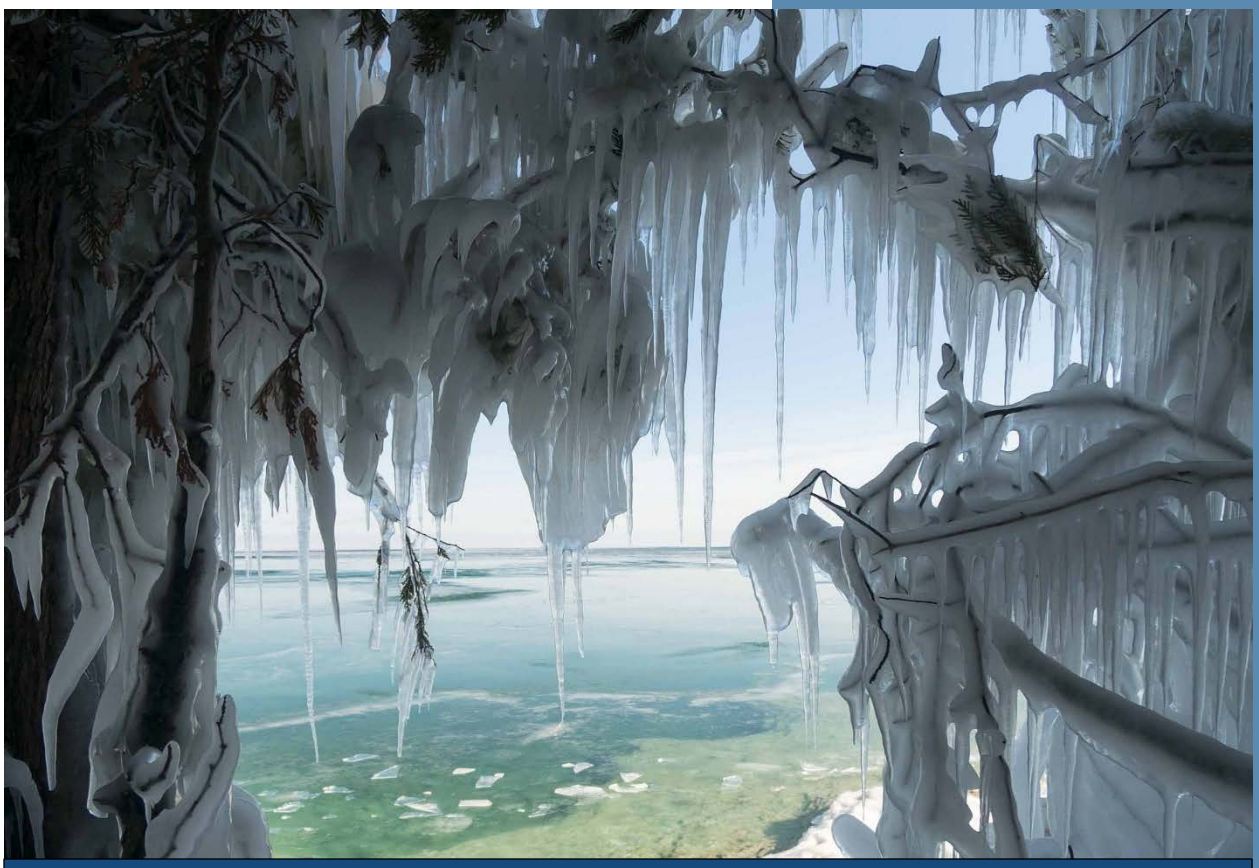

Proceedings Report on Great Lakes Coastal and Nearshore Habitat Assessment Project—Wisconsin

January 14, 2020

University of Wisconsin—Green Bay

2420 Nicolet Drive

Green Bay, WI 54311

9:00 am – 4:00 pm

Prepared for:

Coastal States Organization

Wisconsin Coastal Management Program

FINAL

3/25/2020

LimnoTech

Water Environment | Scientists Engineers

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Prepared by:
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501 Avis Dr
Ann Arbor, MI 48108

Funding for this project provided by Great Lakes Restoration Initiative

Workshop developed in partnership with:

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Introduction

Many Great Lakes shoreline reaches have deteriorated in function and quality due in part to land use change, shoreline alterations, coastal infrastructure, and other influences. Effective restoration actions in these dynamic, complex systems require integrated approaches to enhance coastal biodiversity and promote ecological resilience. To help facilitate the development of these approaches, National Oceanic and Atmospheric Administration (NOAA), the Coastal States Organization (CSO), and Great Lakes Coastal Zone Management Programs conducted workshops in each of the eight Great Lakes states. These workshops were an opportunity for state-level partners to influence the direction of potential future restoration actions in the Great Lakes, and to advocate for funding to be spent at state-prioritized locations for coastal management and habitat objectives.

The overarching purpose of these workshops was to convene stakeholders and partners and to identify shared coastal management principles, goals, priorities, currently available data sources, and outstanding data needs. Emphasis was on identifying, to the extent possible, place-based actions; partners who could support the planning, execution, and maintenance of restoration actions; and identifying and describing data needs associated with these preferred actions. To meet these objectives, state partners developed invitee lists that drew from a wide range of partners, including representatives from local, state, federal, and tribal organizations operating in the Lake Michigan and Lake Superior watersheds. A full summary of the workshop invitees and attendees is provided in Section 5. The workshop results are based on the events of the day and participants in attendance. While efforts were made to invite attendees from both of Wisconsin's Great Lakes watersheds, representation from the Lake Superior region was limited, often due to the travel required to attend the workshop. Organizers made an effort to invite a representative, broad based group of experts. Results are not intended to replace or supplant any current or future planned processes.

This report covers the proceedings of the one-day workshop held in Green Bay, WI on Tuesday, January 14, 2020 as well as the background materials used during the workshop.

1 Morning Session (9:00 AM – 12:00 PM)

1.1 Opening Remarks

Mike Molnar from the Coastal States Organization (CSO) and Mike Friis from the Wisconsin Coastal Management Program (WCMP) started the meeting with introductions and by providing the following background on the workshops:

This series of workshops is an outgrowth of three years of work between CSO, the US Army Corps of Engineers (USACE), NOAA, other Federal Agency partners, and each of the Great Lakes State Coastal Programs to address coastal resiliency issues in the Great Lakes Region. Group efforts originally focused on developing scope of work, and securing funding for the Great Lakes Coastal Resiliency Study (GLCRS). The purpose of the proposed GLCRS was to assess coastal conditions, and develop a risk based management approach for the next 50 years. While the GLCRS did not receive funding in the FY20 USACE budget, and future direction is uncertain at this time; this workshop is an outgrowth of the GLCRS discussions and an opportunity to align state habitat restoration needs with the EPA Great Lakes Restoration Initiative (GLRI) Action Plan. Funding for the workshops provided by agreement with NOAA Office for Coastal Management via US EPA GLRI Focus Area 4. State-level partners worked together to identify and numerically rank habitat restoration projects that align with the restoration goals identified by the GLRI *Focus Area 4—Species and Habitat* in the draft GLRI Action Plan III (USEPA, 2019). The study area for restoration projects extends from the 80-m bathymetry contour in Lake Michigan and Lake Superior waters to the ordinary high water mark including terrestrial or inland aquatic habitats including "connecting habitats for coastal species or critical zones of influence for priority nearshore areas" (FA4 Coastal Systems Work Group). (Figure 1).

The goals of this workshop are to:

1. Identify shared coastal management principles and goals for Wisconsin;
2. Develop a list of coastal and nearshore habitat restoration projects for funding in FY21 and beyond that target habitat benefits for lake trout, walleye, lake sturgeon, yellow perch, cisco, and migratory birds and waterfowl; and,
3. Develop a list of available data, identify gaps, and prioritize data needs.

At the conclusion of all state workshops, NOAA will coordinate with other state and federal partners to identify funding mechanisms and determine potential projects to fund. NOAA OCM, NOAA Restoration Center, USFWS, USACE, USGS, EPA, and NFWF, amongst other funders, will look to this list for projects to fund.

Figure 1. Map of the Wisconsin Study Area

1.2 Overview Workshop and Agenda

The workshop agenda is summarized in Table 1.

Table 1. Workshop Agenda

Workshop Segment	Purpose	Format
Introduction (9-9:20 AM)	Describe workshop purpose, preview agenda	Welcome and introductory statements
Icebreaker Activity (9:20-9:40)	Prepare group for interactive workshop	
Shared Principles and Goals: An overview of state and regional plans (9:40-10)	Prepare audience for discussions by providing overview of past communicated priorities, and identifying alignments with GLRI Action Plan III Focus Area 4	Very brief presentation summarizing state-level reports and GLRI Action Plan III Focus Area 4
Identification of Coastal Habitat Principles (10-10:25)	Start prioritization process by considering high-level principles guiding action	Small group brainstorming and reporting cycles for two questions prompting discussion
Mid-Morning Break		
Identification of Coastal Habitat Goals (10:45-12:00)	Transition to identification of regional or species-specific goals, target 3-5 goals per region	Small group brainstorming organized by region
Lunch Break		
Identifying and Prioritizing Projects and Locations: An overview of state and regional plans (12:30-12:50)	Prepare audience for discussions of project prioritization and data needs by summarizing past projects	Very brief presentation summarizing past projects
Identification and Prioritization of Project Locations (12:50-2:20)	Roughly, identify extent of potential projects and prioritize these. Complete worksheets summarizing potential project details.	Small group identification of potential projects on physical maps organized by region
Mid-Afternoon Break		
Overview of Data Availability (2:35-2:45)	Prepare audience for discussion of data gaps by summarizing presently available data	Very brief presentation of available data related to habitat
Collaborative Identification of Data Needs (2:45 – 3:45)	Identify data gaps and articulate why these data are needed. Complete worksheets summarizing data needs.	
Wrap-up and Evaluation (3:45 – 4)	Note forthcoming reports and request completion of evaluation forms	Paper evaluation form

1.3 Shared Principles and Goals: A Review of State and Regional Plans

Before working together to identify common habitat restoration goals and principles, LimnoTech staff gave a brief presentation highlighting regional principles and goals for habitat restoration in Lake Michigan. The purpose of this presentation was to help workshop attendees consider their own principles and goals related to habitat restoration in both Lake Michigan and Lake Superior.

LimnoTech first started by defining the terms "principles" and "goals", and then gave several examples from the GLRI Action Plan III and the Lake Michigan Biodiversity Conservation Strategy (Pearsall et al., 2012). Principles were defined as foundational science-based ideas that would influence action. Goals were defined as the desired result of an action. Principles and goals from the GLRI Action Plan III and The Lake Michigan Biodiversity Conservation Strategy are summarized in Figures 2 and 3. To link the regional plans to state-level planning efforts, LimnoTech also presented several principles and goals from several state-level reports (WCMP, 2011; WDNR, 2015; WDNR OGL, 2009). These principles and goals are summarized in Figure 4.

LimnoTech discussed how alignment exists between principles and goals defined in past reports and the objectives, commitments, and measures expressed in GLRI Action Plan III Focus Area 4 (Habitat and Species). Attendees were encouraged to identify alignment between their current principles and goals expressed during the workshop, and the GLRI action plan.

Focus Area 4: Habitats and Species	4.1. Protect and restore communities of native aquatic and terrestrial species important to the Great Lakes.	• Identify, restore, and protect habitats and provide habitat connectivity to support important species and associated habitats.
	4.2. Increase resiliency of species through comprehensive approaches that complement on-the-ground habitat restoration and protection.	• Update and implement recovery actions for federal threatened, endangered, and candidate species. • Support population-level protections, enhancements, and re-introductions for tribal, state, and Great Lakes native species of importance.

Figure 2. Summary of Focus Area 4—Species and Habitat Principles and Goals Excerpted from GLRI Action Plan III (USEPA, 2019)

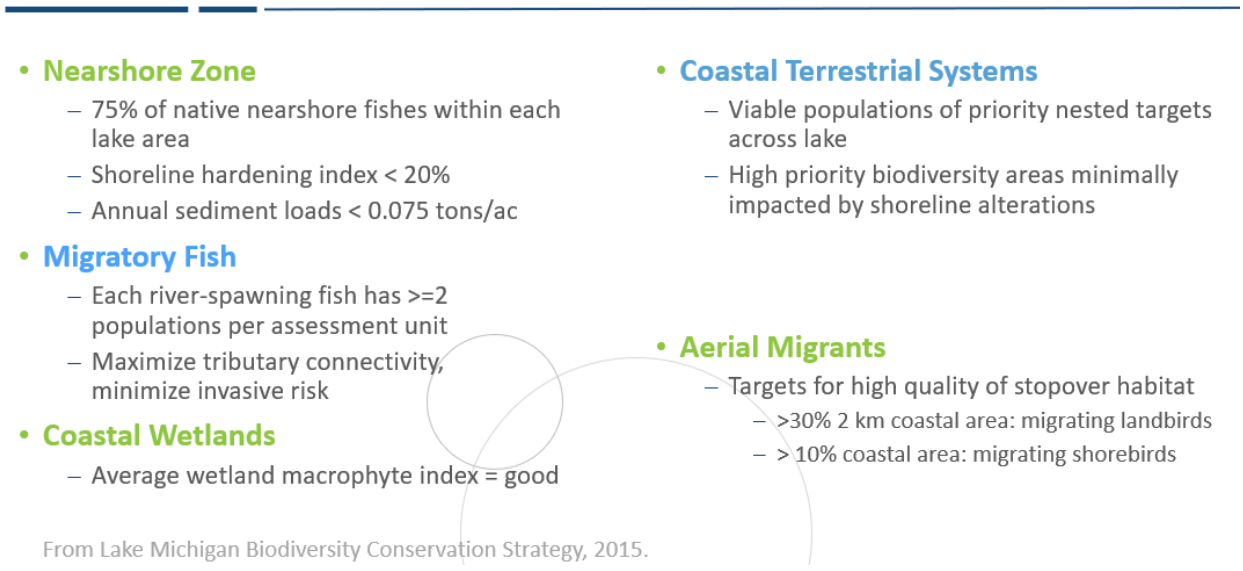

Figure 3. Summary of Select Habitat Restoration Goals Presented in the Lake Michigan Biodiversity Conservation Strategy (Pearsall et al., 2012)

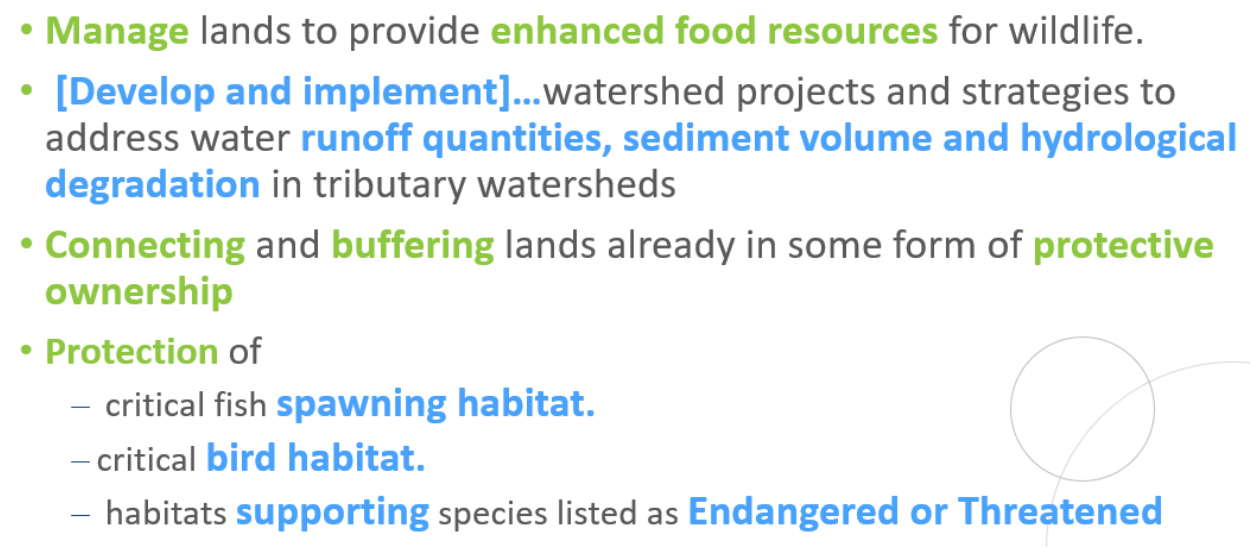

Figure 4. Summary of Select Principles and Goals from Wisconsin State-Level Reports (WCMP, 2011; WDNR, 2015; WDNR OGL, 2009)

1.4 Identifying Principles

During an approximately 25-minute interactive session, workshop attendees organized themselves into groups of approximately six people and responded to the following prompt:

1. What do you think are the key principles for achieving success in nearshore habitat restoration in the great lakes and/or your state?

Each small group reported out on three words or phrases representing the key principles underlying successful habitat restoration projects (Figure 5 and 6). The words and phrases could generally be broken into four broad categories: partnerships and planning, support, science and data, and sustainability. The full results from the first prompt are summarized in Table 2.

After each group reported out their key principles for a successful habitat restoration project, participants were asked if any principles were missing. Workshop participants expressed the importance to having a person to coordinate activities across all partners involved in habitat restoration, and how it is usually difficult to fund this type of position, despite its importance. Participants also further discussed to importance of project resiliency and sustainability. Projects that are sustainable and resilient require a long-term funding commitment to perform maintenance on the site after completion.

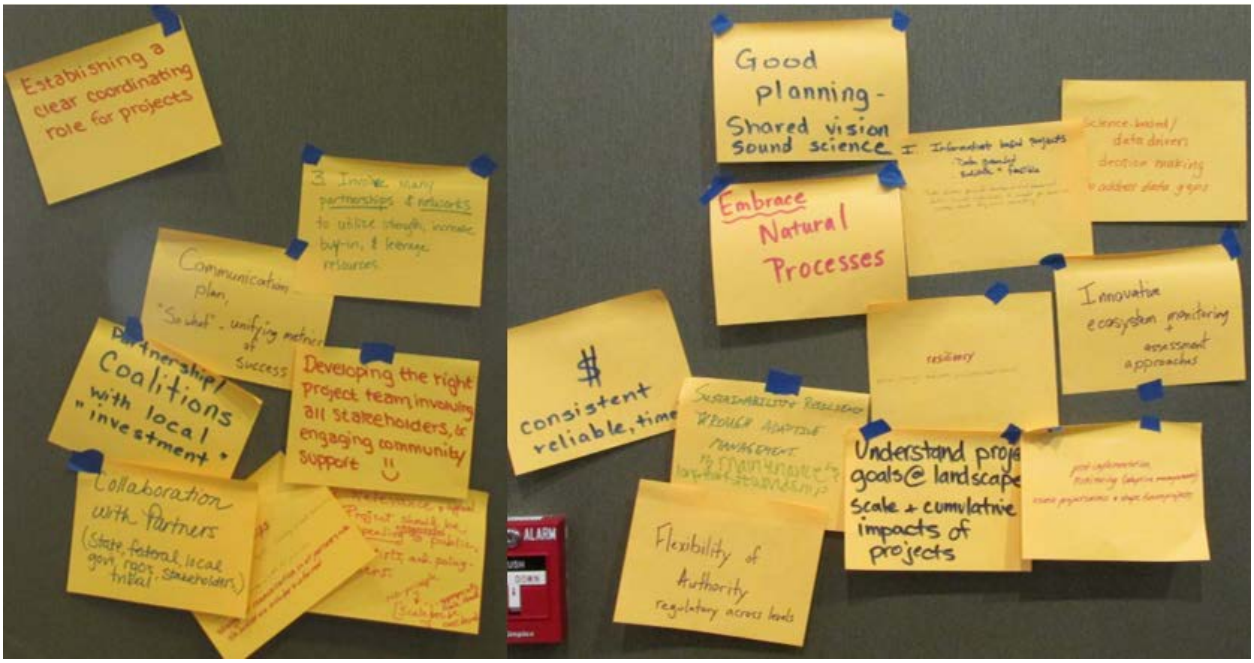

Figure 5. Snapshot of the Results from the Principles Discussion

Figure 6. Participants Working Together to Develop Common Principles

Table 2. Summary of Key Principles Reported by Each Working Group

Category	Key Principle	Further Details
Partnerships and Planning	Clear coordination across all partners and having an explicit role	A coordinator role should be identified and someone is taking responsibility to ensure that the multiple pieces are moving forward. Important to share information across boundaries to share information about projects, funding sources, etc. It should be noted that this type of role is really important, but it can often be difficult to find funding for it.
	Collaboration with all partners: state, local, federal, tribal, private land owners	Doing this increases project buy-in and leveraging resources. Without coordinating with all partners and stakeholders these projects won't happen.
	Communication plan	The communication plan addresses the "SO WHAT" and unifies the metrics of success. Within partnerships and with the public, having metrics that can be communicated across all people involved. Letting people connect to the project's outcomes in a way that is meaningful to them.
	Developing the right project team involving all stakeholders and engaging community support	
	Good planning	This means shared vision and sound science.
	Partnerships and coalitions with local investment	
	Relevance and appeal of the project on a broad scale	It should be relevant and appealing to the public as well as scientists. An appropriate scale should be considered. Everyone understands the value of the project regardless of what that perspective is

Category	Key Principle	Further Details
Support	Consistent funding for operations and management of restoration projects	Developing the partnerships that will help support this.
	Consistent, reliable, and timely money	Funding should be available in a timeframe that meets your project need
Data/Science	Importance of on-going monitoring and long-term data sets	Post-implementation monitoring should be implemented to develop lessons learned during the project
	Need for innovative ecosystem monitoring and assessment approaches	Examples: remote sensing using drone surveys. Incorporate new approaches to old problems. Faster and more accurate data collection. Incorporating citizen science when possible
	Realistic and feasible	The project needs to be data based and possible
	Science based and data-driven decision making to address data gaps	
Sustainability	Adaptive management	The project needs to be sustainable and resilient
	Consider goals across a landscape perspective	How does your project fit into a larger series of goals and objectives
	Embrace natural processes	Respect the context of the site and dominant natural processes
	Resiliency	Planning the project in the context of climate resiliency. Is the plan adaptable? Does it accommodate future conditions?

1.5 Break (15-min)

1.6 Identifying Goals

During an approximately 90-minute interactive session, workshop attendees worked together to identify a common set of goals that could be used to later prioritize habitat restoration projects. Participants self-organized into one of four groups: Lake Michigan South, Lake Michigan North, Green Bay, and Lake Superior (Figure 7). Due to the number of participants interested in working in Green Bay, three additional groups were created: Green Bay #1, Green Bay #2, and Green Bay #3. This resulted in six total groups. The study area for restoration projects extended in from the 80-m bathymetry contour in lakes Michigan and Superior to one coastal county inland. Each group was asked to develop two goal statements related to their region of interest (Figures 8 through 12).

When setting goals, participants were asked to be specific. Each goal statement needed to contain the following four elements:

1. The *subject or resource of concern*
2. The *characteristic or attribute* for the subject or resource of concern
3. The *desired future condition or conceptual target* for that attribute within a 10-year implementation timeframe
4. A measure, if possible

Using these four elements, an example of a full goal statement could be something like “hydrologic connectivity will be restored (by 10%) for fish species that spawn in upstream tributaries”.

Each small group reported its goal statements to the full group, and a nominal voting process was conducted to prioritize goals. The nominal voting process allowed all workshop participants to comment on goal statements that they were not able to directly participate in identifying. To vote, participants were given one green dot for each group. For each group, participants had to select their highest priority per region using a green dot. The goal statements and the results of the nominal voting process are summarized in Table 3.

After the nominal voting was completed, there was a group discussion about unease around selecting only one goal per group. Many participants felt that both of their group goals were equally important and that both should be used. Workshop staff acknowledged the limitations of focusing on projects that relate to a subset of the goals developed by participants, but it was a necessary step to limit the scope of projects that could be discussed in the next section of the workshop, and to arrive at a final ranking of projects. Projects selected during the next segment of the workshop could meet both goals, but they had to meet the top goal selected by the group.

There was also discussion around what would make an appropriate project. According to the workshop team, an ideal project would be something that is achievable to do (as highlighted in the “principles” section), has a geographic footprint, and that has a cost associated with it larger than what the state normally could fund so a budget can be developed.

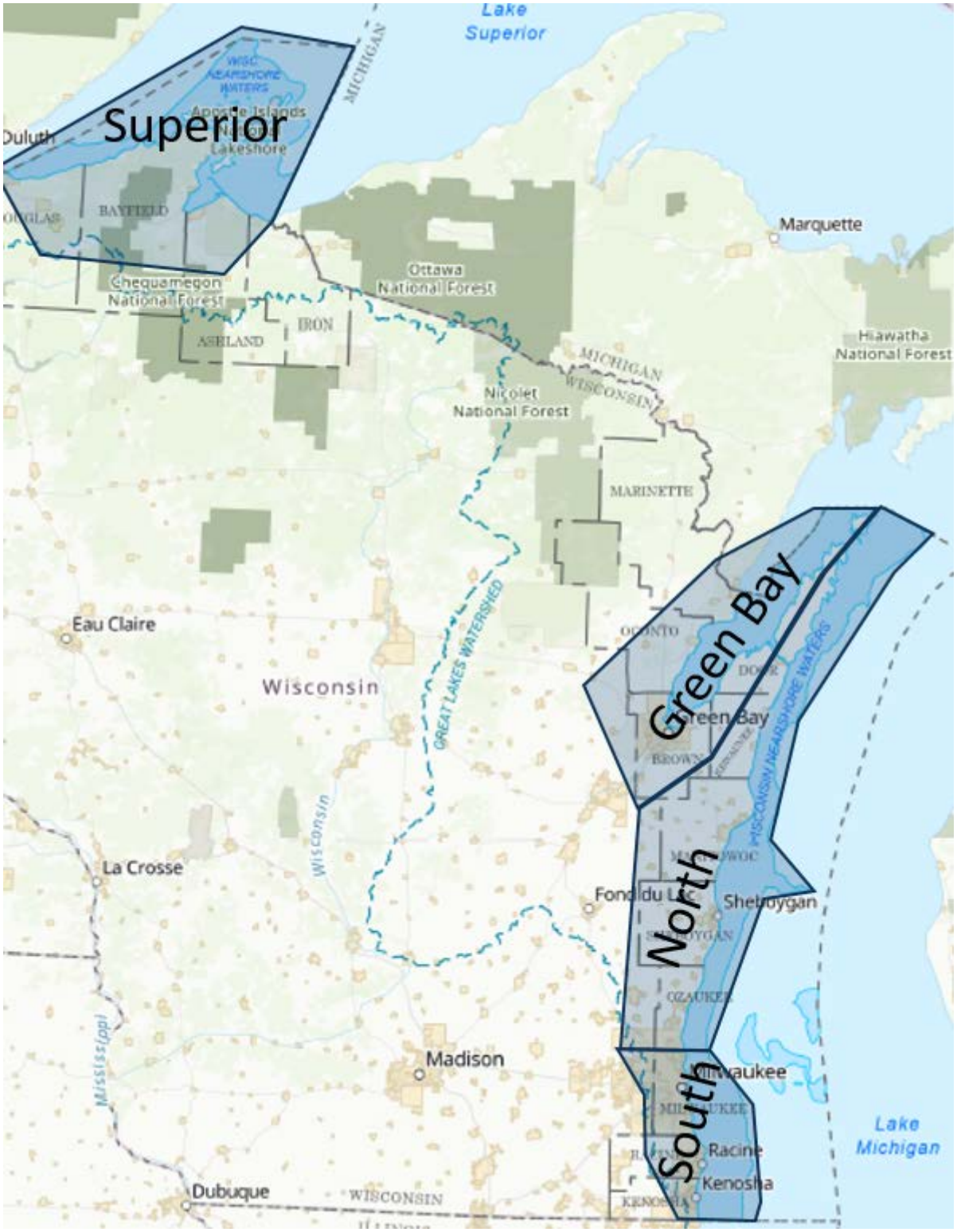

Figure 7. Map of Wisconsin Coastlines and the Approximate Geographic Extent of the Four Groups: Lake Michigan South, Lake Michigan North, Green Bay, and Lake Superior

Figure 8. Green Bay Group Three Developing Goal Statements

Figure 9. Lake Michigan South Group Developing Goals Statements

Figure 10. Lake Michigan North Group Developing Goals Statements

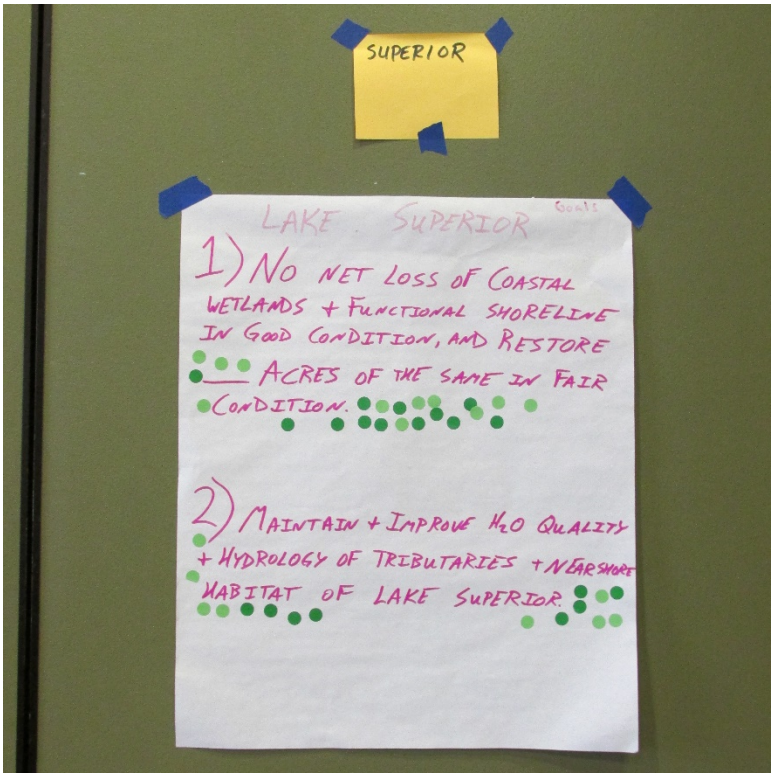

Figure 11. Sample Goal Statements for Lake Superior Group

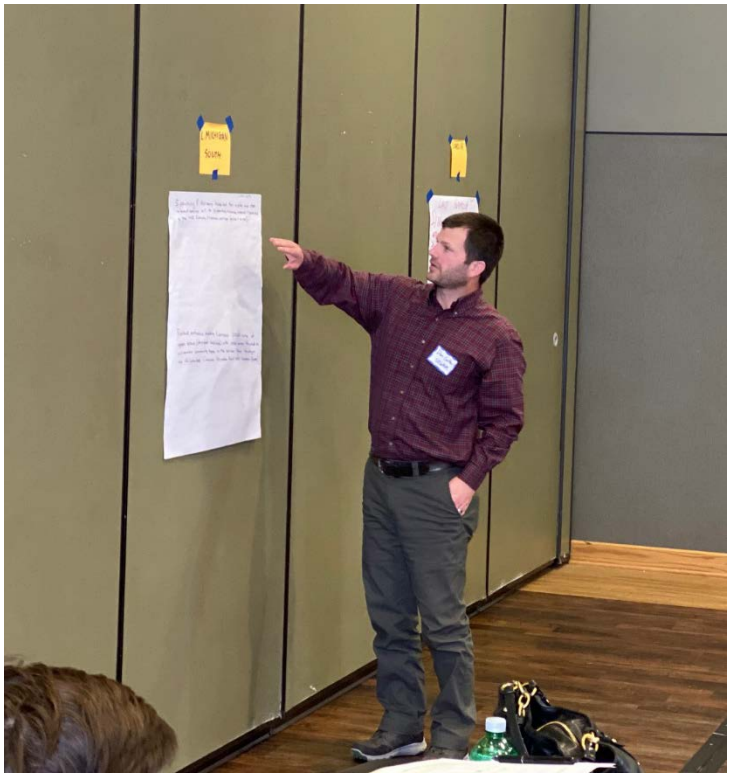

Figure 12. Presentation of Goal Statements by Lake Michigan South Before Nominal Voting by the Larger Group

Table 3. Summary of Goal Statements by Region and the Results of the Nominal Voting Process

Region	Goal	Additional Comments	Green Dot
Lake Michigan South	Protect, enhance, restore, and connect 2,500 acres of open space (stop-over habitats) with 1,000 acres focused on vulnerable community types in the corridor from Waukegan to Milwaukee (includes Chiwaukee Prairie SNA-Kenosha Dunes).	There is a lot of development in this region so habitat availability is a limiting factor	36
	Spawning and nursery habitat for northern pike and other relevant species will be protected, enhanced, restored, and connected to the Milwaukee estuary and riparian corridor (targeting miles and acres).		8
Lake Michigan North	No net loss of coastal wetlands and functional shoreline in good condition, and restore "to-be-determined" acres of the same in fair condition.	We are going to use existing data to help us quantify this	37
	Maintain and improve water quality and hydrology of tributaries and nearshore habitat of Lake Superior	Sedimentation and flashiness is a big issue in this region	7
Green Bay #1	Protect, enhance, or restore natural features of estuaries, small streams, and river mouths by up to 50% within the greater Green Bay ecosystem by 2030.		35
	Enhance and protect existing additional undeveloped shorelines within Green Bay by 2030.		9
Green Bay #2	Preserve, enhance, and/or restore "to-be-determined" acres or kilometers of coastal wetlands for high priority migratory birds by 2030.		26
	Identify, protect, enhance, and/or restore important tributary and spawning reef habitat for high priority nearshore fish species.		11

Region	Goal	Additional Comments	Green Dot
	Preserve, enhance, and/or restore "to-be-determined" acres or kilometers of open substrates and/or undeveloped/unhardened shoreline for high priority migratory birds by 2030.	We mean beach or mudflat habitat that is open	5
Green Bay #3	Improve benthic and fish habitat of mid-Green Bay where hypoxia impairments occur. Reduce the 3-year running annual average days of hypoxia by 50% relative to the 2013-2019 annual average level at the primary monitoring station by 2030.		33
	Improve the reef habitat "system" in Green Bay by increasing functional size and quality by "to-be-determined" acres and "to-be-determined" metrics of quality attributes by 2030.	Similar to GB-2's reef goal. There is a lot that we don't know about this topic so it is challenging to quantify	11
Lake Superior	No net loss of coastal wetlands and functional shoreline in good condition, and restore "to-be-determined" acres of the same in fair condition.	We are going to use existing data to help us quantify this	27
	Maintain and improve water quality and hydrology of tributaries and nearshore habitat of Lake Superior.	Sedimentation and flashiness is a big issue in this region	18

2 Afternoon Session (12:30 PM – 4:00 PM)

2.1 Identifying and Prioritizing Projects and Locations: A Review of State and Regional Plans

Before working together to identify and prioritize habitat restoration projects, LimnoTech staff gave a brief presentation highlighting the different types of restoration projects targeted by the GLRI and examples of both GLRI-funded habitat restoration projects and other types of habitat restoration projects that have been funded in the state. The purpose of this presentation was to provide some background of recently completed and planned projects in the state to help spur conversations between participants.

According to GLRI Action Plan III, the GLRI funds habitat restoration projects that target the "...protection, enhancement, rehabilitation, and restoration" of ecosystems. LimnoTech provided definitions for the four types of projects and examples of projects recently completed in Figures 13 and 14 (USEPA, 2016).

Figure 13. Types of Habitat Restoration Projects as Defined by USEPA (USEPA, 2016)

Restoration Type	GLRI Funded Projects	Other Wisconsin Projects
Protection	Chiwaukee Prairie State Natural Area …[protection of] 12 acres in…coastal wetlands complexes	Saxon Harbor Coastal Conservation Iron County purchased 112 acres of coastal forest along Saxon Harbor…
Enhancement	Aders Creek Restoration and Wetland Enhancement …install in-stream woody debris to restore and enhance 5,000 feet of stream and four wetlands on the Brillon Wildlife Area	Ulao Creek fish and wildlife habitat enhancement and restoration project …a large-scale…restoration project that is restoring multiple stream reaches [and includes] wetland enhancement
Re-establishment	Pike River Wetland and Fish Habitat Restoration …restore 21 acres of wetland habitat and 60 acres of prairie habitat along the Pike River in the Lake Michigan watershed.	Cat Island Chain Restoration in Green Bay Using dredged sediment to recreate 1960s footprint of the Cat Island Chain
Rehabilitation	Restoring Fish Habitat at Wequiock Creek Estuary Control invasive Phragmites, remove accumulated sediment…to restore 91 acres	Wisconsin Point Dune Restoration [Restoration of] dunes that have been degraded and [revegetation] with stabilizing native plants.

Figure 14. Examples of Funded Projects in the State of Wisconsin

2.2 Identifying and Prioritizing Locations

During an approximately 90-minute interactive session, workshop attendees brainstormed potential project locations and marked up maps to document these projects (Figures 15 through 17). Each group then presented two of their proposed projects, and summarized how these locations align with principles and goals for regional habitat restoration that were developed in the morning session. There was a brief question and answer period after each group presented their proposed projects. Answers to these questions were integrated into the project descriptions.

After each group pitched their top two projects, all workshop attendees were given the opportunity to vote on them using sticky dots and multiple rounds of voting. Multiple rounds of voting were required to narrow down the list of top projects from one per group (for a total of six) to one per region (for a total of four). A final round of voting was then required to rank the top four projects in numeric order. The number of rounds and the purpose of each voting round are summarized in Table 4. First, attendees were asked to select the top project for each of the six groups. In a second round of voting (using a red dot), participants were then asked to select top project among the three projects selected from groups Green Bay #1 through #3. Finally, in a third round of voting, participants were asked to select their top project across all four regions: Lake Michigan South, Lake Michigan North, Green Bay, and Lake Superior. The top projects from each of the four regions then went on to a third and final round of voting. Participants were each given one purple dot and asked to select their top project out of all the regions. This resulted in a ranking of all the top projects across all the regions. This information is summarized in Table 5.

After the ranking process, many attendees noted that this step was heavily weighted toward the region with the greatest number of attendees in the room. To ensure that no project information was lost, all projects that were discussed by individual groups are included in Attachment A.

Figure 15. Lake Michigan North Group Discussing Proposed Project Locations

Figure 16. Lake Superior Group Discussing Proposed Project Locations

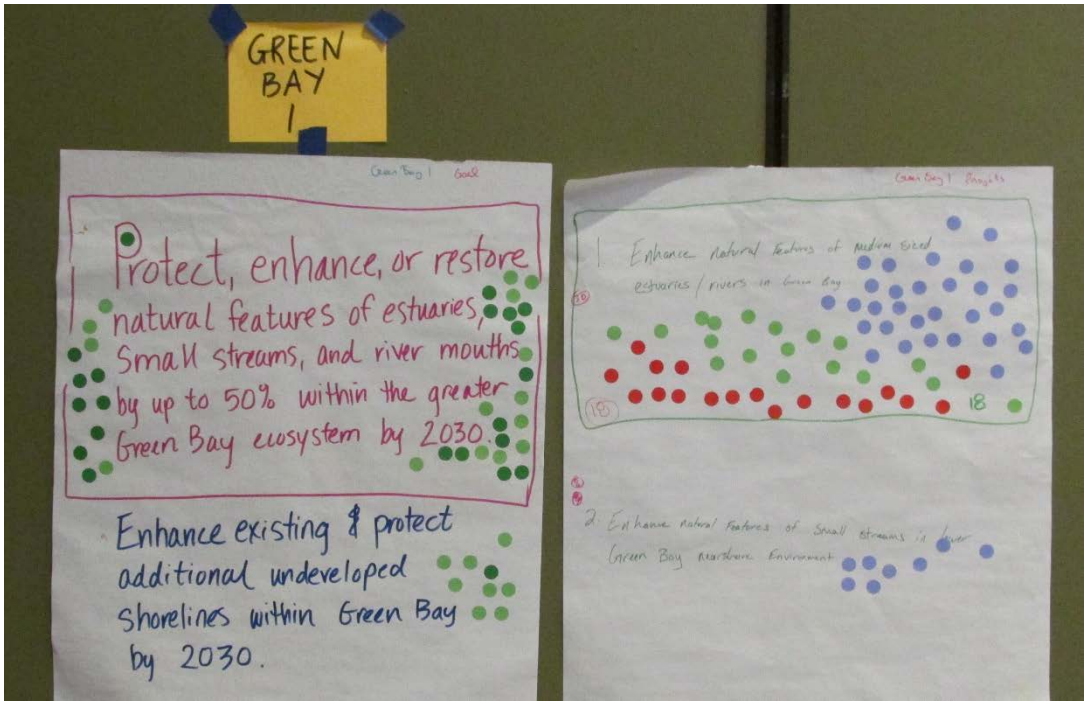

Figure 17. Participant Voting on Proposed Project Locations

Table 4. Summary of Voting System

Round	Purpose	Dot Color
1	Select one top project for each of the six groups: Lake Michigan South, Lake Michigan North, Green Bay 1, Green Bay 2, Green Bay 3, Lake Superior	Green
2	Select one top project across all three Green Bay groups	Red
3	Select one top project from the top projects in the following regions: Lake Michigan South, Lake Michigan North, Green Bay, Lake Superior	Purple

Table 5. Summary of Proposed Projects by Lake

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
Lake Michigan South	1	Kenosha Dunes	This area is ~2,500 acres. A subset of that acreage (40 ac) is relict Holocene dunes, there are over 400 rare plant species there now and perch use it for spawning. It's very popular with the public, and part of a migratory corridor for birds. With rapid rise of water levels, there has been devastating erosion with losses around 25-30 ft/yr. At this loss rate, we are losing critical plant habitat. This project would involve constructing offshore protective structures (sills) to promote resilient shoreline/dune habitat and it would provide artificial reef habitat. We also have the opportunity to restore an area that connects the shore to the upland areas. Currently we have a grant from FWS for engineering design. It will be completed by the end of the summer, so we will be ready to move toward physical action in 2021.	24	1st	—	—	7	3rd
	2	Chiwaukee Prairie SNA: Pike River corridor restoration	This project would focus on the acquisition and restoration of 600 acres of prairie, Restoration efforts would include invasive species management. This region is a biodiversity hotspot, and it is near several other high quality habitats.	19	2nd	—	—	—	—

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
			It has plant diversity similar to Chiwaukee Prairie, and it's where the prairies meet the forest. It will let us connect several remaining areas of high biodiversity, and potentially reconnect many isolated wetlands.						
Lake Michigan North	1.1, 1.3, 1.8	Improve aquatic connectivity within three Lake Michigan watersheds	This project will increase connectivity via removal/remediation of impediments such as dams and failed culverts in three large tributaries to Lake Michigan (Kewannee, Saulk/Sucker, and Ahnapee Rivers). This project will help many of the target fish species (such as lake sturgeon) as well as migratory birds by reconnecting previously disconnected habitat. After projects are completed in these three watersheds, we want to use the lessons learned to build capacity in other watersheds (by using the model we are developing for these three watersheds). These projects are underway but need more support.	23	1st	—	—	8	2nd
	2.1-2.7	Acquire Lake Michigan stopover habitat	This project will allow us to acquire some private lands and improve existing ones for migratory birds. We are targeting approximately 500 acres.	18	2nd	—	—	—	—

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
			Current and past condition of the sites varies greatly. Some are currently agricultural land. This would be enormous for people in the region. Improved outdoor opportunities and improved water quality.						
Green Bay #1		Enhance the natural features of medium sized estuaries and rivers in Green Bay	This project targets Duck Creek, and the Peshtigo, Oconto, Menominee, and Pensaukee rivers These projects are mostly focused on enhancement, but here are also some opportunities for rehabilitation and protection. Duck Creek is in poor condition, but the other four are in fair-to-good condition. These projects would focus on invasive control (such as Phragmites) because these plants are currently harming fish and wildlife diversity. We would reintroduce native plants and restore native animal populations. This would benefit migratory waterfowl, yellow perch, walleye, sturgeon, and a number of other native species. There are many potential partners for this project including WDNR, TNC, USFWS, UWGB, Duck Unlimited, Oneida Nation, and other local municipalities.	30	1st	18	1st	18	1st

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
			These projects are in a variety of states of readiness. Some are ready to go right now while others are in the planning phase.						
		Enhance natural features of small streams in the lower Green Bay nearshore environment	This project is similar to the other project proposed by our group, but here we are focusing on smaller tributaries and estuaries. These are places that fuel the Green Bay system. Nutrients are coming into Green Bay via these smaller tributaries. These other places have do-able projects. This project would seek to control invasives and thereby enhance the nearshore environment and impact native plants and animals, many of which we are targeting in this workshop. Enhancing natural features in these small streams would allow for the interception and sequestration of nutrients, and would help sustain populations of desirable species. These enhancements would also improve recreational opportunities.	8	2nd	—	—	—	—
Green Bay #2		Oconto Marsh wetland project	Currently, the high water condition in this area is resulting in a lack of emergent vegetation, and some property damage (due to erosion and flooding). There has also been a Phragmites invasion which has impeded access to and views of the bay.	21	1st	2	—	—	—

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
			We want to install a wave break that would increase wetland area to the north. We could also enhance wetland acreage to the south by controlling invasive plants. This would benefit a large number of target species and could impact more than 600 acres. There would also many opportunities to enhance wetlands in this region also. many partners ready: Oconto Sportsmen's Club, USACE, private landowners and WI DNR						
		Private land acquisition in Green Bay	We would be acquiring private lands to improve and restore coastal wetlands. In addition to improving and restoring coastal wetlands, we would also restore flood plains and wetland connection to Green Bay. The goal would be to create habitat improvements that create complex, multipurpose habitats that would target multiple species of interest. The final spatial extent will be determined by what we can work out with private landowners. This is currently at the concept stage.	19	2nd	—	—	—	—
Green Bay #3		Establishment of a pay-for-performance program to	This project has a very limited, specific goal: We know that most of the phosphorus coming into Green Bay comes from the Fox River (~2/3 of the total	40	1st	17	2nd	—	—

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
		reduce phosphorus inputs to Green Bay	load). Our project is pay-for-performance on agricultural land. We won't tell land owners how to achieve these reductions, but we will incentivize those reductions however they are achieved. We want to start in the five subwatersheds that contribute the most load (located in the lower Fox River watershed), letting communities improve their own water quality conditions and then work our way up the watershed. We think this is really what needs to happen to improve Green Bay. If we are going to improve the water quality in Green Bay we need to deal with phosphorus loading from the Fox River. Private land owners are key partners in this, but we also know of willing partners at county LCDs, WDNR, NRCS, and others.						
Lake Superior		Allouez Bay and Nemadji River restoration	This is a project located in the St. Louis River estuary at the mouth of the Nemadji River and Allouez Bay. This area is a historically a hotspot of migrating birds and nesting marsh birds, but the quality of the habitat has degraded over time. This project would target 200 acres for restoration and enhancement. In Allouez Bay we would use plantings to re-establish	25	1st	—	—	6	4th

Region	Map #	Project	Further Details	Round 1 Score	Round 1 Rank	Round 2 Score	Round 2 Rank	Final Score	Final Rank
			wild rice, and in the Nemadji River we would use dredged materials to rebuild coastal wetlands. The goal would be to improve the interspersion of existing wetlands in the area and to re-establish habitat in the mouth of the Nemadji. In addition to the wildlife benefits, there are also many social benefits for indigenous communities in the region (related to the planting of wild rice).						
		Fish Creek wetland and bluff restoration	There are similarities between the Allouez Bay/Nemadji River project and this project in Fish Creek. This project will target 200 feet of streambank for stabilization, which will reduce erosion and sedimentation into Fish Creek and Chequamenon Bay. It will also benefit migratory birds, wood turtle, and result in improved fish nursery habitat. This project has been fully designed, and just needs land owner buy-in.	16	—	—	—	—	—

2.3 Break

2.4 Overview of Data Availability

Before working together to identify data needs, LimnoTech staff briefly presented their understanding of data gaps for the state of Wisconsin. Data gaps were described in terms of presence/absence, spatial resolution (low to high), and temporal resolution (low to high). As part of the data gap analysis, LimnoTech identified thirty-four types of data that could be useful for planning habitat restoration projects. This list of data types was generated after a review of papers produced as part of the Great Lakes Aquatic Habitat Framework (GLAHF) (Kovalenko et al., 2018; Wang et al., 2015) and an in-house review by a LimnoTech fish biologist.

In summarizing datasets, LimnoTech divided data sets into three groups: physical, biological, and environmental (Figures 18 through 21). A glossary of terms used in Figures 18 through 21 can be found in Section 6.

- **X**
  - We have found a dataset that matches the metric
- **OK**
  - sufficient level of information for project-scale work
- **LOW**
  - The resolution of the data is technically insufficient to complete project-scale work
- **MODERATE**
  - The resolution of the data is more coarse than desired to complete project-scale work, but useable
- **HIGH**
  - There is sufficient high-resolution to use this dataset for project scale work

Spatial Resolution	Temporal Resolution
Ok	Ok
Low	Low
Moderate	Moderate
High	High

Figure 18. Summary of Shorthand Used in Data Gap Analysis Presentation

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Discharge infrastructure: volumes and types	X	Ok	Ok	NPDES permits
Ecoregions (ecoprovinces)	X	Ok	Ok	
Dams (river access)	X	Ok	Ok	
Road crossings	X	Ok	Ok	
Shoreline classification	X	Ok	Ok	
Stream mouths (watershed pour points)	X	Ok	Ok	
Watersheds	X	Ok	Ok	
Bottom ruggedness (rugosity)				GAP
Bottom slope	X	Low	Low	Derived depth & relief
Connectivity to adjacent habitats				GAP
Hydrogeoforms	X	Low	Low	Derived depth & relief
Relative exposure index (REI)				GAP
River substrate				GAP
Spawning reefs	X	Ok	An update?	Many old srcs, 2011
Substrate composition, variability, and distribution	X	Low	Low	2015, GLAHF 30-m
Water depth	X	High	Moderate	LMCP
Wave energy	X	Moderate	Moderate	USACE modeled results
Wave height	X	Low	High	GLOS buoy (no win. data)

Figure 19. Data Gap Summary for Physical Data

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Benthos (trophic str/function)	X	Moderate	High	GLNPO points, most recent 2011
Coastal wetlands	X	Moderate	Ok	MTRI 12.5-m, high res in Old Woman Crk
Fish (trophic str/function)	X	Moderate	Moderate	Primarily from CSMI
Plankton (trophic str/function)	X	Moderate	High	GLNPO data, may not be sufficient depending on project location
Prevalence of invasive species	X	Moderate	Moderate	GLANSIS, most recent 2014 Phragmites stands
Submerged aquatic vegetation (presence/absence)	X	Moderate	Moderate	Mich. Tech Research Inst, 2012, 30-m
Vegetation density				GAP (looking for SAV)
Vegetation heterogeneity				GAP (looking for SAV)
Vegetation morphotype				GAP (looking for SAV)
Vegetation species composition				GAP (looking for SAV)

Figure 20. Data Gap Summary for Biological Data

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Chlorophyll-a	X	High	High	Lk Superior NERR data
Turbidity	X	High	High	Lk Superior NERR data
Suspended minerals				GAP
Water temperature (incl. timing/variability)	X	Low	Moderate	Derived from NOAA coastwatch satellite
Dissolved oxygen	X	High	High	Lk Superior NERR data
Turbidity	X	High	High	Lk Superior NERR data

Figure 21. Data Gap Summary for Environmental Data

2.5 Collaborative Identification of Data Needs

Data was discussed two ways during the workshop. The two-step approach was used to try to encourage and capture conversations related to data throughout the course of the workshop. The first method was to use a data wall (Figures 22 and 23). On the data wall, workshop participants had the opportunity to identify two types of datasets: those that they needed and those that they had. Participants were also able to qualitatively identify the spatial resolution of the data (ranging from basin scale to local scale) and the temporal resolution of the data (ranging from sampled once to sampled annually). Table 6 summarizes the data needs identified using the data wall. Additional workshop discussion items related to data needs follow this table.

The second way that data was discussed was by having participants return to their project groups. Participants were asked to consider three questions:

1. Do you have data to fill the identified data gaps?
2. What data do you need to complete your proposed project?
3. What data do you need to identify and prioritize future projects?

The answers to these questions are summarized in Tables 7 and 8.

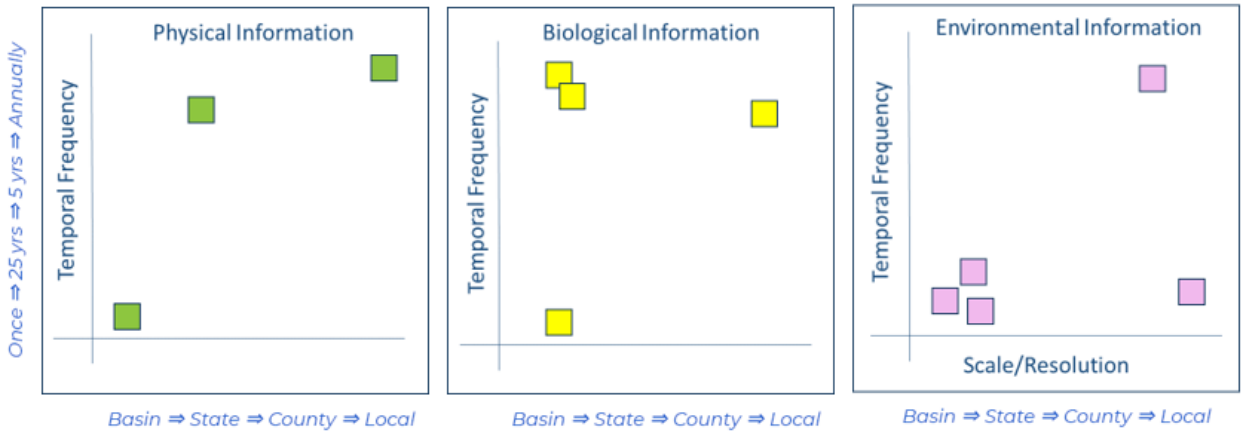

Figure 22. Conceptual Schematic of the Data Wall

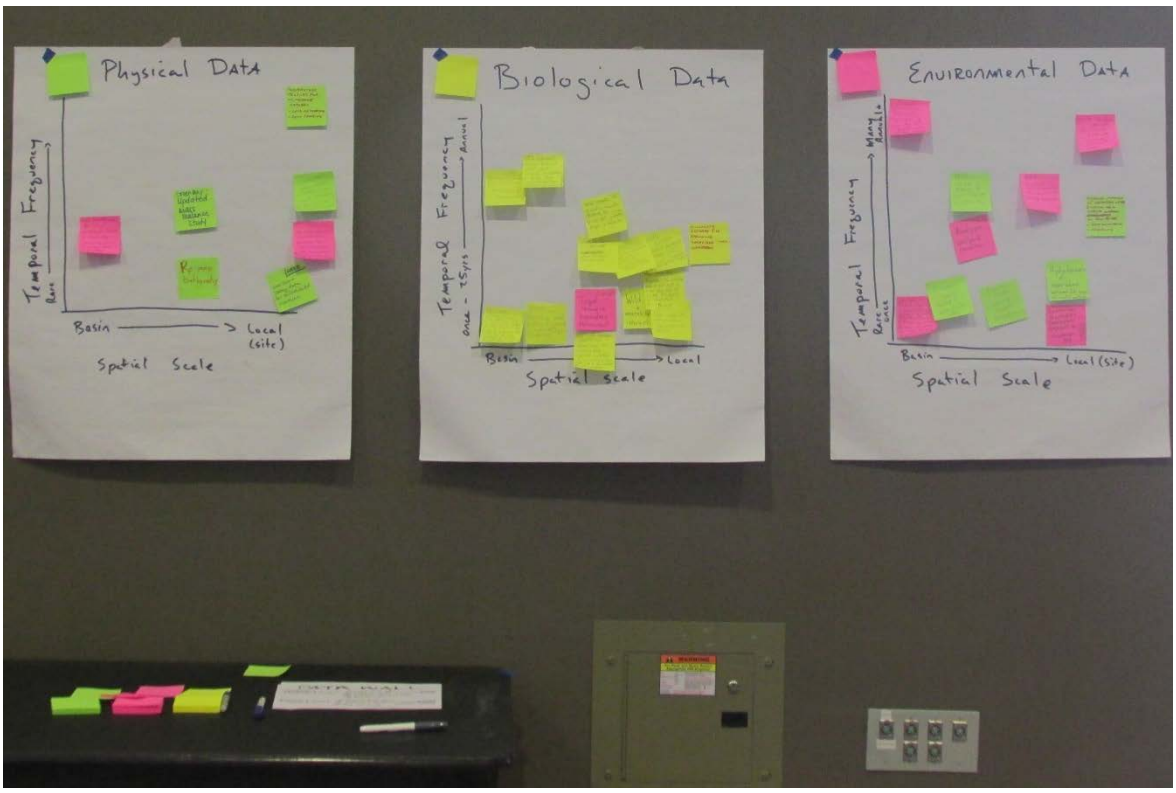

Figure 23. Data Wall for Physical and Biological Data Sets

Table 6. Summary of Datasets Included on the Data Wall

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
Physical	NEED	Chequamenon Bay shoreline habitat assessment. What did the shoreline used to support and what do we want to restore it to?	Once	Local	
	NEED	Comprehensive data collection and modeling for aquatic connectivity. This needs to be site-specific data from the counties	~5 years	County	
	NEED	Lake Superior south shore bathymetry and bottom mapping	Once	County	
	NEED	Lake Superior south shore hydrodynamic modeling	Once	County	
	NEED	Nearshore hydrodynamics to understand sediment and nutrient load	~5 years	County	
	NEED	Quantify and characterize miles of undeveloped shoreline in Green Bay. Some work has been done, but not the entire shoreline [to our knowledge]	~25 years	Basin	
	NEED	Re-map bathymetry	Once	County	
	NEED	St. Louis River Estuary mapping of high erosion locations	~10 years	County	

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
	NEED	Temperature profiles for the Milwaukee Estuary. Data gathering and data sharing.	Annual	Local	
	NEED	Understanding of Green Bay "West Shore wetlands complexes", groundwater dynamics, and impacts of potential groundwater quality and quantity changes	Once	Local	
	NEED	Updated mass balance study for Green Bay	~5 years	County	
	HAVE	Lake sturgeon habitat assessment for the Milwaukee River (physical, biological, and environmental. We also have bathymetry, fisheries, water quality, habitat metrics, and models.	~25 years	Local	No information provided
Biological	NEED	Coastal fish monitoring system	~25 years	Basin	
	NEED	Fish productivity stressors	Once	Local	
	NEED	Fish usage of reef structures	Once	Local	
	NEED	Identify key stopover areas for migratory birds, especially waterfowl (we do know shorebirds areas pretty well, and some land birds, but not completely)	Once	County	
	NEED	Limited information on spawning fish (like cisco and juvenile sturgeon) in Green Bay. Goodyear atlas is from the 1980s.	~10 years	County	

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
	NEED	Little is known about the current status of reefs related to invasives, spawning, reproductions, etc.)	~25 years	County	
	NEED	Milwaukee Estuary fish spawning location, including upstream locations	~25 years	County	
	NEED	MODIS towers through the western Great Lakes	~25 years	Basin	
	NEED	Native mussel BGO mapping in Chequamenon Bay	Annual	Local	
	NEED	Natural community change following the emerald ash borer (e.g., how have hardwood swamps changed?) This should also include supporting physical and environmental data.	~5 years	Basin	
	NEED	Spawning reef locations and quality in Lake Michigan and Lake Superior.	Once	Basin	
	NEED	Trout refugia boundary refinement	Once	County	
	NEED	We don't understand limit factors on yellow perch survival to adulthood in Green Bay (why do we have good year classes that don't result in increases in numbers)	~5 years	Basin	
	NEED	We need to understand the condition of rock reefs in Green Bay and their use by different fish species for spawning and nursery habitat	Once	Local	

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
	NEED	Wild rice and marsh bird interaction	Once	Local	
	HAVE	Avian and fish surveys for Little Manitowoc	~25 years	County	
	HAVE	Botanical inventories for Ozaukee, Milwaukee, Racine, Kenosha, Washington, Waukesha counties	~25 years	County	Southeastern Wisconsin Regional Planning Commission
	HAVE	Environmental corridors for Ozaukee, Milwaukee, Racine, Kenosha, Washington, Waukesha counties	~25 years	County	Southeastern Wisconsin Regional Planning Commission
	HAVE	Fish spawning grounds in the Wisconsin waters of the Great Lakes (Cloberly and Horrall, 1980 [WIS-SG-80-235]). It has been digitized for Ozaukee to Kewanee counties as part of an NCCOS mapping project.	Once	County	
	HAVE	High quality remnant natural area polygons for Ozaukee, Milwaukee, Racine, Kenosha, Washington, Waukesha counties	~25 years	County	Southeastern Wisconsin Regional Planning Commission
Environmental	NEED	Analyze wetland condition	~5 years	County	
	NEED	Economic studies related to the value of clean water	Once	Basin	
	NEED	Economic studies valuing outdoor recreation	Once	Basin	

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
	NEED	Hydrodynamics of nearshore sediment and the sediment fate and transport as related to coastal wetlands	~25 years	Local	
	NEED	Identifying the smaller Green Bay estuaries that could be protected or have water quality enhancement/protection to improve Green Bay fish populations. We know of some small estuaries (like Tibbett, Mahon, and Kayes), but don't know the priority based on impact.	Once	Basin	
	NEED	Quantify upwelling events and impacts on nearshore fisheries	~Annual	Basin	
	NEED	Retention time of nutrients and cyanobacteria propagules in Chequamenon Bay	Once	Local	
	NEED	Suspended sediment dynamics of lower Green Bay to Upper Green Bay, including resuspension	~5 years	County	
	NEED	Water quality dynamics at reef habitats in Green Bay	~5 years	County	
	NEED	We need to understand the potential impacts that the Waukesha water diversion will have on habitat in the Root River. We need data gathering and modeling.	~5 years	Local	
	HAVE	Little Manitowoc. Three years of water quality data with another round of sampling planned for 2020	Annual	Local	No information provided

Table 7. Summary of Data Sets Available to Fill Data Gaps

Region	Data Set	Contact
Lake Michigan South	Site-specific wave energy data for autumn storms during a 6 week time span collected 2,000' offshore of Kenosha	Dr. Josh Anderson, UW-Madison
Lake Michigan North	Great Lakes aquatic connectivity work group data set	Jessica Collier, US Fish and Wildlife Service
	Midwest migration network	Amber Roth, University of Maine
	Offshore migration	Western Great lakes Bird Observatory
Green Bay #1	River substrate data for the Fox River	Beth Olson, Wisconsin DNR
Green Bay #2	None listed	
Green Bay #3	Aquatic vegetation surveys from Wisconsin DNR database	Michelle Nault
Lake Superior	Submerged aquatic vegetation data	

Table 8. Summary of Data Needs by Region

Region	Need Type	What	Where	Why	Resolution(Spatial/ Temporal)	Availability
Lake Michigan South	Project	Updated bird survey data including migratory wetland birds	Chiwaukee Prairie	Would contribute to our knowledge of the migratory birds and species impacted by the potential loss of perched wetlands at Kenosha Dunes	Local/ ~5 years	None mentioned
Lake Michigan North	Project	Motus bird migration data and more bird data in general	None listed	Would help determine stopover habitat priorities and fledge movements	None listed	None mentioned
	Prioritization	Motus bird migration data and more bird data in general	None listed	Database accessibility is the problem. There are many broken links	None listed	None mentioned
Green Bay #1	Project	Submerge aquatic vegetation and emergent P/A and percent cover	Green Bay Estuary	Need to complete project and measure success	None listed	None mentioned
	Project	Substrate data	Green Bay Estuary	Need to complete project and measure success	None listed	None mentioned
	Prioritization	Vegetation data: distribution maps over periods of high and low water	Green Bay Estuary	This is a current gap. It will help establish a baseline and help us evaluate project success.	County/ ~5 years	None mentioned
Green Bay #2	Prioritization	Existing habitat quality information	Green Bay	Currently difficult to quantify impacts of restoration	None listed	None mentioned

Region	Need Type	What	Where	Why	Resolution(Spatial/ Temporal)	Availability
	Prioritization	Botanical quality index for use in assessment of restoration	Green Bay	Currently difficult to quantify impacts of restoration	None listed	None mentioned
	Prioritization	Habitat use of fish spawning at reefs—species, time of year, etc.	Lake Michigan	This data is outdated	None listed	None mentioned
Green Bay #3	Prioritization	High resolution hydrodynamic modeling	Green Bay AOC boundaries	This is currently a roadblock for permitting and funding projects. We can't design projects and propose structures to improve vegetation without knowing how sediment will accumulate, etc.	Local/ Once (updating after each project)	There is a dissertation from UW-Milwaukee that addresses this topic, but the model lacks detailed bathymetry data to effectively model the area.
Lake Superior	Prioritization	Nearshore habitat mapping	None listed	None listed	None listed	None mentioned
	Prioritization	Anticipated climate change impacts and habitat condition	None listed	None listed	None listed	None mentioned
	Prioritization	Climate change vulnerability assessment	None listed	None listed	None listed	None mentioned

Region	Need Type	What	Where	Why	Resolution(Spatial/ Temporal)	Availability
	Prioritization	Data needed to develop accurate model	None listed	None listed	None listed	None mentioned
	Prioritization	High risk erosion mapping	None listed	None listed	None listed	None mentioned
	Prioritization	Integration of flood and habitat models	None listed	None listed	None listed	None mentioned
	Prioritization	Updated nearshore bathymetry	None listed	None listed	None listed	None mentioned

3 Workshop Summary

3.1 Workshop Findings

3.1.1 Common Principles

Workshop participants identified four common principles that underlie many successful habitat restoration projects:

1. They involve collaborative planning and stakeholder engagement that occurs early and often to make sure all voices are heard.
2. They require funding that is reliable so that planning for the future can occur. These funds should also be flexible enough to adapt to emerging project needs.
3. They use sound science and a data driven decision-making process so that the effects of the restoration process can be quantified. And,
4. They are sustainable into the future and take into account a wide variety of environmental conditions.

3.1.2 Common Goals

The top common goal identified by workshop participants are summarized in Table 9. It should be noted that while workshop attendees were able to come to consensus around common goals, they also recognized that, in many cases, the current data is insufficient to quantitatively assess these goals. The types of baseline data that workshop attendees would like to collect are outlined in section 2.5.

Table 9. Summary of Top Goals for Each Lake Identified by Workshop Participants

Region	Goal
Lake Michigan South	Protect, enhance, restore, and connect 2,500 acres of open space (stop-over habitats) with 1,000 acres focused on vulnerable community types in the corridor from Waukegan to Milwaukee (includes Chiwaukee Prairie SNA-Kenosha Dunes).
Lake Michigan North	No net loss of coastal wetlands and functional shoreline in good condition, and restore "to-be-determined" acres of the same in fair condition.
Green Bay #1	Protect, enhance, or restore natural features of estuaries, small streams, and river mouths by up to 50% within the greater Green Bay ecosystem by 2030.

Region	Goal
Green Bay #2	Preserve, enhance, and/or restore "to-be-determined" acres or kilometers of coastal wetlands for high priority migratory birds by 2030.
Green Bay #3	Improve benthic and fish habitat of mid-Green Bay where hypoxia impairments occur. Reduce the 3-year running annual average days of hypoxia by 50% relative to the 2013-2019 annual average level at the primary monitoring station by 2030
Lake Superior	No net loss of coastal wetlands and functional shoreline in good condition, and restore "to-be-determined" acres of the same in fair condition.

3.1.3 Identification of Workshop Priorities

The results from the habitat restoration project prioritization process are summarized in Table 10. For further details about the projects in the table, see section 2.2. For further information about projects that were not ranked, please see Attachment A.

Table 10. Summary of Ranked Habitat Restoration Priorities Developed by Workshop Participants

Region	Map #	Project	Further Details	Final Score	Final Rank
Green Bay #1	1	Enhance the natural features of medium sized estuaries and rivers in Green Bay	This project targets Duck Creek, and the Peshtigo, Oconto, Menominee, and Pensaukee rivers These projects are mostly focused on enhancement, but here are also some opportunities for rehabilitation and protection. Duck Creek is in poor condition, but the other four are in fair-to-good condition. These projects would focus on invasive control (such as Phragmites) because these plants are currently harming fish and wildlife diversity. We would reintroduce native plants and restore native animal populations. This would benefit migratory waterfowl, yellow perch, walleye, sturgeon, and a number of other native species. There are many potential partners for this project including WDNR, TNC, USFWS, UWGB, Duck Unlimited, Oneida Nation, and other local municipalities.	18	1st

Region	Map #	Project	Further Details	Final Score	Final Rank
			These projects are in a variety of states of readiness. Some are ready to go right now while others are in the planning phase.		
Lake Michigan North	1.1, 1.3, 1.8	Improve aquatic connectivity within three Lake Michigan watersheds	This project will increase connectivity via removal/remediation of impediments such as dams and failed culverts in three large tributaries to Lake Michigan (Kewannee, Saulk/Sucker, and Ahnapee Rivers). This project will help many of the target fish species (such as lake sturgeon) as well as migratory birds by reconnecting previously disconnected habitat. After projects are completed in these three watersheds, we want to use the lessons learned to build capacity in other watersheds (by using the model we are developing for these three watersheds). These projects are underway but need more support.	8	2nd
Lake Michigan South	1	Kenosha Dunes	This area is ~2,500 acres. A subset of that acreage (40 ac) is relict Holocene dunes, there are over 400 rare plant species there now and perch use it for spawning. It's very popular with the public, and part of a migratory corridor for birds. With rapid rise of water levels there has been devastating erosion with losses around 25-30 ft/yr. At this loss rate we are losing critical plant habitat. This project would involve constructing offshore protective structures (sills) to promote resilient shoreline/dune habitat and it would provide artificial reef habitat. We also have the opportunity to restore an area that connects the shore to the upland areas. Currently we have a grant from FWS for engineering design. It will be completed by the end of the summer, so we will be ready to move toward physical action in 2021.	7	3rd
Lake Superior	2 & 3	Allouez Bay and Nemadji River restoration	This is a project located in the St. Louis River estuary at the mouth of the Nemadji River and Allouez Bay. This area is a historically a hotspot of migrating birds and nesting marsh birds, but the quality of the habitat has degraded over time.	6	4th

Region	Map #	Project	Further Details	Final Score	Final Rank
			This project would target 200 acres for restoration and enhancement. In Allouez Bay we would use plantings to re-establish wild rice, and in the Nemadji River we would use dredged materials to rebuild coastal wetlands. The goal would be to improve the interspersion of existing wetlands in the area and to re-establish habitat in the mouth of the Nemadji. In addition to the wildlife benefits, there are also many social benefits for indigenous communities in the region (related to the planting of wild rice).		

3.1.4 Data Needs

See section 2.5 for a tabular summary of data needs. For scanned copies of the data worksheets, see Attachment B.

3.2 Next Steps

At the end of the workshop, Mike Molnar, from CSO, briefly discussed the next steps involved in this process:

- Information organization: we will sort through all the great information and develop a report that is to be shared with the coastal program
- Data gap filling: select data gaps identified during this workshop and others will be addressed for a limited portion of the shoreline from April 2020 through March 2021
- NOAA will be able to fund some engineering and design work for a subset of projects.
- NOAA will convene Federal partners, with funding available, during the spring to discuss the project priorities identified in the state-specific workshop and their potential fit with various funding streams.
- Continue the conversation – today has been a great conversation starter. We encourage you to continue the discussion among yourselves and partners.

For questions regarding Wisconsin state efforts and initiatives please contact: Mike Friis (michael.friis@wisconsin.gov) or Todd Breiby (todd.breiby@wisconsin.gov) at the Wisconsin Coastal Management Program Office. For general questions related to the workshops or projects, please contact Mike Molnar (mmolnar@coastalstates.org) at the Coastal States Organization.

4 References

Kovalenko, K. E., Johnson, L. B., Riseng, C. M., Cooper, M. J., Johnson, K., Mason, L. A., ... & Uzarski, D. G. 2018. Great Lakes coastal fish habitat classification and assessment. Journal of Great Lakes Research, 44(5), 1100-1109.

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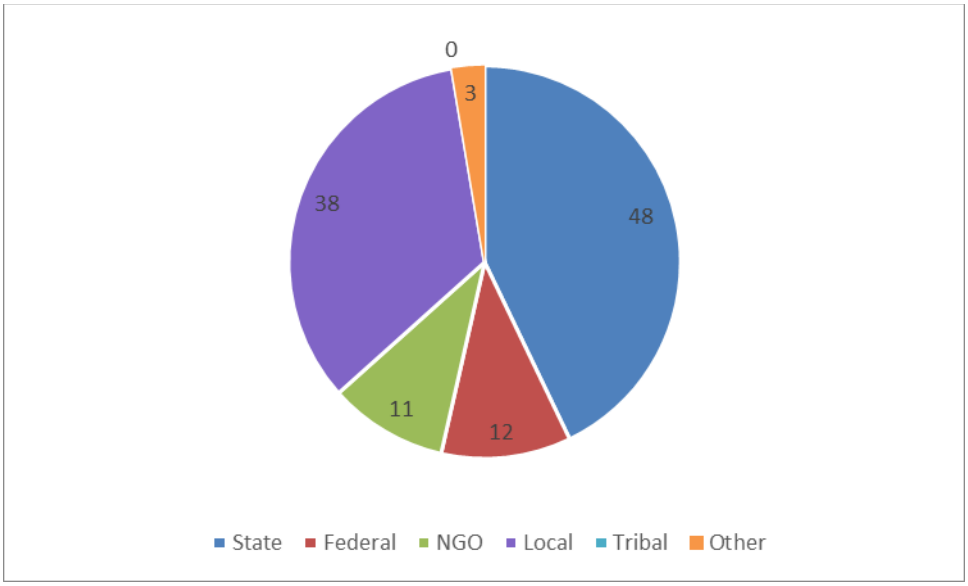
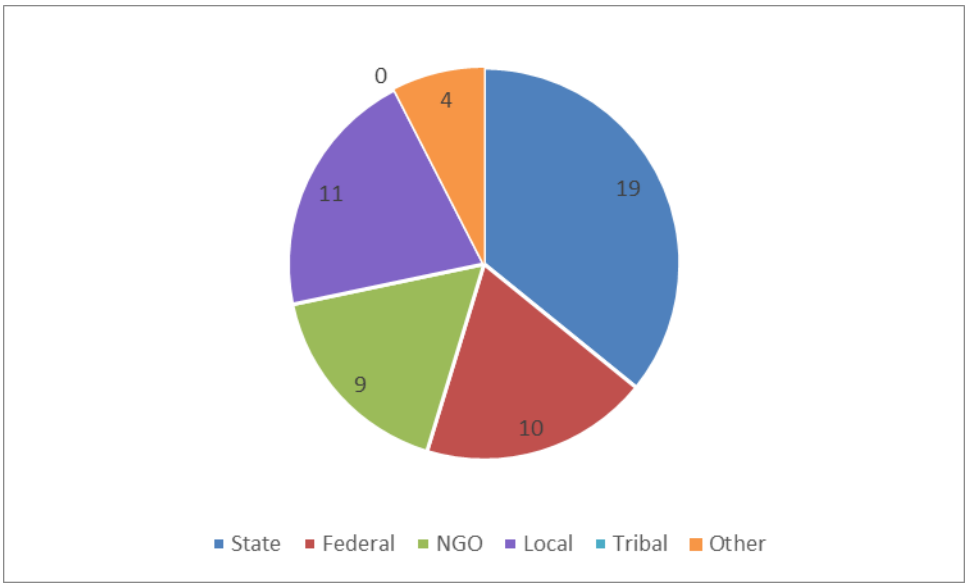
5 Workshop Attendee Summary

Breakdown of workshop invitees:



Breakdown of workshop participants:



The table below summarizes workshop participants and their contact information:

Last	First	Affiliation
Arend	Adam	Wisconsin Coastal Mgmt and UW Sea Grant
Arneson	Jade	University of Wisconsin - Green Bay
Blackburn	Julie	RESPEC
Breiby	Todd	Wisconsin Coastal Management Program
Carrozzino-Lyon	Amy	UW-Green Bay
Carter	Dan	SE Wisconsin Regional Planning Commission
Cooper	Matthew	Northland College
Darnton	Ryan	NOAA Restoration Center
Donofrio	Mike	Wisconsin DNR
Dow	Brennan	Wisconsin Department of Natural Resources
Fermanich	Kevin	Univ of Wisconsin Green Bay and UW-Extension
Friis	Mike	WI DOA
Galbraith	Betsy	US Fish and Wildlife Service
Glenzinski	Brian	DU
Graff	Shawn	American Bird Conservancy
Green	Russ	NOAA / National Marine Sanctuaries
Grimm	Mike	The Nature Conservancy
Hagen	Cherie	WDNR
Hanson	Erin	Door County Soil & Water Conservation Dept.
Heatlie	Terry	NOAA Restoration Center
Hron	Stacy	WDNR
Janssen	John	University of Wisconsin-Milwaukee
Kasberg	Brad	Audubon Great Lakes
Kettler	James	Lakeshore Natural Resource Partnership
Klump	Val	University of Wisconsin-Milwaukee
Knight	Roger	Great Lakes Fishery Commission
Koutnik	Mike	Lake Superior Reserve
Kowalzek-Adrians	Angela	NEW Water
Kupsky	Brianna	WDNR
Luke	Jim	US Army Corps of Engineers
Martinez	Joshua	Wisconsin DNR
Masterson	Cheryl	Wisconsin Department of Natural Resources
Meronek	Tom	Wisconsin DNR
Meyer	Kevin	U.S. Army Corps of Engineers
Molnar	Mike	CSO
Padilla	Julie	LimnoTech
Paoli	Tammie	WI DNR
Pyke	Amanda	Door County Land Trust
Seilheimer	Titus	Wisconsin Sea Grant
Soyk	Trina	FWS
Stewart	Jana	US Geological Survey

Last	First	Affiliation
Stirratt	Heather	NOAA OCM
Struck	Andrew	Ozaukee County Planning and Parks Department
Tyson	Jeff	Great Lakes Fishery Commission
VanVreede	Gary	U.S. Fish and Wildlife Service
VonHoldt	Crystal	Wisconsin DNR
Walter	Mark	Port of Green Bay
Webster	Bobbie	University of WI Green Bay
Wolf	Amy	University of WI-Green Bay
Howe	Bob	UWGB
Dansen		
Hudak	Andrew	
Houghtoc	Chris	UWGB

6 Glossary

Benthos: biotic organisms that are found at the bottom of water bodies.

Ecoregion: A major ecosystem that has a unique geography and receives consistent sunlight and moisture.

Hydrogeoforms: Underwater geologic structures. Hydrogeoforms include features such as underwater reefs, plains, and ridges.

Relative exposure index (REI): The relative exposure index is the effective fetch of a waterbody scaled by mean wind speed. The effective fetch is the length of a waterbody where the wind blows in a consistent direction. Together, fetch and wind speed determine wave size and energy. Ultimately, areas with lower relative exposure index provide better fish habitat.

Trophic structure/function (trophic str/func): Describes the relationship between different organisms within the food web of an ecosystem.

Attachment A

Project Summary Worksheets

1 = Duck Creek 3 = Oconto 5 = Pensaukee
2 = Peshtigo 4 = Menominee

GB-1

PRIORITY PROJECT AND LOCATION WORKSHEET Enhance natural features of (Medium-sized estuaries/rivers)

Project number: 1X (1 X where X = the locations above)

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? GB-1 Goal 1

2. Which goal statements does this project *support*? GB-1 Goal 2

3. The project category (circle one): Sites 2-5 Site #1

Protection (Enhancement) Restoration (reestablishment) (Rehabilitation)

↓ some opportunities in Duck Creek (Site #1)

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):

Phragmites control, invasive cattail control that reduce fish & wildlife diversity
Reintroduce native plants (e.g. wild rice, bullrush, etc.)
Restore native animal populations (e.g. blandings & wood turtle, freshwater mussels, black tern)

5. The desired change that the project intends to accomplish (improve/restore/reduce):

Improve riparian ~~vegetation~~ native plant & animal diversity

6. Targeted species that benefits from actions:

Migratory waterfowl. Yellow perch, walleye, sturgeon

7. Spatial extent/acreage:

5 medium-sized estuaries

8. Current/past condition of the site:

Site 1 - Poor condition. Sites 2-5 - Fair to good condition

9. Social, political and physical context of the project:

10. Potential partners:

Everyone - WDNR, TNC, USFWS, UWGB, Ducks Unlimited, Oneida Nation, local municipalities

11. Unmet data needs:

Vegetation mapping & substrate mapping

12. Readiness (1=ready!; 5=concept stage): 1 (2) 3 4 5

Site #1 has AOC detailed plan
Sites #2-5 have

GB1

PRIORITY PROJECT AND LOCATION WORKSHEET Enhance natural features of

Project number: 2 ~~XXXX~~ (on map) - Small stream/~~XXX~~ in lower GB nearshore environment

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? GB 1 - Goal 1 - smallest

2. Which goal statements does this project *support*? -GB 2, GB 3

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) (Rehabilitation)

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Invasive species removal, restore native plant and animal species

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve population of critical species that characterize the Green Bay ecosystem. Stream provide breeding habitat for ~~the~~ Target species as well as species on which they depend.

6. Targeted species that benefits from actions:
   Yellow perch, walleye, macroinvertebrates (mayflies), migratory birds (stopover habitat), waterfowl (vegetation, food etc.)

7. Spatial extent/acreage:
   Five small tributaries that flow into lower Green Bay

8. Current/past condition of the site:
   ~~Heavily~~ Heavily impacted by upstream development via sedimentation, invasive species

9. Social, political and physical context of the project:
   These tributaries (like our Project 1 - medium-sized tributaries) are the "fuel" of biodiversity and water quality degradation in Green Bay. Rehabilitation of estuaries will help sequester & intercept nutrients, sustain populations of desirable species, and greatly enhance recreational opportunities.

10. Potential partners:
    ~~For~~ Many government agencies, NGO's, CWGB, local communities.

11. Unmet data needs:
    Importance of river mouths to fish spawning, migratory birds, etc. (We know general importance, but specific response to management actions needs to be established.

12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5

GB-2

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 1 Oconto Marsh wetland Project

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Improving coastal wetlands
2. Which goal statements does this project *support*? supporting fish habitat, addressing shoreline concerns
3. The project category (circle one):
   Protection (Enhancement) (Restoration (reestablishment)) (Rehabilitation)
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   - fringe wetland enhancement with offshore wave break
   - possibly reestablish wetland veg through seeding or planting (if needed)
   - invasive vegetation control/maintenance
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   increase wetland habitat north of Oconto River
   enhance wetland habitat south of " "
6. Targeted species that benefits from actions:
   marsh breeding birds, waterfowl, fish nursery, macroinverts mustelids, migratory birds, amphibians
7. Spatial extent/acreage:
   bay north of Oconto River and marsh south of river >600 acres
   to improve connectivity/extent
8. Current/past condition of the site:
   high water, lack of emergent veg, some hardened shoreline & property damage from flooding
9. Social, political and physical context of the project:
   landowner flooding issues, Phrag invasion in past years/impeded access & views of bay
10. Potential partners:
    Oconto Sportsmen, private landowners, Army Corps, DNR
    Oconto County Land & Water Conservation, Ducks Unlimited
11. Unmet data needs:
    alternative methods for shoreline stabilization & wetland protection
    ↳ what type of breakwater?
    impacts of similar pilot projects (Duck Creek Delta - underway)
12. Readiness (1=ready!; 5=concept stage): 1 2 3 (4) 5

GB-2

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 4 Land Acquisition

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Improve Coastal WL's

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Acquire privately owned land to bring under conservational ownership

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   improve / restore coastal wetlands; reconnect wetlands to Bay; restore floodplains, water quality improvements via wetland functional values and others

6. Targeted species that benefits from actions:
   marsh veg / communities = marsh habitat with goal to create complex "multi purpose" habitat needs across spp.

7. Spatial extent/acreage:
   _____

8. Current/past condition of the site:
   high water, lack of emergent veg, hardened shorelines

9. Social, political and physical context of the project:
   landowner flooding, fragmentation, invasive species

10. Potential partners:
    Long term steward (landowner) = NE WIS Land Trust, TNC, Oconto Co. Emergency Management office

11. Unmet data needs:
    _____
    _____

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 (5)

Green Bay - 2

2 Oconto shoreline/wetland enhancement @ Little Suamico Hunt Club

3 Red River wetland enhancement

5 Menominee River mouth planning process

6. Land acquisition of high quality sedge meadow

Green Bay 3.

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 1

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? reduce hypoxia

2. Which goal statements does this project *support*?

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) (Rehabilitation)

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Establish a 'pay for performance' program in the 5 highest Phos. contributing sub-watersheds in the Lower Fox R. watershed. The program would be designed to be supported by a "water fund" created by the affected downstream communities.

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce P load to Lower Fox R./Green Bay

6. Targeted species that benefits from actions:
   All fish species utilizing lower Fox & lower Green Bay, benthic species, SAV

7. Spatial extent/acreage:
   5 sub-watersheds of Lower Fox and open water system of lower Green Bay

8. Current/past condition of the site:
   ~1/3 of cropland has 2-3x excessive soil P

9. Social, political and physical context of the project:
   private landowners are key

10. Potential partners:
    Municipalities, County LCDs, WDNR, NRCS, FWWA, others
    private consultant for verification

11. Unmet data needs:
    Need to continue monitoring P to establish trend, need crop-land data measure performance.

12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5
    (the 3-yr rolling ave is improving ☺)

LMN

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: Lake Mich. Stopover Habitat

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Mich North

2. Which goal statements does this project *support*? #1

3. The project category (circle one):
   Protection Enhancement ~~Restoration~~ (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Property Acq., Invasive removal, shoreline Stabilize
   transition from ag to pre settlement cond.

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve # of stopover sites – improve Habitat, variety of Habitat conditions, Reduce sediment

6. Targeted species that benefits from actions:
   Migratory Bird

7. Spatial extent/acreage:
   500+/- acres

8. Current/past condition of the site:
   Varied by site = Protected sites
   New acquisition

9. Social, political and physical context of the project:
   Varied by Site – sites open to public for Nature based outdoor activities, improved water quality, Access to Lake Michigan

10. Potential partners:
   County, State, Fed, Non profit, local gov.

11. Unmet data needs:
   New acq. need site assessments / wildlife plant inventory

12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5
   Varied

Clay Bluffs
- Lions Den
- Fairy Chasm
- Doyles Bait Company
- Vermont Park
- FBMP Amsterdam Dunes

LMN

PRIORITY PROJECT AND LOCATION WORKSHEET

(1.1, 1.3, 1.8)

Project number: Improving Aquatic Connectivity w/in 3 watersheds L. Michigan

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? increase connectivity via removal/remediation of impediments (linear and lateral)
2. Which goal statements does this project *support*? protection, and restoration
3. The project category (circle one):
   Protection Enhancement (Restoration (reestablishment)) (Rehabilitation)
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   fish passage barriers & reestablishing habitat connections
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   restore fish passage & transfer knowledge to other watersheds
6. Targeted species that benefits from actions:
   ~~walleye~~, Lake Sturgeon & Migratory Waterfowl/birds
7. Spatial extent/acreage:
   TBA 3 large watersheds with Lake Michigan connection
8. Current/past condition of the site:
   Dams & failed culverts, channelized streams w/o connectivity to associated riparian habitat
9. Social, political and physical context of the project:
   Kewaunee, Sauk/Sucker & Ahnapee
   Important watersheds with geographic spread across L. Michigan North
10. Potential partners:
    Federal, State, Local/County Government, NGOs, Sporting Clubs
    Departments within local government - Highway & Planning/Park, Land Con.
11. Unmet data needs:
    Inventory of impediments and associated habitat in some portions of each watershed. (linear & lateral)
12. Readiness (1=ready!; 5=concept stage): 1 (2 1/2) 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 6 Lake Vista Park

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? LAKE MICHIGAN SOUTH

2. Which goal statements does this project *support*? LAKE MICHIGAN SOUTH

3. The project category (circle one):
   Protection (Enhancement) Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   GRASSLAND BIRD HABITAT

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   IMPROVE GRASSLAND HABITAT FOR BIRDS & CONNECTIVITY W/ OTHER IMPORTANT MIGRATORY BIRD HABITAT

6. Targeted species that benefits from actions:
   GRASSLAND NESTING SPECIES / MIGRATORY SPECIES

7. Spatial extent/acreage:
   >100 ac.

8. Current/past condition of the site:
   PUBLIC PARK RESTORED FROM INDUSTRIAL USE

9. Social, political and physical context of the project:
   PUBLIC PARKLAND ADJACENT TO EXISTING COUNTY PARK

10. Potential partners:
    MILWAUKEE COUNTY / CITY OF OAK CREEK

11. Unmet data needs:
    BIRD SURVEYS

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 (5)

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

8

Project number: ~~Muskegon~~ North Beach Dunes

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Mich. S.

2. Which goal statements does this project *support*? Lake Mich. S.

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   ~~Improve connectivity of nearshore, migratory habitat~~
   Remove inv. species, restore natural Dune processes

6. Targeted species that benefits from actions:
   Migratory Birds/Waterfowl
   ~~Monarchs~~

7. Spatial extent/acreage:
   10

8. Current/past condition of the site:
   Degraded remnant of Lake MI Dune & Beach

9. Social, political and physical context of the project:

10. Potential partners:

11. Unmet data needs:

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 5 Colonial Park - Racine

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? _____

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   _____
   _____

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   _____
   _____

6. Targeted species that benefits from actions:
   _____
   _____

7. Spatial extent/acreage:
   _____

8. Current/past condition of the site:
   _____
   _____

9. Social, political and physical context of the project:
   _____
   _____

10. Potential partners:
    _____
    _____

11. Unmet data needs:
    _____
    _____

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 8 North Beach Dunes

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? _____

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   _____
   _____

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   _____
   _____

6. Targeted species that benefits from actions:
   _____
   _____

7. Spatial extent/acreage:
   _____

8. Current/past condition of the site:
   _____
   _____

9. Social, political and physical context of the project:
   _____
   _____

10. Potential partners:
    _____
    _____

11. Unmet data needs:
    _____
    _____

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: PR 4

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Mich. S.
2. Which goal statements does this project *support*? Lake Mich. S.
3. The project category (circle one):
   Protection Enhancement (Restoration (reestablishment)) Rehabilitation
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Restore wetlands & grasslands Adjacent to existing diverse sites along Pike River tributaries (Heidi Prairie & Hawthorn Hollow forest)
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   ~~Restore prairie~~ Ag land → prairie, & wetlands connecting fragmented sites
6. Targeted species that benefits from actions:
   Migratory Birds
   Pike River fishery (Northern pike)
7. Spatial extent/acreage:
   ~200 acres
8. Current/past condition of the site:
   Mostly agricultural - nearby migr. bird conc. site.
9. Social, political and physical context of the project:
   - Burn management an obstacle
10. Potential partners:
    ~~Heidi~~ Private, Kenosha County, Tallgrass Prairie Enthusiasts UW-Parkside, Hawthorn Hollow, Root-Pike WIN
11. Unmet data needs:
    Real estate / ordinances, other wildlife inventory
12. Readiness (1=ready!; 5=concept stage): 1 2 (3) (4) 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 2 Chiwaukee Prairie SNA

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? LM South

2. Which goal statements does this project *support*? 1000 acres Sensitive species

3. The project category (circle one):
   Protection (Enhancement) Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Property purchase and prairie restoration including treating IS

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Restore dunes, connecting habitats

6. Targeted species that benefits from actions:
   Rare & endangered species in rare coastal dune

7. Spatial extent/acreage:
   600 acres

8. Current/past condition of the site:
   Extreme fragmentation,

9. Social, political and physical context of the project:
   ~~KENOSHA COUNTY~~ / STATE NATURAL AREA / DEVELOPING AREA OF LAKESHORE W/BOTH RESIDENTIAL & COMMERCIAL DEVELOPMENTS / ~~LOCAL~~ REGIONALLY IMPORTANT GREEN SPACE

10. Potential partners:
    TNC, Lake County, WDNR, ILDNR, KENOSHA Co. / SEWRPC

11. Unmet data needs:
    ~~VEGETATION SURVEYS~~ / REAL ESTATE SURVEY / LOCAL PLANNING OR ORDINANCES

12. Readiness (1=ready!; 5=concept stage): (1) 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 1 Kenosha Dunes ~~Restoring~~ Coastal Processes

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake MI South

2. Which goal statements does this project *support*? ~~1) Protection 2) Re-establishment~~ Protect/enhance 250+ Acres of open space Focus on Vulnerable Community Types

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Shore Protection Construction of offshore protective structures for Resilient shore/Dune Protection and artificial Reef Habitat

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   1) Halt the loss of critical plant and shore habitat at Kenosha Dunes from extreme erosion, 2) Improve offshore fish Habitat

6. Targeted species that benefits from actions:
   1) 400+ species of RARE Plants, Migratory waterfowl/wetlands
   2) SPAWNING Perch

7. Spatial extent/acreage: ~~~40~~ 50 Acres for Dunes, ~500 Acres Total SNA

8. Current/past condition of the site:
   State NATURAL AREA, Looking to Potentially Expand with additional Land from city. Former shore protection revetment Failed Due to extreme water levels

9. Social, political and physical context of the project:
   Highly visited Area, & unique Physiography - rare Dune habitat

10. Potential partners:
    STATE of WI, U.S.ACE, city, Private Donors (Natural Resource Foundation) WE Energies,

11. Unmet data needs: Need to identify Potential Sources of offshore Sand for restoration Use in evaluation of wetland stability as Dune Bluff erodes.

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #2 & #3 Allouez Bay & Nemadji River

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Restore coastal wetland
2. Which goal statements does this project *support*? Adding coastal wetland
3. The project category (circle one):
   Protection Enhancement **Restoration (reestablishment)** Rehabilitation
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Coastal wetland restoration in Allouez Bay, including wild rice planting and reestablishment of wetlands in Nemadji's mouth using beneficial use of dredge.
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve existing interspersion of existing wetlands, add new ev to Nemadji mouth
6. Targeted species that benefits from actions:
   Marshbirds, colonial waterbirds, waterfowl, fish nursery habitat
7. Spatial extent/acreage:
   200 acres
8. Current/past condition of the site:
   Wetlands, mostly dense ev, little interspersion, ~~[illegible]~~ dwindling migratory bird / nesting bird habitats
9. Social, political and physical context of the project:
   Historic hot spot for migrating birds, marshbirds, key near shore wetland habitat, beneficial use of dredging, urban proximity, "Bird City"; Indigenous context in question, fisheries
10. Potential partners:
    WI DNR, AGL Co Superior, NRRI USFWS, MN Land Trust, USACE, LSRI (Wisconsin NRRI), St Louis River Habitat Work Group
11. Unmet data needs:
    Bathymetry, hydrodynamics, Initial monitoring, research on non-waterfowl avian response to wild rice
12. Readiness (1=ready!; 5=concept stage): **1** 2 3 **4** 5

LS 7

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #7 Fish Creek Bluff Restoration and Wetland

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Superior Goal #1

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement (Restoration (reestablishment)) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Streambank stabilization to reduce erosion + sedimentation, as well as wetland/slough restoration

wetlands - invasive spp. mgmt. habitat restoration for migratory birds

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce sedimentation and erosion into Fish Creek and Chequamegon Bay of Lake Superior. And Improve habitat for slough.

6. Targeted species that benefits from actions:
   Helps to meet broader goal of reducing sediment by 50% from Fish Creek. First project got us there 4%, this will get us closer to that goal.

7. Spatial extent/acreage:
   200 ft

wood turtle migratory birds waterfowl fish nursery habitat

8. Current/past condition of the site:
   This is a poorly eroded streambank.

9. Social, political and physical context of the project:
   Slough under US Hwy 2
   Already has buy-in from local government because eroding bluff is likely to take out the adjacent road.

10. Potential partners:
    Private landowners, Bayfield County, town of Pilsen, US Forest Service, US Fish + Wildlife Service, Burke Center at Northland College.

11. Unmet data needs:

12. Readiness (1=ready!; 5=concept stage): 1 (2) 3 4 5
    has design for project, need to secure landowner buy-in

LS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #7 Fish Creek Wetland + Bluff Restoration

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Superior Goal #1
2. Which goal statements does this project *support*? Lake Superior Goal # 2
3. The project category (circle one):
   Protection   Enhancement   **(Restoration (reestablishment))** [circled]   Rehabilitation
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Invasive spp. Removal in slough and habitat enhancement
   Bluff stabilization in creek
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce sedimentation + erosion, improve condition of Fish Creek Slough
6. Targeted species that benefits from actions:
   Migratory birds, waterfowl, fish nursery habitat, wood turtles
7. Spatial extent/acreage:
   100 acres slough, 200 ft streambank
8. Current/past condition of the site:
   Poorly eroded streambank,
   Interspersion play-to-L water
9. Social, political and physical context of the project:
   Sloughs beloved area for recreation, hunting, fishing
   Adjacent to 100 acre city park
   Bluff Adjacent to county road, infrastructure/safety issue - erosion that will take out the road!
10. Potential partners:
    private landowners, city Ashland, DOT, WDNR
    Northland College, Bayfield Co., US Fish + Wildlife Service,
    Ducks Unlimited, Trout Unlimited
    Lake Superior Collaborative
11. Unmet data needs:
    data on Fish creek + sediment loads
    Better understanding of hydrologic connectivity of wetlands to Lake
    do have project plan for bluff project
    hydrologic connectivity
12. Readiness (1=ready!; 5=concept stage): 1 **(2)** [circled] 3 4 5

Attachment B

Data Summary Worksheets

1 = Duck Creek 3 = Oconto 5 = Pensaukee
2 = Peshtigo 4 = Menominee

GB-1

PRIORITY PROJECT AND LOCATION WORKSHEET Enhance natural features of (Medium-sized estuaries/rivers)

Project number: 1X (1 X where X = the locations above)

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? GB-1 Goal 1

2. Which goal statements does this project *support*? GB-1 Goal 2

3. The project category (circle one): Sites 2-5 Site #1

Protection (Enhancement) Restoration (reestablishment) (Rehabilitation)

↓ some opportunities in Duck Creek (Site #1)

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):

Phragmites control, invasive cattail control that reduce fish & wildlife diversity
Reintroduce native plants (e.g. wild rice, bullrush, etc.)
Restore native animal populations (e.g. blandings & wood turtle, freshwater mussels, black tern)

5. The desired change that the project intends to accomplish (improve/restore/reduce):

Improve riparian ~~vegetation~~ native plant & animal diversity

6. Targeted species that benefits from actions:

Migratory waterfowl. Yellow perch, walleye, sturgeon

7. Spatial extent/acreage:

5 medium-sized estuaries

8. Current/past condition of the site:

Site 1 - Poor condition. Sites 2-5 - Fair to good condition

9. Social, political and physical context of the project:

10. Potential partners:

Everyone - WDNR, TNC, USFWS, UWGB, Ducks Unlimited, Oneida Nation, local municipalities

11. Unmet data needs:

Vegetation mapping & substrate mapping

12. Readiness (1=ready!; 5=concept stage): 1 (2) 3 4 5

Site #1 has AOC detailed plan
Sites #2-5 have

GB1

PRIORITY PROJECT AND LOCATION WORKSHEET Enhance natural features of

Project number: 2 ~~XXXX~~ (on map) - Small stream/~~XXX~~ in lower GB nearshore environment

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? GB 1 - Goal 1 - smallest

2. Which goal statements does this project *support*? -GB 2, GB 3

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) (Rehabilitation)

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Invasive species removal, restore native plant and animal species

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve population of critical species that characterize the Green Bay ecosystem. Stream provide breeding habitat for ~~the~~ Target species as well as species on which they depend.

6. Targeted species that benefits from actions:
   Yellow perch, walleye, macroinvertebrates (mayflies), migratory birds (stopover habitat), waterfowl (vegetation, food etc.)

7. Spatial extent/acreage:
   Five small tributaries that flow into lower Green Bay

8. Current/past condition of the site:
   ~~Heavily~~ Heavily impacted by upstream development via sedimentation, invasive species

9. Social, political and physical context of the project:
   These tributaries (like our Project 1 - medium-sized tributaries) are the "fuel" of biodiversity and water quality degradation in Green Bay. Rehabilitation of estuaries will help sequester & intercept nutrients, sustain populations of desirable species, and greatly enhance recreational opportunities.

10. Potential partners:
    ~~For~~ Many government agencies, NGO's, CWGB, local communities.

11. Unmet data needs:
    Importance of river mouths to fish spawning, migratory birds, etc. (We know general importance, but specific response to management actions needs to be established.

12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5

GB-2

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 1 Oconto Marsh wetland Project

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Improving coastal wetlands
2. Which goal statements does this project *support*? supporting fish habitat, addressing shoreline concerns
3. The project category (circle one):
   Protection (Enhancement) (Restoration (reestablishment)) (Rehabilitation)
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   - fringe wetland enhancement with offshore wave break
   - possibly reestablish wetland veg through seeding or planting (if needed)
   - invasive vegetation control/maintenance
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   increase wetland habitat north of Oconto River
   enhance wetland habitat south of " "
6. Targeted species that benefits from actions:
   marsh breeding birds, waterfowl, fish nursery, macroinverts mustelids, migratory birds, amphibians
7. Spatial extent/acreage:
   bay north of Oconto River and marsh south of river >600 acres
   to improve connectivity/extent
8. Current/past condition of the site:
   high water, lack of emergent veg, some hardened shoreline & property damage from flooding
9. Social, political and physical context of the project:
   landowner flooding issues, Phrag invasion in past years/impeded access & views of bay
10. Potential partners:
    Oconto Sportsmen, private landowners, Army Corps, DNR
    Oconto County Land & Water Conservation, Ducks Unlimited
11. Unmet data needs:
    alternative methods for shoreline stabilization & wetland protection
    ↳ what type of breakwater?
    impacts of similar pilot projects (Duck Creek Delta - underway)
12. Readiness (1=ready!; 5=concept stage): 1 2 3 (4) 5

GB-2

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 4 Land Acquisition

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Improve Coastal WL's

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Acquire privately owned land to bring under conservational ownership

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   improve / restore coastal wetlands; reconnect wetlands to Bay; restore floodplains, water quality improvements via wetland functional values and others

6. Targeted species that benefits from actions:
   marsh veg / communities = marsh habitat with goal to create complex "multi purpose" habitat needs across spp.

7. Spatial extent/acreage:
   _____

8. Current/past condition of the site:
   high water, lack of emergent veg, hardened shorelines

9. Social, political and physical context of the project:
   landowner flooding, fragmentation, invasive species

10. Potential partners:
    Long term steward (landowner) = NE WIS Land Trust, TNC, Oconto Co. Emergency Management office

11. Unmet data needs:
    _____
    _____

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 (5)

Green Bay - 2

2 Oconto shoreline/wetland enhancement @ Little Suamico Hunt Club

3 Red River wetland enhancement

5 Menominee River mouth planning process

6. Land acquisition of high quality sedge meadow

Green Bay 3.

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 1

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? reduce hypoxia

2. Which goal statements does this project *support*?

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) (Rehabilitation)

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Establish a 'pay for performance' program in the 5 highest Phos. contributing sub-watersheds in the Lower Fox R. watershed. The program would be designed to be supported by a "water fund" created by the affected downstream communities.

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce P load to Lower Fox R./Green Bay

6. Targeted species that benefits from actions:
   All fish species utilizing lower Fox & lower Green Bay, benthic species, SAV

7. Spatial extent/acreage:
   5 sub-watersheds of Lower Fox and open water system of lower Green Bay

8. Current/past condition of the site:
   ~1/3 of cropland has 2-3x excessive soil P

9. Social, political and physical context of the project:
   private landowners are key

10. Potential partners:
    Municipalities, County LCDs, WDNR, NRCS, FWWA, others
    private consultant for verification

11. Unmet data needs:
    Need to continue monitoring P to establish trend, need crop-land data measure performance.

12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5
    (the 3-yr rolling ave is improving ☺)

LMN

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: Lake Mich. Stopover Habitat

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Mich North

2. Which goal statements does this project *support*? #1

3. The project category (circle one): ~~Protection~~ ~~Enhancement~~ ~~Restoration~~ (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal): Property Acq., Invasive removal, shoreline stabilize, transition from ag to pre settlement cond.

5. The desired change that the project intends to accomplish (improve/restore/reduce): Improve # of stopover sites – improve Habitat, variety of Habitat conditions, Reduce sediment

6. Targeted species that benefits from actions: Migratory Bird

7. Spatial extent/acreage: 500+/- acres

8. Current/past condition of the site: Varied by site = Protected sites, New acquisition

9. Social, political and physical context of the project: Varied by site – sites open to public for Nature based outdoor activities, improved water quality, Access to Lake Michigan

10. Potential partners: County, State, Fed, Non profit, local gov.

11. Unmet data needs: New acq. need site assessments / wildlife plant inventory

12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5

Varied

Clay Bluffs
- Lions Den
- Fairy Chasm
- Doyer Bay Camp
- Vermont Park
- FBMP Amsterdam Dun

LMN

PRIORITY PROJECT AND LOCATION WORKSHEET

(1.1, 1.3, 1.8)

Project number: Improving Aquatic Connectivity w/in 3 watersheds L. Michigan

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? increase connectivity via removal/remediation of impediments (linear and lateral)
2. Which goal statements does this project *support*? protection, and restoration
3. The project category (circle one):
   Protection Enhancement (Restoration (reestablishment)) (Rehabilitation)
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   fish passage barriers & reestablishing habitat connections
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   restore fish passage & transfer knowledge to other watersheds
6. Targeted species that benefits from actions:
   ~~walleye~~, Lake Sturgeon & Migratory Waterfowl/birds
7. Spatial extent/acreage:
   TBA 3 large watersheds with Lake Michigan connection
8. Current/past condition of the site:
   Dams & failed culverts, channelized streams w/o connectivity to associated riparian habitat
9. Social, political and physical context of the project:
   Kewaunee, Sauk/Sucker & Ahnapee
   Important watersheds with geographic spread across L. Michigan North
10. Potential partners:
    Federal, State, Local/County Government, NGOs, Sporting Clubs
    Departments within local government - Highway & Planning/Park, Land Con.
11. Unmet data needs:
    Inventory of impediments and associated habitat in some portions of each watershed. (linear & lateral)
12. Readiness (1=ready!; 5=concept stage): 1 (2 1/2) 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 6 Lake Vista Park

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? LAKE MICHIGAN SOUTH

2. Which goal statements does this project *support*? LAKE MICHIGAN SOUTH

3. The project category (circle one):
   Protection (Enhancement) Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   GRASSLAND BIRD HABITAT

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   IMPROVE GRASSLAND HABITAT FOR BIRDS & CONNECTIVITY W/ OTHER IMPORTANT MIGRATORY BIRD HABITAT

6. Targeted species that benefits from actions:
   GRASSLAND NESTING SPECIES / MIGRATORY SPECIES

7. Spatial extent/acreage:
   >100 ac.

8. Current/past condition of the site:
   PUBLIC PARK RESTORED FROM INDUSTRIAL USE

9. Social, political and physical context of the project:
   PUBLIC PARKLAND ADJACENT TO EXISTING COUNTY PARK

10. Potential partners:
    MILWAUKEE COUNTY / CITY OF OAK CREEK

11. Unmet data needs:
    BIRD SURVEYS

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 (5)

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

8

Project number: ~~Muskegon~~ North Beach Dunes

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Mich. S.

2. Which goal statements does this project *support*? Lake Mich. S.

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   ~~Improve connectivity of nearshore, migratory habitat~~
   Remove inv. species, restore natural Dune processes

6. Targeted species that benefits from actions:
   Migratory Birds/Waterfowl
   ~~Monarchs~~

7. Spatial extent/acreage:
   10

8. Current/past condition of the site:
   Degraded remnant of Lake MI Dune & Beach

9. Social, political and physical context of the project:

10. Potential partners:

11. Unmet data needs:

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 5 Colonial Park - Racine

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? _____

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   _____
   _____

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   _____
   _____

6. Targeted species that benefits from actions:
   _____
   _____

7. Spatial extent/acreage:
   _____

8. Current/past condition of the site:
   _____
   _____

9. Social, political and physical context of the project:
   _____
   _____

10. Potential partners:
    _____
    _____

11. Unmet data needs:
    _____
    _____

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 8 North Beach Dunes

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? _____

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   _____
   _____

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   _____
   _____

6. Targeted species that benefits from actions:
   _____
   _____

7. Spatial extent/acreage:
   _____

8. Current/past condition of the site:
   _____
   _____

9. Social, political and physical context of the project:
   _____
   _____

10. Potential partners:
    _____
    _____

11. Unmet data needs:
    _____
    _____

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: PR 4

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Mich. S.
2. Which goal statements does this project *support*? Lake Mich. S.
3. The project category (circle one):
   Protection Enhancement (Restoration (reestablishment)) Rehabilitation
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Restore wetlands & grasslands Adjacent to existing diverse sites along Pike River tributaries (Heidi Prairie & Hawthorn Hollow forest)
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   ~~Restore prairie~~ Ag land → prairie, & wetlands connecting fragmented sites
6. Targeted species that benefits from actions:
   Migratory Birds
   Pike River fishery (Northern pike)
7. Spatial extent/acreage:
   ~200 acres
8. Current/past condition of the site:
   Mostly agricultural - nearby migr. bird conc. site.
9. Social, political and physical context of the project:
   - Burn management an obstacle
10. Potential partners:
    ~~Heidi~~ Private, Kenosha County, Tallgrass Prairie Enthusiasts UW-Parkside, Hawthorn Hollow, Root-Pike WIN
11. Unmet data needs:
    Real estate / ordinances, other wildlife inventory
12. Readiness (1=ready!; 5=concept stage): 1 2 (3) (4) 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 2 Chiwaukee Prairie SNA

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? LM South

2. Which goal statements does this project *support*? 1000 acres Sensitive species

3. The project category (circle one):
   Protection (Enhancement) Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Property purchase and prairie restoration including treating IS

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Restore dunes, connecting habitats

6. Targeted species that benefits from actions:
   Rare & endangered species in rare coastal dune

7. Spatial extent/acreage:
   600 acres

8. Current/past condition of the site:
   Extreme fragmentation,

9. Social, political and physical context of the project:
   ~~KENOSHA COUNTY~~ / STATE NATURAL AREA / DEVELOPING AREA OF LAKESHORE W/BOTH RESIDENTIAL & COMMERCIAL DEVELOPMENTS / ~~LOCAL~~ REGIONALLY IMPORTANT GREEN SPACE

10. Potential partners:
    TNC, Lake County, WDNR, ILDNR, KENOSHA Co. / SEWRPC

11. Unmet data needs:
    ~~VEGETATION SURVEYS~~ / REAL ESTATE SURVEY / LOCAL PLANNING OR ORDINANCES

12. Readiness (1=ready!; 5=concept stage): (1) 2 3 4 5

LMS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 1 Kenosha Dunes ~~Restoring~~ Coastal Processes

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake MI South

2. Which goal statements does this project *support*? ~~1) Protection 2) Re-establishment~~ Protect/enhance 250+ Acres of open space Focus on Vulnerable Community Types

3. The project category (circle one):
   Protection Enhancement Restoration (reestablishment) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Shore Protection Construction of offshore protective structures for Resilient shore/Dune Protection and artificial Reef Habitat

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   1) Halt the loss of critical plant and shore habitat at Kenosha Dunes from extreme erosion, 2) Improve offshore fish Habitat

6. Targeted species that benefits from actions:
   1) 400+ species of RARE Plants, Migratory waterfowl/wetlands
   2) SPAWNING Perch

7. Spatial extent/acreage: ~~~40~~ 50 Acres for Dunes, ~500 Acres Total SNA

8. Current/past condition of the site:
   State NATURAL AREA, Looking to Potentially Expand with additional Land from city. Former shore protection revetment Failed Due to extreme water levels

9. Social, political and physical context of the project:
   Highly visited Area, & unique Physiography - rare Dune habitat

10. Potential partners:
    STATE of WI, U.S.ACE, city, Private Donors (Natural Resource Foundation) WE Energies,

11. Unmet data needs: Need to identify Potential Sources of offshore Sand for restoration Use in evaluation of wetland stability as Dune Bluff erodes.

12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

LS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #2 & #3 Allouez Bay & Nemadji River

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Restore coastal wetland
2. Which goal statements does this project *support*? Adding coastal wetland
3. The project category (circle one):
   Protection Enhancement **Restoration (reestablishment)** Rehabilitation
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Coastal wetland restoration in Allouez Bay, including wild rice planting and reestablishment of wetlands in Nemadji's mouth using beneficial use of dredge.
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve existing interspersion of existing wetlands, add new ev to Nemadji mouth
6. Targeted species that benefits from actions:
   Marshbirds, colonial waterbirds, waterfowl, fish nursery habitat
7. Spatial extent/acreage:
   200 acres
8. Current/past condition of the site:
   Wetlands, mostly dense ev, little interspersion, ~~[illegible]~~ dwindling migratory bird / nesting bird habitats
9. Social, political and physical context of the project:
   Historic hot spot for migrating birds, marshbirds, key near shore wetland habitat, beneficial use of dredging, urban proximity, "Bird City"; Indigenous context in question, fisheries
10. Potential partners:
    WI DNR, AGL Co Superior, NRRI USFWS, MN Land Trust, USACE, LSRI (Wisconsin NRRI), St Louis River Habitat Work Group
11. Unmet data needs:
    Bathymetry, hydrodynamics, Initial monitoring, research on non-waterfowl avian response to wild rice
12. Readiness (1=ready!; 5=concept stage): **1** 2 3 **4** 5

LS 7

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #7 Fish Creek Bluff Restoration and Wetland

NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Superior Goal #1

2. Which goal statements does this project *support*? _____

3. The project category (circle one):
   Protection Enhancement (Restoration (reestablishment)) Rehabilitation

4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Streambank stabilization to reduce erosion + sedimentation, as well as wetland/slough restoration

wetlands - invasive spp. mgmt. habitat restoration for migratory birds

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce sedimentation and erosion into Fish Creek and Chequamegon Bay of Lake Superior. And Improve habitat for slough.

6. Targeted species that benefits from actions:
   Helps to meet broader goal of reducing sediment by 50% from Fish Creek. First project got us there 4%, this will get us closer to that goal.

7. Spatial extent/acreage:
   200 ft

wood turtle migratory birds waterfowl fish nursery habitat

8. Current/past condition of the site:
   This is a poorly eroded streambank.

9. Social, political and physical context of the project:
   Slough under US Hwy 2
   Already has buy-in from local government because eroding bluff is likely to take out the adjacent road.

10. Potential partners:
    Private landowners, Bayfield County, town of Pilsen, US Forest Service, US Fish + Wildlife Service, Burke Center at Northland College.

11. Unmet data needs:

12. Readiness (1=ready!; 5=concept stage): 1 (2) 3 4 5
    has design for project, need to secure landowner buy-in

LS

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #7 Fish Creek Wetland + Bluff Restoration

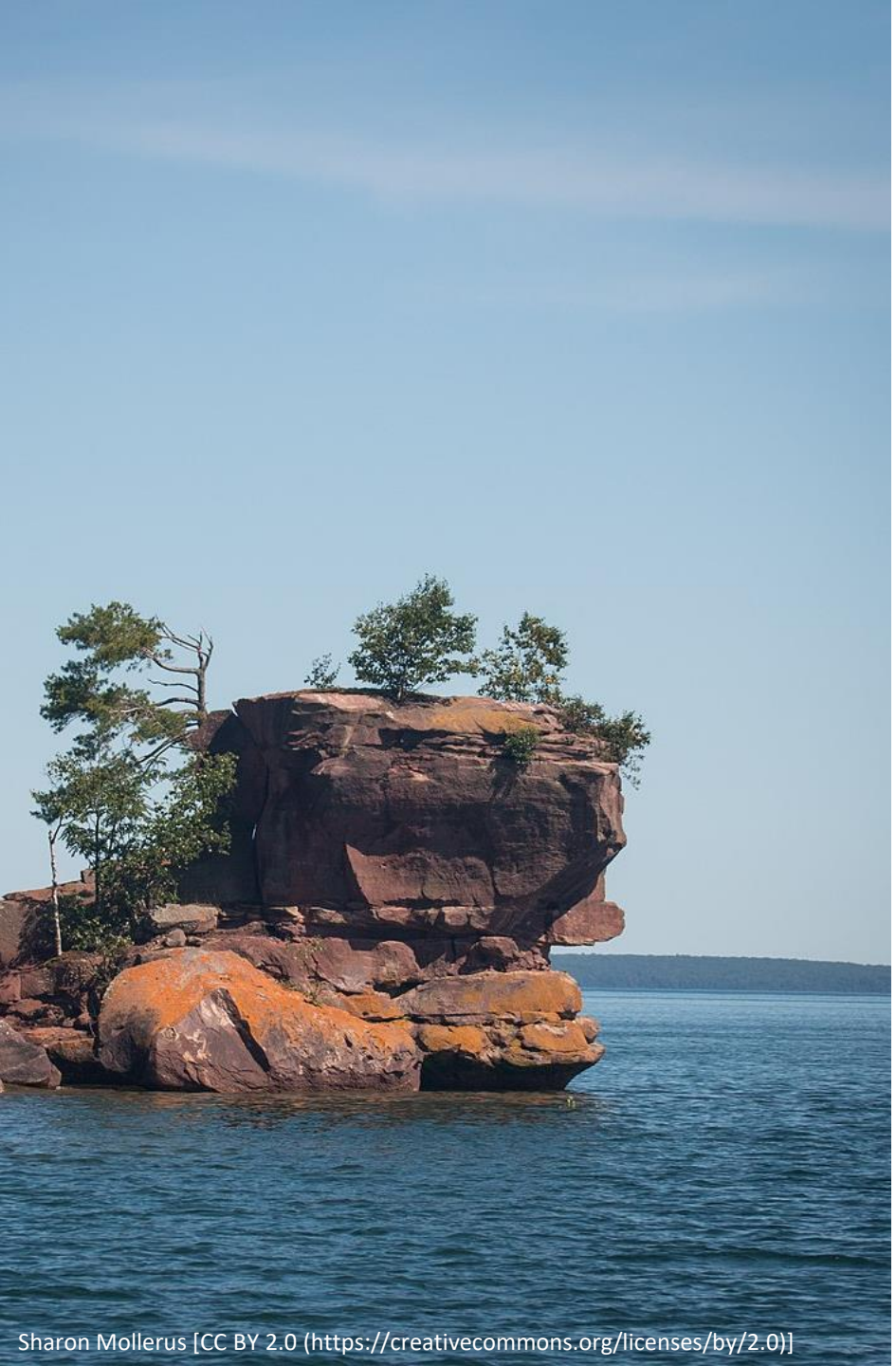
NUMBER THIS PROJECT ACCORDING TO DIRECTIONS PROVIDED DURING THE WORKSHOP. THEN WRITE THE SAME PROJECT NUMBER ON A STICKY DOT AND ATTACH THE STICKY DOT TO THE LOCATION ON THE MAP THAT CORRESPONDS TO THIS PROJECT.

1. Which goal statement does this this project *primarily* address? Lake Superior Goal #1
2. Which goal statements does this project *support*? Lake Superior Goal # 2
3. The project category (circle one): Protection / Enhancement / **(circled) Restoration (reestablishment)** / Rehabilitation
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal): Invasive spp. removal in slough and habitat enhancement. Bluff stabilization in creek
5. The desired change that the project intends to accomplish (improve/restore/reduce): Reduce sedimentation + erosion, improve condition of Fish Creek Slough
6. Targeted species that benefits from actions: Migratory birds, waterfowl, fish nursery habitat, wood turtles
7. Spatial extent/acreage: 100 acres slough, 200 ft streambank
8. Current/past condition of the site: Poorly eroded streambank,
9. Social, political and physical context of the project: Sloughs beloved area for recreation, hunting, fishing. Adjacent to 100 acre city park. Bluff Adjacent to county road, infrastructure/safety issue - erosion that will take out the road!
10. Potential partners: private landowners, city Ashland, DOT, WDNR, Northland College, Bayfield Co., US Fish + Wildlife Service, Ducks Unlimited, Trout Unlimited
11. Unmet data needs: Better understanding of hydrologic connectivity of wetlands to lake; data on Fish creek + sediment loads. do have project plan for bluff project
12. Readiness (1=ready!; 5=concept stage): 1 **(2)** 3 4 5 — 2 circled

Margin notes: Interspersion play-to-4 water; Lake Superior Collaborative; hydrologic connectivity

Attachment C

Presentation Slides



GREAT LAKES COASTAL AND NEARSHORE HABITAT ASSESSMENT WORKSHOP—WISCONSIN

JANUARY 14, 2020

UNIVERSITY OF WISCONSIN-GREEN BAY

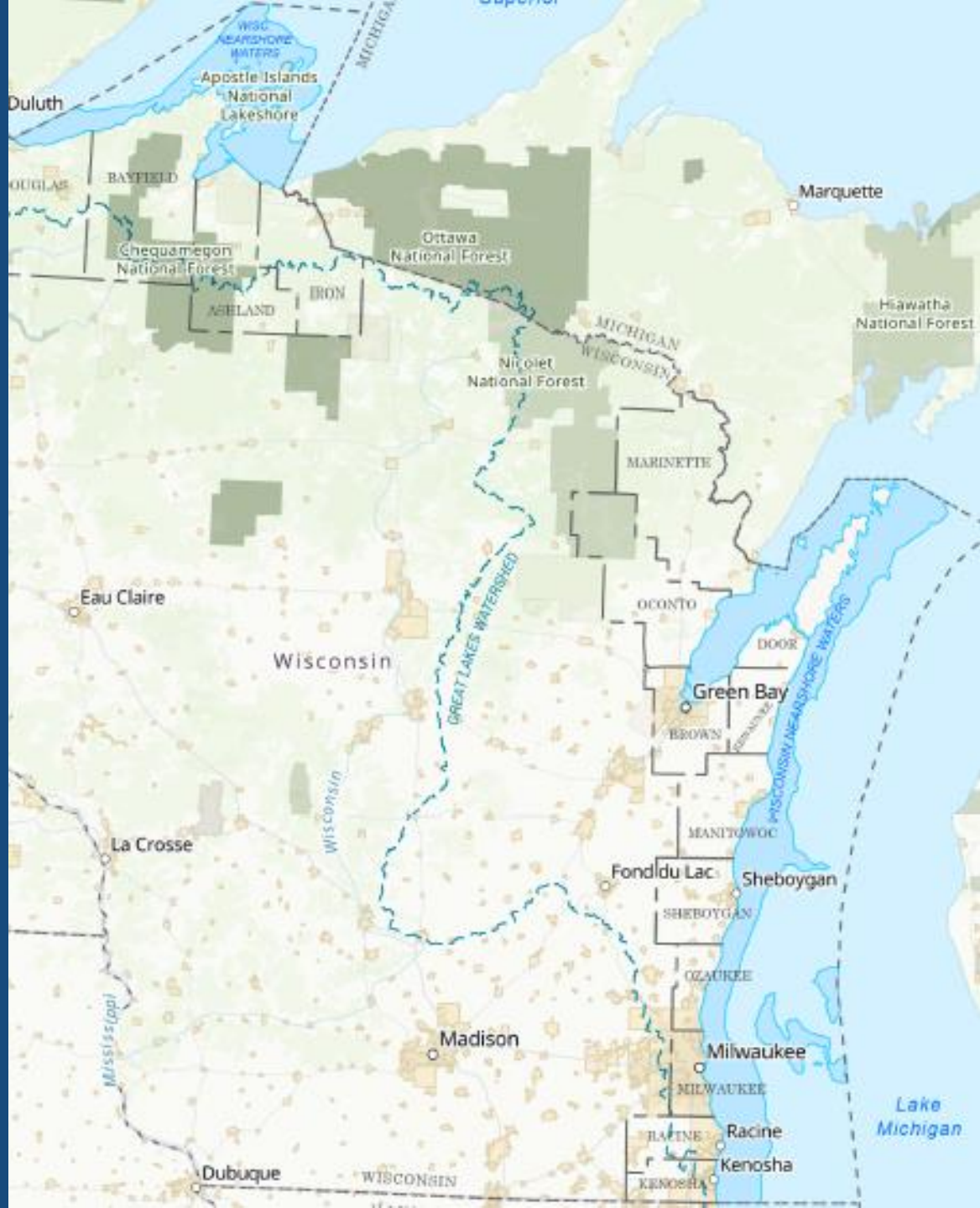
2420 NICOLET DRIVE

GREEN BAY, WI 54311

9:00 AM – 4:00 PM

WORKSHOP CONTEXT

1. Collect data
2. Identify and fill data gaps
3. Develop priorities
4. **Tee up future projects**



WORKSHOP CONTEXT

- Project Priorities
- U.S. portion of GL Basin
- Nearshore area:
  - 15 M depth – Lake Erie
  - 80 M depth – others Lakes
  - Ordinary High Water Mark – shoreline
- Data
  - All the above
  - Plus Coastal Counties

NOAA Photo Library [Public domain]

PURPOSE OF THE WORKSHOP

Identify:

- shared coastal management principles, goals, priorities, and data needs.
- specific place-based actions and people who can support these actions, and
- data needs associated with these preferred actions.

The targeted habitats for lake trout, walleye, lake sturgeon, yellow perch, cisco, and migratory birds and ducks.

ANTICIPATED OUTCOMES

- Identify shared coastal management principles and goals for each state.
- Develop a list of coastal and near shore habitat projects for funding in FY21 and beyond that target habitat benefits for lake trout, walleye, lake sturgeon, yellow perch, cisco, migratory birds, and other species of interest.
- Develop a list of available data, identify data gaps, and prioritize data needs.

Yinan Chen [Public Domain]

AGENDA

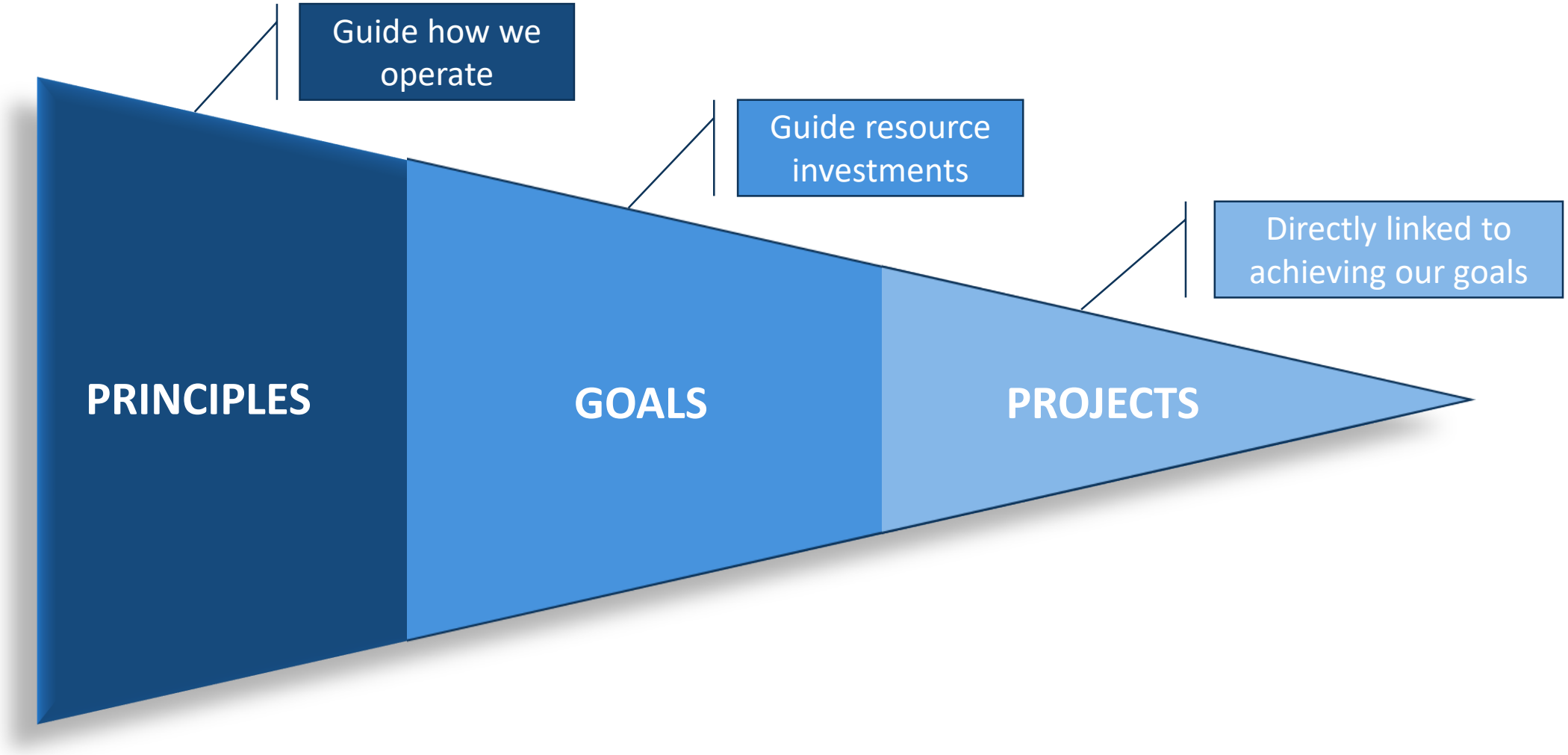
9:00	Welcome and introductions
9:40	Overview of state and regional plans
10:00	Identifying principles
10:30	Break
10:45	Identifying Goals
12:00	Lunch
12:30	Identifying and prioritizing projects and locations
2:20	Break
2:35	Identifying and Prioritizing Needed Data and People
3:45	Closing Remarks
3:55	Evaluation and Adjourn

Wisconsin Coastal Management Program

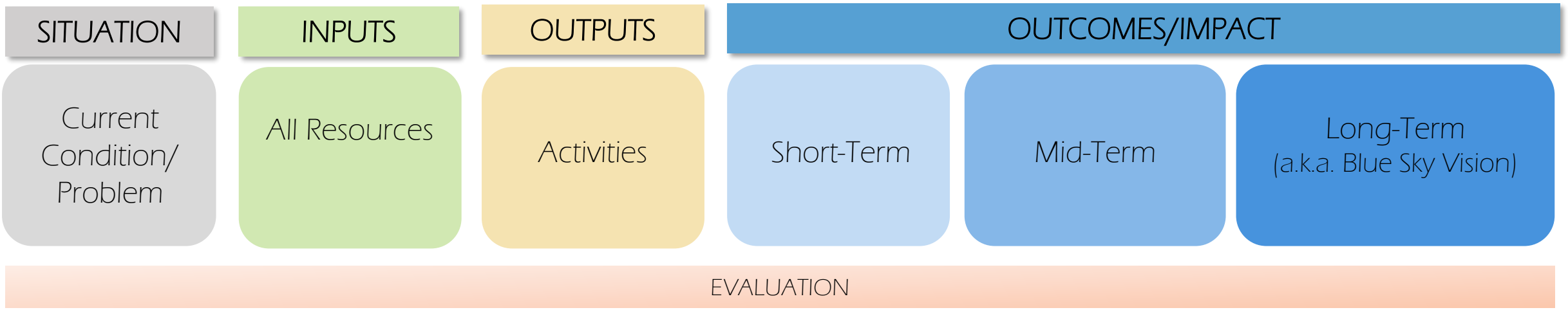
LimnoTech Water Environment | Scientists Engineers

RESPEC

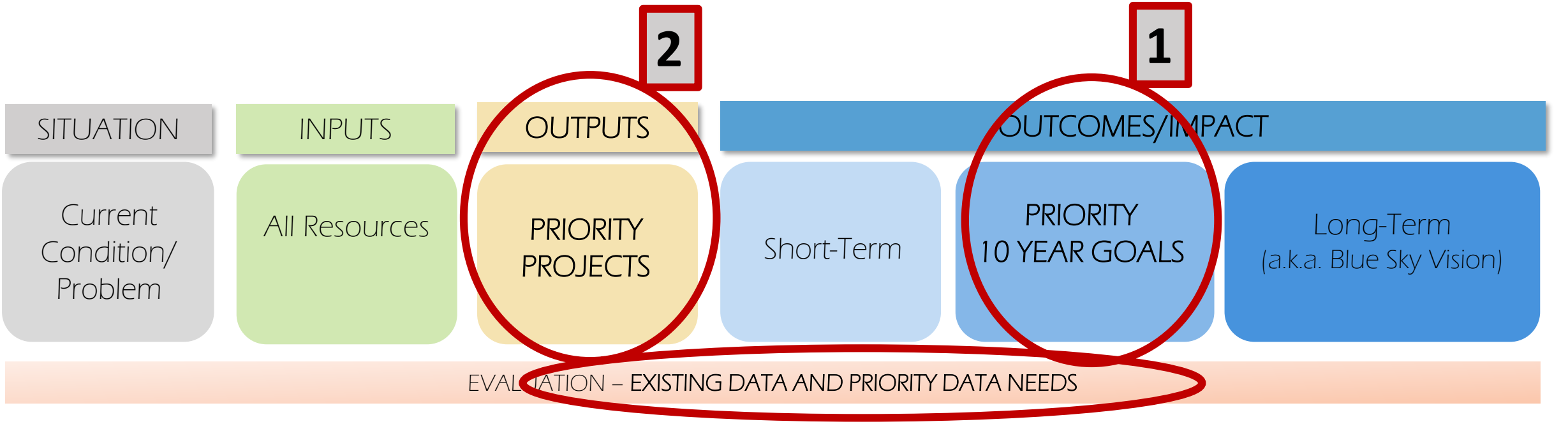
KEY ASPECTS OF AGENDA AND APPROACH



FRAMEWORK FOR TODAY'S ACTIVITIES



FOCUS OF TODAY'S ACTIVITIES



Etiquette

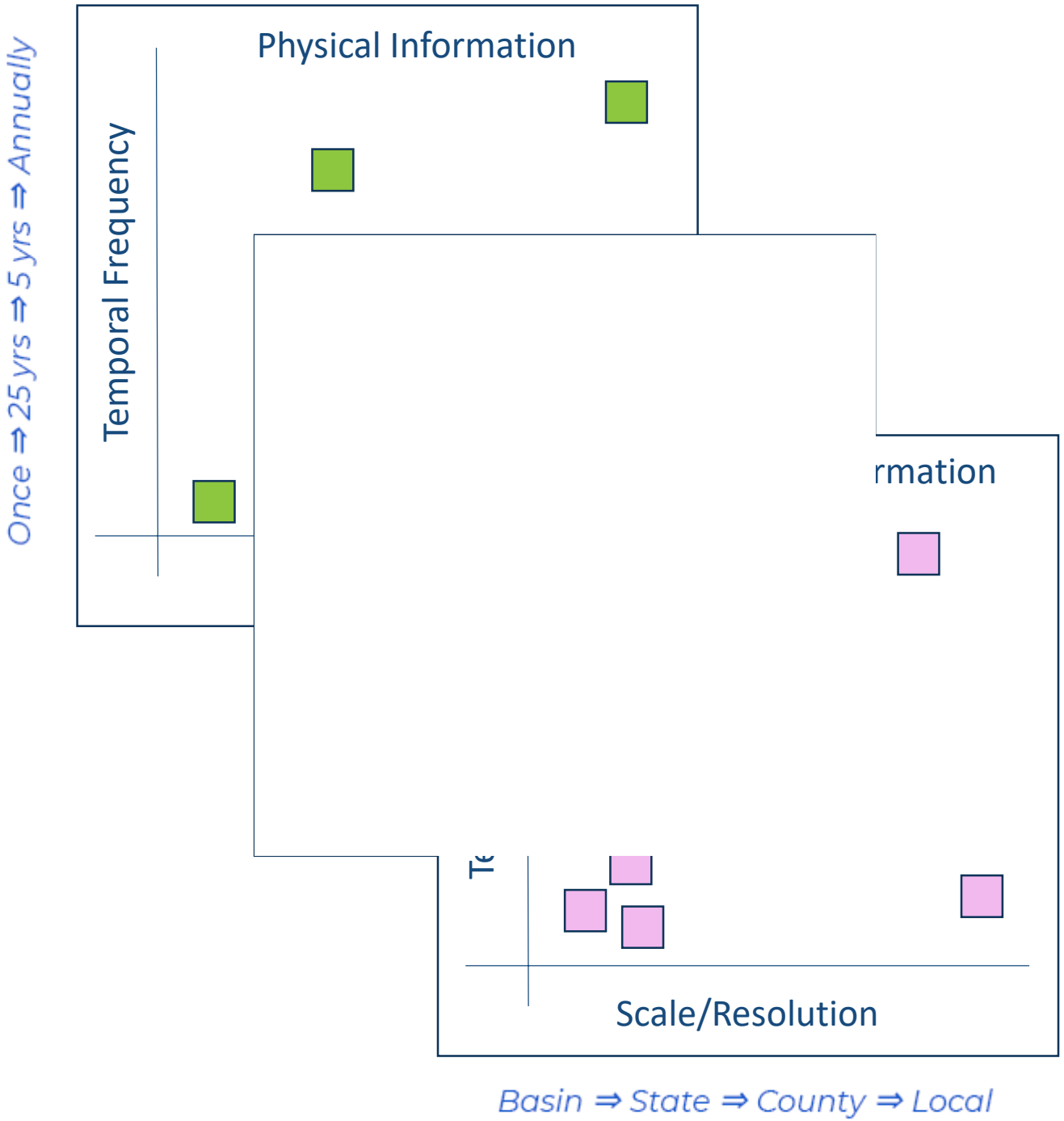
- **Contribute** your thinking and experience
- Listen to **understand**
- **Connect** ideas
- Listen together for **patterns, insights and deeper questions**
- Play, doodle, draw

KEYS TO SUCCESS

- Write legibly
- Complete thoughts in details
- Limited use of local/regional acronyms

DATA

- What scale? What frequency?
- Data types
  - Physical
    - Bathymetry
    - Substrate
  - Biological
    - Fish & benthos
  - Environmental
    - Dissolved oxygen
    - Water temperature



SHARED PRINCIPLES AND GOALS

- An overview of state and regional plans

Some definitions and examples for use and reference today

Principle:
a foundational idea
that influences action.

Goal:
the desired result
of an action.

Principles Examples:

Shoreline development can disrupt natural processes which can in turn limit habitat quality.

Habitat is often limited by fragmentation.

Science-based Goals Examples:

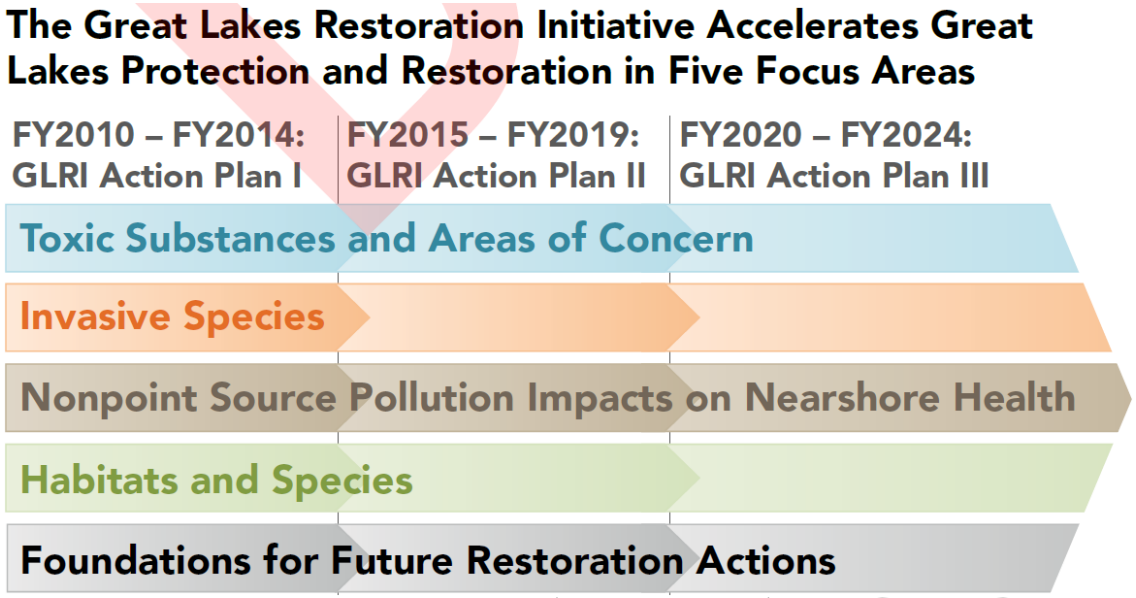
Take action to reduce shoreline hardening to less than 20% by 2030.

Maximize tributary connectivity for Lake Michigan migratory fish, while minimizing increased risk of invasive species.

Past principles and goals guiding habitat action

- Resources that have helped to articulate coastal habitat principles and goals in Wisconsin
  - GLRI Action Plan 3 (2020-2024), Focus Area 4: Habitat and Species
  - State and Regional Plans: LAMPs, Biodiversity Reports, and several other state plans

- **Workshops objective:**
  Identify principles, goals, projects and data needs
  that fit into a larger, shared, organized framework



Excerpt from 2019 GLRI Action Plan III

GLRI Action Plan III, Focus Area 4 – general statements of direction

- **Objectives**
  - **Protect and restore** communities of native **aquatic and terrestrial** species
  - Increase **resiliency** of species
- **Commitments**
  - **Identify, restore, and protect habitats** and provide **habitat connectivity**
  - Update and implement recovery actions for **federal threatened, endangered, and candidate species**.
  - Support **pop.-level protections, enhancements, and re-introductions**

GLRI Action Plan III, Focus Area 4 – example **statements of direction**

- Restoring **riparian habitat corridors**, further connecting **high-quality aquatic and terrestrial** habitat.
- Pursuing **innovation related to natural- and nature-based features** to enhance coastal ecosystem function.
- Considering **beneficial use of dredged material** to create new habitats.
- **Assessing** top-level predators, assisting in **re-introduction of native prey species**.
- Avoiding species extinction, **identifying key habitats and limiting factors**, increasing or protecting population levels
- Evaluating **population dynamics** (fish and wildlife)

Regional Plan examples of Lake Michigan habitat and species goals

- **Nearshore Zone**
  - 75% of native nearshore fishes within each lake area
  - Shoreline hardening index < 20%
  - Annual sediment loads < 0.075 tons/ac
- **Migratory Fish**
  - Each river-spawning fish has >=2 populations per assessment unit
  - Maximize tributary connectivity, minimize invasive risk
- **Coastal Wetlands**
  - Average wetland macrophyte index = good
- **Coastal Terrestrial Systems**
  - Viable populations of priority nested targets across lake
  - High priority biodiversity areas minimally impacted by shoreline alterations
- **Aerial Migrants**
  - Targets for high quality of stopover habitat
    - >30% 2 km coastal area: migrating landbirds
    - > 10% coastal area: migrating shorebirds

From Lake Michigan Biodiversity Conservation Strategy, 2015.

Examples of Lake Michigan habitat and species goals

GLRI Statements of Direction

Pursue innovation related to natural and natured based features

- **Nearshore Zo**
  - 75% of native f thin each lake area
  - **Shoreline hardening index < 20%**
  - Annual sediment loads < 0.075 tons/ac
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  - Average wetland macroph

Restore riparian habitat corridors, further connecting high quality aquatic and terrestrial habitat

- **Coastal Terrestrial Syste**
  - Viable populations of pri across lake
  - **High priority biodiversity areas minimally impacted by shoreline alterations**

Identify key habitats and limiting factors

Support protection of native species that have cultural, subsistence, and economic value

- **Aerial Migrants**
  - Targets for high quality of s over habitat
    - >30% 2 km coastal area: grating landbirds
    - **> 10% coastal area: migrating shorebirds**

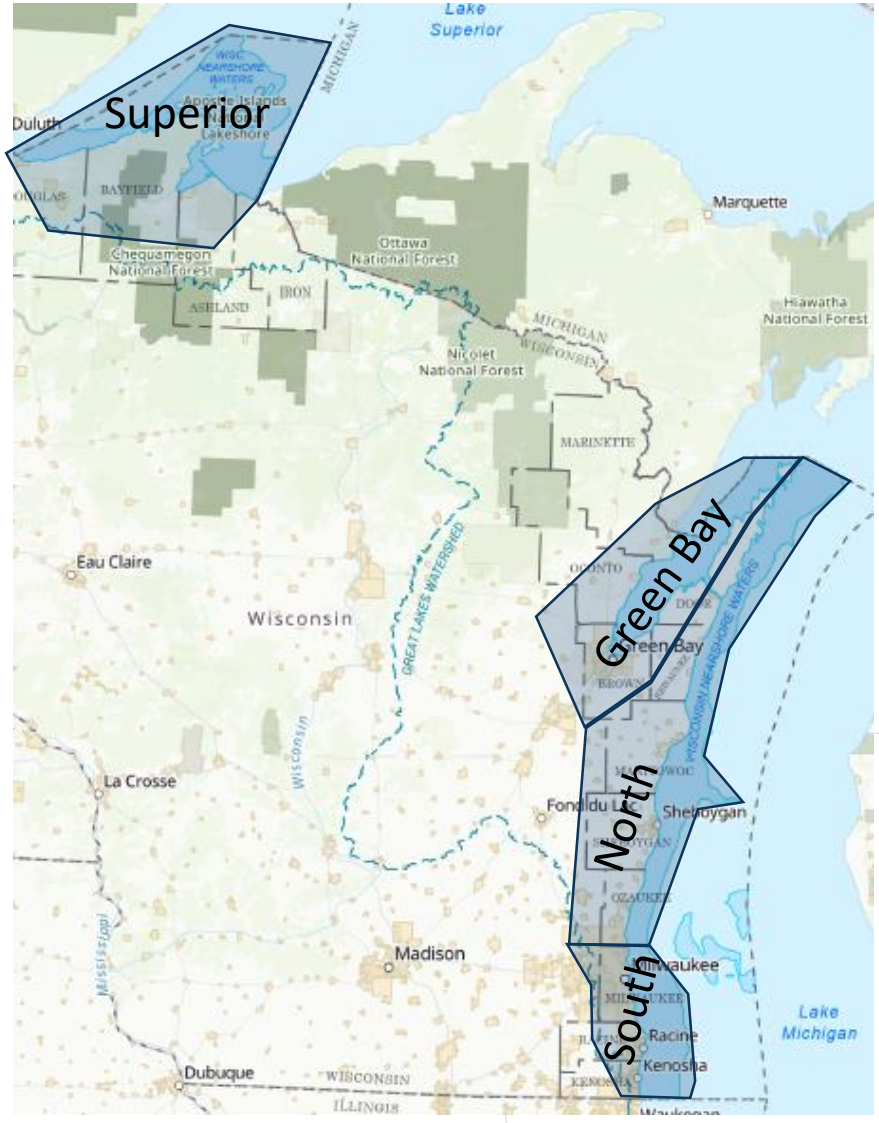
From Lake Michigan Biodiversity Co

Wisconsin state plans – example statements of direction

- **Manage** lands to provide **enhanced food resources** for wildlife.
- **[Develop and implement]…**watershed projects and strategies to address water **runoff quantities, sediment volume and hydrological degradation** in tributary watersheds
- **Connecting** and **buffering** lands already in some form of **protective ownership**
- **Protection** of
  - critical fish **spawning habitat.**
  - critical **bird habitat.**
  - habitats **supporting** species listed as **Endangered or Threatened**

Transition to breakout sessions – principles and goals

- Discussing principles and goals one way to place habitat actions into larger framework
  - May help to communicate about project benefits at larger scales
  - May help to identify common directions of Illinois agencies, common directions of multiple Great Lakes states
  - May help to identify linkages between state priority projects and GLRI Action Plan III



Principles

- ✓ A few minutes on your own
- ✓ Group conversation & noodling
- ✓ Choose 3/table
- ✓ Transfer to large green sticky notes (1 per sheet)
- ✓ Report out

What do you think are the key principles for achieving success in nearshore habitat restoration in the Great Lakes and/or the state of Wisconsin?

Consider:

- People
- Partnerships
- Data
- Science
- Funding

Examples:

- Ecosystem approach that incorporates multiple benefits.
- Innovative, science-based approaches.
- Adaptive management to maximize benefits.
- Realistic and feasible.
- Sustainable design that uses natural features.
- Uses the strength of partnership.

Goals

- ✓ Self select table
- ✓ 45 minutes group conversation & noodling
- ✓ Chose 3 well-written goals/table
- ✓ Transfer to sticky flip chart – leave room for voting dots!
- ✓ Report out

Develop up to 3 goal statements per group

Groups

- Lake Superior
- Green Bay
- North shore
- South shore

Goal Statements Must Be Explicit and Contain:

- Subject or resource of concern,
- Characteristic or attribute for the subject or resource of concern,
- Desired future condition for conceptual target (10-year timeframe) for the subject or resource of concern, and
- A measure, if possible.

Examples:

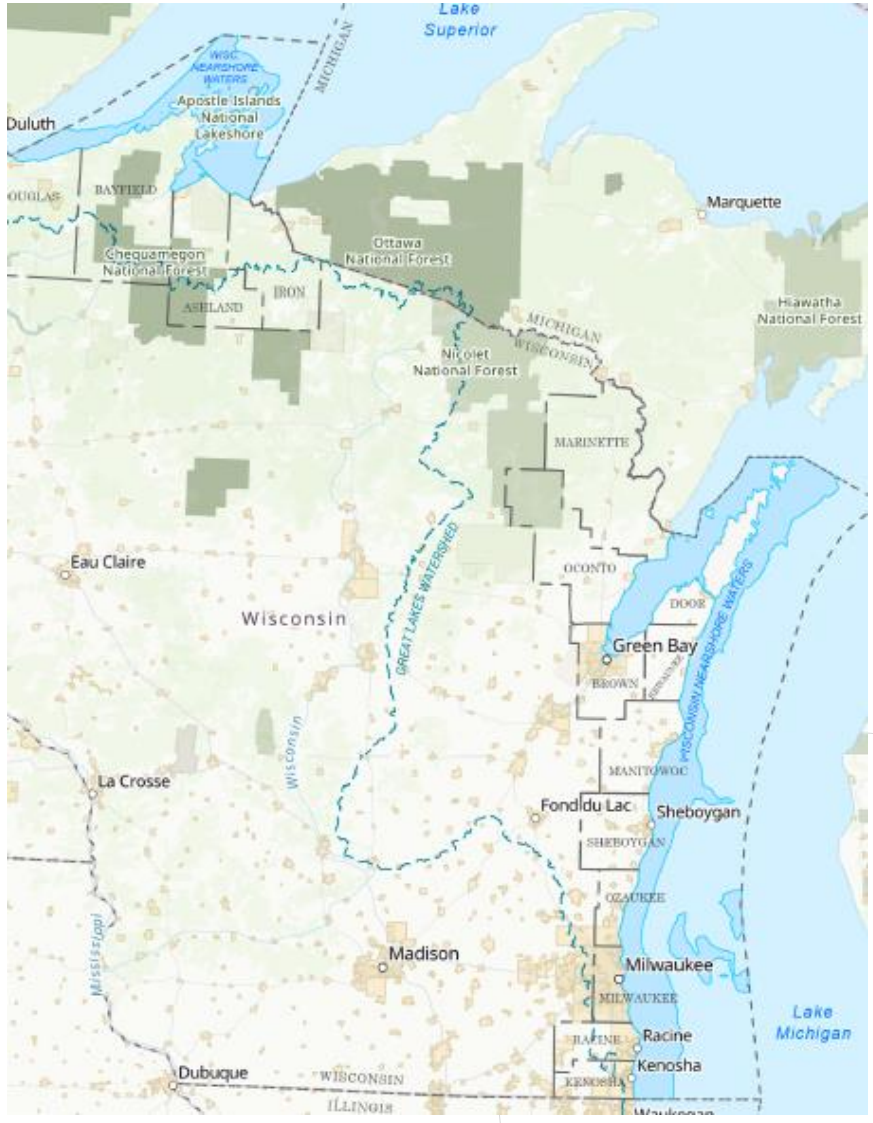
- Indiana: “Surface water will be restored to increase stormwater storage by 5% so that diverse, self-sufficient biological communities are supported.”
- Michigan: protect, enhance, and/or restore “…4,000 acres of coastal and nearshore habitat by 2030” in St Clair/Detroit River corridor

IDENTIFYING AND PRIORITIZING PROJECTS AND LOCATIONS

- An overview of state and regional plans

GLRI and Wisconsin Project Types and Priorities

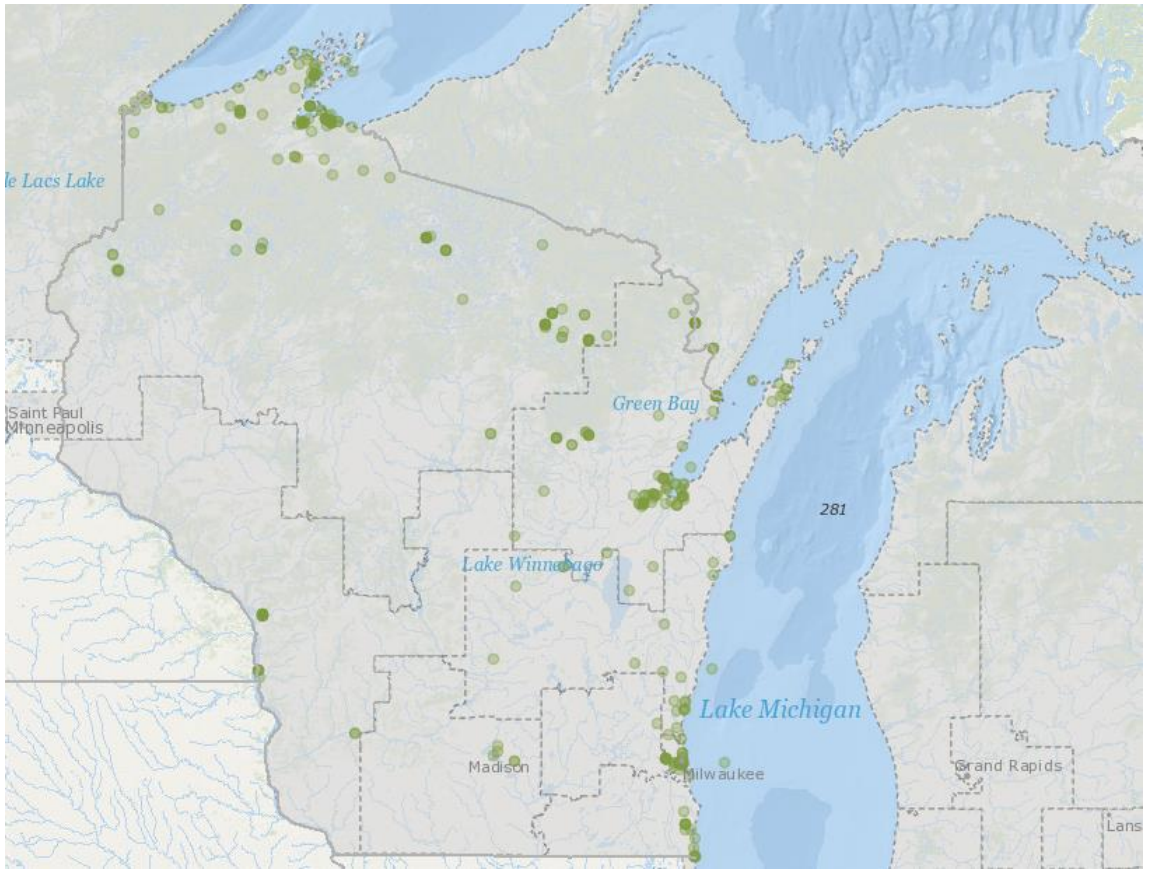
- Resources that help to articulate coastal habitat project priorities in Wisconsin
  - Project types supported by GLRI Action Plan 3, Focus Area 4: Habitat and Species
  - Completed Wisconsin projects from reports
  - Transition to discussion of your current project priorities



Project Types Supported by GLRI

"Restoration under the GLRI includes ecosystem **protection**, **enhancement**, **rehabilitation**, and **restoration**."

Draft GLRI Action Plan III, 2019



Definition of GLRI Project Types by EPA

Protection:
The removal of a threat or prevention of decline in habitat quality. No net gain.

Example:

Purchase of land or easement

Enhancement:

The improvement of a specific function in existing habitat. No net gain.

Example:

Flow alterations in a wetland

Restoration (Re-establishment):
Rebuilding a former habitat. Net gain.

Example:

Removing shoreline hardening and restoring natural shoreline

Restoration (Rehabilitation):
Repairing natural/historic function in a degraded habitat. No net gain.

Example:

Removing invasive species that prevent native species from thriving

Funded projects in Wisconsin

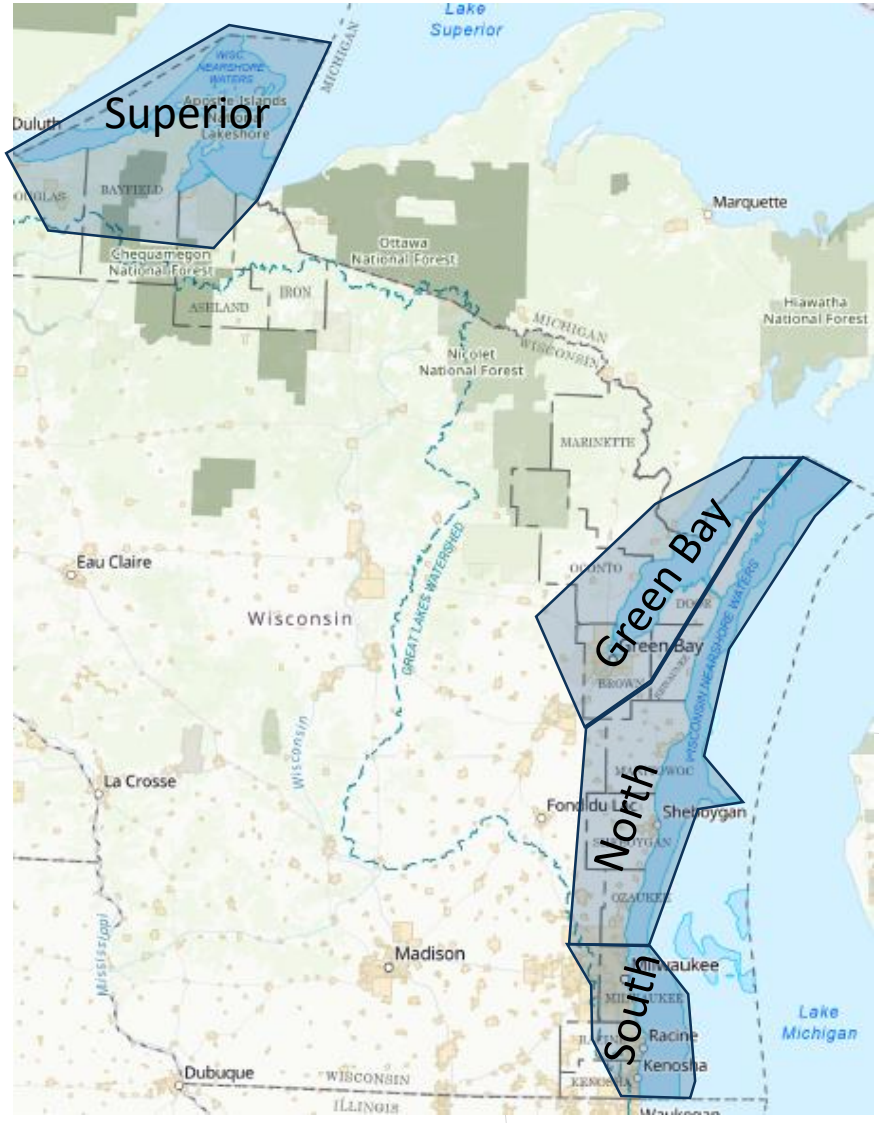
Restoration Type	GLRI Funded Projects	Other Wisconsin Projects
Protection	Chiwaukee Prairie State Natural Area …[protection of] 12 acres in…coastal wetlands complexes	Saxon Harbor Coastal Conservation Iron County purchased 112 acres of coastal forest along Saxon Harbor…
Enhancement	Aders Creek Restoration and Wetland Enhancement …install in-stream woody debris to restore and enhance 5,000 feet of stream and four wetlands on the Brillon Wildlife Area	Ulao Creek fish and wildlife habitat enhancement and restoration project …a large-scale…restoration project that is restoring multiple stream reaches [and includes] wetland enhancement
Re-establishment	Pike River Wetland and Fish Habitat Restoration …restore 21 acres of wetland habitat and 60 acres of prairie habitat along the Pike River in the Lake Michigan watershed.	Cat Island Chain Restoration in Green Bay Using dredged sediment to recreate 1960s footprint of the Cat Island Chain
Rehabilitation	Restoring Fish Habitat at Wequiock Creek Estuary Control invasive Phragmites, remove accumulated sediment…to restore 91 acres	Wisconsin Point Dune Restoration [Restoration of] dunes that have been degraded and [revegetation] with stabilizing native plants.

Project priorities in Wisconsin

- St Louis River
  - From MN workshop
    - Project #2: Protect/preserve 400 ac of land in the Superior Municipal forest
    - Project #3: Acquire several acres of private property near St. Louis R Streambank Protection Area & Oliver landing
    - Both target migratory birds & just need funds
- Lakes Michigan & Superior
  - Protect and restore 55,000 acres of coastal, riparian, and wetland habitat
  - Restore eight tributaries within the two basins

Transition to breakout sessions – Identifying priority restoration sites

- **Time now to discuss ideas for future projects!**
- Breakout groups will organized by goal groups
- Please provide as much detail as possible – helps to increase likelihood of project realization

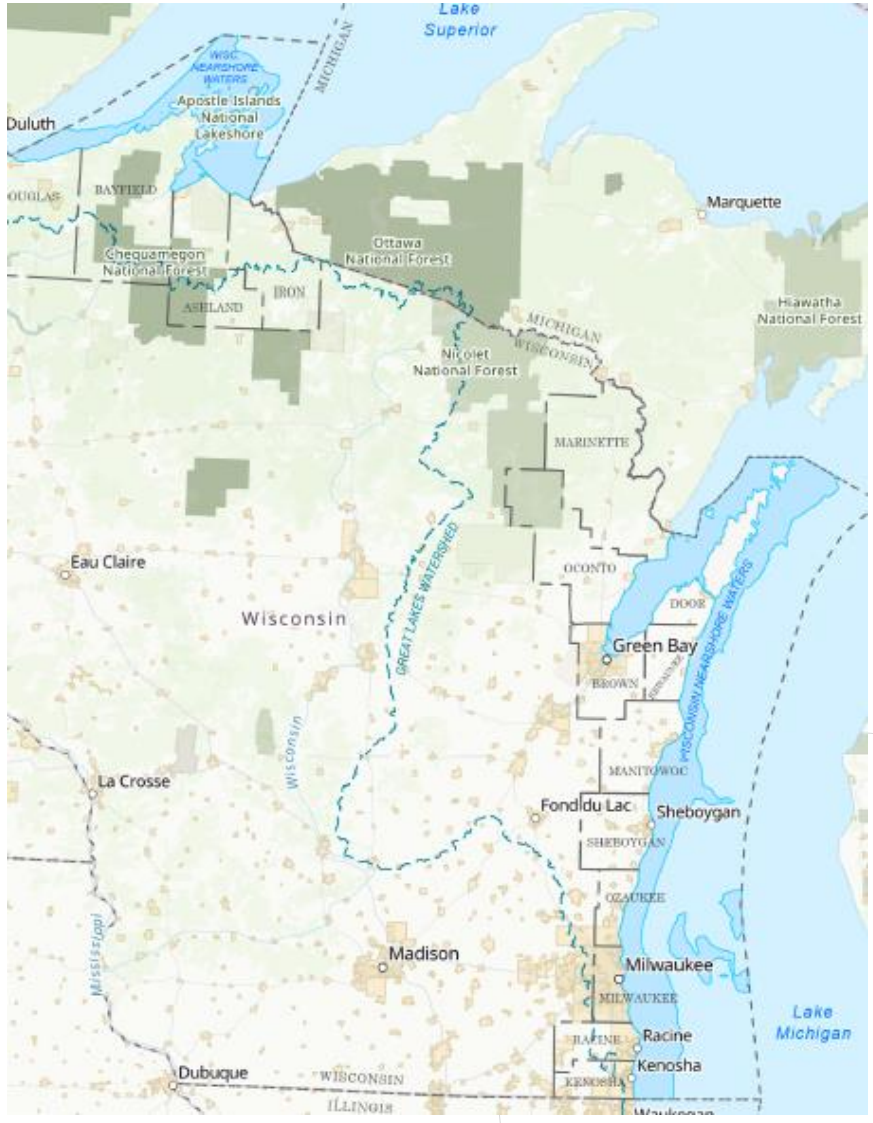


IDENTIFYING AND PRIORITIZING DATA

- An overview of data gaps

Identifying existing habitat-related data

- **WHY** we are reviewing this
  - Successful habitat restoration projects need data
    - For identifying and describing current habitat locations and planning project locations
    - For supporting project design
    - For post-auditing project effectiveness
  - Some apparent data gaps are due to lack of discoverability – help us locate data if possible!



Identifying types of habitat data

- **Targeting data that impact fish communities in the coastal zone**
  - **Review** of Great Lakes Aquatic Habitat Framework (GLAHF)
  - **Review** fisheries biologist
  - **Resulting in** 34 data types

- **Types of gaps**
  - Presence/absence
  - Temporal resolution
  - Spatial resolution

- **WHAT** we intend to have at the end of the discussion
  - **Do you have** state-level data to fill our data gaps?
  - Which data gaps are **most important to fill**?

Identifying types of habitat data

- **Targeting data that impact fish communities in the coastal zone**
  - **Review** of Great Lakes Aquatic Habitat Framework (GLAHF)
  - **Review** fisheries biologist
  - **Resulting in** 34 data types

- **Types of gaps**
  - Presence/absence
  - Temporal resolution
  - Spatial resolution

- **Where we have been:**
  - Regional data sources:
    - NOAA Digital Coast
      - Coastal Change Analysis Program
    - Great Lakes Aquatic Habitat Framework (GLAHF)
    - Great Lakes Observation System (GLOS)
    - USGS Great Lakes Sci Center
    - US Army Corps of Engineers
  - State data sources:
    - **Wisconsin DNR Open Data**
    - Lake Superior NERR

- **We have found many maps, but can't always get the underlying data**

Identifying types of habitat data

- Key questions to answer
  - Do you have any data to fill these gaps?
  - What data do you need to execute the projects we have proposed?
  - What data would you need to identify future projects in the future?

Review of spatial/temporal resolution

- **X**
  - We have found a dataset that matches the metric
- **OK**
  - sufficient level of information for project-scale work
- **LOW**
  - The resolution of the data is technically insufficient to complete project-scale work
- **MODERATE**
  - The resolution of the data is more coarse than desired to complete project-scale work, but useable
- **HIGH**
  - There is sufficient high-resolution to use this dataset for project scale work

Spatial Resolution	Temporal Resolution
Ok	Ok
Low	Low
Moderate	Moderate
High	High

Definitions & Abbreviations

- **CSMI (Cooperative science and monitoring initiative):** research efforts derived from Lakewide Action Management Plans (LAMPs)
- **Ecoregion:** a major ecosystem defined by distinctive geography
- **GLANSIS:** Great Lakes Aquatic Nonindigenous Species Information System
- **Hydrogeoforms:** underwater structures. These can be natural or manmade.
- **Relative exposure index:** is a wind speed, direction, and frequency weighted measure of effective fetch
- **USACE:** US Army Corps of Engineers

Physical habitat data—”static”

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Discharge infrastructure: volumes and types	X	Ok	Ok	NPDES permits
Ecoregions (ecoprovinces)	X	Ok	Ok	
Dams (river access)	X	Ok	Ok	
Road crossings	X	Ok	Ok	
Shoreline classification	X	Ok	Ok	
Stream mouths (watershed pour points)	X	Ok	Ok	
Watersheds	X	Ok	Ok	

X = present

ok = sufficient level of information for project-scale work

Physical habitat data—”dynamic”

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Bottom ruggedness (rugosity)				GAP
Bottom slope	X	Low	Low	Derived depth & relief
Connectivity to adjacent habitats				GAP
Hydrogeoforms	X	Low	Low	Derived depth & relief
Relative exposure index (REI)				GAP
River substrate				GAP
Spawning reefs	X	Ok	High	
Substrate composition, variability, and distribution	X	Moderate	Moderate	2015, GLAHF 30-m
Water depth	X	High	Moderate	
Wave energy	X	Moderate	Moderate	USACE modeled results
Wave height	X	Low	High	GLOS buoy (no win. data)

Biological habitat data

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Benthos (trophic str/function)	X	Moderate	High	GLNPO points, most recent 2011
Coastal wetlands	X	Moderate	Ok	MTRI 12.5-m, high res in Old Woman Crk
Fish (trophic str/function)	X	Moderate	Moderate	Primarily from CSMI
Plankton (trophic str/function)	X	Moderate	High	GLNPO data, may not be sufficient depending on project location
Prevalence of invasive species	X	Moderate	Moderate	GLANSIS, most recent 2014 Phragmites stands
Submerged aquatic vegetation (presence/absence)	X	Moderate	Moderate	Mich. Tech Research Inst, 2012, 30-m
Vegetation density				GAP (looking for SAV)
Vegetation heterogeneity				GAP (looking for SAV)
Vegetation morphotype				GAP (looking for SAV)
Vegetation species composition				GAP (looking for SAV)

Is there a state-wide database available? Missing spatial data? Remote sensing?

Environmental habitat data

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Chlorophyll-a	X	High	High	Lk Superior NERR data
Turbidity	X	High	High	Lk Superior NERR data
Suspended minerals				GAP
Water temperature (incl. timing/variability)	X	Low	Moderate	Derived from NOAA coastwatch satellite
Dissolved oxygen	X	High	High	Lk Superior NERR data
Turbidity	X	High	High	Lk Superior NERR data

Is there a state-wide database available? Missing spatial data? Remote sensing?

THANK YOU

todd.brieby@Wisconsin.gov

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