rich Klein, P.E., Hydrologic Engineer, Stantec

Data Quality Control: will ensure all environmental data will be of adequate quality for the project

- Rick Hein, UW-Manitowoc
- Rebecca Abler, UW-Manitowoc
- Jon Gumtow, Stantec

Project Oversight: Will provide on the ground oversight

- Rich Klein, Stantec
- Dan Koski, Director, Public Infrastructure, City of Manitowoc
- Chad Scheinoha, Public Infrastructure, Parks, City of Manitowoc
- Matt Smits, Engineering, Stormwater Technician, City of Manitowoc
- Greg Minikel, Engineering, Division Manager, City of Manitowoc

Stakeholder Advisory Committee: Will provide input into all project activities and outreach

- Gary Van Vreede, US Fish and Wildlife
- Natanya Hayden, WI DNR
- Jeff Pritzl, WI DNR
- John Masterson, WI DNR

- Peter Ziegler, Wisconsin Waterfowl Association
- Wendy Lutzke, Friends of the Manitowoc River Watershed
- Amy Fettes, Friends of the Manitowoc River Watershed and the Lakeshore Natural Resource Partnership
- Tom Ward, AIS Coordinator, Manitowoc County
- Jennifer Powell, Lakeshore Invasive Species Management Area (LISMA)

Water Quality Monitoring: Will provide oversight and quality control on all sampling and analysis of water quality monitoring

- Rick Hein, UW-Manitowoc
- Rebecca Abler, UW-Manitowoc

Land Surveys and Property Titles: Will provide a detailed land survey overlaid with parcel map

- SMI, Civil and Structural Engineers, Manitowoc

Invasive Species Identification and Control: Will provide input and oversight over a comprehensive invasive species management plan for the project

- Tom Ward, Manitowoc County Invasive Species Coordinator
- Jennifer Powell, Lakeshore Invasive Species Management Area (LISMA)
- Melissa Curran, Stantec

Outreach: Will coordinate all outreach to stakeholders and the media

- Sherrill Anderson, Regional Outreach Coordinator, LNRP

Community Engagement and Additional Fundraising: Will provide staff resources for community engagement, fundraising events, and grant writing

- James Kettler, Executive Director, LNRP
- Jenn Hansmann, Community Relations Coordinator, LNRP

A4. Quality System Documentation

The Lakeshore Natural Resource Partnership has a set of bylaws and an annual set of action/development plans that function as our quality assurance system. Our bylaws define our policies, principles, goals and objectives and ensure that our work meets the organization's quality standards. The action and development plans provide the framework for planning and implementing work performed by the organization and ensure that our projects and initiatives support our mission. These plans are developed annually as part of our strategic planning in collaboration with project partners and Board member representatives.

Appendices 1-2: LNRP Bylaws and 3-Year Strategic Plan

A5. Problem Statement/Definition/Background

On June 12, 2008, the City of Manitowoc, WI experienced an extreme storm event – the same storm that caused the Lake Delton Dam to fail in the Wisconsin Dells. The Little Manitowoc River (LMR) rose approximately 4.5 feet in less than 24 hours, reaching record levels. The LMR flows into Lake Michigan.

Following this flood, the Little Manitowoc River coastal wetland, from Lake Michigan to Reed Avenue, drained to become an exposed mud flat. This was the catalyst that brought people together to take action to protect this unique ecosystem. Two years later, the mud flat is filled in with cattails, reed canary grass, *Phragmites*, and Japanese knotweed. Extensive cattail and invasive species populations within the project area has reduced the habitat quality providing limited breeding and migratory bird stopover habitat. The lack of open water also limits the use of the estuary by fish species including yellow perch and northern pike.

The Great Lakes coastal wetlands are transition zones which provide many critical habitats for fish, birds, and plant life. Coastal wetlands also help maintain Lake Michigan's water quality and aid in preventing erosion while offering recreational, education and tourism opportunities.

This is a community based project that is being lead by local citizens and the City of Manitowoc with a goal of improving coastal fish and wildlife habitat, aesthetics, and outdoor recreation/educational opportunities. A series of stakeholder meetings with representative from local NGOs, municipal, state, and federal agencies it has resulted in a consensus based improvement plan. Decisions regarding benefits to the coastal resources have been discussed and supported by the Wisconsin Department of Natural Resources, U.S. Fish and Wildlife Service, and U. S. Army Corps of Engineers.

A6. Proposed Work

The 38.5 acre wetland and river complex is located adjacent to Lake Michigan at the mouth of the Little Manitowoc River in the City of Manitowoc, WI. Gaining both agency and public buy-in is paramount. The City Master Plan that has been developed with the help of several members of the public, WDNR, Army Corps of Engineers, USFWS, Wisconsin Waterfowl Association and private consulting firms indicates that this restoration project has the potential to be a marked improvement over the existing condition. However, more information is needed by stakeholders prior to permitting and final approval.

Specifically, the Little Manitowoc Coastal Wetland Restoration will include the following elements:

- A complete habitat assessment of the wetlands that quantifies the existing impairments of the wetlands (namely sedimentation and the presence of invasive species).
- Benchmark water quality and macro-invertebrate analysis.
- Completion of a public participation process with the various stakeholders to gain buy-in to a restoration plan approach.
- A preliminary design that refines and details the current Master Plan for the area.
- Removal of accumulated sediment (12-15 in. depth) to expose the native muck and peat wetland soils.

- Modification of the existing monotypic wetland surface to provide a variety of inundation depths and frequencies that include pockets of open water, emergent wetland areas, and sedge meadows.
- Control of invasive species, which include *Phragmites australis* (common reed grass), *Typha* spp. (cattails), *Phalaris arundinacea* (reed canary grass) and *Polygonum cuspidatum* (Japanese knotweed). These are all NR 40 restricted species.
- Seeding and planting of native species within and surrounding the wetland.
- Re-meandering of the stream to reflect its original alignment prior to the stream being straightened in the mid 1930's.
- Placement of riffle structures in the existing stream that will also facilitate fish migration upstream that are currently inhibited due to the extremely shallow depths in the river between Waldo Ave (STH 42) and Reed Avenue.
- Install instream habitat structures to improve fish passage during low flow conditions.
- Relocate an existing 60 inch stormwater outfall to eliminate streambank scouring.
- Incorporate stormwater BMPs to improve water quality.
- Establishment of a network of trails to be used for recreation and education. In addition to these trails, observation decks, fishing and water access points, benches and picnic areas will be created.

Project Implementation and Outcomes

The anticipated outcomes of the project are to:

- Re-establish the hydrologic connection between the wetland and the Little Manistowoc River, benefiting over 1500 feet of stream channel and 38 acres of coastal wetland;
- Improve 38 acres of shorebird habitat: migratory stopovers, staging and breeding grounds for birds. In all, an average of 215 different species of birds are observed here annually. The diversity of birds has decreased since the 2008 flood event. We want to make this a birding and wildlife destination!
- Restore fish passage to over one mile of stream channel that currently has large mapped wetlands adjacent to the channel;
- Reduce invasive species on 30+ acres, in particular *Phragmites australis* (common reed grass), *Typha* spp. (cattails), *Phalaris arundinacea* (reed canary grass), and *Polygonum cuspidatum* (Japanese knotweed). These are all WDNR (NR 40) restricted species.
- Provide recreational and educational opportunities such as wildlife observations, integration with the Lincoln Park Zoo programs, in addition to existing regional trail systems like the Ice Age Trail and Mariners Trail along Lake Michigan.
- Integrate the restoration efforts into the conceptual plans for a 240-acre Little Manistowoc River Conservancy. **Special Note:** This 38+ acre coastal wetland project is within the Little Manistowoc River Conservancy that is being developed and will stretch from the shore of Lake Michigan to 1.5 miles inland, connecting three city parks. Running along 2.5 miles of the meandering Little Manistowoc River, there will be a total conservation area of 230+ acres and potentially more with easements (118 acres are already conservancy). So far, 15 unique habitat types within the conservancy have been identified. The coastal wetland restoration is a key part to making this

an ecologically healthy Conservancy and will promote the economic vitality of coastal Manitowoc.

A7. Data Quality Objectives

The primary data to be collected will be sedimentation measures, invasive species presence and abundance, water quality analysis, and macro-invertebrate analysis.

Stantec will allocate necessary resources for topographical and hydrology analysis based on standard procedures. Topographic surveys will be referenced to the local Manitowoc County coordinate system. Hydrologic and floodplain analysis will be completed using standardized HEC-RAS models and protocol.

Faculty from the Biological Division at UW-Manitowoc will provide the sampling protocols and lab quality assurances. The same faculty will provide oversight to paid interns and sections from three UW courses: General Biology, Human Environmental Biology, and General Zoology. Further guidance will come from Water Action Volunteer (WAV) protocols established by the Wisconsin Department of Natural Resources.

Appendices 3-10: Water Quality Protocols

Special Training Requirements or Certifications

The project team will be led by the staff of the Lakeshore Natural Resource Partnership including: Executive Director, Jim Kettler; Regional Outreach Coordinator, Sherrill Anderson; and Community Relations Coordinator, Jenn Hansmann.

The City of Manitowoc fully endorses the project and will provide in-kind contributions for administrative support and additional field activity support during the restoration and reconstructive phase.

Additional inputs have been received from the Wisconsin Waterfowl Association representative Peter Ziegler, Jennifer Powell coordinator of the Lakeshore Invasive Species Management Area, and from the Manitowoc County Lakes Association's Aquatic Invasive Species Coordinator Tom Ward.

Representative staff of Stantec, an environmental consulting and engineering firm, have already been engaged to complete a full habitat assessment and will be contracted for additional analysis necessary for completing the engineering design. The staff includes: Jon Gumtow, Senior Wetland Ecologist; John Wiater, Aquatic Biologist; Melissa Curran, Botanist; Rich Klein, Hydrologic Engineer, and Brian Bub, Avian Ecologist.

Professors Richard Hein and Rebecca Abler from UW Manitowoc will provide oversight and quality control for student interns who will be employed to gather benchmark water quality data and biological indicators. Interns have already been engaged for preliminary work in summer 2013 and 2014, and will continue a third and fourth season of monitoring in 2015 and 2016.

Documentation and Records

All reports will be held in the City of Manitowoc archives. Reports will include:

- Summary reports from LNRP
- Formal land survey
- Water quality data analysis reports from UW-Manitowoc interns and classes
- Habitat assessments
- Topographical and hydrology assessments
- WDNR and USACE permits
- Any other project documentation.

B1, B2, B3. Design/Methods for Data Use or Collection

All water quality methods and biotic indices were developed in collaboration with the faculty at UW-Manitowoc and reflect the Water Action Volunteer protocols approved by the Wisconsin Department of Natural Resources. Attached are the lab methods from the UW-Manitowoc Division of Biological Sciences and the WAV protocols (see Appendices 3-10).

Vegetation mapping was completed to identify plant communities and map invasive species (*Phragmites*, reed canary grass, buckthorn, honeysuckle, and Japanese knotweed). Eight plant communities were identified. Follow-up chemical treatment of *Phragmites* has been conducted to control the spread of this problematic aquatic species.

A 1-foot contour interval topographic survey was completed to assist with the conceptual design and locate contributing storm sewer outlets, road culverts and property boundaries. Cross-sections were also completed in the existing stream channel and analysis of the channel to assess channel stability.

Floodplain and hydraulic analysis was completed to analyze flood profiles and culvert water velocities for different design storms. This data will be used in the concept design to evaluate flow velocities to support aquatic organism passage.

B4. Analytical Methods Requirements

Water samples will be collected according to applicable standard methods and analyzed at the UW-Manitowoc laboratory utilizing chain of custody procedures, blanks, duplicate samples, and spikes. The laboratory maintains standard methods and quality control procedures all of which are of a precision sufficient for research grade work.

Analysis of water quality data will be completed in collaboration with the faculty at UW-Manitowoc and staff of LNRP.

Quality control and tracking will be supervised by UW Manitowoc faculty. All sample chain of custody will be recorded on data sheets (in field) and in lab notebooks which remain in the lab at UW-Manitowoc. Student workers will be trained in all protocols by UW-Manitowoc faculty prior to the start

of sampling, and will be assessed before allowed to begin collecting data. Field meters, including oxygen probes, pH meters, etc., will be calibrated prior to each sampling trip according to the manufacturer's instructions. Spectrophotometers used in determining phosphate concentrations will be calibrated using a standard curve protocol and checked regularly. Incubation of any biological cultures (e.g. *E. coli* Colilert samples) will be in a standard incubator equipped with a thermometer and monitored throughout the sampling season.

B5, B10. Quality Control Requirements/Data Management

All manually collected field data are written in a field book and immediately compared to previous reading to identify measurements outside of normal range. Data are uploaded to spreadsheets in the lab after each sample period, overlap compared to previous datasets, and compared to manual readings to identify errors. Data are accepted after comparison to manual readings and checked for continuity and outliers. Data are stored in spreadsheet form and backed up on computers owned by LNRP.

B, B7, B8. Instrument Testing, Maintenance, and Calibration; Inspection of Supplies

UW-Manitowoc maintains their lab equipment and field sampling devices on a regular and standardized basis. All lab and field supplies are purchased from national suppliers.

Temperature and Dissolved Oxygen – collected with YSI 550 handheld probe. The probe is air calibrated prior to each use and membranes replaced as necessary.

E. coli – sampled and quantified using EPA standard methodology (Idexx most probable number technique via colilert reagent). Student interns are trained and proficiency is tested at the beginning of each sampling season.

Total phosphorus and total dissolved phosphorus – collected and analyzed in dedicated, acid-washed glassware using the EPA standard ammonium molybdate/stannous chloride methodology and analyzed using a Spectronic 20D+ spectrophotometer. The spectrophotometer is calibrated prior to each use and a standard curve is run at the beginning of each season and anytime new reagents are used.

Ammonia nitrogen – measured using Hach Color Disc Test Kit.

Stream velocity – measured with a Global Water FP111 digital water velocity meter.

pH and conductivity – measured with a Fisher Accumet AP 85 pH/Conductivity meter. Meter is calibrated before each use.

Turbidity – measured with LaMotte 2020we meter. Meter is calibrated before each use.

B9. Use of existing Environmental Data

No existing data has been used other than benchmark water quality data produced using the same protocols and analytical standards proposed here and collected/analyzed by the faculty and interns at UW-Manitowoc.

C1, C2. Management Assessment and Oversight

The Executive Director of the Lakeshore Natural Resource Partnership, James Kettler, is managing the project. Two UW-Manitowoc Faculty, Rick Hein and Rebecca Abler, provide additional oversight on the field and lab methods. Stantec and City of Manitowoc staff will provide input into the overall project management.

Data Review, Validation, Verification, and Reconciliation with Data Quality Objectives

All data will be accepted upon review by the data management team consisting of LNRP, Stantec, City of Manitowoc, and Division of Biological Sciences at UW-Manitowoc.

References and Appendices

Attached are the Wisconsin Water Action Volunteer (WAV) protocols. All other methods are described in this report.

Appendices 1-2

LNRP Bylaws

LNRP 3-Year Strategic Plan

Appendices 3-10

1. Fact Series – Stream Monitor
2. Fact Series – Dissolved Oxygen
3. Fact Series – Habitat Assessment
4. Fact Series – Stream Flow
5. Fact Series – Bugs
6. Fact Series – Temperature
7. Fact Series – Turbidity
8. Using Biological Indicators