***Project Title****:* Assessment of Migratory Waterfowl Populations and Native Wetland Plant Remnants in the Lower Green Bay and Fox River AOC (Complement to Phase 2 of theFish and Wildlife Habitat and Population Assessment)

***Fiscal Agent****:*

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***DUNS#****:* 782431803

***Project Location****:*Lower Green Bay and Fox River Area of Concern (Brown County, WI)

***Proposed Work:***

Migratory waterfowl comprise one of the most historically, culturally, and economically important elements of the Green Bay ecosystem. Prince et al. (1992) estimated that 12% of the breeding pairs of dabbling ducks in the entire Great Lakes occur in Green Bay, along with by far the highest concentrations of migratory diving ducks in Lake Michigan. Connett (1949), Stiller (1994), and others described spectacular numbers of migratory ducks in Green Bay, supporting a thriving waterfowl harvest between the 1870s and early 1900s (Harris 1998); even today, Green Bay continues to provide an important recreational opportunity for hunters and birdwatchers. Harris (1998) documented a dramatic rise in numbers of mollusk-feeding diving ducks, especially goldeneye (*Bucephala* spp*.*) and scaup (*Aythya* spp.), following the invasion of dreissenid mussels in the 1990s. This increase in diving duck numbers was accompanied by a spatial shift in duck concentrations, leading to large rafts of ducks in shallow rock/gravel shoals where zebra mussels (*Dreissena polymorpha*) or quagga mussels (*Dreissena rostriformis bugensis*) are abundant (Harris 1998).

Despite the importance of waterfowl to the region and recognition in the Lower Green Bay and Fox River Area of Concern’s (LGB&FR AOC) Remedial Action Plan, surprisingly, few studies have quantified waterfowl use in Green Bay. No systematic monitoring of migratory waterfowl in the Bay has been established. Patterns described by Harris (1998) seem to be continuing, but a quantitative, cost-effective monitoring plan is badly needed to identify potential management actions and to assess the success or failure of restoration efforts.

Plant foods for waterfowl and other wetland wildlife, on the other hand, have declined severely in the LGB&FR AOC. Surveys by University of Wisconsin-Green Bay botanists during 2015 and 2016 have shown that many areas where invasive *Phragmites australis* has been controlled are dominated by monotypic stands of hybrid cattail (*Typha* x *glauca*), with little native plant diversity. Important wetland plants like wild celery (*Vallisneria americana*), duck potato (*Sagittaria latifolia*), and other characteristic wetland species are present, but are localized and nowhere near their former extent. Transitional habitats like sedge meadows and other important habitats for nesting wildlife, amphibians, and other indigenous species have been reduced to a few small remnants. Many interacting factors have caused the disappearance of these plant features from parts of the LGB&FR AOC, possibly including the aggressive aerial spraying of *Phragmites australis* (Rinella et al. 2009)*.* The same may apply to submergent aquatic plants (Wagner et al. 2007). Regardless of the causes, the result has been a reduction of diverse native wetland plant communities to small pockets that are vulnerable to further destruction or invasion by undesirable species. Fortunately, remnant populations of many native wetland species still are present in the LGB&FR AOC, but they need to be identified, mapped and protected if they are to serve as reservoirs of recolonization and restoration activities.

This project will complement the second year of a larger project to assess baseline fish and wildlife habitat conditions and document potential habitat restoration opportunities in the LGB&FR AOC and its immediately contributing watershed. The primary focus will be on the area within 1 km of the ordinary high water mark between Point au Sable on the east shore of Green Bay and Longtail Point on the west shore (hereafter defined as the AOC project area).

The specific goals of the project are to:

1. Develop and implement a systematic, repeatable method for surveying migratory waterfowl in the AOC. This method will include permanent ground survey points (e.g., Point au Sable Nature Preserve, Cat Island Wave Barrier) as well as a sustainable method for aerial sampling, potentially including the use of unmanned aerial vehicles or drones McEvoy et al. 2016). Specific objectives for this aspect of the project are as follows:
	1. Identify and map locations where waterfowl stage within the AOC during both fall and spring migratory periods.
	2. Describe waterfowl species composition and estimate seasonal numbers of individuals in the AOC.
	3. Describe how waterfowl distributions change throughout each migratory period and across seasons.
	4. Compare data collected at ground survey points with aerial sampling and describe how these field methodologies differ.
2. Identify and map critical remnants of native wetland and submerged aquatic plants in the AOC, possibly including nearby areas that may serve as sources and benchmarks for restoration projects.
3. Collaborate with agencies and other researchers to assemble information from previous and ongoing projects that are relevant to goals 1-2. In other words, avoid duplication of efforts in order to maximize field effort and to complement existing sources of information.

During all phases of the project, UW-Green Bay staff will maintain close communication with Wisconsin Department of Natural Resources (WDNR) staff and will solicit information and recommendations from experts on the conservation of fish and wildlife populations in the AOC.

 ***Deliverables****:*

*Since this project agreement is between UW-Green Bay and WDNR, UW-Green Bay assumes all responsibility for any deliverables listed below, including any that are being completed under a subcontract award from UW-Green Bay. UW-Green Bay should ensure that subcontracts have adequate provisions to ensure completion of deliverables listed below.*

1. A quality assurance project plan (QAPP) that is approved by WDNR and U.S. Environmental Protection Agency (EPA). As noted below, the QAPP will further outline in more detail deliverables, final products, and project expectations and will serve as an extension of this plan. Project-specific outcomes that are not identified below will be identified during the project planning process. The QAPP will be one of the first tasks of the proposed project.
2. Consultations with WDNR regarding completion of the project goals (frequency and logistics of these consultations will be outlined in the QAPP).
3. Stakeholder debriefing/input meetings (frequency and logistics outlined in the QAPP).
4. **A spatially explicit, standardized protocol for monitoring migratory waterfowl in the AOC and recommended, permanent long-term sampling points for future monitoring.**
5. **Results from a trial survey of waterfowl during fall 2016 and spring 2017 using the standardized protocol.**
6. **A list of important indigenous plant species that are important to fish and wildlife populations in the AOC, including both food plants and plant species that provide indirect benefits such as nesting cover and habitat for a productive trophic community.**
7. **A digital (GIS) map of important remnants of native plant diversity in the AOC, focusing on species that will be critical sources of propagules for ecological restoration efforts.**

8. Quarterly written updates that address

* + Amount of money spent that quarter;
	+ Deliverables and work accomplished during the quarter;
	+ Any problems that were encountered and how they were resolved; and
	+ Planned tasks/deliverables for the next quarter

Updates will be e-mailed to the WDNR project manager.

9. Final report summarizing Deliverables 5-8.

***Communication with WDNR Project Manager***

*Any problems that the UW-Green Bay encounters with the project that have the potential to affect the project timeline must be reported immediately to the WDNR Project Manager.* *UWGB will be responsible for following any applicable rules and regulations regarding the use of unmanned aircraft for the project. Any field data collection efforts associated with this project must be discussed with WDNR in advance of the field work and supported by the approved QAPP.*

***Budget****:*

|  |  |
| --- | --- |
| **ITEM** | **AMOUNT** |
| **Personnel/Salaries/Fringe Benefits** |   |
| **UW-Green Bay** |   |
| Personnel/Salaries (academic staff) | $12,000.00 |
| Fringe Benefits | $5,160.00 |
| Personnel/Salaries (LTE) | $10,000.00 |
| Fringe Benefits | $1,800.00 |
| Personnel/Salaries (students) | $6,000.00 |
| Fringe Benefits | $180.00 |
| **Sub total** | **$35,140.00** |
| **UW-Green Bay** |   |
| Travel (including boat travel)  | $1,800.00 |
| Supplies  | $300.00 |
| Other Costs | $150.00 |
| **Sub total** | **$2,250.00** |
| **Total Direct Charges** | **$37,390.00** |
| **Indirect Charges UW-Green Bay (15% salaries and fringes)** | $5,271.00 |
|  |  |
| **Total Cost**  | **$42,661.00** |

**Budget Narrative**

*Salaries*:

UW-Green Bay: UW-Green Bay leaders of this project will include Principal Investigators Dr. Robert Howe, Dr. Amy Wolf, and Senior Research Specialist Erin Giese. Their time will be contributed as part of their existing University appointments and are not included in the budget above. Other contributors to the project include Cofrin Center for Biodiversity Botanist Dr. James Horn and Natural Areas Ecologist Bobbie Webster, who will be responsible for field surveys and mapping native plant remnants. We will enlist recent graduate Tom Prestby, an expert ornithologist who has conducted extensive bird surveys in lower Green Bay, as primary field researcher for developing and implementing waterfowl surveys. UW-Green Bay student Cody Becker is an authorized drone pilot who will assist with development of the aerial waterfowl surveys. Other students who have participated in field research in the AOC will assist with the project. Giese will be responsible for assembling, organizing, and archiving information acquired during the project, while Howe and Wolf will be primarily responsible for writing reports and administering the budget. Fringe benefits for UW-Green Bay contributors vary by employee class according to contractual rates established by the University of Wisconsin System.

*Travel*: Travel costs in the UW-Green Bay portion of the budget will cover trips to and from field sites by field researchers.

*Supplies*: Supplies and equipment include costs of miscellaneous field supplies and computer storage devices like external disk drives.

*Other* *Costs*: Other costs include printing and copying.

*Indirect* *Costs*: Indirect costs will be applied to salaries and fringes at the off-campus rate of 15%.

***Timeline:***

All work is done on a reimbursement basis. The grantee will invoice the WDNR, and the WDNR will reimburse the grantee following the acceptable completion (as noted by WDNR review of acceptance) of the tasks and deliverables outlined in the table below:

|  |  |
| --- | --- |
| **Timeframe** | **Deliverables Scheduled to be Completed** |
| October 7 - December 31, 2016 | * Quarterly update and invoice (Q1) due January 9, 2017
* Approved QAPP
* Draft protocol for waterfowl surveys
* Field test of waterfowl survey protocol during fall migration
* Digital (GIS) template for mapping plant diversity remnants
* Summary of results from previous and new plant surveys
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| January 1, 2017 - March 31, 2017 | * Quarterly update and invoice (Q2) due April 10, 2017
* Analysis and revision of fall waterfowl surveys
* Winter waterfowl surveys (if ice absent)
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| April 1, 2017 - June 30, 2017 | * Quarterly update and invoice (Q3) due July 10, 2017
* Spring waterfowl surveys
* Preliminary maps of critical plant diversity remnants in AOC
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| July 1, 2017 - September 30, 2017 | * Quarterly update and invoice (Q4) due April 10, 2017
* Follow-up surveys of plant diversity remnants
* Summary of waterfowl surveys and description of recommended assessment protocol
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| October 1, 2017 - December 31, 2017 | * Quarterly update and invoice (Q5) due January 8, 2018
* Final report and recommended long term assessment protocols
* GIS map of critical plant diversity remnants in AOC
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***Acknowledgement of Grant Funding*:**

For any materials (presentations, handouts, promotional materials, etc.) that are produced as part of this grant, UW-Green Bay and contractors will acknowledge that this project was done with funding from the WDNR Office of Great Lakes and the Great Lakes Restoration Initiative. Logos will be provided for this purpose.

***Literature Cited:***

Connett, E.V. 1949. Waterfowling in the Mississippi Flyway. Van Nostrand Co., Inc. New York.

Harris, V.A. 1998. Waterfowl use of lower Green Bay before (1977-78) and after (1994-97) zebra mussel invasion. M.S. Thesis. University of Wisconsin-Green Bay, Green Bay, WI. 97 pp.

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Stiller, D. 1994. Stiller’s duck camp – a half century of waterfowling on Green Bay. Alt Publishing Co. Green Bay, WI. 178 pp.

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