QUALITY ASSURANCE PROJECT PLAN

Schuchardt Farms Conservation Plan

Prepared for:

City of Sheboygan
828 Center Avenue, Suite 205
Sheboygan, WI 53081

2011-1003.01

Prepared by:

GRAEF
One Honey Creek Corporate Center
125 South 84th Street, Suite 401
Milwaukee, WI 53214-1470
Telephone: (414) 259-1500
FAX: (414) 259-0037

August 2011

SECTION A – PROJECT MANAGEMENT

A.1 Title of Plan and Approval

Quality Assurance Project Plan
Schuchardt Farms Conservation Plan

Prepared by:
GRAEF

Carolyn Esswein, GRAEF, Project Manager — Date: 9.19.2011

Brian Schneider, GRAEF Quality Assurance Coordinator — Date: 9-16-11

Tina Myers, GRAEF, Conservation Plan Team Leader — Date: 9-20-11

Laura Giese, GRAEF, QAPP Preparer — Date: 9-16-11

Stacy Hron, Wisconsin Department of Natural Resources, Project Manager — Date: 9-14-11

Donalea Dinsmore, Wisconsin Department of Natural Resources, Great Lakes QA Manager — Date: 8/23/11

Approval to begin field work granted 7/29/11
QAPP approval contingent on minor revision to state quality objectives for Sonde. DD.

Table of Contents

1.0 - PROJECT MANAGEMENT 1
1.2 Project/Task Organization 1
1.3 Problem Definition/Background 2
1.4 Project/Task Description 3
1.5 Quality Objectives & Criteria 5
1.6 Special Training/Certification 7
1.7 Documents and Records 8
2.0 DATA GENERATION & AQCUISITION 9
2.1 Sampling Process Design (Experimental Design) 9
2.2 Sampling Methods 12
2.3 Sampling Handling & Custody 13
2.4 Analytical Methods 13
2.5 Quality Control 13
2.6 Instrument/Equipment Testing, Inspection, Maintenance and Calibration 14
2.7 Inspection/Acceptance of Supplies & Consumables 14
2.8 Data Acquisition Requirements for Non-Direct Measurements 14
2.9 Data Management 14
3.0 ASSESSMENT AND OVERSIGHT 15
3.1 Assessments and Response Actions 15
3.2 Reports to Management 15
4.0 DATA VALIDATION AND USABILITY 16
4.1 Data Review, Verification, and Validation 16
4.2 Verification and Validation Methods 16
4.3 Reconciliation with User Requirements 16

List of Appendices

APPENDIX A	Procedures for continuous water quality monitoring (Sondes and YSI)
APPENDIX B	Procedures for stage and discharge measurements
APPENDIX C	Wisconsin Floristic Quality Assessment
APPENDIX D	NHI Rare Plant Field Report Form – 1700-049
APPENDIX E	Invasive Plant Report Form
APPENDIX F	Forest Stand Summary Form 2400-26
APPENDIX G	WDNR RAM Evaluating Wetland Functional Values Form
APPENDIX H	NHI Rare Animal Field Report Form – 1700-048
APPENDIX I	Physical characterization/water quality field data sheet and habitat assessment field data sheet
APPENDIX J	6600 Calibration / field deployment log forms
APPENDIX K	Reference Material
APPENDIX L	Chapter 5: Habitat Assessment and Physicochemical Parameters of EPA's Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition
APPENDIX M	WDNR Conservation Practice Standard 1002
APPENDIX N	Resumes
APPENDIX O	Sonde locations
APPENDIX P	GRAEF proposal (June 22, 2011)

SCHUCHARDT FARMS CONSERVATION PLAN

PLANT COMMUNITY / FORESTRY / INVASIVE PLANT SURVEY
WETLAND FUNCTIONAL ASSESSMENT
FISHERIES AND AQUATIC RESOURCES ASSESSMENT
WILDLIFE HABITATASSESSMENT
PRELIMINARY STORMWATER INFILTRATION ASSESSMENT

1.0 - PROJECT MANAGEMENT

1.2 Project/Task Organization

Roles & Responsibilities for Conservation Plan.

Individual(s) Assigned	Responsible for:
Carolyn Esswein, GRAEF Project Manager	• Overall project management • Monitors study progress • Ensures project completion
Brian Schneider, GRAEF Quality Assurance Coordinator	• Internal QAPP approval • Ensures QAPP is followed • Overall project QA/QC • Review field data
Tina Myers, GRAEF Conservation Plan Team Leader	• Plant community survey project leader • Oversee data collection, and reporting for natural community / plant assessments • Oversee wetland functional assessment reporting • Assist with QA/QC
Laura Giese, GRAEF Forestry Project Leader	• QAPP preparation • Plant community surveyor • Oversee data collection, and reporting for natural community / plant assessments • Forest reconnaissance project leader • Assist with QA/QC
Timothy Ehlinger, Ecological Research Partners Fisheries Project Leader	• Fish and aquatic resources assessment
William Mueller, Western Great Lakes Bird & Bat Observatory Wildlife Project Leader	• Wildlife habitat assessment
John McCarthy, GRAEF Stormwater Project Leader	• Storm water infiltration identification

The resumes for personnel listed in the organizational chart are included in Appendix N. William Mueller and Noel Cutright were added after the original team was assembled. Their resumes are also included in Appendix N.

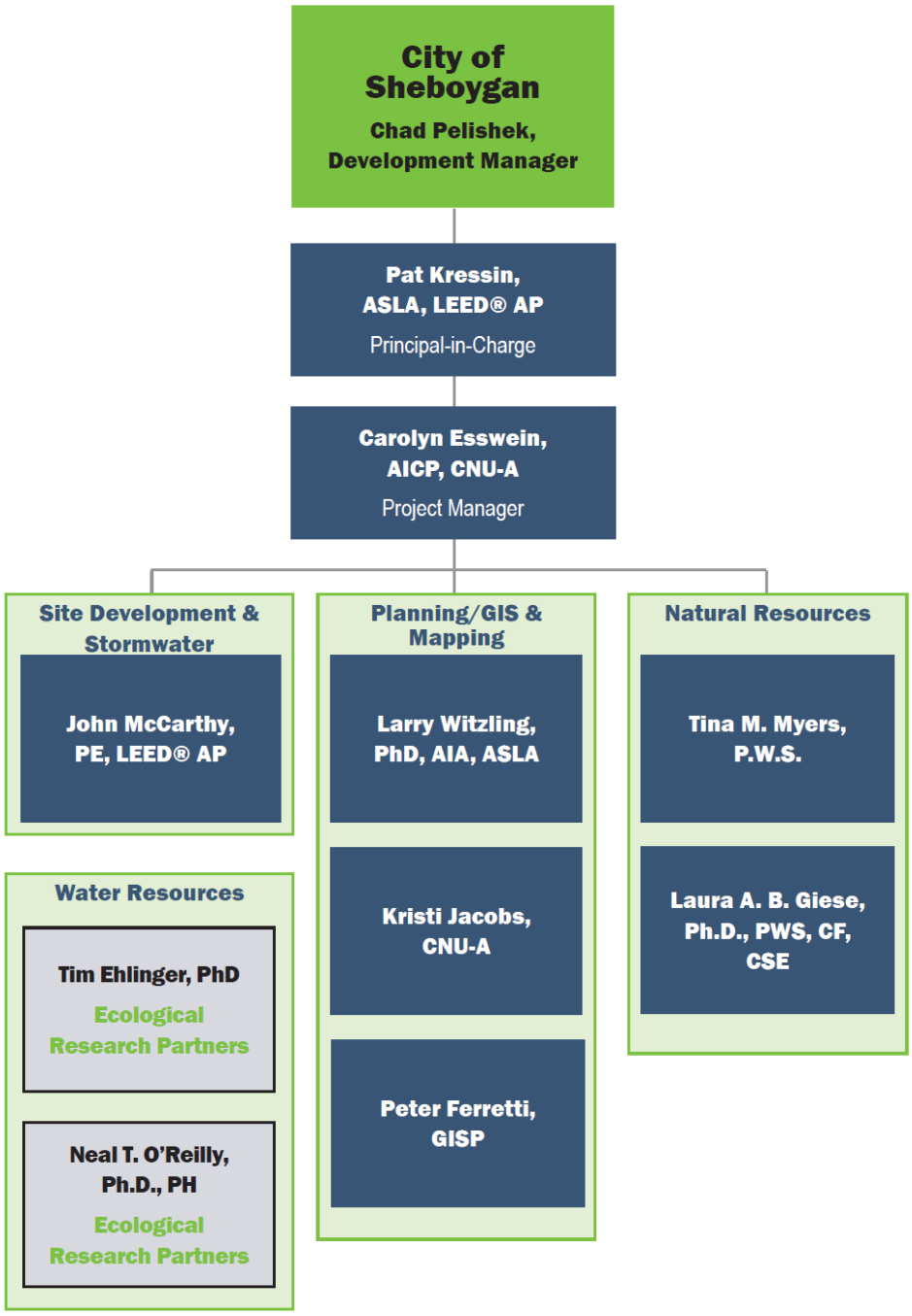

Figure 1. Organizational chart for the Schuchardt Farms Conservation Plan.

1.3 Problem Definition/Background

The City of Sheboygan purchased 205 acres with the intention to develop the property and bolster the local economy. Due to the large size of this relatively undeveloped parcel, mosaic of upland and wetland ecosystems, as well as its location in the Sheboygan River Area of Concern (AOC), the City of Sheboygan will prepare a Conservation Plan that identifies unique natural resources and critical areas to preserve and/or restore. A plan illustrating proposed

conservation/restoration areas will be prepared with emphasis on current environmental conditions, existing habitat, potential impact to the environment based on site work, scenic views and values, and the effect conservation/restoration may have on the fisheries, wildlife, plant community and project identity.

Willow Creek, the only known coldwater Wisconsin tributary to Lake Michigan, flows through the Schuchardt Farms property, and the eastern 1.5 mile segment is designated a Class II trout stream. Not only does Willow Creek have naturally reproducing brook and brown trout, it also supports naturally reproducing anadromous salmonid populations (Coho, Chinook, and Steelhead). Willow Creek is also a tributary to the Sheboygan River Area of Concern. Historic land use practices have significantly affected stream hydrology and morphology, evident by the incised channels, eroding stream banks, increased turbidity, and impacts to the fish and other aquatic organisms. Since future development is the greatest threat to aquatic resources, a conservation plan that targets preservation, enhancement, and restoration of existing natural resources, coupled with sustainable development practices is the key. The goal is not only to reduce negative effects on the environment, but to improve current conditions, and promote stewardship for this unique tract of undeveloped land located at the outskirts of the City of Sheboygan.

As part of the Wisconsin Department of Natural Resources (WDNR) Great Lakes Restoration Initiative (GLRI) grant many surveys are being conducted in the area and may include data specific to the Schuchardt Farms property. Available survey data will be reviewed and incorporated into the Conservation Plan. Below is a list of surveys either completed or in progress associated with the Sheboygan AOC Pathway to Delisting Habitat BUI's—Survey and Assessment project:

- Wintering Birds, Fish Eating Birds, Small Mammal Study
- Fish Habitat and Population Assessment
- River and Stream Macroinvertebrate and Habitat Assessment
- Herptile Survey
- Breeding Bird Survey
- Natural Community/Rare Plant Survey
- Bat Survey
- Mussel Survey

1.4 Project/Task Description

A review of past reports, studies, maps, aerial photographs, and topographical information provided by the City of Sheboygan, will provide an understanding of previous site investigations: specifically critical findings, potential impacts on preservation and development, proposed preservation and development recommendations. Additionally, information relating to the ongoing "Sheboygan AOC Pathway to Delisting Habitat BUI's Survey and Assessment" project will be reviewed. Review items include:

- Wetland delineations
- Topographic survey with river cross sections
- Preliminary FEMA floodplain analysis
- Natural heritage inventory review
- Site development regulations and limiting factors
- Willow Creek stream assessments

The main purpose of this project is to document existing natural resources on the Schuchardt Farms property: upland/riparian/wetland plant communities (including forest stands), wildlife habitat, and aquatic resources. The information provided by surveyors from this project, as well as information from previous reports, will provide the basis for preparing a conservation plan, which will assist City of Sheboygan planners with selecting the most appropriate areas for conservation, restoration, and development. These data will also contribute to the overall knowledge of local natural resources, identify threats to these ecosystems, and provide suggestions for habitat improvements.

Environmental surveys will be conducted at the Schuchardt Farms property with the following objectives:

1. Identify, describe, and assess plant communities.
2. Collect forest stand structure data.
3. Evaluate wetland functions
4. Assess fisheries and aquatic resources
5. Identify, describe and assess wildlife habitat
6. Identify stormwater Infiltration areas

Previous studies will be reviewed, and may provide additional background data, operate as a baseline for comparison, or prompt additional measures for consideration in the conservation plan. Below is a list of studies that may be integrated:

- Willow Creek Watershed and Improvement Plan (May 2011)
- Stream Assessment, Hilsenhoff Biotic Index (HBI) and Index of Biotic Integrity (IBI) (December 2006)
- Willow Creek Baseline Monitoring Report Sheboygan River Basin (December 2006)
- Delisting Targets for the Sheboygan River Area of Concern: Final Report (December 2008)
- Wetland Delineation Report prepared by Thompson and Associates, dated October 22, 2009
- Schuchardt Property Site Feasibility Analysis (May 2011)

The data assembled in these environmental surveys, coupled with the GLRI data and information in previous reports, will serve as the basis for conservation plan development.

The exact survey locations for the plant community and wildlife habitat component have not yet been selected. The surveyors will identify the survey locations using recent aerial photos, USGS 7.5' topographic maps, various Geographic Information System (GIS) sources, and information from past survey efforts. The fisheries and aquatic resources component has selected survey locations (Appendix O).

Project Timeline:

- July-August 2011—Surveys and assessments completed.
- August 29, 2011 Submit DRAFT to City and DNR for review and comments
- September 12, 2011 City Council Meeting
- September 19, 2011 Council Meeting
- September 26, 2011 Final Revisions and Submittal Final report (Conservation Plan)

1.5 Quality Objectives & Criteria

Quality objectives and criteria will be based on the following categories: Precision & Accuracy/Bias, Data Representativeness, Comparability, and Completeness.

The plant community inventory will identify species presence. Based on the data collected, the quality of each plant community will be determined through a floristic quality assessment which generates a numeric floristic quality index (FQI).

The forest stand assessment will provide quantitative structural data, as well as qualitative information pertaining to forest health.

The wetland functional assessment results in a qualitative estimation of the potential for a wetland to perform various functions.

Quantitative data collected for the fisheries and aquatic resources assessment will determine the presence of potential suitable habitat.

The wildlife assessment will identify presence of species observed and does not provide population information. Wildlife potential will be evaluated based on existing habitat conditions.

A. Precision & Accuracy/Bias

The method of surveying plant communities does not support measurable precision nor accuracy/bias calculations. However, meander surveys often result in a greater number of species being recorded than random plot sampling. Field verification of each plant community area delineated (based on preliminary desk-top interpretation) will be conducted. The same intensity of plant identification will be used for each plant community. It is anticipated that all plants observed will be identified to the species level. The surveyor(s) chosen for this component of the project are knowledgeable and experienced, with creditable plant identification skills. Also, the surveyor(s) will take photos of representative plants for further identification if needed. Since a single team of two will be performing all of the plant surveys, the methods should be consistent throughout the site.

The method of collecting forest stand data with randomly located plots may present bias based on number of plots established per stand. A variable-radius plot is used to determine basal area with a 10 BAF prism. Steep slopes may affect basal area measurements. The D-tape measures trees to the tenth place. Accurate forest stand structure data is anticipated. The surveyor(s) chosen for this component of the project are knowledgeable and experienced, with creditable tree identification and measurement skills.

Wetland functional assessments are subjective based on the nature of the data forms and guidance. The surveyor(s) chosen for this component of the project are knowledgeable of the local wetland types and experienced conducting wetland functional assessments to maintain consistency.

The method of assessing fisheries habitat does not support measurable precision nor accuracy/bias calculations. The rapid habitat assessment utilizes broad scale ratings which rely on best professional judgment and therefore may introduce a qualitative bias. The fisheries and aquatic resources surveyor(s) chosen for this component of the project are knowledgeable and experienced, with creditable scientific skills. Measurable precision or accuracy/bias calculations associated with sondes and discharge data is referenced in the respective standard operating procedures (SOPs) (Appendices A and B). Sonde measurement accuracy is $\pm$ 0.1 degree.

Water quality measurements should meet the criteria in Appendix A, Table 1 Quality Control Goals Between Adjacent Measurements and Deployed Sondes. The parameter accuracy goals include: Temperature 0.5ºC; pH ±0.5; Conductivity ±0.15%; DO ±0.7 mg/L; and Turbidity ± 5 NTUs. Since the Fisheries Project Leader will be performing all of the surveys, the methods should be consistent throughout the site.

The method of surveying wildlife does not support measurable precision nor accuracy/bias calculations. The surveyor(s) chosen for this component of the project are knowledgeable and experienced, with creditable identification skills. It is anticipated that all wildlife observed will be identified to the species level. Since the Wildlife Project Leader will be assisting with performing all of the wildlife surveys, the methods should be consistent throughout the site.

Where necessary surveyor(s) will use a Trimble GeoXH 6000 series, which is generally accurate to less than one foot (based on plant community structure), to collect locational data.

B. Data Representativeness

The primary purpose of the natural resource surveys/assessments are to document existing conditions within the Schuchardt Farms property. Survey/assessment locations will be chosen to maximize thorough identification of flora and fauna. Data collected in this fashion will be representative of current ecosystems within the Schuchardt Farms property. Survey locations will be independently reviewed by the Project Manager and Conservation Plan Team Leader prior to field mobilization.

The plant inventory will not include spring ephemeral species. A review of available existing data will supplement this inventory. Sedges and rushes will have matured to afford species-level identification. Also late flowering asters, golden-rods and prairie species will facilitate species-level identification.

Tree identification and measurement do not have seasonal limitations. The number of plots to be established per forest stand classification will be sufficient to represent each forest stand.

Standard WDNR methodology for aquatic habitat is to use a station length of 35 x mean stream width, or a minimum of 100m. Utilizing this formula for the total length of the steam, estimated from satellite photos, 16 stations needed to cover the study area. For site planning purposes, it is more important to have a broader coverage (at the expense of intensive detail) compared to limited coverage (WDNR method). Applying the intensive DNR method for the full site would be beyond of the scope (and budget and timetable) of this project. Data will be collected at the same time of year the WDNR conducts its baseline monitoring. Seasonal habitat and water quality elements that may be missed include winter water temperatures, which are critical for successful salmonid spawning. Subsequently spawning condition will be inferred from other sources (e.g. presence of young-of-year).

Wildlife surveys will miss spring/fall migratory birds and may miss birds that are no longer vocal due to the survey time being past breeding season. Surveys will be conducted early morning and late evening to ensure maximum observations of wildlife. Due to time constraints surveys for specific wildlife taxa, and quantitative surveys will not be conducted.

C. Comparability

The procedures used in this project will be comparable to those used in other Natural Resource Assessments. The surveyor(s) will use standard survey forms in order to ensure repeatability. To the greatest extent possible WDNR/NHI procedures and survey forms were utilized to be

comparable with WDNR and NHI assessments. Methods and procedures will be documented in the final report.

Plant nomenclature will primarily follow common name and scientific name as listed in the National List of Plant Species that Occur in Wetlands: Region 3 – North Central. The USDA NRCS Plants database (http://plants.usda.gov/java/) will be consulted for non-wetland plants. Plant communities will be classified according to the Wisconsin Natural Heritage Inventory (NHI) Program's Natural Community classification. Forest stands will be classified according to the Public Forest Lands Handbook Forest Habitat types and Wisconsin NHI Natural Community Classification system.

Use of the WDNR *Rapid Assessment Methodology (RAM) for Evaluating Wetland Functional Values* is comparable throughout Wisconsin.

The EPA RAPID method uses quantitative data and then scores those data into Condition categories. This is not conceptually different than the WDNR methodology. The DNR method is more intensive (18 transect per station with typically 2 or 3 stations per stream). The RAPID method was chosen to allow the ability to characterize the full study site with the less intensive method (6 transects per station with 16 stations for the stream). The field data sheet and the summary assessment form from the EPA manual are comparable with the WDNR intensive assessments.

Wildlife surveys are comparable with standard procedures.

D. Completeness

Data completeness will be calculated for this project. The completeness objective for this project is for 95% of the field data to be collected and usable. The surveyor(s) will make every effort to obtain valid data for each sampling point selected, or area surveyed.

1.6 Special Training/Certification

Each of the natural resource project leaders will be responsible for ensuring that those performing the surveys receive the training necessary for each component of the study. Prior to the field-sampling season, the Project Leaders will go over the SOPs, methods, and QA requirements with the surveyor(s) and answer any questions that they may have. All training will be documented and records will be kept in the project file.

To minimize any potential health and safety risks related to field sampling conducted as part of this project, surveyors need to be physically able to conduct field work under demanding conditions and be well prepared to handle contingencies or emergencies. The following are suggested requirements for all field survey personnel:

a) Recent CPR training,
b) Recent first aid training,
c) Completion of a satisfactory interview about health and safety aspects of the project with the Project Leader, including routine safety precautions and a discussion of actions to be taken in the event of an emergency.

Surveyor(s) will refer to the GRAEF safety awareness training or site specific project plan regarding employees Working Alone for additional information about safety during the field work.

1.7 Documents and Records

The natural resource surveyor(s) will supply the following records and documents:

Plant Community Inventory

1. *Wisconsin Floristic Quality Assessment* (WFQA) plant list data based on methodology described in Bernthal, 2003[1] (Appendix C)
2. Wisconsin Natural Heritage Inventory (NHI) Rare Plant Field Report forms (Appendix D: Form 1700-049) for each of the rare plant populations, if encountered. Rare plants must be identified to the appropriate taxon level as listed on the Wisconsin Natural Heritage Working List (http://www.dnr.state.wi.us/org/land/er/wlist/). Method(s) of identification must be indicated on the rare plant reporting forms.
3. Invasive Plant Report Forms, Version Feb. 2008 (equivalent to DNR form 1700-056: Appendix E) for each invasive plant species observed.
4. Forest stand structure data forms based on Form 2400-26 (Appendix F) of the Public Forest Lands Handbook.
5. Wetland functional assessment using Wisconsin Department of Natural Resources (WDNR) *Rapid Assessment Methodology (RAM) for Evaluating Wetland Functional Values*[2] (Appendix G).

Wildlife Habitat Assessment

6. Wildlife observation according to plant community map documenting common and scientific names, date observed, and relative abundance.
7. Wisconsin Natural Heritage Inventory (NHI) Rare Animal Field Report forms (Appendix H: Form 1700-048, for each rare animal, if encountered. Rare animals include those listed on the Wisconsin Natural Heritage Working List http://dnr.wi.gov/org/land/er/wlist/06_2011_Working_List.pdf. Method(s) of identification must be indicated on the rare animal reporting forms.

Fisheries and Aquatic Resources Assessment

8. Physical Characterization and Water Quality Field Data Sheet (Appendix I)
9. Habitat Assessment Field Data Sheet (Appendix I)
10. Sonde 6600 calibration/field deployment log forms (Appendix J)

GPS and Photographs

11. GPS coordinates documenting rare plant locations and forest stand structure plot centers. GPS points should also be used to document locations of unique features, representative portions of natural communities, shifts in community attributes, or changes in community types. GPS points should also be used to document places where photographs were taken.
12. Photographs of the surveyed plant communities, or other documented features such as disturbances or threats. Digital photos should be provided as a jpg or tif.

---

[1] Bernthal, Tom. 2003. *Development of a Floristic Quality Assessment for Wisconsin*. Wisconsin Department of Natural Resources, Bureau of Fisheries Management and Habitat Protection, 22 pp.

[2] *WDNR Rapid Assessment Methodology for Evaluating Wetland Functional Values*. Jan 2001. Wisconsin Department of Natural Resources.

All field data sheets will be saved electronically as Portable Document Format (PDF) files.

A Final Report will be completed for this project based on the accepted proposal Appendix P). The report will include at minimum:

- Discussion of methods used
- Summary of natural resource assessments results with emphasis on priority areas for conservation and restoration
- Conceptual development plan
- Conservation plan
- All data collected

2.0 – DATA GENERATION & AQCUISITION

2.1 Sampling Process Design (Experimental Design)

The purpose of this project is to identify and assess existing natural resources within the Schuchardt Farms property: what species and ecosystems exist, their condition and status (which are priorities for conservation), and documenting and mapping where they occur. This information can then be used to prepare a conservation plan to inform the City of Sheboygan of development strategies to meet a balance between economic development and conservation/restoration of unique and high-quality ecosystems as well as, specific delisting strategies for the fish and wildlife beneficial use impairments (BUIs) in the Sheboygan River AOC. The experimental design must ensure collection of quality data in order to support these goals.

Review of previous reports and existing databases will provide background information for plant community classification and probable flora and fauna. Previous research studies may also provide insight to historical issues, and potential restoration. Reports to be reviewed include, but are not limited to:

- Willow Creek Watershed and Improvement Plan (May 2011)
- Stream Assessment, Hilsenhoff Biotic Index (HBI) and Index of Biotic Integrity (IBI) (December 2006)
- Willow Creek Baseline Monitoring Report Sheboygan River Basin (December 2006)
- Delisting Targets for the Sheboygan River Area of Concern: Final Report (December 2008)
- Wetland Delineation Report prepared by Thompson and Associates, dated October 22, 2009
- Schuchardt Property Site Feasibility Analysis (May 2011)

Note that data collection efforts for the Sheboygan River Area of Concern Survey and Assessment are supported by a QAPP.

Prior to conducting field investigations, a desktop analysis will be performed using April 2009 ortho-image aerial photography (City of Sheboygan) to create a preliminary map of plant communities. Initial plant community boundary differentiation will be at broad structural (forest, scrub-shrub, herbaceous) and hydrologic (aquatic, riparian, upland) scales based on photographic signature and existing GIS data such as topography, soils, and wetlands (identified in Thompson and Associates October 22, 2009 Wetland Report). The plant community boundaries will be adjusted and refined in the field as necessary. Plant community differentiation will not be at a scale less than 0.5 acre.

The information collected for the following inventories/surveys/assessments may be limited by seasonality of the individual natural resource component (i.e., absence of spring ephemeral plants; avian migration and breeding times; aquatic resource presence/absence).

1. Upland/Riparian/Wetland plant inventory
    - The surveyor will conduct field inventories to document upland, riparian, and wetland plants in their associated habitats. These will be meander surveys; there will be no plot-based surveys.
    - Using the Wisconsin Natural Heritage Inventory (NHI) Program's Natural Community classification (http://www.dnr.state.wi.us/org/land/er/communities/), the surveyor will document plant communities. When the plant composition does not match a NHI classification, is a mix of classifications, or transitional, the plant community will be described/classified based on dominant plant species and landscape position.
    - *Wisconsin Floristic Quality Assessment* will be performed for each plant community classification.
    - The surveyor will document rare plant occurrences. Documentation will include completion of a Wisconsin NHI Rare Plant Reporting Form for each population and collecting supporting plant photo vouchers, as well as including method used for identification of the plant to the appropriate level as listed on the Wisconsin Natural Heritage Working List (see http://www.dnr.state.wi.us/org/land/er/wlist/).
    - The surveyor will document invasive plant occurrences by completing WI State Herbarium Invasive Plant Report forms and collecting supporting plant photo vouchers. Invasive species are based on references cited in (Appendix K).
    - Wildlife (including tracks and other signs) observed during the meander surveys will be documented.

2. Forest stand structure
    - The surveyor will collect field data using tenth-acre fixed plots for species composition, average diameter at breast height (DBH), trees per acre, and natural regeneration assessment. Variable radius plots will be used for basal area.
    - Classification will be based on the Public Forest Lands Handbook Forest Habitat types and Wisconsin Natural Heritage Inventory Natural Community Classification system.
    - Meander surveys conducted as part of the plant community inventory will supplement forest stand information (flora and fauna observed, forest health).

3. Wetland functional assessment
    - The surveyor(s) will conduct functional assessments on the previously delineated wetlands using the WDNR *Rapid Assessment Methodology (RAM) for Evaluating Wetland Functional Values*

4. Fisheries and aquatic resources assessment
    - The surveyor will conduct habitat assessment (s) based on EPA's *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Edition*; specifically *Chapter 5: Habitat Assessment and Physicochemical Parameters* (Appendix L).

- The surveyor will assess water quality by continuous monitoring dissolved oxygen, temperature, pH, and conductivity using YSI 6600 and 6600 EDS sondes. Detailed instruction on sonde calibration, selection of sonde deployment locations, sonde deployment, sonde retrieval, and sonde data download can be found in Appendix A. 6600 Calibration/Field Deployment Log (Appendix J) will be used.
- The surveyor will measure stage and discharge as part of the Fish Habitat Surveys. Velocity will be measured using a wading rod, and Flowtracker (acoustical) or a Price Pygmy meter.

5. Wildlife habitat assessment
   - The Western Great Lakes Bird & Bat Observatory (WGLBBO) field personnel will utilize an area reconnaissance method (also known as an “area search” method; see Blair 1999, Dieni and Jones 2002, and Roberts and Schnell 2006) for collecting wildlife observation data, including observations of all wildlife taxa to include avian, mammal, herptile, and invertebrate species on the Schuchardt Property. Due to the seasonal timing (August 2011) during which data are being collected, urgency of completing the surveys, and budgetary constraints, more formal methods such as point or line transect counts, small mammal trapping, hoop netting for herptiles, track counts, or other similar methods are precluded for use.
   - The area search methodology is frequently used and accepted for many "rapid assessment" studies and is a prime choice in this situation where a quick turnaround and rapid assessment of data and habitat conditions are of utmost importance. Point count methods were ruled out due to the required seasonal timing of these surveys, which preclude noting all singing male passerine bird species this late in the year. Some avian species have concluded the song or other vocalization portion of their annual cycle, especially for single-brooded species. During August, some early migrant passerines that do not breed at this location are also expected.
   - The area reconnaissance method for this property will involve undertaking a meandering search for wildlife taxa including birds, mammals, reptiles, amphibians, and invertebrates throughout all existing plant communities on the site, and recording data on a standard field form. The form will incorporate recording of weather data, start and end time of each visit, a text description of plant communities in which observations took place, enumeration of species by both common and scientific names, count results of number of individuals of each wildlife species found. Observations of tracks and scat will be incorporated, and photography of invertebrate species will be done where practicable. All field visits will begin at the current time of local sunrise. We will mark locations of each area searched on an aerial photo. We will report results to the project leader at the end of four weeks of once-per-week field investigation visits.

6. Stormwater Infiltration identification
   - Identification of stormwater infiltration areas will follow the WDNR standard protocol in Conservation Practice Standard 1002 (Appendix M).

Note that exact survey locations have not yet been selected. These will be determined by the surveyor(s) and reviewed by the QA/QC Team, prior to the beginning of the inventory period. The surveyor will utilize his or her knowledge of this landscape, aerial photos and topographical

maps of the project area, various GIS layers, and the habitat requirements of target species. The sampling will be done within the entire Schuchardt Farms property.

Timing of the surveys will be determined by the respective surveyor(s), using his or her professional judgment. As the plant inventory is a one-time assessment rather than a monitoring study, each ecosystem will be surveyed only once during the project. Water quality and temperature within Willow Creek will be continuously monitored for four weeks. Stream velocity and discharge will be determined during deployment and retrieval of instream loggers. The stream habitat assessment is a one-time assessment. Wildlife assessments will be conducted according to the best viewing times for respective wildlife and performed once per week over a consecutive four week time frame.

2.2 Sampling Methods

Plant Community Inventory and Mapping (including forest stands)

- Using the desktop plant community map, conduct meander surveys through the plant communities and prepare one comprehensive plant species list for each identified plant community classification
- Note dominant/rare/invasive species
- Photo-document representative plant communities
- The preliminary-mapped plant community boundaries will be refined in the field as needed.
- Wildlife observed during the field investigation through sight, sound and signs will be noted and supplement wildlife habitat assessment

Forest Stand Structure

- Forest stand acreage will determine the number of plots per forest stand. There will be at least two random plots per forest stand over one acre. Fewer or more plots will be based on forest stand size and homogeneity. Plot center will be GPS-located to allow for repeated sampling.
- One-tenth acre (radius = 37.2 feet) fixed radius plots will be used to determine:
    - Species composition
    - Average stand diameter at breast height (DBH) with D-tape
    - Number of trees per acre (trees greater than 4 inches DBH)
    - Regeneration of tree species will be qualitatively noted as low, medium or high
- Variable radius plots will be used to determine:
    - Basal area using a 10 factor prism
- Assessment of forest stand and individual tree health and condition will be based on overall observation of external signs (decay, leaf color, fungi, and direct observation of insects or egg masses) and cross-referenced with known/documented insects and pathogens;

Wetland Functional Assessment

- A wetland functional assessment will be conducted on each of the wetlands identified in the October 2009 wetland report prepared by Thompson and Associates. Methodology will follow the DNR Rapid *Assessment Methodology (RAM) for Evaluating Wetland Functional Values*.

Fisheries and Aquatic Resources Assessment

- Stream habitat assessments (approximately 16 100 meter segments) will be

conducted for Willow Creek within the Schuchardt property boundaries according to EPA RAPID Methodology. Physical characterization/water quality field data sheet(s) and habitat assessment field data sheet(s) will be used.

- Water quality monitoring will be conducted by four-week continuous deployment of 3 YSI multiparameter sondes. One will be positioned upstream where Willow Creek enters the property, the second in the middle of the property, and the third downstream, where Willow Creek leaves the property. The following data will be measured at 30 minute intervals: oxygen, conductance, pH, temperature, depth and turbidity. Dissolved oxygen (DO) will be compared to published tolerance limits for brook char (*Salvelinus fontinalis*). Local or temporal variations of DO should not decrease to less than 5.0 mg/l.
- Water temperature monitoring will be conducted by four-week continuous deployment of eight Onset™ dataloggers in pools spaced along the stream reach within the property. Temperature readings will be taken every 30 minutes. Air temperature loggers will also be employed.
- Stream velocity and discharge will be measured at the location and time of deployment and retrieval of the YSI and Onset loggers.
- Monitoring equipment locations are depicted on the aerial photograph in Appendix O.

Wildlife Habitat Assessment

- The wildlife biologist will utilize an area reconnaissance method for collecting wildlife observation data, including observations of all wildlife taxa to include avian, mammal, herptile, and invertebrate species throughout all existing plant communities on the site, recording data on a standard field form, and reporting results to the project leader by the end of four weeks of once-per-week field investigation visits. All field visits will begin at the current time of local sunrise.

Stormwater Infiltration Identification

- An overlay of NRCS soil mapping will be placed over a map of the Schuchardt property. Based on soil data for each soil type the infiltration potential will be determined according to WDNR Conservation Practice Standard 1002. At this time only the initial screening (Step A) will be performed. No test pits or borings will be conducted.

Note that there will be no samples collected for the surveys. The surveyor(s) will document rare species by taking a photograph.

2.3 Sampling Handling & Custody

Samples will not be collected for this study.

2.4 Analytical Methods

All observations will be done in the field. No analytical equipment or methods will be used except for the sondes that will be placed in Willow Creek.

2.5 Quality Control

The records generated in the survey procedures are subject to review during data validation. The data collected by this project will be used to identify and prioritize natural resources conservation/restoration areas within the Schuchardt Farms property. It will be used for planning and management decisions.

Quality Control Activities

Each Team Leader will be performing their respective surveys, supporting consistency of sampling methods. The surveyor(s) will ensure that all equipment and supplies are present and in good working order in order to support the collection of accurate data.

Plant species identification will be performed at the survey site by the surveyor(s), using his or her training and experience and reference keys as necessary. In the event that a surveyor is unsure of the species of a particular plant, a photo voucher will be collected so the identification can be made or confirmed.

Corrective Actions

If the Conservation Plan Team Leader disagrees with an identification made by one of the surveyors, and there is a question as to the true identity of a flora or fauna species, the information will be kept on file, but will be disregarded in the final report. If the specimen can be clearly identified as something other than what the surveyor recorded, then the species will be changed for the records. Stream monitoring measurements that are not within acceptable parameters will be reviewed and retaken if necessary. Any changes will be recorded and included in the final report.

2.6 Instrument/Equipment Testing, Inspection, Maintenance and Calibration

The primary instrument needing testing and maintenance will be the Global Positioning System (GPS). The Conservation Plan Project Leader will provide the surveyor(s) with a GeoXH 600 series, and will be responsible for maintaining it and keeping it in operable condition, referring to the owner's manual as needed. Any problems with the GPS unit should be resolved by the Project Leader. Two prominent site features (such as culvert outlet or road corner) will be GPS-located at the onset of each day of data collection, as a basic method of checking the coordinate system and general accuracy of the equipment.

The YSI sondes and Onset dataloggers are calibrated before deployment according to the procedures specified in the SOPs in Appendix J.

Other equipment necessary for these assessments includes keys for plant/wildlife identification, a digital camera, and measuring devices (meter stick, tape measure, d-tape, 10 BAF prism). The respective Project Team Leader surveyor will check that all items pertinent to their Conservation Plan component are present and in good condition before sampling.

2.7 Inspection/Acceptance of Supplies & Consumables

The respective Project Team Leaders will ensure that any supplies or consumables required are present and in good condition before sampling.

2.8 Data Acquisition Requirements for Non-Direct Measurements

Where available, relevant, and reliable, data from previous studies will be reviewed and may be used for comparison with the data gathered as part of this project.

2.9 Data Management

The surveyor(s) will record their respective survey data on paper, using standard reporting forms, where applicable. These include the following which can be found in the Appendices:

- Rare animal reporting form

- Rare plant reporting forms
- Invasive plant forms
- RAM forms for evaluating wetland functional values
- Physical characterization/water quality field data sheet
- Habitat assessment field data sheet

Plant and wildlife field data will be recorded in field notebooks with subsequent transcription to spreadsheet or table for document incorporation. As needed, data and information shall be recorded on the calibration, deployment/ retrieval, and field logs. Data from sondes and dataloggers will be downloaded to spreadsheets. Each respective project leader will check for complete data collection at the end of a field day and retain the collected data in his/her custody. At the completion of each week, the respective project leader will provide the QA/QC team with copies of the field collected data.

3.0 – ASSESSMENT AND OVERSIGHT

3.1 Assessments and Response Actions

The Quality Assurance Officer for the project will be responsible for performing and recording any assessments. The QA Officer and/or the Project Leader will provide the respective project leaders, who will be conducting the surveys, at the beginning of the field season with project details to ensure that everyone will be collecting and recording data according to their respective SOP. The surveyors are encouraged to ask questions any time questions should arise.

General surveillance will be the primary assessment technique of the plant community and wildlife components. Field measurements are planned for the forest stand structure component. Field monitoring is planned for the fisheries and aquatic resources component. Desktop review of soils mapping is planned for stormwater infiltration identification. Data checks will be performed during the course of the project. The Quality Assurance Officer for the project will be responsible for ensuring that any necessary corrective actions are carried out, verified, and documented.

Data collected during these assessments will be compared with other data sources, where such information exists. Differences between new and historical data will be reconciled through consultation with DNR technical staff to resolve data quality concerns.

3.2 Reports to Management

The Project Leader for each component of the project will provide a written status report to the overall Project Manager and Project QA Manager following their field data collection period. The Project Manager will schedule one or two meetings in order to gather these status reports and address any questions or concerns that the Project Leaders may have about the operation of the project. At a minimum, the status reports will include the following:

1. Work accomplished this reporting period
2. Remaining work to be accomplished
3. Data compilation to date

This information will be used by the Project Manager to monitor the status and progress of the project. It will be used by the Project QA Manager to monitor project QA status and actions.

4.0 – DATA VALIDATION AND USABILITY

4.1 Data Review, Verification, and Validation

The Project Leader and QA Officer for the project will be responsible for critically reviewing all project data, metadata, and quality control data to determine if there are any problems that compromise data usability. All data will be reviewed for completeness and correctness. Certain basic calculations will be performed to check the data against the quality criteria.

4.2 Verification and Validation Methods

The Project Leader and QA Officer for the project will be responsible for assuring that all data are verified and validated. Procedures to evaluate field data primarily include checking for transcription errors and reviewing field notebooks. It is expected that the surveyors will check the data in the field, and that the people entering the data into electronic spreadsheets or databases will also check the data. Any issues related to data verification and validation will be resolved by the appropriate Project Leader. Any problems that will affect the use of the data for the project objectives will be reported to the overall Project Manager and Project QA Manager.

4.3 Reconciliation with User Requirements

Individual Surveys

Each Project Leader will be responsible for critically reviewing their respective project data, metadata, and quality control data to determine if there are any problems that compromise data usability. The QA Officer for the overall project will review all data to determine if there are any problems that compromise data usability. Any problems that will affect the use of the data for the project objectives will be reported to the overall Project Manager and Project QA Manager. The Project Manager will make a final decision regarding the validity and usability of the survey data collected during this project. Sample collection, analysis, and data reporting processes will be evaluated to determine if the data are of sufficient quality to meet project objectives.

Assessments: plant community / forestry / invasive plant / wetland function / fisheries and aquatic resources / wildlife habitat / preliminary stormwater infiltration

Valid data from the individual surveys in combination with historic data from the study area will be utilized to complete the final Conservation Plan Report. Historic data will be evaluated to make sure that they are of sufficient quality for project purposes. Conservation/restoration areas will be prioritized according to a matrix which incorporates each of the natural resource assessments. The Assessment Team will routinely meet with the Project Manager and Project QA Manager to insure that their respective reports meet the needs for development of a Conservation Plan. Any limitations on the use of the data will be reported in the Conservation Plan Report.