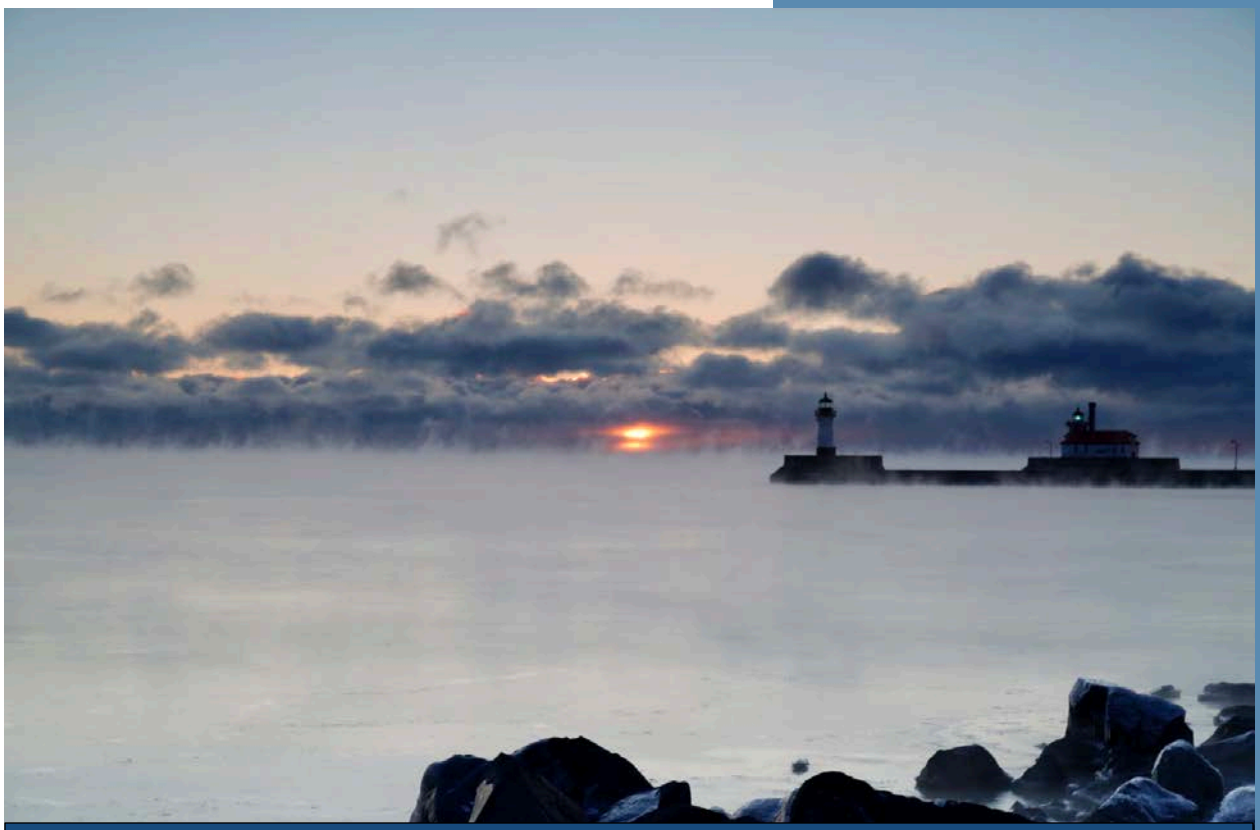

Proceedings Report on Great Lakes Coastal and Nearshore Habitat Assessment Project—Minnesota

January 7, 2020
Hermantown Training Center
5111 Maple Grove Rd
Hermantown, MN 55811
9:00 am – 4:00 pm

Prepared for:
Coastal States Organization

FINAL

3/25/2020

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Water Environment | Scientists Engineers

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Prepared for:

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3/25/2020

Prepared by:
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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. 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. 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 Hermantown, MN on Tuesday, January 7, 2020 as well as the background materials used during the workshop.

1 Morning Session (9:30 AM – 12:30 PM)

1.1 Opening Remarks

Mike Molnar from the Coastal States Organization (CSO) 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 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 Minnesota;
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.

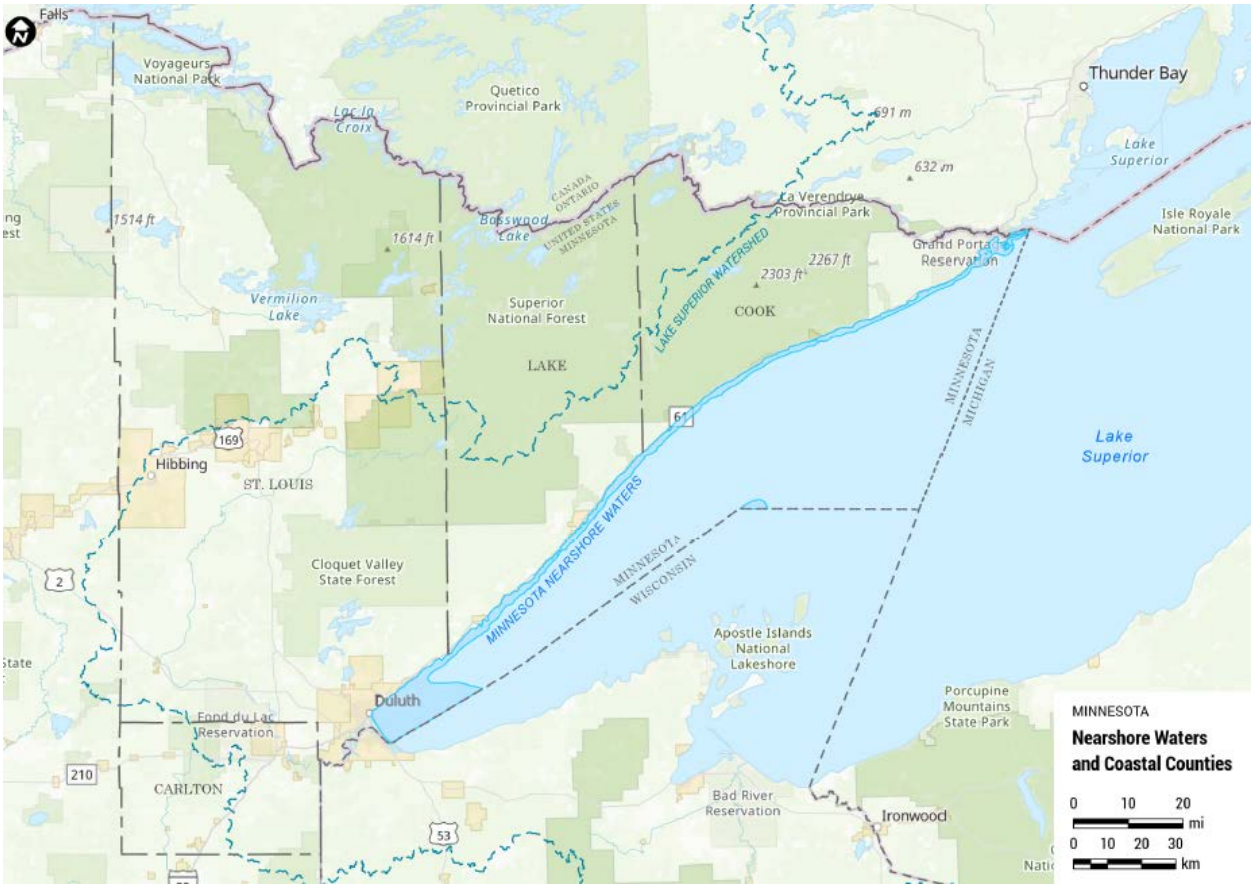

Figure 1. Map of the Minnesota Study Area

1.2 Overview Workshop and Agenda

The workshop agenda is summarized in Table 1.

Table 1. Workshop Agenda

Workshop Segment	Purpose	Format
Introduction (9:30-9:50 AM)	Describe workshop purpose, preview agenda	Welcome and introductory statements
Icebreaker Activity (9:50-10:10)	Prepare group for interactive workshop	
Shared Principles and Goals: An overview of state and regional plans (10:10-10:30)	Prepare audience for discussions by providing overview of past communicated priorities, and identifying	Very brief presentation summarizing state-level reports and GLRI Action Plan III Focus Area 4

Workshop Segment	Purpose	Format
	alignments with GLRI Action Plan III Focus Area 4	
Identification of Coastal Habitat Principles (10:30-10:55)	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 (11:15-12:30)	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 (1:00-1:20)	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 (1:20-1:50)	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 (3:05-3:15)	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 (3:15 – 4:15)	Identify data gaps and articulate why these data are needed. Complete worksheets summarizing data needs.	
Wrap-up and Evaluation (4:15 – 4:30)	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 Superior. The

purpose of this presentation was to help workshop attendees consider their own principles and goals related to habitat restoration in the Lake Superior region.

LimnoTech first started by defining the terms "principles" and "goals", and then gave several examples from the GLRI Action Plan III and the Lake Superior Biodiversity Conservation Assessment (LSLAMP-SWG, 2013). 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 Superior Biodiversity Conservation Assessment 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 (Audubon MN, 2014; MPCA, 2018a; MPCA, 2018b). 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)

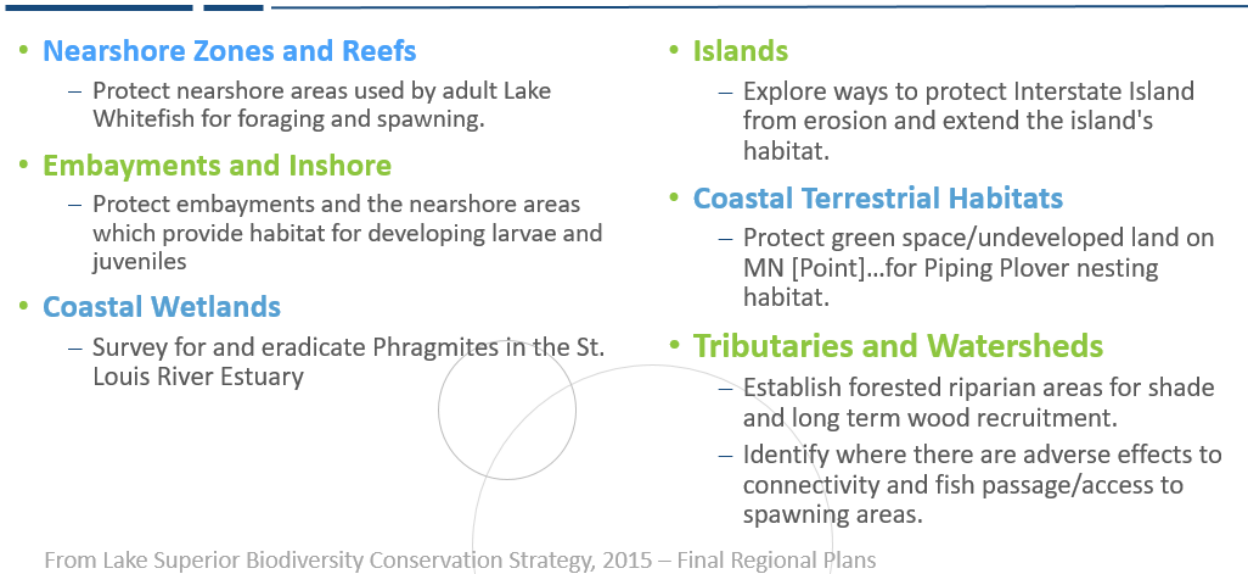

Figure 3. Summary of Select Habitat Restoration Goals Presented in the Lake Superior Biodiversity Conservation Assessment (LSLAMP-SWG, 2013)

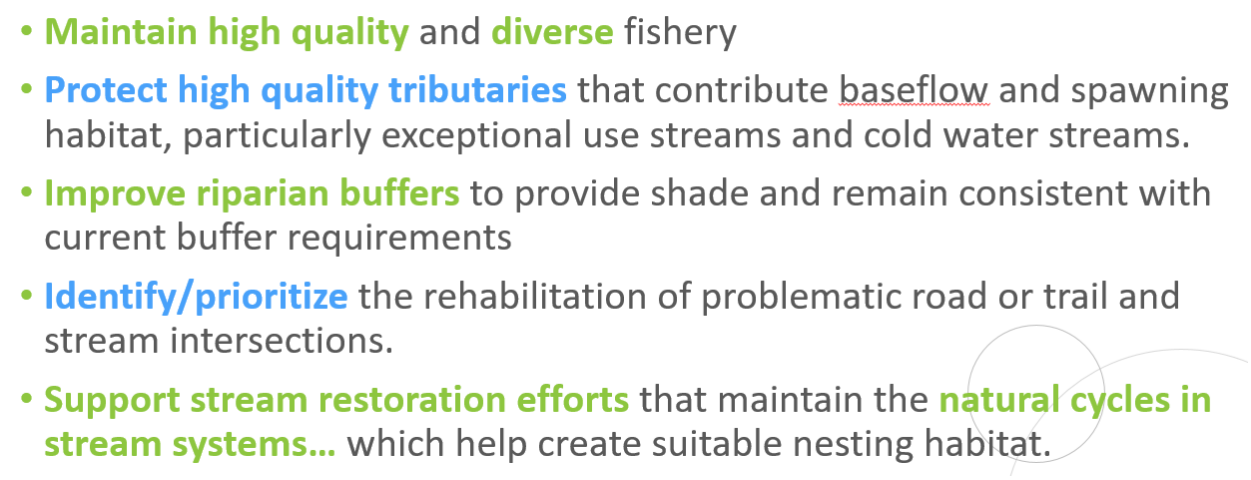

Figure 4. Summary of Select Principles and Goals from Minnesota State-Level Reports (Audubon MN, 2014; MPCA, 2018a; MPCA, 2018b)

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, 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. There was one principle some participants thought was missing: funding. None of the principles listed directly addressed funding issues around habitat restoration projects; however, many participants felt that their principles indirectly addressed funding (e.g., if you mentioned "sustained monitoring" activities then sustained funding to support those activities would be implied). Other participants felt that funding didn't need to be directly addressed because of the Minnesota Legacy Amendment Act, which already enshrines funding as important in this state. At the conclusion of this discussion everyone acknowledged that consistent funding was an important principle for successfully completing a habitat restoration project, and as such, it was added as a principle.

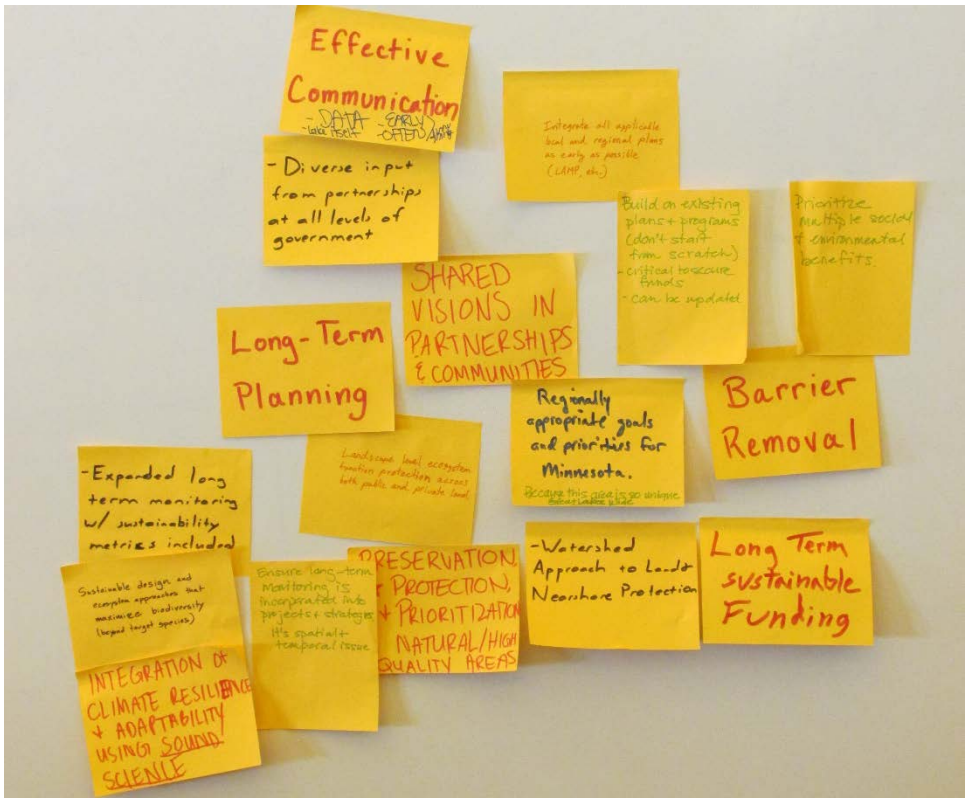

Figure 5. Snapshot of the Results from the Principles Discussion

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		This is related to capacity. It is important to remove the barriers that would prevent this project from moving forward.
	Diverse input from partnerships at all levels of governments	
	Effective communication	This is needed among partnerships and with the public.
	Communication about the benefits, the data, sharing, and funding mechanisms"	
Data/Science	Build on existing plans and programs (don't start from scratch)	This is critical to securing funds and the plans can be updated over time.
	Ensure that long-term monitoring is incorporated into projects and strategies.	
	Expanded long-term monitoring with sustainability metrics included	
	Having regionally appropriate goals and priorities for Minnesota	Our concerns are very different than many of the other states.
	Integrate all applicable local and regional plans as early as possible	
	Landscape level ecosystem function protections including public and private land	Much of this region is privately owned, and that should be considered in the restoration process.

Category	Key Principle	Further Details
	-	
	Watershed approach to land and nearshore protection	
Sustainability	Integration of climate resiliency and adaptability using sound science	
	Long-term planning	Really relates to the landscape level function protection
	Sustainable design and ecosystem approaches that maximize diversity beyond target species	

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: St. Louis River estuary, St. Louis County, Lake County, and Cook County (Figure 7). The study area for restoration projects extended in from the 80-m bathymetry contour in Lake Superior to one coastal county inland. Each group was asked to develop 3 to 5 goal statements related to either a target species of interest or a region or location 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 with a brief question and answer session after. The answers to the questions for each group were integrated into the goal statements in Table 3. Once all the groups finished presenting their goals statements, 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 two dots for each region: one green and one red. For each region, participants had to select their highest priority using a green dot and their lowest priority using a red dot. The goal statements and the results of the nominal voting process are summarized in Table 3.

After the nominal voting process, there was some discussion around the top goal selected for St. Louis County: the development of a long-term watershed ecosystem monitoring program. Many participants thought this was an excellent idea for the region, but workshop staff mentioned that the goal of this workshop was to identify on the ground, actionable habitat restoration projects, not monitoring projects. It was decided that the develop of a long-term watershed monitoring project would be moved to the data needs discussion of the workshop.

There was also a discussion about the effectiveness of splitting workshop participants into groups based on county. Many of the participants in the Cook County and Lake County groups felt that there was significant overlap between their goals, and the types of restoration projects they would like to propose. To address these concerns, workshop staff spent several minutes looking for themes across all the goals listed across the four groups. The following two themes were identified:

1. Restoring connectivity for fish species
2. Restoring migratory bird habitat

Based on these themes, workshop staff proposed splitting participants into the following four groups:

1. St Louis River Estuary

2. Coldwater fish habitat connectivity
3. Nearshore coastal habitat
4. Forests for bird habitat

Workshop participants agreed to this new division of groups and separated themselves accordingly. After moving to their new groups, Participants in groups two through four quickly convened to generate a new top goal statement that would be consistent with their new grouping. The updated goal statements are summarized in Table 4.

Finally, there was a brief question and answer session at the conclusion of this process. The questions and answers are paraphrased below:

Question: How will this meld with the LAMP? We did a similar exercise a few months ago

- We don't intend to supplant the LAMP process. This process draws upon existing information across plans and projects. We know the LAMP has this information in it, but not all LAMPs across the lakes have projects identified. We are trying to identify projects that are ready to go, or need a bit more engineering and design.

Question: is there funding that is going to be applied to these priorities?

- Yes, funders will be convening after all workshops have been completed

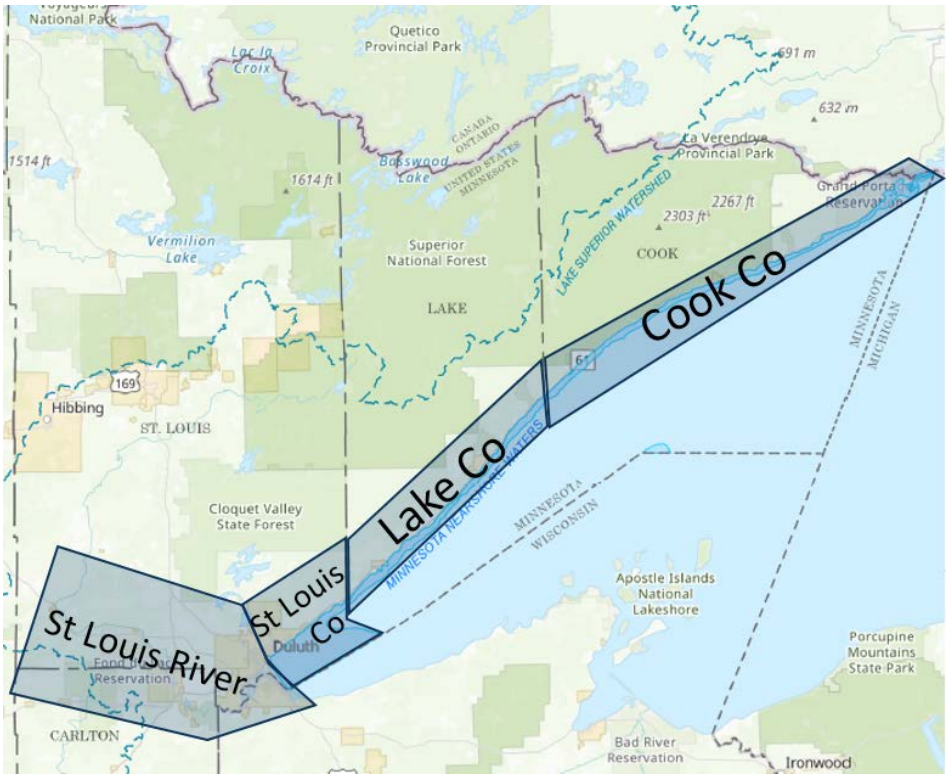

Figure 7. Map of Lake Superior Coastline and the Approximate Geographic Extent for the Four Groups: St. Louis River Estuary, St. Louis County, Lake County, and Cook County

Figure 8. St. Louis County Group Developing Goal Statements

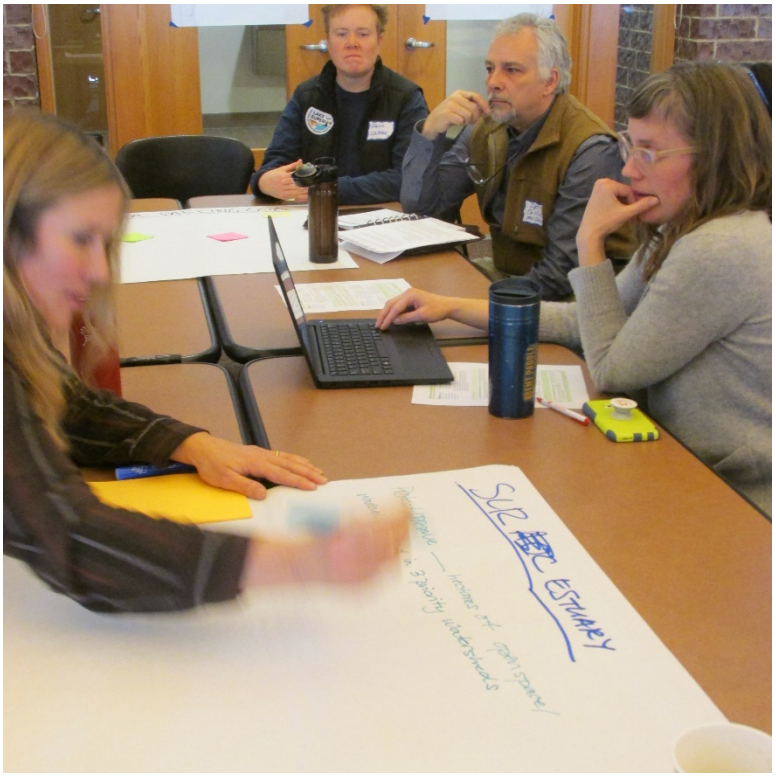

Figure 9. St. Louis River Estuary Developing Goals Statements

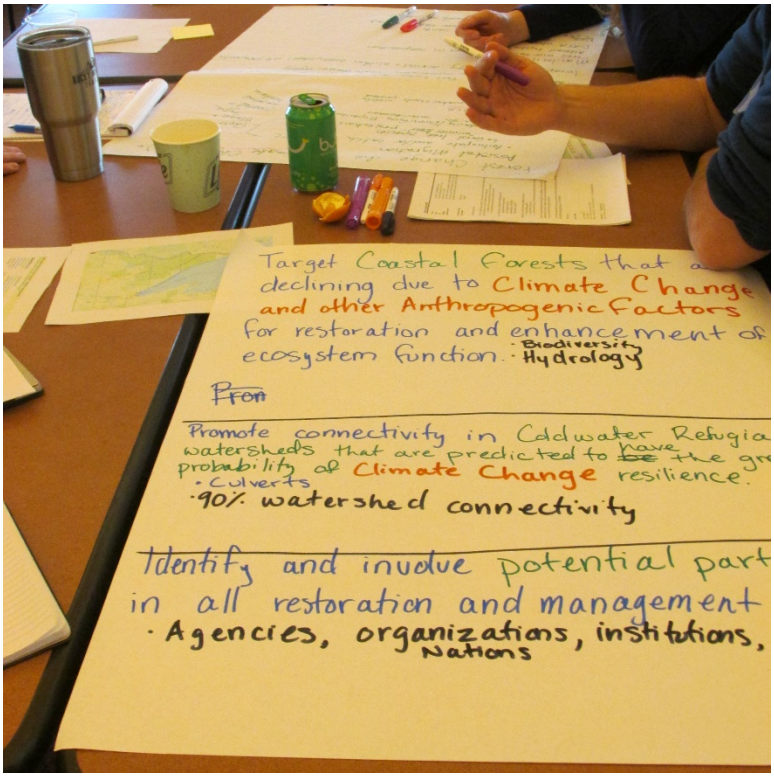

Figure 10. Lake County Group Developing Goals Statements

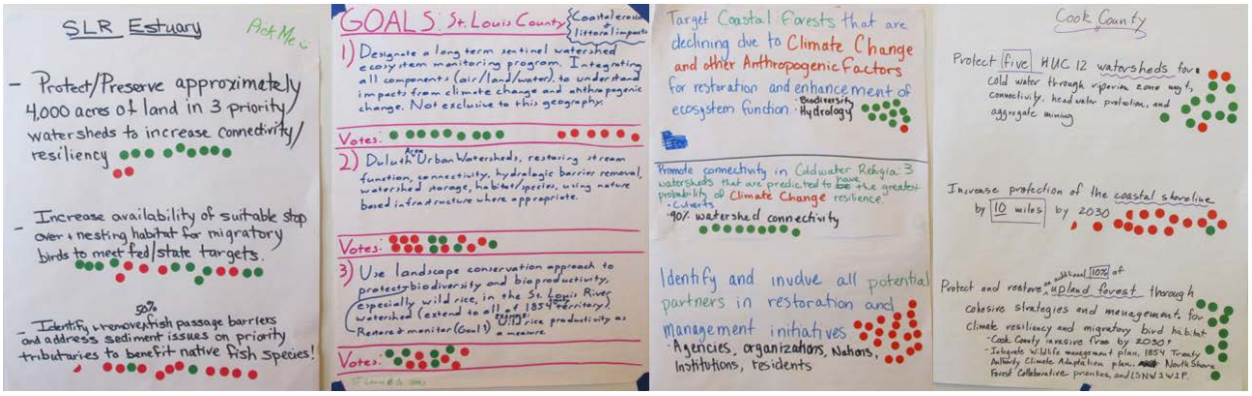

Figure 11. Initial Goal Statements for Each Group: St Louis River Estuary, St. Louis County, Lake County, and Cook County

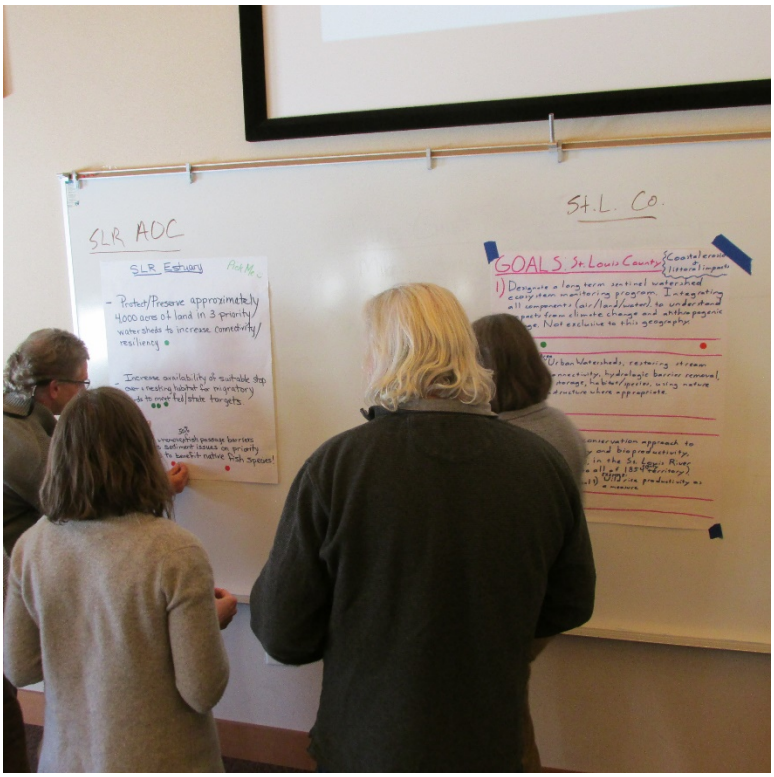

Figure 12. Nominal Voting on Goal Statements by Group

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

Region	Goal	Green Dot	Red Dot
St. Louis River Estuary			2
	Increase availability of suitable stop over and nesting habitat for migratory birds to meet federal and state targets	5	8
		3	15
St. Louis County	-	12	6
		12	9
	-	7	14
Lake County		18	1

Region	Goal	Green Dot	Red Dot
			1
	Identify and involve all potential partners in restoration and management initiatives. Targeting agencies, organizations, nations, institutions, residents.	0	27
Cook County		16	1
		13	7
	Increase protection of the coastal shoreline by 10 miles by 2030	5	17

Table 4. Updated Goal Statements Based on New Groups

Region	Goal
St. Louis River Estuary	See Table 3 above
Coldwater Fish Connectivity	Coordinated, strategic approach to restore coldwater connectivity through barrier removal that restores hydrology, connectivity, biology, water quality, and geomorphology
Nearshore Coastal Habitat	Increase knowledge of and preservation of unique coastal and nearshore habitats and maintain/protect biodiversity in these habitats. Establish increases in preserved area based on specific habitat type (i.e., one additional wetland).
Forests	Protect and restore an additional 10% of coastal* forests through cohesive strategies and management for climate resiliency and migratory bird habitat • Mitigate invasive species (e.g., have Cook Co. free of invasive species by 2030) • Integrate extant initiatives (e.g., include Wildlife Management Plan, 1854 Treaty, Authority Climate Adaptation Plan, North Shore Forest Collaborative, Lake Superior Northshore One Watershed One Plan [LSN 1W1P]) *This group disagreed about the inclusion of the word “coastal” in the goal statement.

2 Afternoon Session (1:00 PM – 4:30 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 Minnesota Projects
Protection	St. Louis R. Natural Areas Acquisition and Conservation …important coastal wetland habitats identified through the Lake Superior Action and Mgmt Plan.	Crosby Manitou State Park Land Acquisition MLSCP helped acquire over 600 acres to consolidate park lands into a contiguous unit
Enhancement	Stewart River Stabilization and Habitat Improvement Stabilize the stream channel and improve aquatic and riparian habitat along 3,000 feet of the Stewart River.	Interstate Island (Phase I) Habitat enhancement for common terns and piping plover
Re-establishment	Lower St. Louis R AOC Wild Rice Restoration …restore 150 acres of wild rice wetlands within the St. Louis River estuary of Minnesota and Wisconsin	Knowlton Creek Stream Restoration repaired 6,500 feet of degraded stream channel, restored 8 acres of wetlands
Rehabilitation	Riparian Habitat Assessment, Protection and Management in MN's Lake Superior Watershed …prioritize sites that…will promote and ensure angler success and stream habitat quality into the future	Chambers Grove Restoration **removing hardened shoreline**, contouring the river bank, planting local vegetation, and adding in-water habitat.

Figure 14. Examples of funded projects in the State of Minnesota

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 three 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.

After each region pitched their top three projects, all workshop attendees were given the opportunity to vote on them using green, blue, and orange sticky dots. Attendees were asked to rank the projects within each region against each other in order to determine the top project within each region. After workshop attendees voted, each project then received a score according to the scoring system summarized in Table 5. The top projects from each region then went on to a second round of voting. Participants were each given one purple dot and asked to select their top project across all of regions. This resulted in a ranking of all the top projects across all regions. This information is also summarized in Table 6. To ensure that no project information was lost, all projects that were discussed by individual groups are included in Attachment A.

There was a brief question and answer period after each group presented their proposed projects. Questions and answers by region are presented below. The answers to the questions were integrated into Table 6.

Figure 15. St. Louis River Estuary Group Discussing Proposed Project Locations

Figure 16. Forests Group Discussing Proposed Project Locations

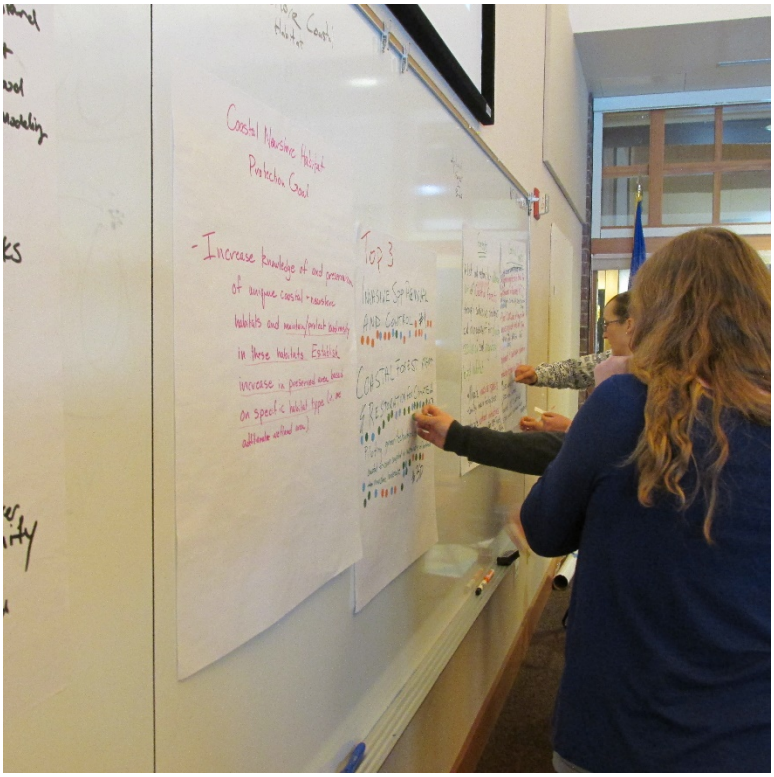

Figure 17. Participant Voting on Proposed Project Locations

Table 5. Summary of Voting System

Dot Color	Rank	Point Value
Green	First	3
Blue	Second	2
Orange	Third	1

Table 6. Summary of Proposed Projects by Lake

Region	Map #	Project	Further Details	Green (1st)	Blue (2nd)	Orange (3rd)	Region Specific Score	Region Specific Rank	Final Score	Final Rank
St. Louis River Estuary	1	City of Duluth Land Acquisition	We want to acquire 4,000 acres of - official protection.	28	1	0	86	1st	6	3rd
	2	Superior Municipal Forest Land Acquisition		1						
	3	Private Property Land Acquisition		0	8			3rd		

Region	Map #	Project	Further Details	Green (1st)	Blue (2nd)	Orange (3rd)	Region Specific Score	Region Specific Rank	Final Score	Final Rank
Coldwater Streams			These projects are tied together. The first St. Louis River, Flute Reed River).							2nd
Nearshore and		Coastal forest management and restoration for climate	We know our coastal forests are declining. We know there is also a lot of interest in this. This is ready to go in some respects.	16	9	1	67		5	4th

Region	Map #	Project	Further Details	Green (1st)	Blue (2nd)	Orange (3rd)	Region Specific Score	Region Specific Rank	Final Score	Final Rank
Coastal Habitat										
	3b	Piloting green technologies to control coastal erosion coupled with restoration of hardened nearshore landscape		12	8	8	60	2nd		
	1	Invasive Species Removal and Control		2	8	17	39	3rd		
Forest	1	Implement Five Landscape Collaborative Protection/Restoration Projects		16	7	3	65	1st	11	1st

Region	Map #	Project	Further Details	Green (1st)	Blue (2nd)	Orange (3rd)	Region Specific Score	Region Specific Rank	Final Score	Final Rank
	3	Determining the right trees for restoration in the context of climate change		10	9	10	58	2nd		
	2	Plant 5,000 acres of longer lived species on private lands over 10 years		2	11	13	41	3rd		

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 Minnesota. 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 Short-Hand Used in Data Gap Analysis Presentation

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. St Louis River data?
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	
Wave energy	X	Moderate	Moderate	USACE modeled results
Wave height	X	Low	High	GLOS buoy (no win. Data)
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	

Figure 19. Data Gap Summary for Physical Data

Data Type	Present?	Spatial Resolution	Temporal Resolution	Notes
Benthos (trophic str/func)	X	Moderate	Moderate	Federal points, most recent 2011
Coastal wetlands	X	Moderate	Ok	MTRI 12.5-m
Fish (trophic str/func)	X	Moderate	Moderate	
Plankton (trophic str/func)	X	Moderate	Moderate	From CSMI in Lk Superior and GLNPO
Prevalence of invasive species	X	Moderate	Moderate	GLANSIS, most recent 2014 Phragmites stands
Submerged aquatic vegetation (presence/absence)	X	Low	Low	Mich. Tech Research Inst, 2012, 30-m
Vegetation density				GAP
Vegetation heterogeneity				GAP
Vegetation morphotype				GAP
Vegetation species composition				GAP

Figure 20. Data Gap Summary for Biological Data

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

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 to share. 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 7 summarizes the data needs identified using the data wall. Additional workshop discussion items related to data needs follow this table. Data summary worksheets filled out by workshop participants can be found in Attachment B.

The second way that data was discussed was by having participants return to their project groups and work together. 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 8 and 9. In Tables 8 and 9, information was provided by attendees at the workshop regarding needed information and potential sources of information. The information provided has not been vetted and may be incorrect. Additionally, many workshop participants did not identify their group. To address this issue while also identifying data needs, a fifth group called “General” was created. Needed data sets that did not have a clear group association were listed as “General”.

After each group discussed their data needs there was a brief reporting out period where each group expressed their top data needs. This conversation is summarized below:

- St. Louis River Estuary
    - Currently we lack long-term restoration monitoring data. This means we cannot quantify which projects are working and which aren’t
    - Central data portal for all the groups working in the region would help with data accessibility and information communication
- Coldwater Streams
    - More data to support better forestry management and model development
        - We want to be able to quantify the impacts of different forestry practices

        - Evapotranspiration data

- Nearshore and Coastal Habitat
    - We want a better understanding of which plant materials are working for restoration. Right now projects are putting in plants and we don't know if these plantings are working.
- Forest
    - We would like the Ecological Limits of Hydrologic Alteration (ELOHA) analysis to be conducted for the rest of the tributaries in the Northshore region
    - We need information on socioeconomic metrics and a health impact analysis to help quantify the value of conservation efforts to the public.
    - We would like more data on soil moisture holding capacity.

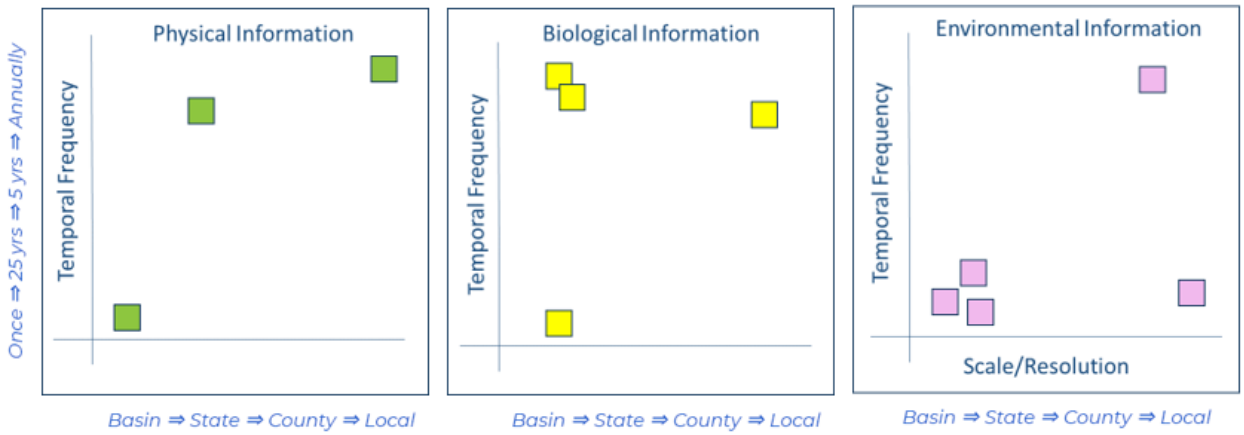

Figure 22. Conceptual Schematic of the Data Wall

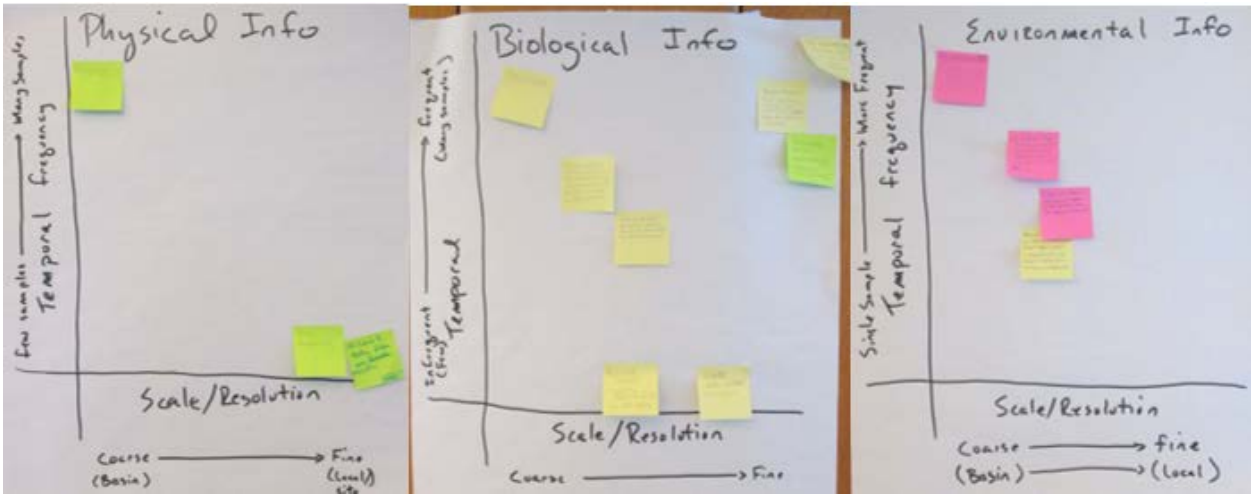

Figure 23. Data Wall for Physical, Biological, and Environmental Data Sets

Table 7. Summary of Datasets Included on the Data Wall

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
Physical					
	NEED	Hyperspectral imagery of the coastal zone of the Great Lakes	~10 years	Basin	
	NEED		~10 years	Basin	
	NEED	--	~5 years	Local	
Biological	NEED	Need more data on wild rice productivity--long-term monitoring using standardized methods published by Minnesota Sea Grant	~5 years	State	
	NEED	Collection and analysis of long-term biological, physical, and chemical data for adaptive management	~5 years	County	
	NEED	Accurate forest inventory (throughout time and updated)	Annual	Local	
	NEED	ELOHA project complete data/modeling for the North Shore	Once	County	

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
	NEED	What are the correct plants/species/ecotypes to use in coastal restoration efforts?	~5 years	County	
	NEED	LiDAR data update for the region	Once	Local	
	NEED		Once	County	
	NEED	Lake Superior monitoring data of parameters such as temperature--currently in unknown status and availability	Once	Basin	
	NEED	Annual migratory bird monitoring (population status and productivity), and habitat condition along the Northshore and estuary	Annual	Local	
Environmental	NEED	Need to compile data on landscape context, hydrology, and altered hydrologic regime for wild rice waterbodies	~5 years	County	
	NEED	collect and analyze social, behavioral, cultural, and decision making data for adaptive management	~5 years	County	
	NEED	Baseline information on forest landscape, forest types, ages, and opportunities for forest restoration/enhancement projects.	~5 years	County	

Data Type	Have or Need	Description	Temporal Scale	Spatial Scale	Contact or Notes
			~		
	NEED	Environmental data (e.g., temperature and precipitation) for nearshore terrestrial habitat. Can be used for environmental niche modeling)	Annual	Local	
	NEED	Collect and analyze social, behavioral, cultural and decision making data for adaptive management	~5 years	County	

Table 8. Summary of Data Sets Available to Fill Data Gaps

Region		
St. Louis River Estuary	Aquatic and wetland vegetation in the St. Louis River estuary and upper St. Louis River watershed	Carol Reschke, UMD NRRI
	Water chemistry for a few wild rice stands and restoration sites	Chan Lau Chun, UMD NRRI
Coldwater Streams	Continuous water temperature data on most trout streams for St. Louis and Carlton Counties. Most sites have three years of data	None provided
	National Wetlands Inventory preliminary functional assessment	
Nearshore Coastal Habitat	Hardened shoreline classification dataset (public release 2/2020) for Lake Superior coastline	Brandon Krumwiede, NOAA OCM
Forest	Super canopied trees-baseline	

Region	Data Set	Contact
		Clinton Little-MN DNR Coastal Program
General	Sites of biological significance—Minnesota state-wide dataset	Minnesota Biological Survey
	Native plant communities mapping for sites of biological significance	Minnesota Biological Survey
	Vegetation sampling for releve [sic] plots	Minnesota Biological Survey
	Long-term vegetation monitoring plots. This project was just initiated and has one year of data	Minnesota Biological Survey
	Bird migration data	Janelle Long, Hawk Ridge Bird Observatory

Table 9. Summary of Data Needs by Region and Type

Region	Need Type	What	Where	Why	Resolution	Availability
St. Louis River Estuary			-			None mentioned
Coldwater Streams	Project	Preliminary functional assessment from Minnesota's current NWI data		We can prioritize the protection of coldwater streams based on climate change impacts and changes in wetland function	Local/ 5 years	None mentioned
	Project	LiDAR	Lake Superior	This is critical to affective project design	No details provided	None mentioned

Region	Need Type	What	Where	Why	Resolution	Availability
	Project	Evapotranspiration	Lake Superior north and south	Will help water budget modeling and is important to project design	No details provided	None mentioned
	Project	High resolution coastal change analysis program	Lake Superior coastal zone	Critical to project design	No details provided	None mentioned
	Project	LiDAR HDEM and stream lines/DEM canopy model	Lake Superior watershed	This data will help improve stream mapping and contribute to NHI	No details provided	None mentioned
Nearshore Coastal Habitat	Project	Nearshore substrate classification and geology (offshore	Minnesota waters	CMECS mapping	Local/ Once	None mentioned
	Project	What plant materials will thrive in restoration plantings in the coastal zone?	Coastal terrestrial forests, wetlands, dunes, and rocky shores	If NOAA/GLRI	No details provided	None mentioned
	Prioritization	Distribution of invasive species such as invasive cattails that	Lake Superior shoreline	Natural wild rice stands have been declining and we don't know why. This is an important plant in the region	Basin/ Annual	Non mentioned

Region	Need Type	What	Where	Why	Resolution	Availability
	Prioritization	Fine scale environmental parameters (temp, precip, etc) for coastal habitat	Terrestrial/ nearshore region	We cannot model how plants will respond to climate change without this data.		None mentioned
Forest	Project	Complete ELOHA (ecological limitation of hydrologic alteration) analysis for all Northshore HUC-12 watersheds	North-shore	This will assist in land protection priorities and inform forest restoration and enhancement design	No details provided	None mentioned
	Project	Comprehensive avian species distribution and habitat use within priority HUC-12 watersheds	North-shore	See above	No details provided	None mentioned
	Project	EDD (invasive species) maps	North-shore	See above	No details provided	None mentioned
	Project	Landowner contact information	Not specified	We need to contact private land owners to get them involved in restoration efforts	No details provided	None mentioned
	Project	Integrated maps of forest standard, timber harvest, and planned timber harvest	Not specified	This would provide before and after measures of human use of restored areas	No details provided	None mentioned
	Prioritization	Better forest characterization/quantification	North-shore, St. Louis, and	Would help determine forest cover across all ownerships to address watershed runoff	Local/ Once	None mentioned

Region	Need Type	What	Where	Why	Resolution	Availability
	Prioritization	Evapotranspiration data	North-shore	See above	Local/ Once	None mentioned
	Prioritization	Accurate and up to date forest inventory across ownerships (not just canopy by understory)	All Great Lakes counties	Will help have accurate modeling for sustainability, planning, etc.	Local/ Annual	None mentioned
General	Project	More resolved soil inventory data, particularly soil water holding capacity	Not specified	See above	No details provided	None mentioned
	Project	Vegetation monitoring-repeated collection of data from sites over time	Not specified	We would like to have vegetation trends over time	Basin/ o temporal details provided	None mentioned
	Prioritization	Sediment budget	Lake Superior shoreline	Help us determine where littoral material is moving and where there are deficits. It can help regulators with permitting	No details provided	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 use sound science and a data driven decision making process so that the effects of the restoration process can be quantified. And,
3. 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 10. 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 10. Summary of Top Goals for Each Lake Identified by Workshop Participants

Planning Area	Goal
St. Louis River Estuary	Protect/preserve approximately 4,000 acres of land in three priority watersheds to increase connectivity/resiliency. Most of the parcels that create the 4,000 acres have already been identified
Coldwater Stream Connectivity	Coordinated, strategic approach to restore coldwater connectivity through barrier removal that restores hydrology, connectivity, biology, water quality, and geomorphology
Nearshore and Coastal Habitat	Increase knowledge of and preservation of unique coastal and nearshore habitats and maintain/protect biodiversity in these habitats. Establish increases in preserved area based on specific habitat type (i.e., one additional wetland).

Planning Area	Goal
Forest	Protect and restore an additional 10% of coastal* forests through cohesive strategies and management for climate resiliency and migratory bird habitat. • Mitigate invasive species (e.g., have Cook Co. free of invasive species by 2030) • Integrate extant initiatives (e.g., include Wildlife Management Plan, 1854 Treaty, Authority Climate Adaptation Plan, North Shore Forest Collaborative, Lake Superior Northshore One Watershed One Plan [LSN 1W1P]) *This group disagreed about the inclusion of the word "coastal" in the goal statement.

3.1.3 Identification of Workshop Priorities

The results from the habitat restoration project prioritization process are summarized in Table 11. For further details about the projects in the table, see section 2.2. For details on the inclusion of the Rogers Park Project, see section 2.2. For further information about projects that were not ranked, please see Attachment A.

Table 11. Summary of Ranked Habitat Restoration Priorities Developed by Workshop Participants

Region	Map #	Project	Further Details	Final Score	Final Rank
Forest	1	Implement Five Landscape Collaborative Protection/Restoration Projects	Birds use this region as a major migratory corridor. It's in great shape, but it isn't perfect. There is currently development pressure on many of these lands and they are privately owned. This project builds on some great initiatives over the past 10 years. Bringing many landowners together to collaborate, coordinate land management, and preserve lands. We need to start managing forests around ecological needs, not around political boundaries.	11	1st
Coldwater Streams	1	Fish Habitat Reconnection via Multiple Methods	These projects are tied together. The first is a programmatic approach looking to target the most resilient cold water systems. One of the	9	2nd

Region	Map #	Project	Further Details	Final Score	Final Rank
		(only one project was proposed by this group)	biggest issues is connectivity as seasons get warmer. It is critical that the fish can reach cold water refuges. In the first part of the project, we would like to reconnect 400 miles in three watersheds (Baptism, Manitou, Two Island) by replacing culverts. These rivers were selected because they are predicted to be the most resilient streams on the North Shore (based on modeling). This would target brook trout, coastal brook trout. There are many partners. The second part focuses on removing fish barriers and restoring bank and channels. We are targeting >5 miles for restoration/reconnection and the removal of many barriers. This project would improve habitat, water quality. It is supported by partners and the local communities in the region (Tisher, Keene, St. Louis River, Flute Reed River).		
St. Louis River Estuary	1	City of Duluth Land Acquisition	We want to acquire 4,000 acres of undeveloped tax forfeit parcels within the City of Duluth for permanent protection. Duluth has the unique opportunity to have 20-30% of their land designated as open space. Most of these parcels have been selected already. Many parcels are already used as open space by residents, but they need official protection.	6	3rd
Nearshore and Coastal Habitat	2	Coastal forest management and restoration for climate	We know our coastal forests are declining. We know there is also a lot of interest in this. This is ready to go in some respects. There are some that we could do right now, but others that require more research. We have targeted three different watersheds that are in good shape currently.	5	4th

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.

In this workshop, many participants also expressed a desire to start a long-term monitoring program in a reference watershed in order to identify trends over the next 20 to 30 years.

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.
- Federal partners, with funding available, will be convened by NOAA 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.

4 References

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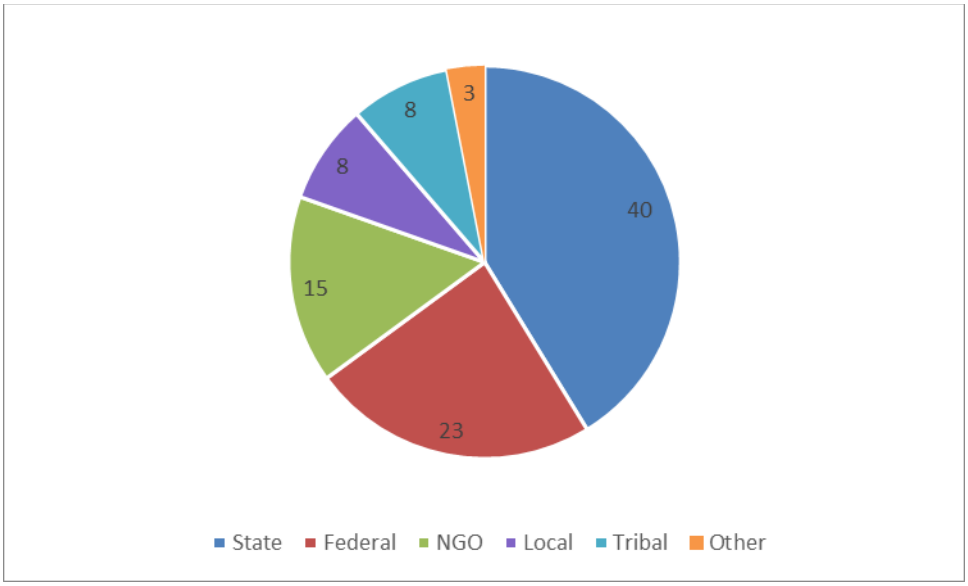
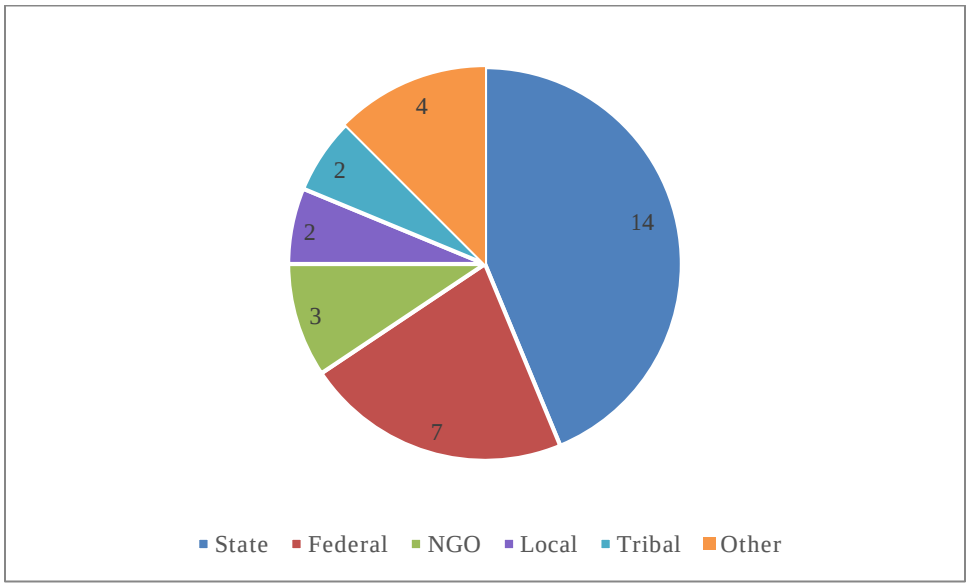
Wang, L., Riseng, C. M., Mason, L. A., Wehrly, K. E., Rutherford, E. S., McKenna Jr, J. E., ... & Robertson, M. 2015. A spatial classification and database for management, research, and policy making: The Great Lakes aquatic habitat framework. Journal of Great Lakes Research, 41(2), 584-596.

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
Blackburn	Julie	RESPEC
Bracey	Annie	University of Minnesota-Duluth
Bradley	Doug	LimnoTech
Collins	Pat	MN DNR - EWR
Darnton	Ryan	NOAA
Desotelle	Diane	City of Duluth
Gross	Briana	University of Minnesota-Duluth
Hansel	Ilena	Cook Soil and Water Cons. Dist
Hendrickson	Deserae	MN DNR Fish and Wildlife
Holstrom	Rebecca	MN DNR - EWR
Jereczek	John	MN DNR
Kaspar	Tyler	1854 Treaty Authority
Koehler	Edward	US Fish and Wildlife Service
Krumwiede	Brandon	NOAA
Krumwiede	Brandon	NOAA
Lindgren	John	MN DNR Fish and Wildlife
Little	Clinton	MN DNR
Luke	James	US Army Corps of Engineers
Martus	Jesse	Minnesota Pollution Control Agency
McClinton	Tim	DEA, Inc
McDonnell	Julie	MN DNR
Meyer	Kevin	US Army Corps of Engineers
Padilla	Julie	LimnoTech
Paron	Dean	MN DNR Fish and Wildlife
Parson	Jessica	MN DNR
Paulson	John	North Shore Forest Collaborative
Peterson	Daryl	Minnesota Land Trust
Sorensen	Hilarie	1854 Treaty Authority
Thompson	Molly	Sugarloaf The North Shore Stewardship Assn
VanNingen	AmberBeth	MN DNR
Wick	Molly	US EPA
Reschke	Carol	UMD NRRI

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

CW connect

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: Flute Reed River 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? Coldwater/Connectivity

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):
   Hewitt ramp and ~~dam~~ barrier removal along with bank stabilization

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce sediment loading - reduce erosion on the banks - improve macroinvert habitat - Improve fish habitat - riparian plantings - improve coldwater temps

6. Targeted species that benefits from actions:
   cold water fish in stream

7. Spatial extent/acreage:
   unknown - a couple of miles

8. Current/past condition of the site:
   currently ramps are a barrier and creating erosion issues - sites are stressed.

9. Social, political and physical context of the project:
   Private landowner - they are willing (most) to do projects to improve the water quality

10. Potential partners:
    MNDNR - local fisheries, Cook SWCD, landowners (private)

11. Unmet data needs:
    continuous water quality data of the river

12. Readiness (1=ready!; 5=concept stage): 1 **(2)** **(3)** 4 5
    (Need designs and further work w/ landowners
    ~~(dependent on ... funding ...)~~

Big Wild Categories

400 miles - #2

#2 - Connectivity - culverts - 3 additional

(Dan)

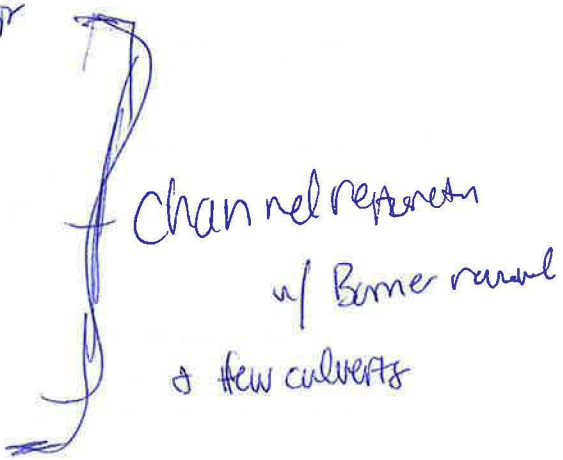
#3 - Dam - Barrier removal - Heart Range

#1

Fischer, Flute Reed

#5 Fond du Lac Dam Fish Bypass

#4 - Both - culvert + dam removal



CW corned

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 2 Program the fix Culvert removal on Climate Resilient streams

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? Coldwater Connectivity and Climate Change Resilience
2. Which goal statements does this project *support*? Increase coldwater connectivity,
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):
   Focus connectivity enhancement / restoration on Climate Change resilient watersheds
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve 5 river components of Geomorphology, Water Quality, Hydrology, connectivity, and biology.
6. Targeted species that benefits from actions:
   Brook trout, coastal brook trout
7. Spatial extent/acreage:
   400 miles of cold water streams connected
8. Current/past condition of the site:
   Supported large populations of native brook trout. Culverts isolated populations and have made them vulnerable to climate change.
9. Social, political and physical context of the project:
   Brook trout have been identified as key species for protection by numerous watershed plan and agencies.
10. Potential partners:
    Partnering with MPCA, Lake County SWCD, Cook County SWCD, Trout Unlimited, EPA, 1854 Treaty Authority, USACE, USFWS
11. Unmet data needs:
    None - data has been collected and analyzed.
12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

CW Connect

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 3 - Tischer Creek Connectivity

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) Coldwater Connectivity
2. Which goal statements does this project *support*? (2) coldwater Connectivity
3. The project category (circle one):
   (Protection 3) (Enhancement 2) Restoration (reestablishment) (Rehabilitation 1)
4. The proposed action (invasive species removal, wetland restoration, shoreline stabilization, fish barrier removal):
   Fish barrier removal + wetland restoration
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Eliminate current temperature / flow / fish passage impairments caused by Hartley Dam/pond by separating pond + stream channel
6. Targeted species that benefits from actions:
   ~~BK~~ Brook Trout
7. Spatial extent/acreage:
   24 acres; 3 miles of connectivity & 1.5 miles temperature remediation + flow remediation
8. Current/past condition of the site:
   Impoundment of coldwater trout stream, Impairment to temperature & flow
9. Social, political and physical context of the project:
   Removal of the dam is contained in the City of Duluth's Hartley management plan. Many residents that use the park, pond + stream that surround is project area.
10. Potential partners:
    City of Duluth, MN DNR, St. Louis County SWCD, Hartley Nature Center
    FOR MORE INFO CONTACT: JOHN LINDGREN
11. Unmet data needs:
    Feasibility study has been started. Need to finish FS and complete design, environmental review + contracting.
12. Readiness (1=ready!; 5=concept stage): 1 2 (3) 4 5

CW connect

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 4 Keene Creek

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? coldwater connectivity
2. Which goal statements does this project *support*? coastal habitat
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 CHANNELIZED REACH TO STABLE NATURAL STREAM CHANNEL W/IMPROVED HABITAT AND FISH PASSAGE (INCLUDES 1 CULVERT AND ONE DAM REMOVAL) ↳ BOTH FISH BARRIERS)
   INVASIVE REMOVAL IN RIPARIAN CORRIDOR (JAPANESE KNOTWEED)
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   REMOVE 2 FISH BARRIERS, RESTORE NATURAL STREAM CHANNEL AND PROCESSES
6. Targeted species that benefits from actions:
   BROOK TROUT (WILD), BROWN TROUT (STOCKED)
7. Spatial extent/acreage:
   APPROXIMATELY 3000 ft of STREAM CHANNEL AND ADJACENT RIPARIAN HABITAT
8. Current/past condition of the site:
   CHANNELIZED, DAM, FAILING CULVERT
9. Social, political and physical context of the project:
   HIGHLY SUPPORTED BY COMMUNITY
10. Potential partners:
    MN POWER, CITY of DUTUTH (BOTH LANDOWNERS)
    MNDNR FISHERIES, TROUT UNLIMITED, SO ST LOUIS SWCD
    FOR MORE INFO CONTACT: JOHN LINDGREN
11. Unmet data needs:
    SURVEY - DETAILED W/ GEOMORPHOLOGY DATA FOR DESIGN
12. Readiness (1=ready!; 5=concept stage): 1 2 3 (4) 5

CW connect

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 5 Fond du Lac Dam fish Bypass

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? Fish Connectivity

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

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 CONNECTIVITY TO HISTORIC SPAWNING HABITAT UPSTREAM OF THE FOND DU LAC DAM FOR BOTH LAKE STURGEON AND WALLEYE

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   CREATE A FISH BYPASS CHANNEL TO ALLOW STURGEON AND WALLEYE ACCESS TO HISTORIC SPAWNING AREAS IN JAY COOKE STATE PARK

6. Targeted species that benefits from actions:
   LAKE STURGEON, WALLEYE, WHITE SUCKER

7. Spatial extent/acreage:

8. Current/past condition of the site:
   FOND DU LAC DAM IS CURRENTLY A COMPLETE FISH BARRIER

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

10. Potential partners:
    MNDNR, USFWS, MN POWER
    FOR MORE INFO CONTACT DESERAE HENDRICKSON

11. Unmet data needs:

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

Forest

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: (1) Plant 5,000 Ac. of trees (forest habitat) through targeted outreach, Education & Assistance

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? Coastal forests

2. Which goal statements does this project *support*? (as stated)

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):
   Forest restoration & enhancement on 6000 private lands parcels along Northshore.

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Return resilient, longer lived tree species to the Northshore along Highway 61 Corridor.

6. Targeted species that benefits from actions:
   Wildlife habitat and brook trout, clean-cold water migratory bird along the fly zone of Northshore.
   * (trees restored: white pine; white spruce; white cedar; yellow birch; + oak)

7. Spatial extent/acreage:
   Up to 5000 acres / 10 years.

8. Current/past condition of the site:
   Dying birch, brushy, no large woody debris, limited super canopy trees.

9. Social, political and physical context of the project:
   6000 private land owners over 100+ miles of coastline across Cook / Lake Counties.

10. Potential partners:
    the Northshore Stewardship Assoc., Northshore Sugarloaf Forest collaborative, SWCD, MDNR Private Lands Forestry

11. Unmet data needs:
    Unknown

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

Forest

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 2- ~~Ave Forester~~ 2500 Acres Restoration on WMA's

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? Climate Resiliency + migratory bird habitat.
2. Which goal statements does this project *support*? - protect + resler 10% forests - mitigate invasive 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):
   Invasive species removal / Reforestation + Tree protection + Rx Burning
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve regeneration on WMAs + reduce competition w/ invasives + grasses
6. Targeted species that benefits from actions: - importance
   Migratory birds, Bats, Moose, lynx, White-tailed deer
7. Spatial extent/acreage:
   WMAS (5229 acres) in Lake/Cook county ≈ 2,000 acres to be restored?
8. Current/past condition of the site:
   declining birch stands - gravel pits spruce + other spp up for harvest. on 10 year list.
9. Social, political and physical context of the project:
   WMAS along the North Shore, public lands to be improved
10. Potential partners:
    NSFC, USFS, RGS?, Audubon
11. Unmet data needs:
12. Readiness (1=ready!; 5=concept stage): (1) 2 3 4 5

3 Forest

genetic source material for restoration seeds

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: Determine Which are the right trees for Restoration along shore zones

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? Coastal Forest

2. Which goal statements does this project *support*? Cold Water Habitat

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):
   Tests of many species/populations along the northshore to determine what source material will acheive our restoration & enhancement goals for climate resilience.

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Determine what is the right trees (species/seed sources) that have the best chance to survive in a climate that continues to change

6. Targeted species that benefits from actions:
   Robust, climate resilient forests will support migrating & resident birds as well as other coastal wildlife

7. Spatial extent/acreage:
   coastal forests along the North Shore within watersheds

8. Current/past condition of the site:
   logging, secondary growth

9. Social, political and physical context of the project:
   Dominant trees in coastal forests are dying & not regenerating creating opportunity for invasive species & causing degradation of the habitat quality for migrating birds & other wildlife

10. Potential partners:
    DNR, TNC,

11. Unmet data needs:
    Spatial scale of locally appropriate adapted seed sources for forest restoration

12. Readiness (1=ready!; 5=concept stage): (1) 2 3 4 5
    many previous proposals already written but not yet funded

5

Forest

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: Implement 5 Landscape Collaborative Projects.

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? top 5 HUC 12 watersheds.

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): add'l
   Coordinated Forest Wetland 5K 10K Ac. Protection 5K Ac. Restoration targeted to top priority HUC 12 watersheds.

6. Targeted species that benefits from actions:

7. Spatial extent/acreage:
   5 HUC 12 watersheds along N Shore.

8. Current/past condition of the site:
   Fair to good. Depends on Metric

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

10. Potential partners:
    USFWS, USFS, DNR, Lake, Cook, St Louis County, TEO's.

11. Unmet data needs:
    Ehola Analysis all HUC 12 watersheds on Shore

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

Nearshore Coastal

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: (4) Inventory of private septic systems in near shore coastal zone

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? Coastal Nearshore Habitat
2. Which goal statements does this project *support*? clean water/wetlands in nearshore coast
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):
   Inventory of private septic systems to assist with monitoring of water quality and sources of pollution
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Reduce pollutants, restore coastal water quality in nearshore tributaries and Lake Superior
6. Targeted species that benefits from actions:
   native flora & fauna
7. Spatial extent/acreage:
   focus in Lake County & Cook County so similar data to St. Louis County make it part of One Watershed One Plan.
8. Current/past condition of the site:
   Many private septic systems are failing; some formerly seasonal cabins are becoming year-round residential properties with out-dated or non-existent septic systems
9. Social, political and physical context of the project:
   Partners would be county boards & BSWR, MN Dept of Health, and working with private landowners
10. Potential partners:
11. Unmet data needs:
    Lake & Cook Co only identify parcel numbers with septic systems, need more specific location and type and age information
12. Readiness (1=ready!; 5=concept stage): (1) (2) 3 4 5

Nearshore Coastal

PRIORITY PROJECT AND LOCATION WORKSHEET

See 3b for Restoration of coastal habitat #3 due to erosion

Project number: #3a

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? Coastal Nearshore Habitat Goal
2. Which goal statements does this project *support*? SLR Estuary, Upland Forests
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):
   Preservation of coastal dune habitat on MN Point - Beachgrass dune, sand beach, ~~&~~ Woodland forest on stabilized dunes. - Support City of Duluth to protect Natural Areas on MN Point
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Protects existing natural habitat and restores vulnerable areas
6. Targeted species that benefits from actions:
   Migratory Birds, waterfowl?, Rare MN species (animals + plants)
7. Spatial extent/acreage:
   ~ 3-7 miles
8. Current/past condition of the site:
   Degraded near development
   Natural state
9. Social, political and physical context of the project:
10. Potential partners:
    City of Duluth, Private owners, ACoE
11. Unmet data needs:
    Impacts to nearshore aquatic/terrestrial habitats due to beach nourishment
12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 (5)

1

Nearshore Coastal

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? Protecting habitat/biodiversity

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):
   Invasive species removal and control

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Invasives - tansy, Tanacetum vulgare, invasive cat tails, phragmites
   Euphrasia stricta, Pastinaca sativa, Rhamnus cathartica, Lonicera (non-native)
   Gypsophila paniculata, Lythrum salicaria, Rhamnus frangula
   (Minnesota Point)

6. Targeted species that benefits from actions:
   All local native species, esp native arctic-alpine disjuncts & coastal fronts along rocky shores, sand dune flora on MN Point, and native wetland/aquatic species in St. Louis R. estuary.

7. Spatial extent/acreage:
   Horsebay, Artist Point Grand Marais, Tettegouche State Park, Lighthouse Point Two Harbors, Minnesota Point, St. Louis River Estuary

8. Current/past condition of the site:
   Future threats from extreme weather and anthropogenic impacts

9. Social, political and physical context of the project:
   Private land needs species removal as well.

10. Potential partners:
    Cook and Lake county invasives.

11. Unmet data needs:
    More invasive data (survey, etc.)

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

Nearshore Coastal

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #36

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? # Nearshore Coastal Habitat
2. Which goal statements does this project *support*? Connectivity, Upland Forest, etc
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 hardened shoreline; ~~pilot~~ ~~effort~~ pilot erosion control practices that are natural process based to improve habitat
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   protect infrastructure with benefit to habitat and nearshore process
6. Targeted species that benefits from actions:
   data gaps nearshore use target fish species and supporting communities/food chain
7. Spatial extent/acreage:
   N Shore
8. Current/past condition of the site:
   Various States of Stability; erosion; ~~urban~~ low development impacts
9. Social, political and physical context of the project:
   Urban Environments and rural developed/private lakeshore properties
10. Potential partners:
    Cities; FEMA; Townships; USACOE; State; NOAA; Private Landowners
11. Unmet data needs:
12. Readiness (1=ready!; 5=concept stage): 1 2 3 4 5

Nonshore Coastal

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: #2

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? Coastal Nearshore Habitat
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):
   Coastal forest management and restoration for climate change.
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Prepare coastal forests for a changing climate – restore forest with appropriate ecotypes/diversity
6. Targeted species that benefits from actions:
   Migratory birds, fish (watersheds), insects, vertebrates (e.g., deer), humans.
7. Spatial extent/acreage:
   85 mi² + 114 mi² + 85 mi² = 284 mi² for complete watersheds
   Baptism Poplar Knife
8. Current/past condition of the site:
   These are good condition sites that are facing ** climate change. Good chance to prep them for the future
9. Social, political and physical context of the project:
   Humans live there. Tax base important. Tourism is a key economic driver. Physical landscape is steep, challenging, forested.
10. Potential partners:
    Northshore Forest Collaborative, The Nature Conservancy, NNN Land Trust, DNR, County Foresters
11. Unmet data needs:
    Seed zone tests – appropriate seed choice for locations. How unique is the coastal germplasm compared to inland?
12. Readiness (1=ready!; 5=concept stage): 1 (2) 3 4 5

SLR

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? 1 protect/preserve 4,000 ac inestuary
2. Which goal statements does this project *support*? bird habitat + fish connectivity + habitat
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 4,000 acres of undeveloped tax-forfeit parcels within the City of Duluth for permanent protection
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Protection of undeveloped land to support habitat for migratory birds, climate resiliency, natural hydrologic function, and cold water.
6. Targeted species that benefits from actions:
   Migratory birds and ducks
   Native fish assemblages
7. Spatial extent/acreage:
   4,000 acres across City of Duluth
   (the city has detailed maps available)
8. Current/past condition of the site:
   Undeveloped
9. Social, political and physical context of the project:
   City of Duluth is working to protect land for natural resources function and cultural services.
10. Potential partners:
    City of Duluth, Minnesota Land Trust, St Louis County
11. Unmet data needs:
    Land value assessments
12. Readiness (1=ready!; 5=concept stage): (1) 1½ 2 3 4 5

Estimated funds needed $10 million

SLR

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 2

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? Estuary: Protect/Preserve 4000 ac

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):
   Secure permenant protection on threatened/potentially threatened portions of Superior Municipal Forest, restore habitat conditions w/in Superior Muni. Forest

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   1. Perm Protection of City lands
   2. Native Plant Community restoration of Riparian habitats in Muni. forest and adjacent public land

6. Targeted species that benefits from actions:
   migratory birds

7. Spatial extent/acreage:

8. Current/past condition of the site:
   Undeveloped, largely 2nd growth forest

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

10. Potential partners:
    City of Superior, Lake Superior NERR, WI DNR

11. Unmet data needs:
    Management action based map of ~~needs~~ parcels in need of protection, quality/condition map of existing undeveloped lands/habitat types

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

SLR

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 3

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? 1 protect/preserve 4000 acres
2. Which goal statements does this project *support*? bird habitat
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 private property adjacent to St Louis River Streambank protection area + Oliver landing (SBPA)
5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Protection will support migratory bird habitat, especially marsh bird habitat, climate resiliency. Will also allow public access to SBPA.
6. Targeted species that benefits from actions:
   Migratory birds
7. Spatial extent/acreage:
   Several acres
8. Current/past condition of the site:
   undeveloped
9. Social, political and physical context of the project:
   Site will facilitate access for public + managers to SBPA, 4000 acres of preserved high quality habitat. Willing landowner ready to sell.
10. Potential partners:
    WDNR, Douglas County, City of Superior
11. Unmet data needs:
12. Readiness (1=ready!; 5=concept stage): (1) 2 3 4 5

SLR

PRIORITY PROJECT AND LOCATION WORKSHEET

Project number: 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? Increase knowledge of + presn. of unique coastal + nearshore habitats

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):
   Enhancement of emergent wetlands in the SLR estuary to support coastal marsh birds. Creation of hemi-marsh conditions.

5. The desired change that the project intends to accomplish (improve/restore/reduce):
   Improve existing emergent wetlands to better support marsh birds through creation of open ponds + channels,

6. Targeted species that benefits from actions:
   Wetland obligate migratory birds + ducks

7. Spatial extent/acreage:
   Several sites in the estuary: Mud Lake, Perch Lake, Grassy Pt, Spirit Lake, Radio Tower Bay, North Bay, Allouez Bay

8. Current/past condition of the site:
   existing habitat quality ranges from poor to good but enhancement necessary for bird habitat

9. Social, political and physical context of the project:
   Wide support from estuary partners for work within the Audubon Important Bird Area

10. Potential partners:
    Minnesota DNR, Minnesota Land Trust, Fond du Lac Band, UMD-Natural Resources Research Institute, Wisconsin DNR

11. Unmet data needs:
    project designs needed

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

Attachment B

Data Summary Worksheets

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Forest - Coastal

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
   1 Super canopied trees - baseline
   2 Restoration opportunities

2. Location:
   Northshore coastal zone

3. Contact:
   Clint Little - DNR Coastal Program

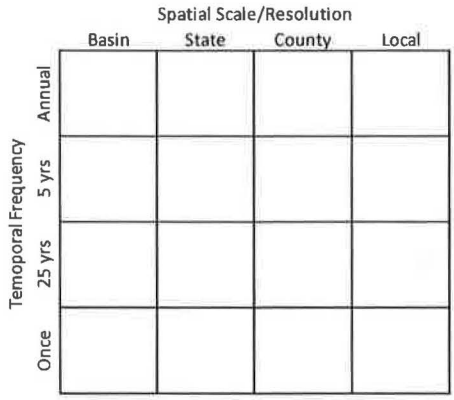
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
   GIS - Layer of Super Canopied trees via LiDar
   " " " dead/decimated trees/brush areas

5. Location:

6. Why is this data important:
   Determines priority areas for forest restoration.

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

_____

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_____

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_____

WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

_____

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_____

10. Location:

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_____

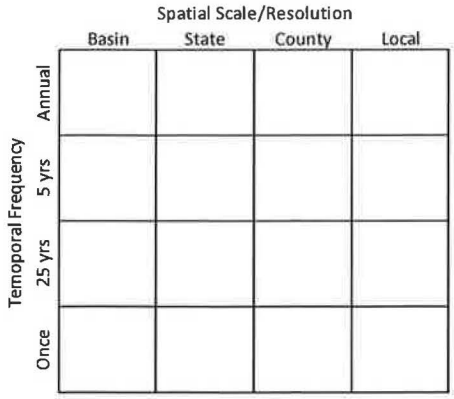
11. Why is this data important:

_____

_____

_____

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Implement Landscape Collaborative protection & Resteration Projects.

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:

2. Location:

3. Contact:

WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

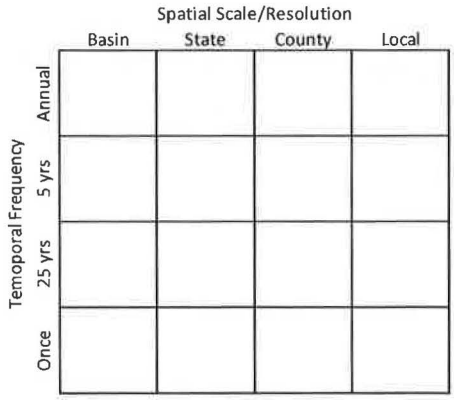
4. Data description: (1) ✓ Complete Eloka (Ecological limitation & Hydrologic alteration) Analysis for all northshore HUC 12 watersheds.

5. Location: (2) ✓ Comprehensive Avian species distribution & habitat use ~~along the~~ within priority HUC 12 watersheds along the northshore of Lake Superior.

6. Why is this data important: ✓ Assist in land protection priorities and inform ~~Res~~ forest Restoration & enhancement design.

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):

(3) ✓ EDD MAPS (Invasive species)



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

_____

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10. Location:

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_____

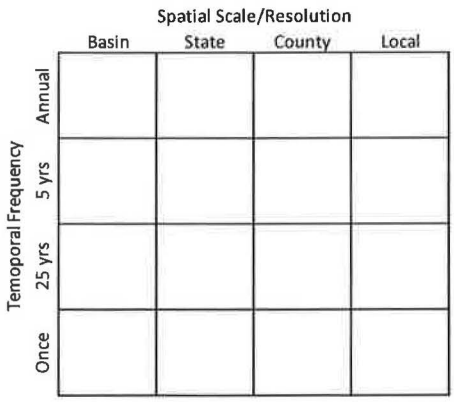
11. Why is this data important:

_____

_____

_____

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: _____

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
Landowner contact info
Tax records do not work well for seasonal/rec. landowners
Many addresses are directed to banks (for tax payment)
BIN Migration Dates

2. Location:
Hawk Ridge Bird Observatory

3. Contact:
Janelle Lony jlong@hawkridge.org
Also MN ornithological Union
NRRI — Alexis

WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

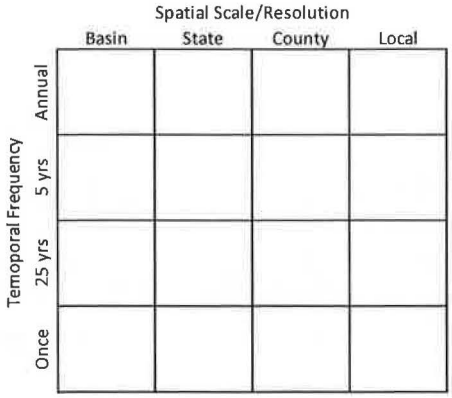
4. Data description:
Landowner contact info
Tax records do not work well for seasonal/rec landowners
Many addresses are directed to banks (for tax payment)

copy

5. Location:
County tax offices — but it needs to be sorted
Also check for accuracy & usability

6. Why is this data important:
We need to contact private landowners to get them involved in restoration

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

_____

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

_____

_____

_____

10. Location:

_____

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_____

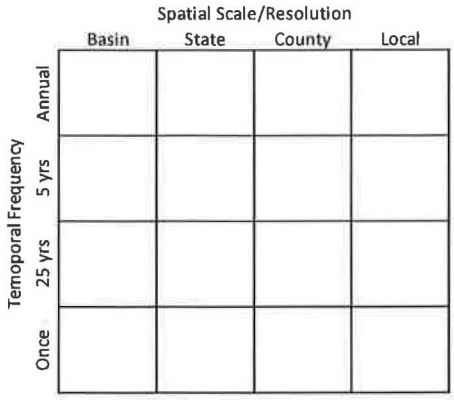
11. Why is this data important:

_____

_____

_____

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: General

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
Before and after measures of human use of restored areas.

2. Location:

3. Contact:

WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
Integrate maps of Forest stands, timber harvest and planned timber harvest

5. Location:
More resolved soil inventory data, particularly soil water holding capacity

6. Why is this data important:

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):

MITECH
- Great Lakes Remote Sensing. ORG
- High Impact targeting + Erosion mapping/model

FOLLOW UP → Tom Hollenhorst

Temoporal Frequency	Spatial Scale/Resolution: Basin	State	County	Local
Annual				
5 yrs				
25 yrs				
Once				

8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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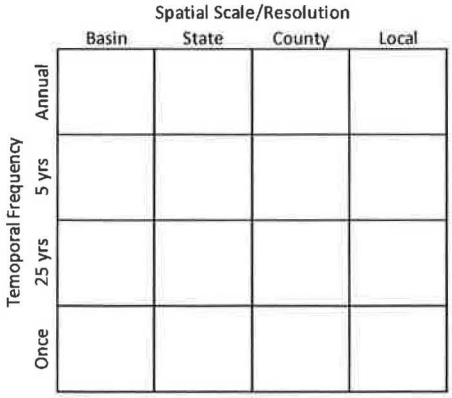
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):

FOLLOW UP →



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: _____

~~DO YOU HAVE DATA TO FILL OUR DATA GAPS?~~

1. Data description:
NEED BETTER FOREST CHARACTERIZATION/QUANTIFICATION ACROSS ALL OWNERSHIPS WITHIN A WATERSHED

2. Location: ST. LOUIS
NORTH SHORE & NEMADJI WATERSHEDS

3. Contact: ALSO NEED MORE FLOW GUAGING

WHAT DATA DO YOU ~~NEED~~ HAVE TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
HAVE COLLECTED 3 CONTINUOUS WATER TEMP DATA ON MOST OF OUR TROUT STREAMS. MOST SITES HAVE 3 YEARS DATA. ✓

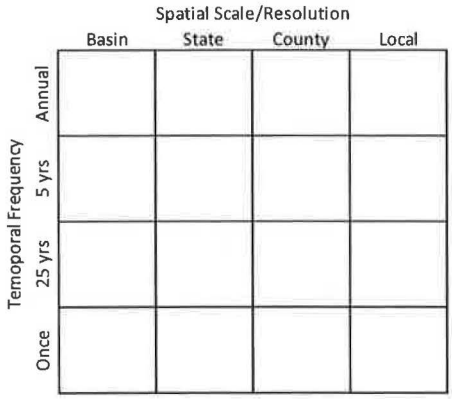
5. Location:
ST. LOUIS/CARLTON COUNTIES

6. Why is this data important:

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):

EVAPOTRANSPIRATION DATA FOR NORTH SHORE
LIDAR - HI RES

TO HELP DETERMINE FOREST COVER ACROSS ALL OWNERSHIPS TO ADDRESS WATERSHED RUNOFF



8. Additional Notes:

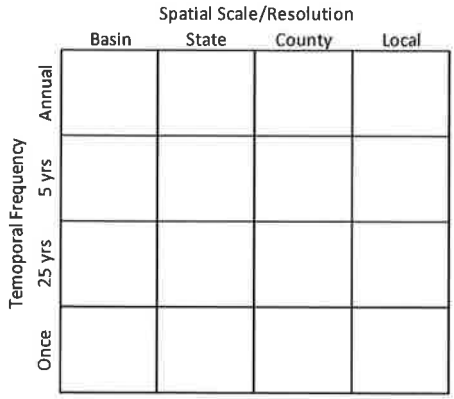
WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description: SEE FRONT PAGE

10. Location:

11. Why is this data important:

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: _____

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
✓ Aquatic & wetland plants/vegetation in the St. Louis River estuary and upper St. Louis R watershed, water chemistry for a few wild rice stands and restoration sites

2. Location:
✓ St. Louis R estuary Duluth MN/Superior WI; upper St. Louis R - Norway Pt and upstream from Skibo landing & Kettle Lake in Carlton Co, Sandy Flowage Aitkin Co)

3. Contact:
✓ Carol Reschke - plant community/vegetation data Chau Lan Chun - water chem data UMD-NRRI Univ. of Minnesota Duluth, Natural Resources Research Institute resc0032@d.umn.edu

WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
✓ more data on wild rice stands (more stands) in coastal zone: wild rice productivity, landscape context, invasive spp, water chem, hydrology/water flow/dams, role of wildlife (e.g. muskrat populations/activity). Hydrodynamic data w/ currents seiche & GL. water levels in estuaries

5. Location:
✓ St. Louis River watershed

6. Why is this data important:
✓ Help understand role of landscape context, hydrology, water chemistry and wildlife activity in relation to wild rice productivity. Wild rice has been declining in the last 20 yrs, not really understood why. Help restore wild rice productivity in natural stands (not cultivated wild rice), how wild rice productivity is related to GL. water levels

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):

Temoporal Frequency	Spatial Scale/Resolution: Basin	State	County	Local
Annual	X			
5 yrs				
25 yrs				
Once				

8. Additional Notes:

WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

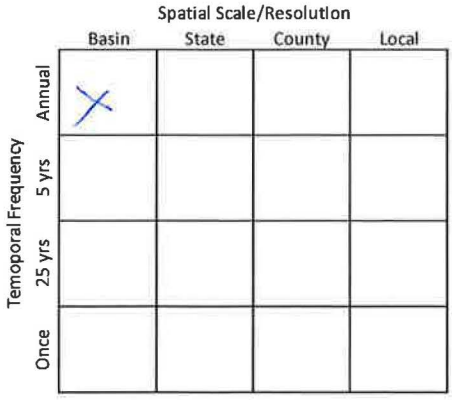
✓ Distribution of invasive species such as invasive cattails that displace wild rice in Great Lakes shores

10. Location:

11. Why is this data important:

✓ wild rice - natural stands - have great cultural & economic significance in upper Great Lakes states especially important to indigenous tribes. Need more information & analysis to understand decline and better manage for improved productivity.

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale): Wild rice is an annual plant, and productivity is known to vary on a cycle of about 4 to 5 yrs. So we need annual data for long term - at least 5 to 10 yrs monitoring to assess relationships to productivity of wild rice. Need more monitoring of more sites.



13. Additional Notes:

In addition to wild rice productivity, monitor water chemistry, hydrology and upstream alterations to hydrology, landscape context, wildlife activity that may benefit wild rice (e.g. muskrat) & impair wild rice (browsing by geese)

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: _____

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description: SEDIMENT TO [illegible]

2. Location: [illegible] LAKE SUPERIOR SHORELINE

3. Contact:

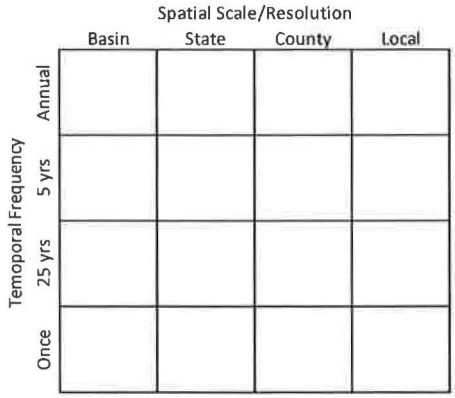
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description: SEDIMENT BUDGET

5. Location: LAKE SUPERIOR SHORELINE ALONG MN COAST

6. Why is this data important: HELP DETERMINE WHERE LITTORAL MATERIAL IS MOVING, WHERE THERE ARE DEFICITS

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:
DATA CAN BE USED TO HELP REGULATORS W/SHORELINE PROJECT PERMITTING, WHERE OPTIMAL LOCATIONS FOR COMBO PROJECTS (WETLANDS, REEFS) CAN BE PLACED + INFORM FITE DESIGN

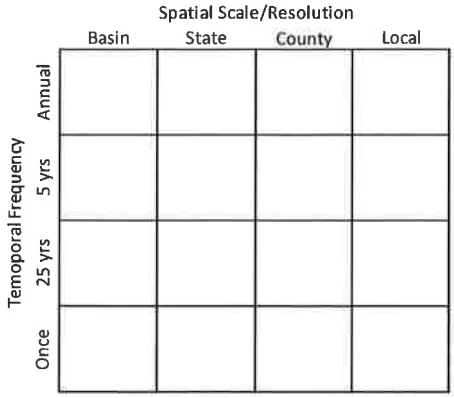
WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

10. Location:

11. Why is this data important:

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Coastal/Nearshore

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
✓ Hardened Shoreline Classification Dataset (public release Feb. 2020)

2. Location:
✓ For all lakeshore areas, but not the St. Louis River estuary.

✓ 3. Contact:
Brandon Krummiede, NOAA OCM

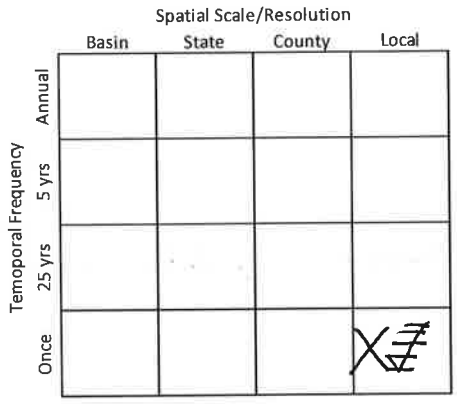
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
Nearshore substrate classification & geology (offshore).

5. Location:
MN waters.

6. Why is this data important:
CMECS mapping

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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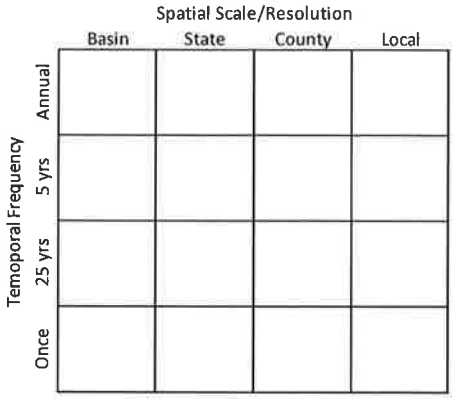
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: _____

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:

2. Location:

3. Contact:

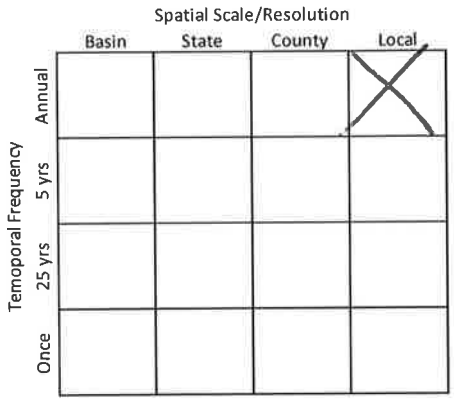
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
Accurate + up to date forest inventory across ownerships (not just canopy - but understory).

5. Location:
Everywhere in MN - St. Louis, Lake, & Cook Co's

6. Why is this data important:
to have accurate modeling for sustainability, planning, etc.

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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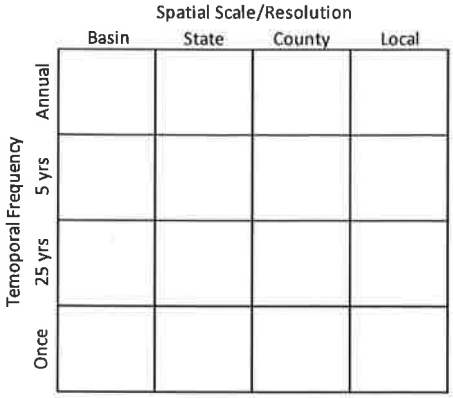
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP Cold water Streams

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
NWI Preliminary Functional Assessment ✓

2. Location:
Lower St. Louis River watershed, Lake Superior North & South watersheds ✓

3. Contact:
Clinton Cuttle ✓

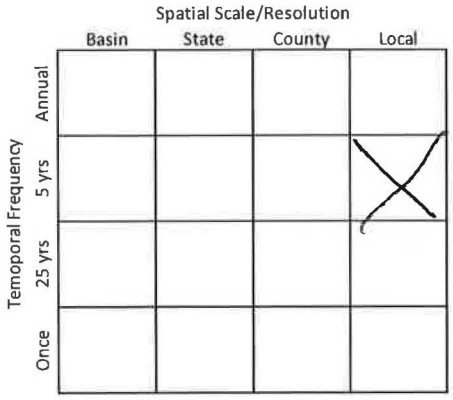
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
Develop preliminary Functional Assessment from Minnesota's current NWI Data
Collaboration w/ MNDNR

5. Location:

6. Why is this data important:
Climate change impacts, changes in wetland function protection of wetlands functioning to protect Coldwater Streams

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:
Minnesota: NWI Exists, Functional assessment & will improve efforts to protect wetlands Functions in a Cold water Stream

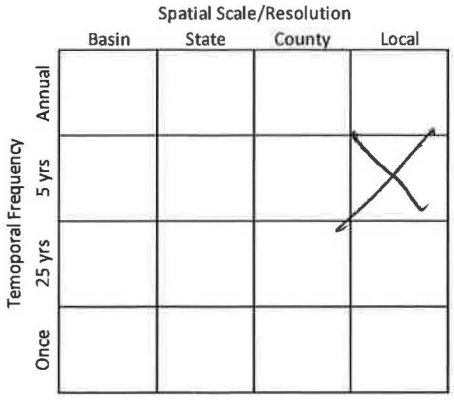
WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:
The state of MN has methodology but lacks funding

10. Location:

11. Why is this data important:
Prepare for resilient Communities and Coastal Forests

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

St. Mary's University Nemadji watershed wetland functional assessment project

Evapotranspiration

Lidar

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Coldwater Streams

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:

2. Location:

3. Contact:

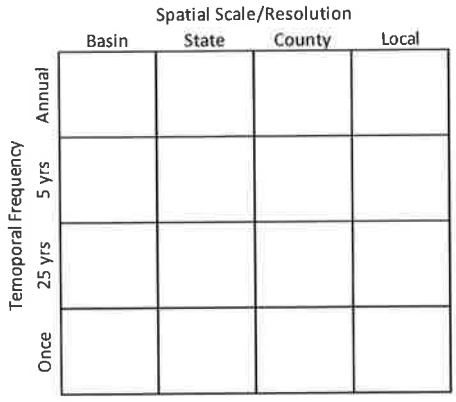
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description: Lidar

5. Location: Coastal Zone Lake Superior North & South & specifically the identified project sites.

6. Why is this data important: Critical to effective project design

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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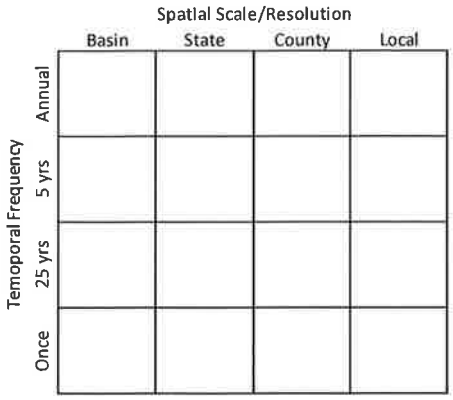
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Coldwater streams

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:

2. Location:

3. Contact:

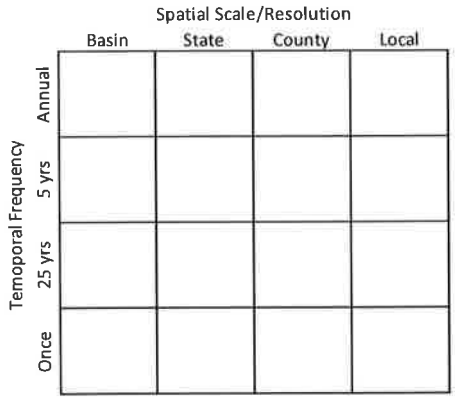
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description: Evapotransporation

5. Location: Lake Superior North + South

6. Why is this data important: Water budget modeling important to project designs

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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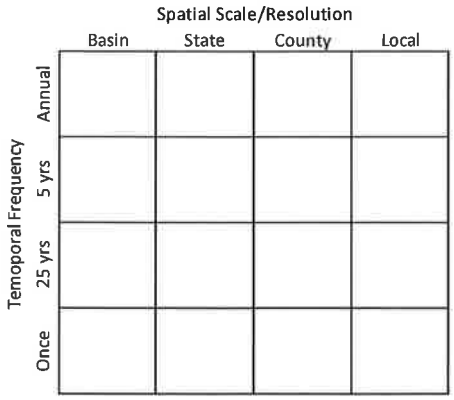
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Coldwater Streams

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:

2. Location:

3. Contact:

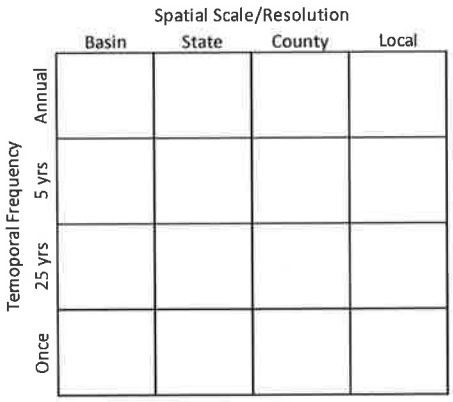
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description: High Resolution Coastal Change Analysis Program

5. Location: Coastal Zone Lake Superior North + South

6. Why is this data important: Critical to project design

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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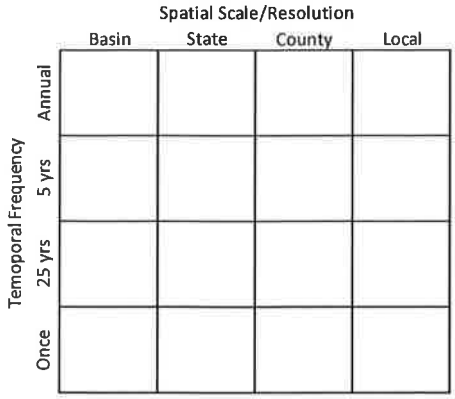
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: _____

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:

OK → Sites of Biological Significance - MN state-wide Data set
(2) Native Plant Communities - mapping for Sites of Biological Significance (and many state lands)
(3) Vegetation sampling for Relevé plots
(4) Long-term vegetation monitoring plots (project just initiated - 1 yr. of data)

2. Location:

✓ Lake Superior watershed - minor watersheds

3. Contact:

✓ Minnesota Biological Survey

WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:

Vegetation monitoring - repeated collection of data from sites over time

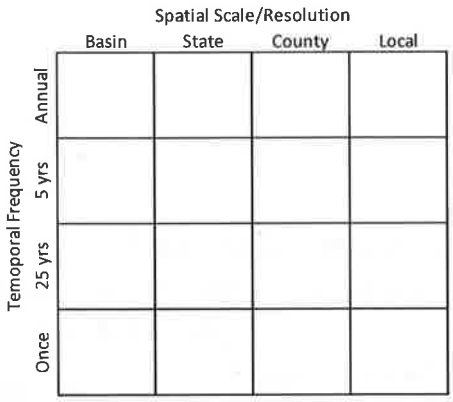
5. Location:

watershed level - statewide

6. Why is this data important:

veg. trends

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

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WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

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10. Location:

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11. Why is this data important:

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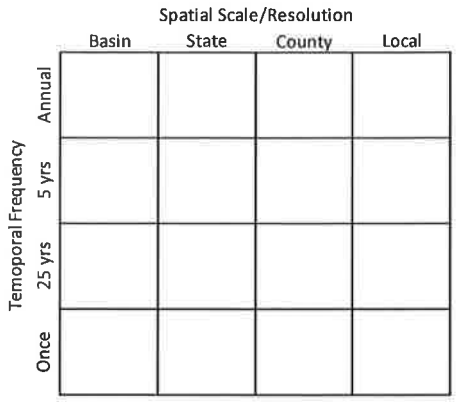
12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Cold water Streams

DO YOU HAVE DATA TO FILL OUR DATA GAPS?

1. Data description:
LiDAR Derived products

2. Location:

3. Contact:
Clinton Little

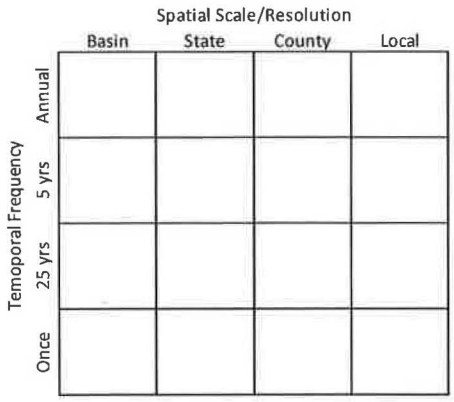
WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

4. Data description:
LiDAR HDEM & Stream lines / DEM Canopy Model

5. Location:
Lake Superior Watershed

6. Why is this data important:
Improve Stream mapping data and contribute to NHD

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



8. Additional Notes:

DNR LiDAR Acquisition Plan Fall 2019

WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

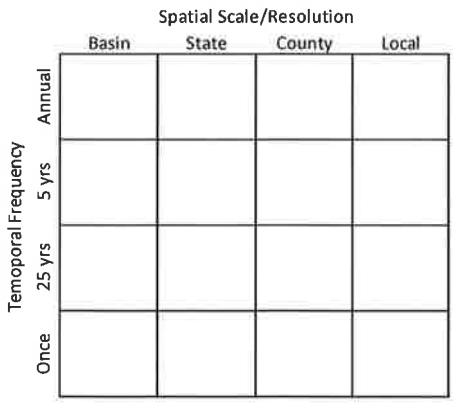
9. Data description:

Money

10. Location:

11. Why is this data important:

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

DATA NEEDS FOR PROJECTS AND PLANNING WORKSHEET

GROUP: Nearshore

~~*DO YOU HAVE DATA TO FILL OUR DATA GAPS?*~~ Data Needed:

1. Data description:
What plant materials will thrive in restoration plantings in the coastal zone?

2. Location:
Coastal terrestrial forests, wetlands, dunes, and rocky shores

3. Contact:

WHAT DATA DO YOU NEED TO COMPLETE YOUR PROPOSED PROJECT?

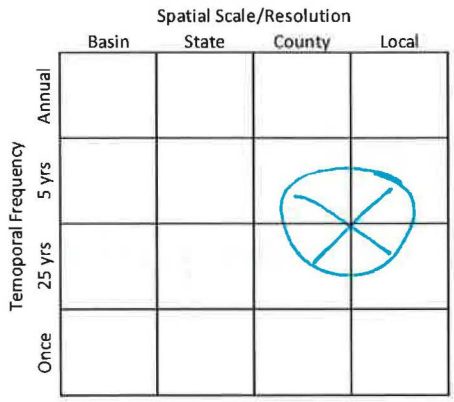
4. Data description:

5. Location:

6. Why is this data important:
If NOAA/GLRI is funding restoration, they should know if the plantings will thrive.

7. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):

Low temporal frequency, moderate scale



8. Additional Notes:

WHAT DATA DO YOU NEED TO IDENTIFY AND PRIORITIZE FUTURE PROJECTS?

9. Data description:

Fine scale environmental parameters (temp, precipitation, etc.) for coastal habitat (terrestrial, nearshore habitat) – air + water temperature

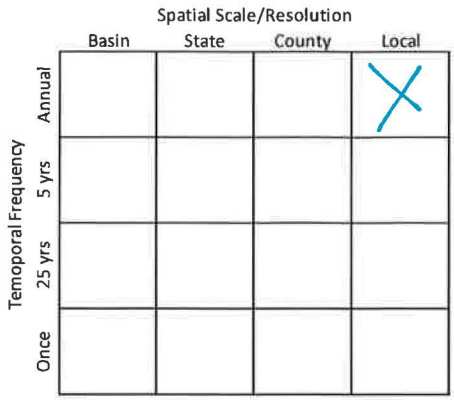
10. Location:

Terrestrial, nearshore – particularly rocky sheilds

11. Why is this data important:

We cannot model how plants will respond to climate change without this data. Also need long-term monitoring.

12. Estimate of temporal frequency and scale ("X" the box that matches your preferred spatial and temporal scale):



13. Additional Notes:

If NOAA/GLRI has funding, it would be good to dedicate some of it to data collection. Otherwise they are throwing money away.