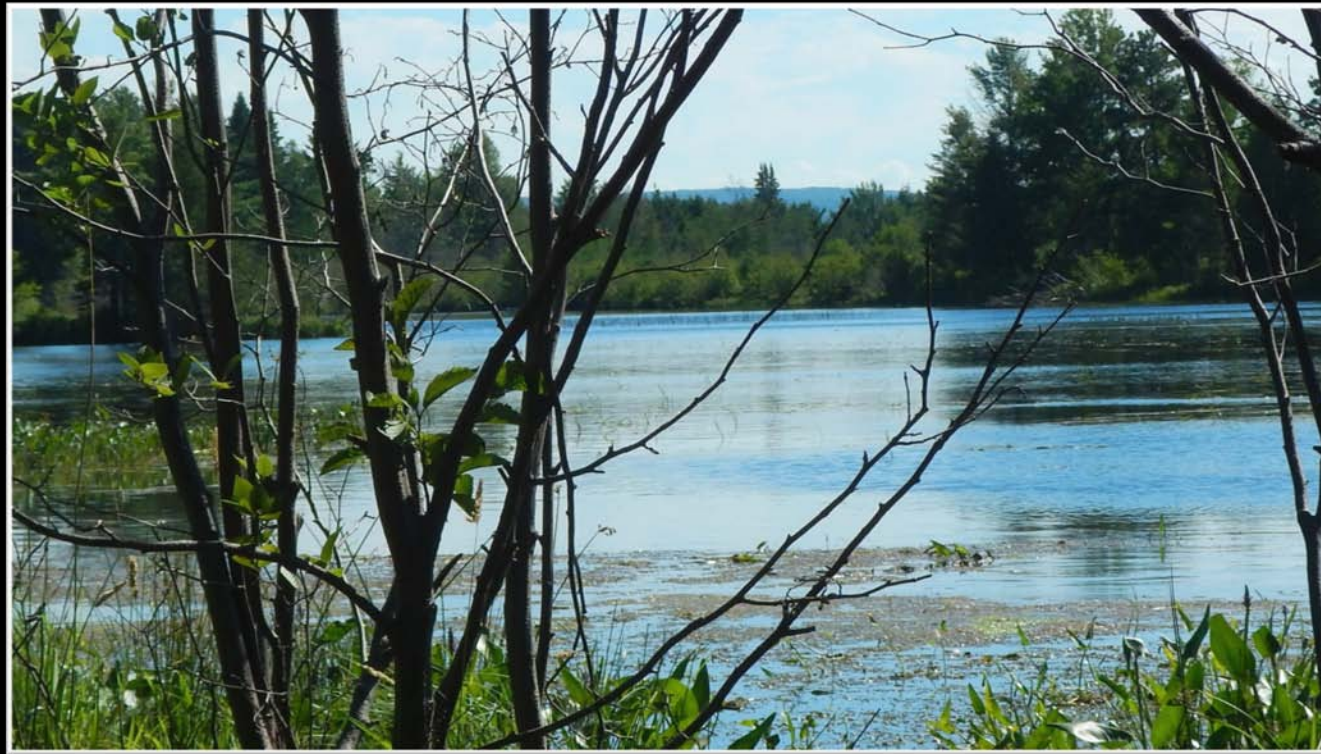# Wetland Baseline Data Collection Project to Strengthen Sovereign Management Capacity of the Keweenaw Bay Indian Community

Erin Johnston
Wildlife Biologist
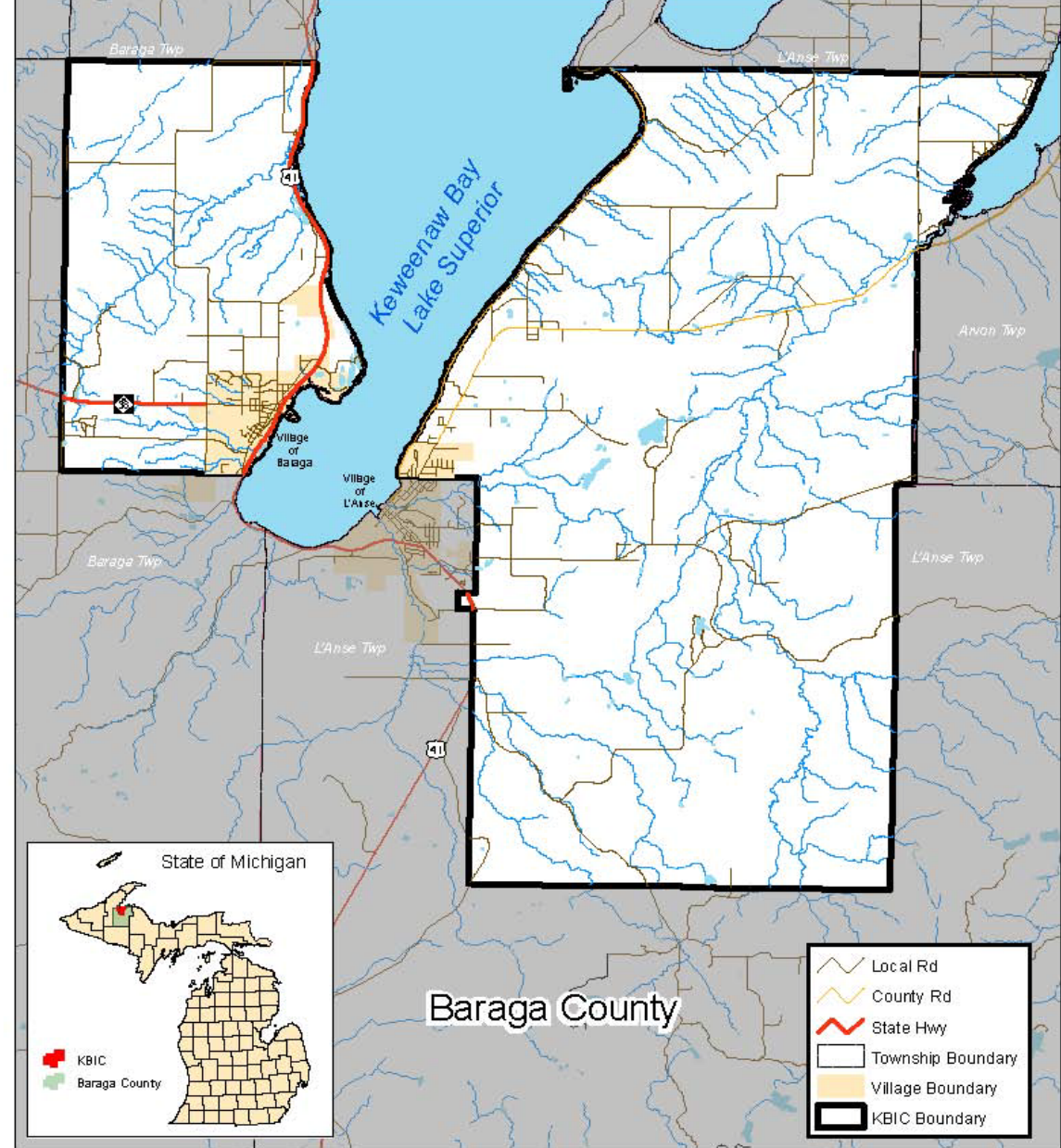KBIC Natural Resources Department

Who Are We?

- Lake Superior Band of Chippewa Indians
- L'Anse Indian Reservation: **59,000 acres**
- **3,622** enrolled members
- Approximately **800** live on Reservation
- **80** miles of rivers
- **3,000** acres of wetlands
- **160** lakes and ponds
- **17** miles of Lake Superior shoreline
- Rural community
- Largely forested land
- **Checkerboard ownership**

Where Are We?

Keweenaw Bay Indian Commuinty
Baraga County, Michigan
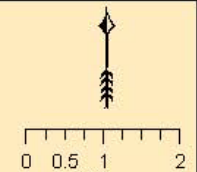
What was this project all about?

WETLANDS!

- Wetlands are transition zones between land and water

- Water loving plants such as cat-tail, pitcher plants, cranberry, Labrador tea (swamp tea), and tag alder

- Wildlife often found in wetlands include muskrat, beaver, moose, and waterfowl.
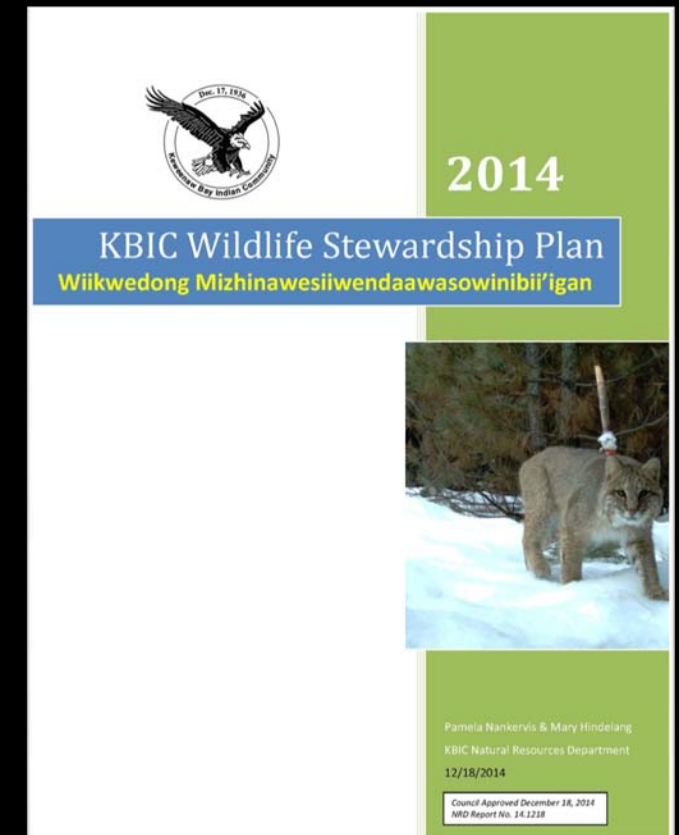
- Marsh, Bog, and Swamp

Why Wetlands?

- Highly productive ecosystems
- Provide a variety of ecosystem services
  - Filter toxins
  - Habitat (fish, wildlife, plants)
  - Flood control
- "Medicine cabinets"
  - *In the Ojibwe language the words for bog (mashkiig), swamp (waabashkiki) and medicine (mashkiki)*

How wetlands work
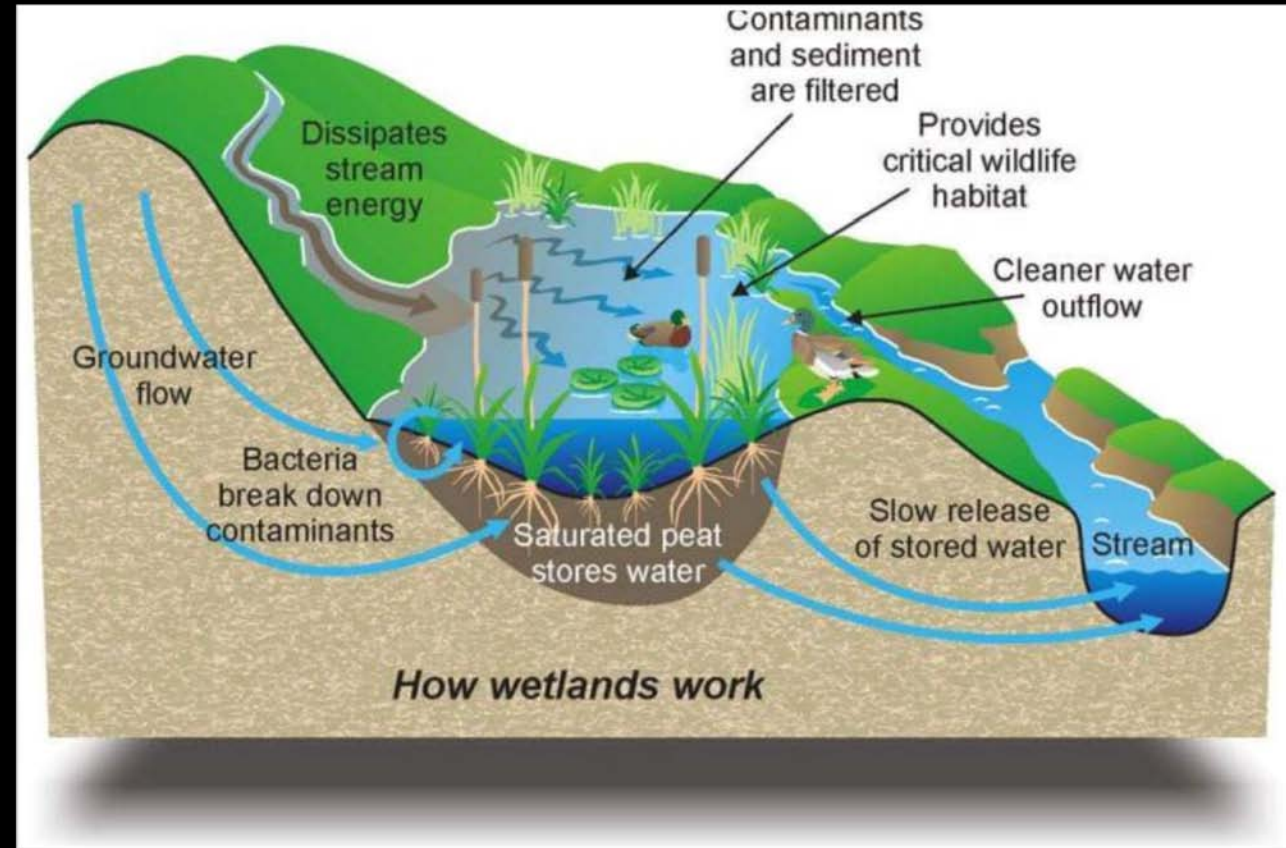
Funding Source & Previous ANA Projects

- Administration for Native Americans
  - Environmental Regulatory Enhancement

- Wildlife & Habitat Inventory 2009-2011
  - 50 Upland/Riparian and Wetland Sites
    - Remote camera surveys
    - Habitat assessment through plant community surveys

- Tribal Wildlife Stewardship Plan 2012-2014
  - Science & TEK "teams"
  - Future guidance for the KBIC Wildlife Program
  - Species and habitat components

2014

KBIC Wildlife Stewardship Plan
Wiikwedong Mizhinawesiiwendaawasowinibii'igan

Pamela Nankervis & Mary Hindelang
KBIC Natural Resources Department
12/18/2014

Council Approved December 18, 2014
NRD Report No. 14.1218

Problem Statement

There is no integrated wetland monitoring strategy for KBIC or central location where biological data and site specific background information regarding water quality, sediment, wildlife, macroinvertebrates, and plants can be found and used for ongoing assessments of site conditions and wetland management planning.
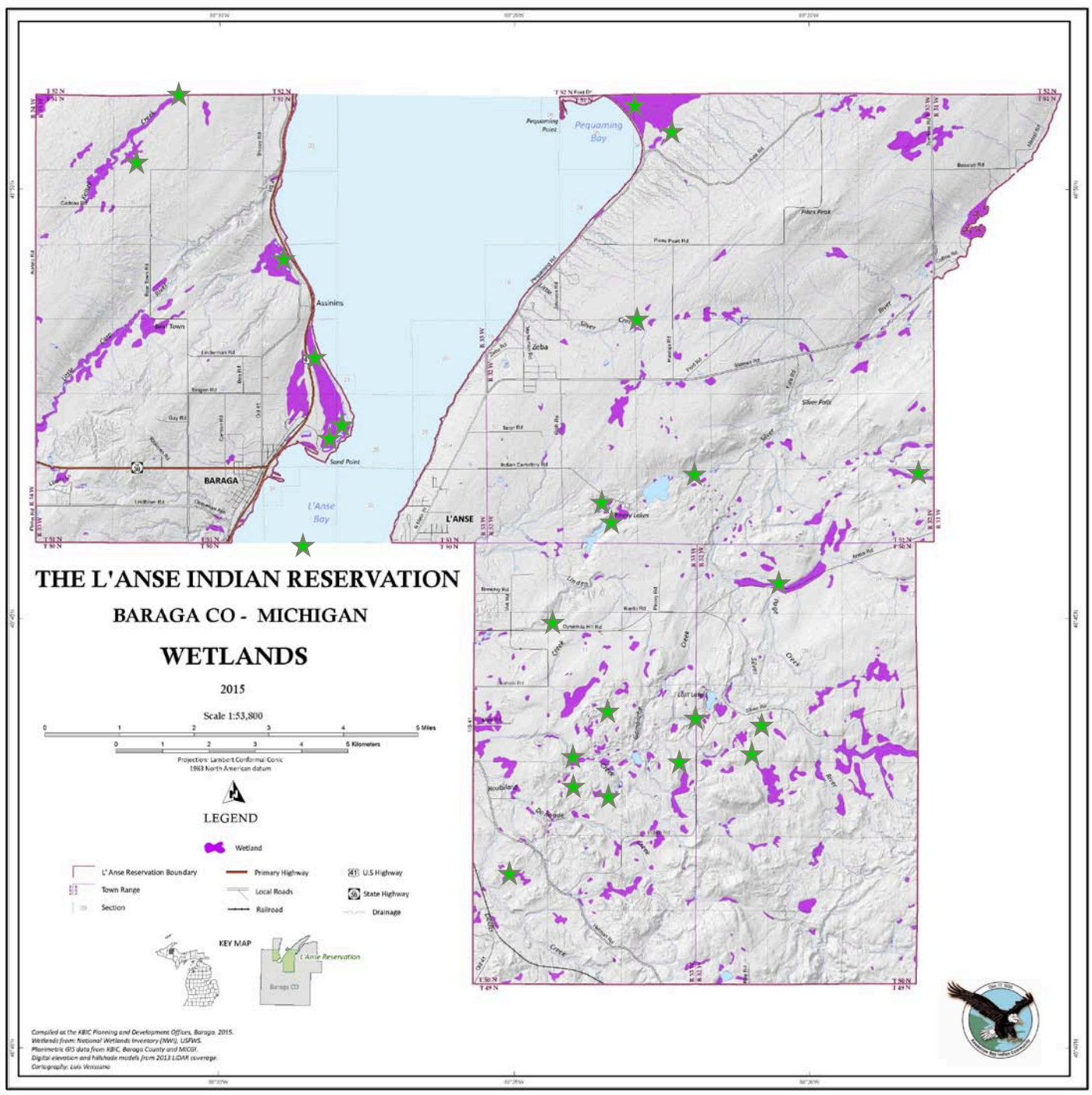
2016-2018 Project

- Wetland Program Development
  - Organizing existing data
  - Filling data gaps
  - Testing methodologies for long-term monitoring
  - Identify/align with Ojibwa values
  - Monitor for changes associated with climate change, land use, and environmental degredation

Project Objectives

- Create a database of existing data

- Inventory 28 wetland sites on the L'Anse Reservation
  - Plants
  - Water & sediment
  - Macroinvertebrates
  - Wildlife

- Survey the community to gage tribal member values and priorities related to wetland resources

THE L'ANSE INDIAN RESERVATION

BARAGA CO - MICHIGAN

WETLANDS

2015

Scale 1:53,800

LEGEND

Plant Communities

- Wetland classification schemes are often based on plant species present

Michigan Natural Features Inventory / Michigan State University Extension

Michigan's Natural Communities

Classification and Descriptions as a PDF   Community Distribution Maps   Key to the Communities   Ranking Criteria

Natural Community State Ranks

Name	State Rank
Alvar	S1
Bog	S4
Boreal Forest	S3
Bur Oak Plains	SX
Cave	S1
Clay Bluff	S2
Coastal Fen	S2
Coastal Plain Marsh	S2
Dry Northern Forest	S3
Dry Sand Prairie	S2
Dry Southern Forest	S3
Dry-mesic Northern Forest	S3
Dry-mesic Prairie	S1
Dry-mesic Southern Forest	S3
Emergent Marsh	S4
Floodplain Forest	S3
Granite Bedrock Glade	S2

Communities by Ecological Groups

PALUSTRINE
Marsh
- Submergent Marsh
- Emergent Marsh
- Great Lakes Marsh
- Inland Salt Marsh
- Coastal Plain Marsh
- Intermittent Wetland
- Northern Wet Meadow
- Southern Wet Meadow
- Interdunal Wetland

Wet Prairie
- Wet Prairie
- Wet-mesic Prairie
- Wet-mesic Sand Prairie
- Lakeplain Wet Prairie
- Lakeplain Wet-mesic Prairie

Fen
- Poor Fen
- Patterned Fen
- Northern Fen
- Prairie Fen
- Coastal Fen

Bog
- Bog

Vegetation

Poor fens have a unique flora that is intermediate between northern fen and bog. Poor fens are characterized by a graminoid-dominated herbaceous layer of low to moderate diversity. While sedges remain dominant, many poor fens also support a continuous carpet of sphagnum mosses and widely scattered, slightly raised peat ridges or mounds with low ericaceous, evergreen shrubs and stunted conifer trees. Gradients in pH, light, soil moisture, and cation concentrations (i.e., nutrient availability) determine floristic composition of poor fens. Sedges dominate the species-poor herbaceous layer of poor fens. Few-seed sedge (*Carex oligosperma*) and wiregrass sedge (*Carex lasiocarpa*) are typically dominant. Other sedges that are characteristic of poor fens include creeping sedge (*Carex chordorrhiza*), coastal sedge (*C. exilis*), livid sedge (*C. livida*), few-flower sedge (*C. pauciflora*), and mud sedge (*C. limosa*). Additional graminoids that thrive in poor fens include twig-rush (*Cladium mariscoides*), three-way sedge (*Dulichium arundinaceum*), cotton-grasses (*Eriophorum* spp.), swamp candles (*Lysimachia terrestris*), white beak-rush (*Rhynchospora alba*), arrow-grass (*Scheuchzeria palustris*), and tufted bulrush (*Trichophorum cespitosum*). The following is a list of prevalent herbaceous plants occurring in poor fen: rush aster (*Symphyotrichum boreale*), fireweed (*Chamerion angustifolium*), fringed willow-herb (*Epilobium ciliatum*), grass-leaved goldenrod (*Euthamia graminifolia*), wild blue flag (*Iris versicolor*), bog buckbean (*Menyanthes trifoliata*), marsh cinquefoil (*Comarum palustre*), false mayflower (*Maianthemum trifolium*), bog goldenrod (*Solidago uliginosa*), and common bog arrow-grass (*Triglochin maritima*). Insectivorous plants, round-leaved sundew (*Drosera rotundifolia*), spoon-leaf sundew (*D. intermedia*), pitcher-plant (*Sarracenia purpurea*), horned bladderwort (*Utricularia cornuta*), and flat-leaved bladderwort (*U. intermedia*), are common features of poor fens. Where a continuous moss layer occurs, it is dominated by sphagnum mosses, especially *Sphagnum magellanicum*, *S. angustifolium*, *S. capillaceum*, *S. capillifolium*, *S. recurvum*, *S. papillosum*, and *S. fuscum*.

The patchy shrub layer of poor fens is dominated by low, primarily ericaceous shrubs including bog rosemary (*Andromeda glaucophylla*), leatherleaf (*Chamaedaphne calyculata*), bog laurel (*Kalmia polifolia*), Labrador tea (*Rhododendron groenlandicum*), bog willow (*Salix pedicellaris*), large cranberry (*Vaccinium macrocarpon*), and small cranberry (*V. oxycoccos*). The tall shrub layer of poor fens is less dense than the low shrub layer and is often restricted to the periphery. Tall shrubs typical of poor fens include black chokeberry (*Aronia prunifolia*), mountain holly (*Ilex mucronata*), pussy willow (*Salix discolor*), steeplebush (*Spiraea tomentosa*), and wild-raisin (*Viburnum cassinoides*). More minerotrophic shrubs, like bog birch (*Betula pumila*), Kalm's St. John's-wort (*Hypericum kalmianum*), and shrubby cinquefoil (*Dasiphora fruticosa*), can occur in poor fens where their roots extend beneath the surface mat to minerotrophic peat. Trees within poor fens are widely scattered (tree cover is typically less than 10%), stunted (seldom reaching six meters), and are often restricted to scattered, low peat mounds. The most commonly occurring trees in poor fens are black spruce (*Picea mariana*) and tamarack (*Larix laricina*), with jack pine (*Pinus banksiana*) and white pine (*P. strobus*) as occasional associates.

Plant Communities

- Aquatic Surveys
  - Point intercept
  - Throw a rake

- Emergent/Transitional Zone Surveys
  - Relevé Plot
  - Transect inventories

KBIC Wetlands

- Complex systems
- Multiple classifications in one system
  - Poor fen
  - Shore fen
  - Bog
  - Cat-tail marsh
  - Beaver floodings
  - Emergent marsh (sedge dominated)
  - Floating mats
  - Riverine march systems
  - Leatherleaf dominated bog
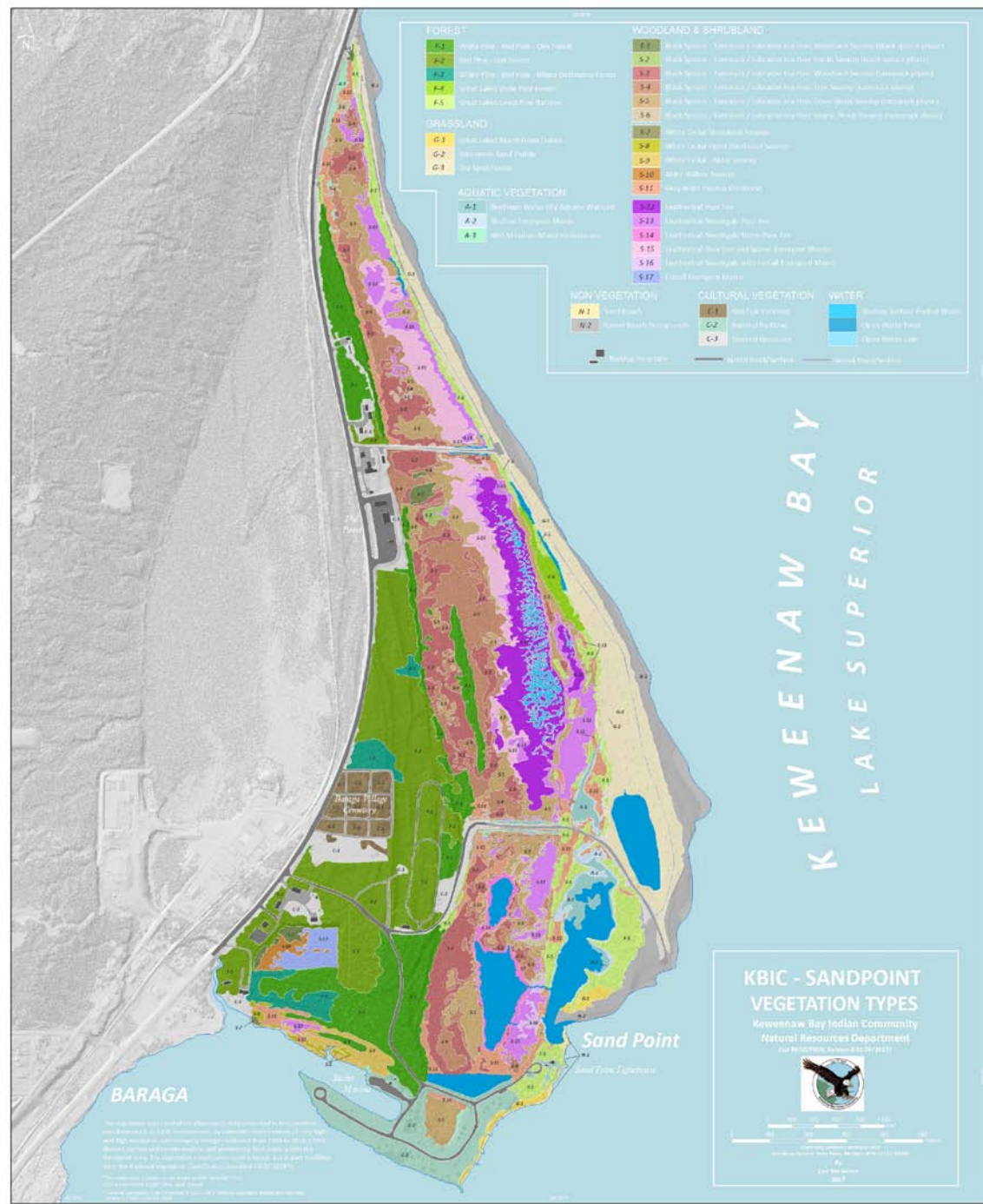
Water & Sediment Quality

- Standard surface water parameters
  - Temp, DO, pH, turbidity
- Three sampling events
  - Spring, Summer, Fall
- Metals, low level mercury, nutrients, e.coli
  - Identify anything that may be inhibiting aquatic life from thriving

Log Out (45 min.)

Setup ▼ Metadata ▼ Import ▼ Enter ▼ Review ▼ Batch ▼ Analyze ▼ Publish ▼ Help ▼

Monitoring Locations

Search | Clear Search Criteria | Add New | Export to Excel | Show Locations on the Map

Search Criteria | **Monitoring Locations**

Organization ID	Monitoring Location ID	Monitoring Location Name	Monitoring Location Type	Latitude	Longitude
KBICNRD_WQX	AR1MS	Arvon Road	Wetland Undifferentiated	46.7566525	-88.33955078
KBICNRD_WQX	BB1WS	Beartown Beaver Flooding	Wetland Undifferentiated	46.83658333	-88.52319444
KBICNRD_WQX	BC1WS	Boyer Creek (Head of Bay)	Wetland Undifferentiated	46.752148	-88.49082339
KBICNRD_WQX	DH1WS	Dynamite Hill	Wetland Undifferentiated	46.74822222	-88.41191667
KBICNRD_WQX	GN1WS	Gomache North	Wetland Undifferentiated	46.72113889	-88.34863889
KBICNRD_WQX	HB1WS	Herman Beaver Flooding	Wetland Undifferentiated	46.70241667	-88.41941667
KBICNRD_WQX	HL1WS	Hidden Lake	Wetland Undifferentiated	46.78527778	-88.46797222
KBICNRD_WQX	HP1MS	Hatchery Pond	Wetland Undifferentiated	46.845169	-88.37177178
KBICNRD_WQX	HR1WS	Haataja Road	Wetland Undifferentiated	46.80691667	-88.38061111
KBICNRD_WQX	IC1MS	Indian Corner	Wetland Undifferentiated	46.716373	-88.39319456
KBICNRD_WQX	KC1WS	Kelsey Creek	Wetland Undifferentiated	46.85202778	-88.50975
KBICNRD_WQX	LB1WS	Lightfoot Bog	Wetland Undifferentiated	46.89380556	-88.20583333
KBICNRD_WQX	LD1WS	Lightfoot Bay Dock	Wetland Undifferentiated	46.89405556	-88.20144444
KBICNRD_WQX	LI1MS	Little Indian Ponds	Wetland Undifferentiated	46.718282	-88.36849981
KBICNRD_WQX	LL1WS	Laughs Lake Beaver pond	Wetland Undifferentiated	46.78	-88.36486111
KBICNRD_WQX	ML1MS	Mud Lakes	Wetland Undifferentiated	46.821003	-88.48240839
KBICNRD_WQX	NS1MS	North Sand Point	Wetland Undifferentiated	46.799495	-88.47194953
KBICNRD_WQX	PC1WS	Pages Creek	Wetland Undifferentiated	46.77719444	-88.30080556
KBICNRD_WQX	PL1MS	Pinery Lakes	Wetland Undifferentiated	46.768644	-88.39078303
KBICNRD_WQX	PP1MS	Pinery Ponds	Wetland Undifferentiated	46.778241	-88.36426769
KBICNRD_WQX	PR1MS	Pequaming Road	Wetland Undifferentiated	46.850945	-88.37784789
KBICNRD_WQX	PT1WS	Pinery Twin	Wetland Undifferentiated	46.77161111	-88.38986111
KBICNRD_WQX	RI1WS	Roubillard Impoundment	Wetland Undifferentiated	46.722936	-88.38295206
KBICNRD_WQX	SP1WS	Silver Ponds	Wetland Undifferentiated	46.738817	-88.34677088

|◄ ◄ ═══════●═══════ ►| Page **1** of 1   Item 1 to 27 of 27

Macroinvertebrates

Group 1: Pollution Intolerant Species
- Mayfly
- Riffle Beetle
- Caddisfly Larva
- Stonefly
- Right-Handed Snail

Group 2: Moderately Pollution Intolerant Species
- Sowbug
- Scud
- Clam
- Crayfish
- Damselfly Larva

Group 3: Pollution Tolerant Species
- Aquatic Worm
- Midge Larva
- Leech
- Black Fly Larva
- Left-Handed Snail

- Sampled twice/year (spring/summer; summer/fall)
- Environmental quality (bioindicators)
- Varying level of tolerance to stressors
  - Pollution
  - Oxygen
  - Toxins/metals
- Food source

Wildlife Use

Community Survey

- Seasonal Wetland Activities
  - Hunting, fishing, trapping, gathering, knowledge sharing
- Environmental Benefits
  - Habitat, flood mitigation, filter pollution
- Community Benefits
  - Hunt/fish/gather, medicines, spiritual well being, non-commercial harvest
- Wetland Stewardship
  - Monitor, Restore, Protect
- Learning Opportunities

Results

- Low response rate (~20%)

- Seasonal Wetland Activities
  - Hunting – Fall
  - Fishing, recreation- Summer
  - Recreation, gathering, spiritual well-being – Summer & Fall
  - DO NOT USE
    - Do Not Engage?

Environmental Benefits

	Statement: *I believe wetlands need to be protected and/or restored because they provide <u>ENVIRONMENTAL BENEFITS</u> such as…*	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	Habitat for fish	1	2	3	4	5
	Habitat for wildlife	1	2	3	4	5
	Habitat for plants and trees	1	2	3	4	5
	Collection of excess water during a flood or storm	1	2	3	4	5
	Filtration of pollution from runoff before water reaches Lake Superior	1	2	3	4	5
	Retention of sediments and soils	1	2	3	4	5
	Storage and recycling of nutrients	1	2	3	4	5
	Biological diversity (many different fish, wildlife, and plants)	1	2	3	4	5
	Water to recharge the ground water supply	1	2	3	4	5

Community Benefits

Statement: *I believe wetlands need to be protected and/or restored because they provide MY COMMUNITY with the following benefits, such as opportunities for...*	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
hunting	1	2	3	4	5
fishing	1	2	3	4	5
trapping	1	2	3	4	5
Medicinal plant gathering (for specific ailments)	1	2	3	4	5
Gathering of plants for traditional food or drink (berries, nuts, roots, leaves, or others)	1	2	3	4	5
Recreation (wildlife viewing, hiking, snowshoeing, or others)	1	2	3	4	5
Spiritual well being and personal enrichment	1	2	3	4	5
Sharing knowledge and skills with others (education, training, or other teachings)	1	2	3	4	5
Gathering materials for making traditional/ ceremonial items (**non-commercial** use)	1	2	3	4	5
Gathering materials for **non-commercial** activity (crafting, firewood, boughs, peat, or others)	1	2	3	4	5
Gathering materials for **commercial** activity (crafting, firewood, boughs, peat, or others)	1	2	3	4	5
As a source of **non-commercial**, household water (gardening, washing, or others)	1	2	3	4	5
As a source of water for **commercial** activity	1	2	3	4	5

Wetland Stewardship

	Statement: *Focused on monitoring, restoration, and protection, my top 5 wetland stewardship priorities are…* (PLEASE CHECK YOUR TOP 5 PRIORITIES ONLY)
2	***Monitor* wetland habitat, including buffer zones (wetland fish, wildlife, and plants species)**
	Monitor wetland water quality (sediment, pore water, macroinvertebrates, and water sampling)
3	***Monitor* human activities that may potentially impact wetland overall health (industry, agriculture, and other development activities)**
1	***Restore* wetland habitat, including buffer zones, through restoration projects (i.e. wild rice restoration, Sand Point coastal beach restoration, and stream connectivity)**
	Restore wetland habitat, including buffer zones, through governance participation (i.e. lobbying Congress for funding programs and initiatives such as the Great Lakes Restoration Initiative and Land and Conservation Act funding)
5	***Protect* wetland habitat, including buffer zones, through projects (i.e. invasive species management program)**
4	***Protect* wetland habitat, including buffer zones, through regulations and ordinances (i.e. restrictions on chemical use, open dumping)**
	Protect wetland habitat, including buffer zones, through governance participation (i.e. develop water quality standards for wetlands)
	Protect wetland habitat, including buffer zones, through educational initiatives and outreach materials (i.e. events such as Lake Superior Day and Environmental Fair)
	Other (please write in)

Learning Opportunities

	Statement: *The top 5 areas I am most interested in for learning opportunities are…* (PLEASE CHECK YOUR TOP 5 PRIORITIES ONLY)
1	**Common fish, wildlife and plants** that live in our regional wetlands
4	**Gathering particular plant species** in our regional wetlands and their uses
	Harvesting particular wildlife species in our regional wetlands
3	**Ojibwa cultural values** related to wetlands and their resources
2	**Current KBIC** natural resource programs, projects, and policies related to the protection and restoration of wetland habitats (fisheries, wildlife, wetlands, water resources, plants, KBIC Title Ten, and others)
	Current tribal natural resource programs, projects, and policies related to the protection and restoration of wetland habitats (such as GLIFWC and other regional tribes work with fisheries, wildlife, wetlands, water resources, plants, and others)
	Current federal and state natural resource programs, projects, and policies related to the protection and restoration of wetland habitat (fisheries, wildlife, wetlands, water resources, plants, and others)
	Volunteer opportunities with the KBIC-NRD to help protect and restore wetlands in our community
5	**Individual practices and activities** that can help protect and restore wetlands (in your home, private property, work place, recreation, and/or business such as lawn & garden care, timber harvest, waste disposal, safe handling/use of chemical products, construction near wetlands, and others)
	Other (please write in)

Third Coast Conversations

- Engage community in conversations about water

- Lunch & Learn focused on wetlands

- Unknown scenarios

- Discussion of wetlands, importance, threats, etc

Challenges

- Weather
- Wildlife
- Site conditions
- Accessibility
- Methodology
- Survey development
- Funding

Next Steps

- Complete second year of sampling
- Final report describing each site
- Seek funding to develop Wetland Monitoring Program
  - Waiting to hear back from EPA

Questions?

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Thank You

Wetland Project Team

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- Karena Schmidt, Ecologist
- Valoree Gagnon, Social Scientist (MTU)
- Evelyn Ravindran, Natural Resources Director
- KBOCC Environmental Science Interns & Laboratory resources