Wetland Hydrology Monitoring – Don’t Get Bogged Down

Jennie Skancke – Wetland Program Coordinator

Amy Kendig – Data Analysis, Figure Creation, Sounding Board

DEPARTMENT OF NATURAL RESOURCES

September 2026| dnr.state.mn.us/wetlands

Partners

Sites and Data Sharing

MN DNR
- State Parks
- Scientific and Natural Areas
- Wildlife Management Areas
- Aquatic Management Areas

Three Rivers Park District
U.S. Forest Service
The Nature Conservancy

U.S. Fish and Wildlife Service
- Waterfowl Production Areas
- National Wildlife Refuges

Anoka County & Conservation District
Beltrami County
Becker County
Cedar Creek Ecosystem Science Reserve
Red Lake DNR

Agenda

- Project Recap
- Equipment Lessons Learned
- Project Coordination Lessons Learned
- Questions

DNR Hydrologist at Iron Springs Bog Scientific and Natural Area

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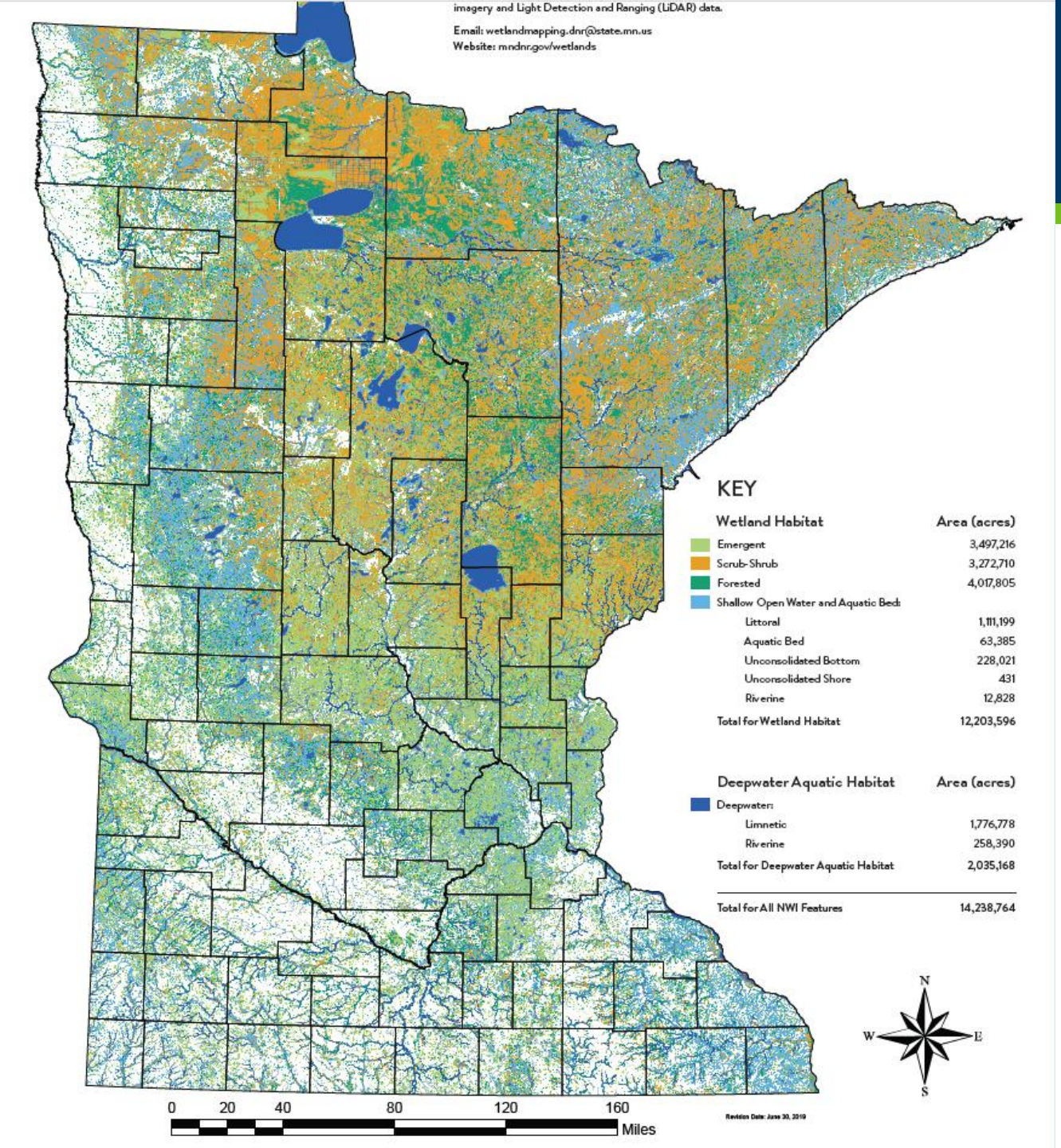


Original Design

Site selection was time consuming – MN is very big and diverse

Desktop Review was helpful but required a well-trained eye

- Many wetlands were thrown out after site visit

- Spread our sampling across all types

- MN has many wetlands that don't fit well into an Eggers and Reed or Circular 39 category. Many floating peat mats and other wetlands with multiple "types".

MN DNR Thresholds Report

Report to the Minnesota State Legislature: Definitions and Thresholds for Negative Impacts to Surface Waters

Key Questions – what are the natural water level regimes of MN wetlands without any external influence. Can that data be used to make water use permitting decisions?

Minnesota Department of Natural Resources

January 2016

MNDNR

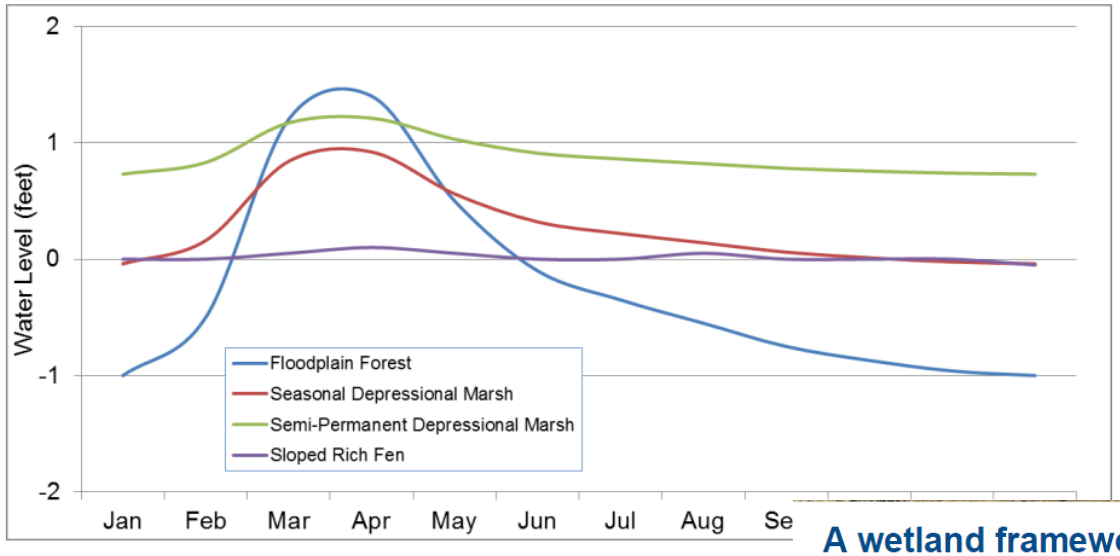
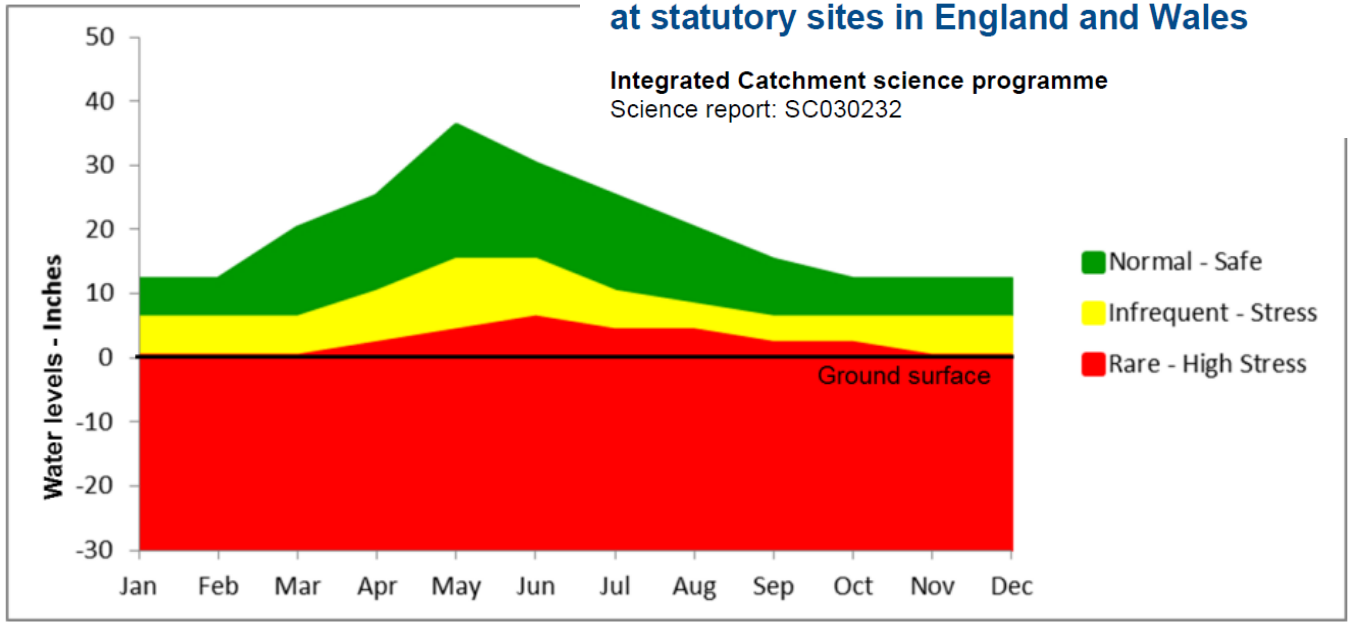


Figure from:

A wetland framework for impact assessment at statutory sites in England and Wales

Integrated Catchment science programme
Science report: SC030232



MN State Statutes

- **Relationship to surface water resources.** Groundwater appropriations that will have negative impacts to surface waters are subject to applicable provisions in section 103G.285 may be authorized only if they avoid known negative impacts to surface waters. If the commissioner determines that groundwater appropriations are having a negative impact to surface waters, the commissioner may use a sustainable diversion limit or other relevant method, tools, or information to implement measures so that groundwater appropriations do not negatively impact the surface waters.

- **Negative impact to surface waters** means a change in hydrology sufficient to cause aquatic ecosystem harm or alter riparian uses long term.

- **Ecosystem harm** means to change the biological community and ecology in a manner that results in loss of ecological structure or function.

- **Sustainable diversion limit** means a maximum amount of water that can be removed directly or indirectly from a surface water body in a defined geographic area on a monthly or annual basis without causing a negative impact to the surface water body.

Original Design

Hydro-Geomorphic Class	Water Regime Class	Plant Community	Ecological Province		
			Prairie Parkland	Eastern Broadleaf	Laurentian Mixed Forest
Depression/Flat	Temporarily Flooded to Saturated	Wet Meadow, Wet Prairie	3	3	3
Depression/Flat	Temporarily to Seasonally Flooded	Wooded and Shrub Swamps	3	3	3
Depression	Seasonally Flooded	Shallow Marsh	3	3	3
Depression	Semi-Permanently Flooded to Intermittently Exposed	Deep Marsh	3	3	3
Riverine Floodplain	Temporarily to Seasonally Flooded	Forested and Shrub Floodplain	3	3	3
Sloped	Saturated	Fen	3	3	3
Organic Peatland	Saturated	Open and Coniferous Bog	--	3	3
Lacustrine	Semi-Permanently to Permanently Flooded	Aquatic	Monitored by Shallow Lakes Program		

Received the Program Development Grant from EPA to get started with 20 wells.

We have a unit that does stream and well data collection exclusively; the supervisor committed to long-term monitoring

Site selection was time consuming – MN is Very Big and diverse

Final Site Types

Wetland Characteristics			Ecological Province		
Hydro-Geomorphic Class	**Water Regime Class**	**Plant Community**	**Prairie Parkland**	**Eastern Broadleaf**	**Laurentian Mixed Forest**
depression/mineral flat	temporarily flooded to saturated	wet prairie	3	1	1
depression/mineral flat/slope	seasonally flooded to saturated	wet meadow	1	4	2
depression/lotic/mineral flat/peatland	seasonally flooded to saturated	wooded and shrub swamps	1	2	9
depression/mineral flat	seasonally to semi-permanently flooded	shallow marsh	4	4	0
depression/lentic/mineral flat	permanently flooded	deep marsh/shallow open water	1	1	2
depression/mineral flat/peatland/slope	seasonally flooded to saturated	rich fen	8	4	4
peatland	saturated	open and coniferous acid peatland	0	0	8
lentic	semi-permanently to permanently flooded	aquatic	Monitored by Shallow Lakes Program		

MN has many different types of wooded and shrub swamps and many types of peatlands

The Eggers and Reed Plant Community Classification and other simplified classification types don't capture the wetland diversity in Minnesota.

MN Native Plant Communities are better descriptors

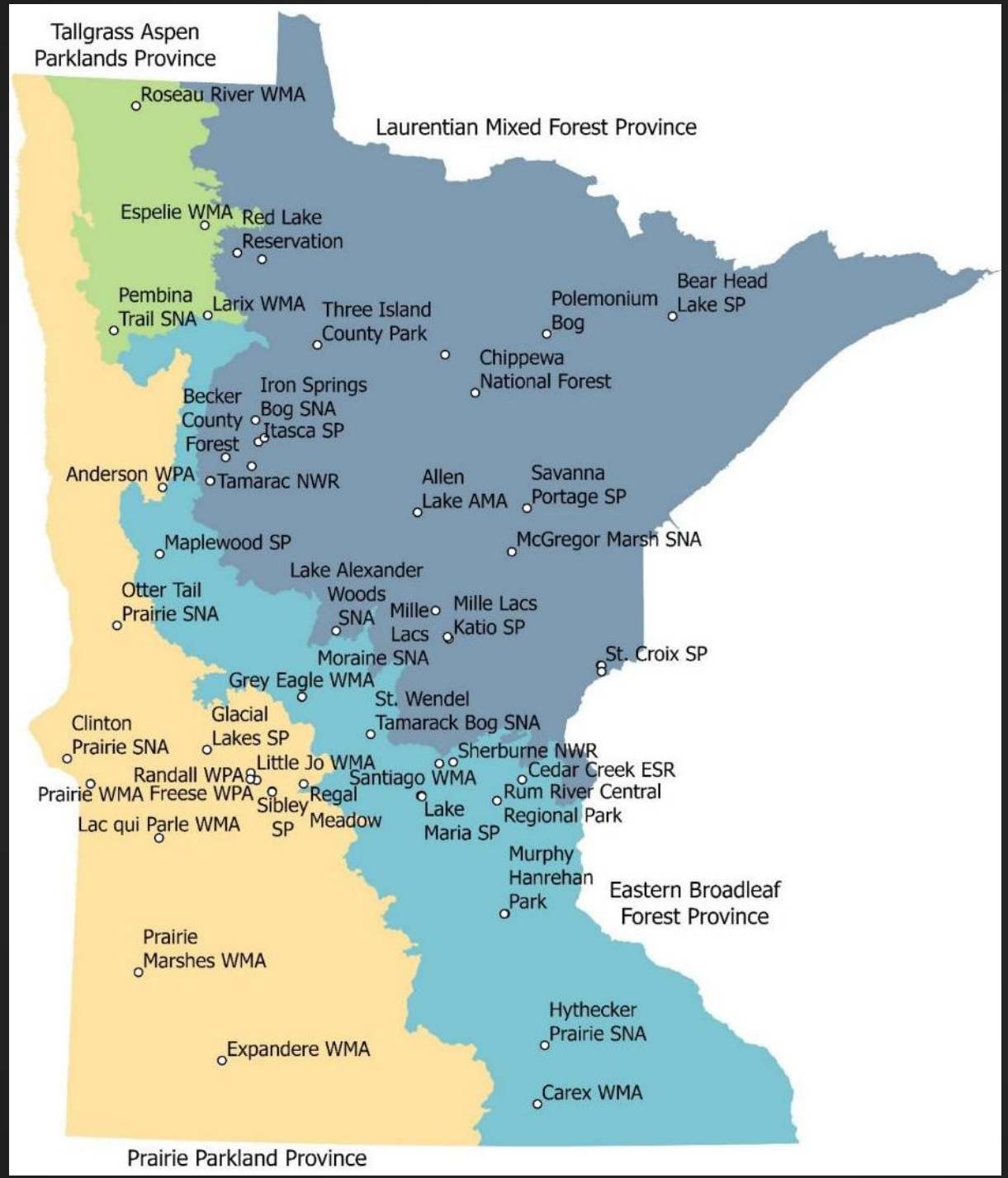
To be determined: do the wetlands in each "box" have similar hydrology?

Wetland Types Crosswalk

Site	NWI				NPC
	SPCC	HGM	Cowardin	Circular 39	
Pembina Trail SNA	shrub wetland	terrene flat vertical	PSS1/EM1D	6	WPn53b: Wet Brush-Prairie (Northern) (82%), WMs83a: Seepage Meadow/Carr (11%), OPp93a: Calcareous Fen (Northwestern) (8%)
Polemonium Bog	coniferous bog	terrene peatland vertical	PFO4Dq	8	FPn63b: White Cedar Swamp (Northcentral)
Red Lake Reservation 1	seasonally flooded/saturated emergent wetland	terrene flat throughflow	PEM1D	2	OPp91: Prairie Rich Fen
Red Lake Reservation 2	shrub wetland (76%), seasonally flooded/saturated emergent wetland (24%)	terrene flat vertical	PSS1/EM1D (76%), PEM1D (24%)	6 (76%), 2 (24%)	N/A
Savanna Portage SP	hardwood wetland (64%), coniferous bog (31%), shrub wetland (5%)	terrene flat vertical (69%), terrene peatland vertical (31%)	PFO1D (64%), PFO2Dq (21%), PFO4Dq (10%), PSS1D (5%)	7 (64%), 8 (31%), 6 (5%)	APn81b: Poor Tamarack - Black Spruce Swamp
St. Croix SP 1	open bog	terrene peatland vertical	PSS3/EM1Dq	8	WMn82b: Sedge Meadow
St. Croix SP 2	coniferous bog	terrene peatland vertical	PFO4Dq	8	APn81b2: Poor Tamarack - Black Spruce Swamp, Tamarack Subtype
St. Croix SP 3	hardwood wetland	lotic floodplain throughflow	PFO1D	7	WFn64b: Black Ash - Yellow Birch - Red Maple - Alder Swamp (Eastcentral)

NPC = Native Plant Community

Pembina Trail SNA
Three Island County Park
Iron Springs Bog SNA
Itasca State Park
Becker County Forest
Tamarac NWR
Anderson WPA
Maplewood State Park
Grey Eagle WMA
Glacial Lakes State Park
Clinton Prairie SNA
Prairie WMA
Little Jo WMA
Freese WPA
Sibley State Park
Prairie Marshes WMA

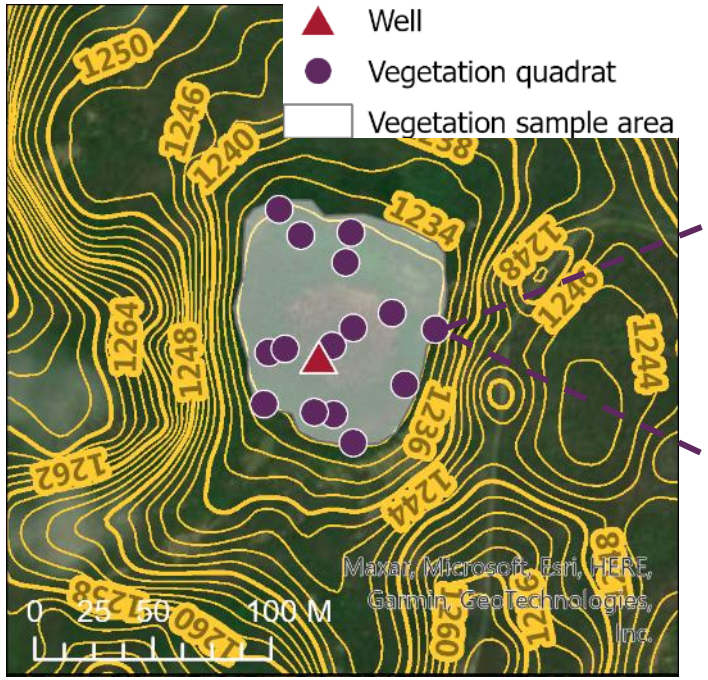


Site Locations

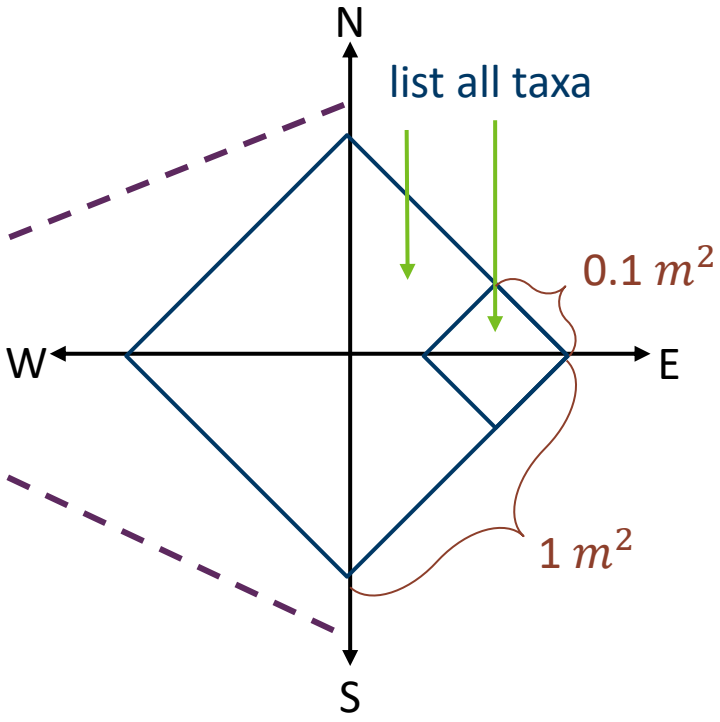
Bear Head Lake State Park
Chippewa National Forest
Allen Lake AMA
Savanna Portage State Park
Mille Lacs Kathio State Park
St. Croix State Park
St. Wendel Tamarack Bog SNA
Santiago WMA
Sherburne NWR
Cedar Creek ESR
Lake Maria State Park
Rum River Central Regional Park
Murphy Hanrehan Park
Carex WMA

Vegetation Data Collection

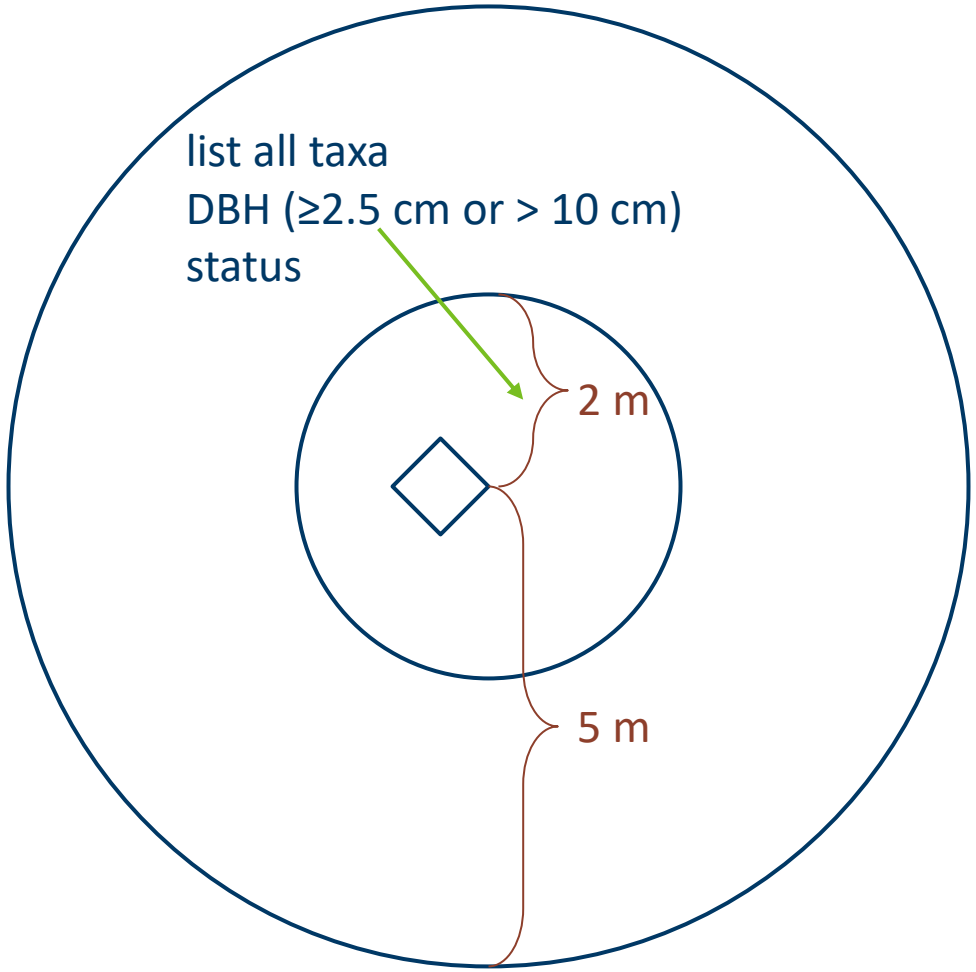
15 random quadrats

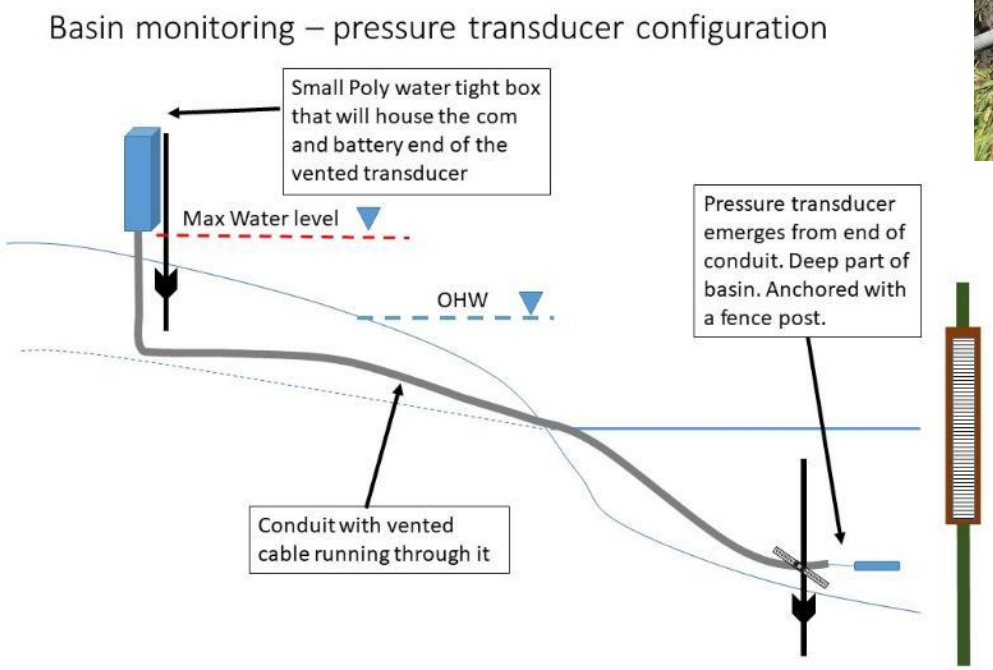


all vegetation

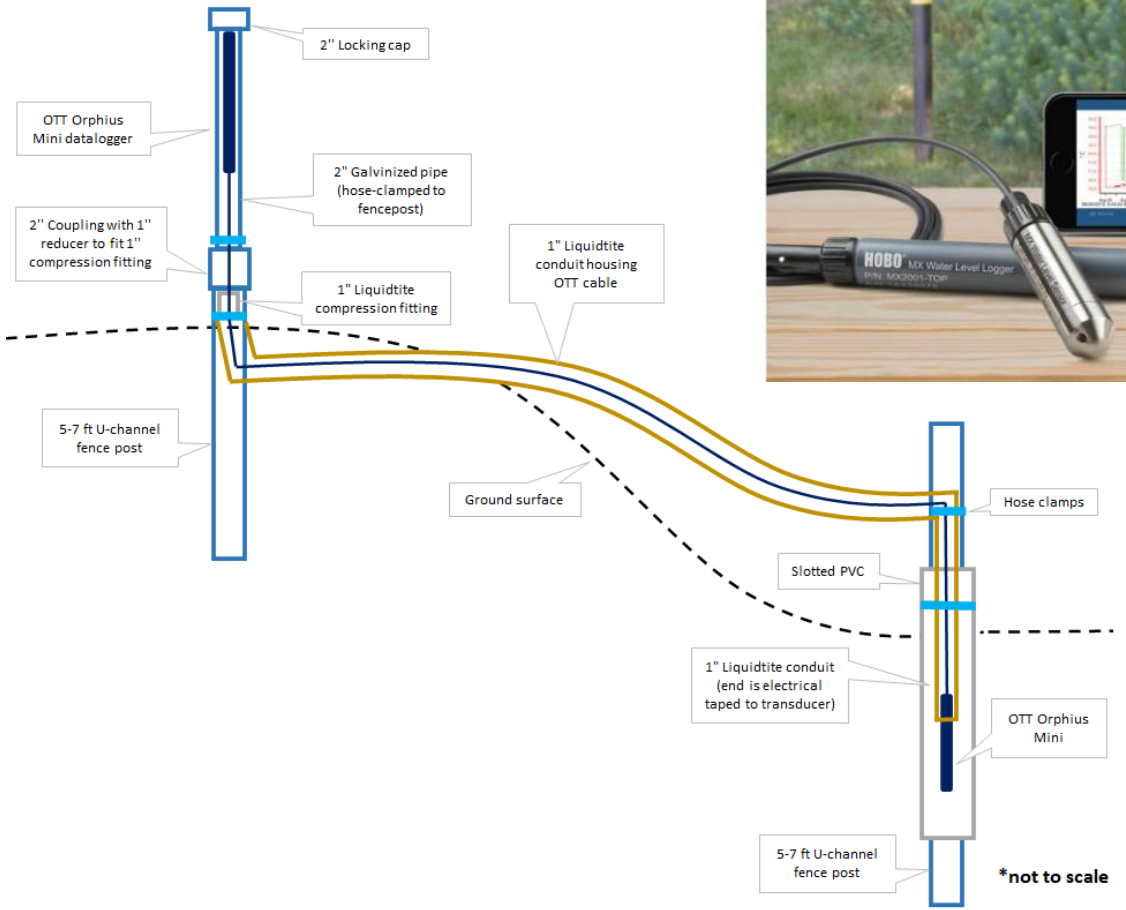


woody vegetation





Wetland Hydrology Equipment



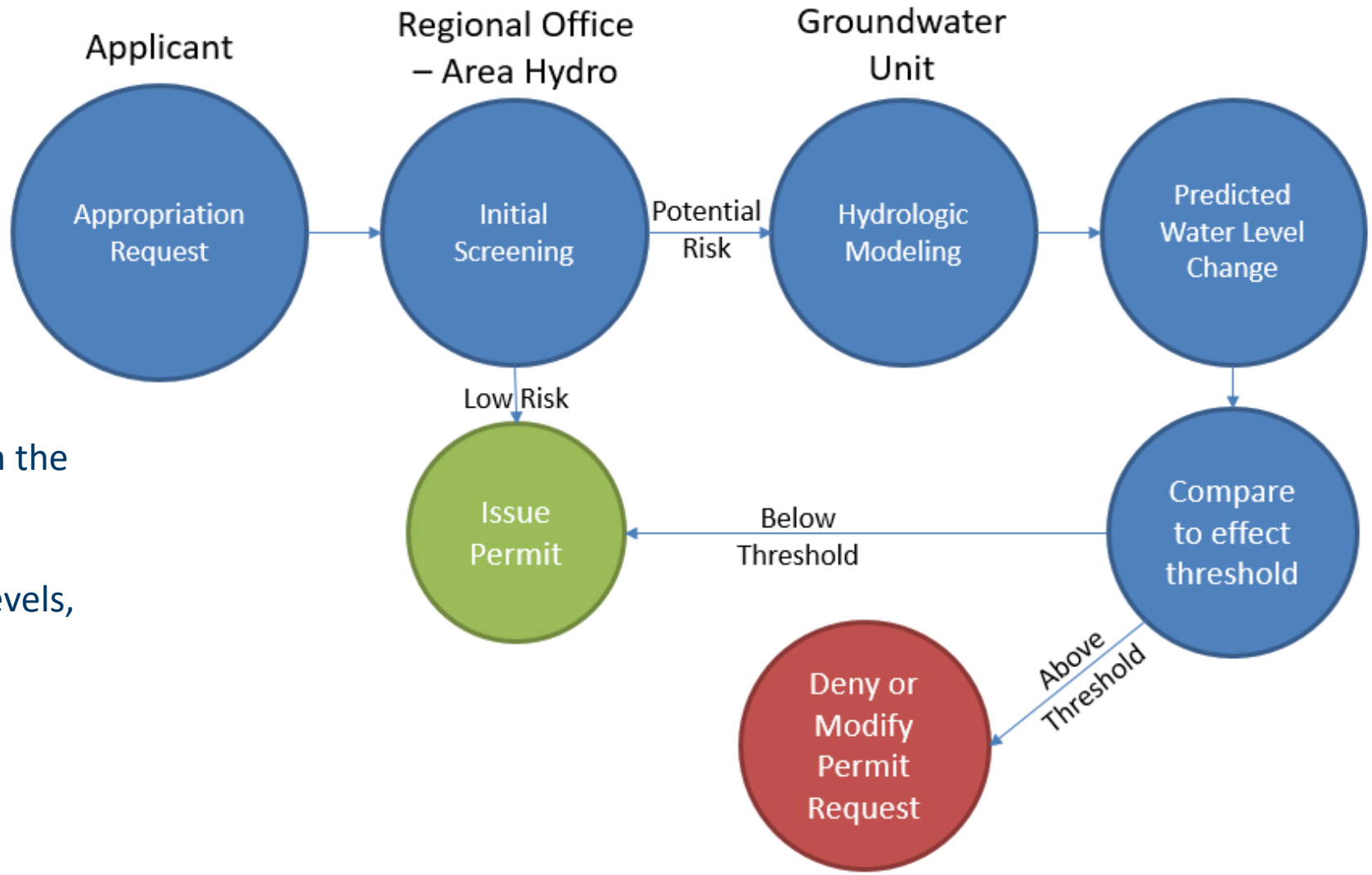
Allen Lake
Wet Forest

If the water level may be too high to wade

Have swapped from OTT to the Hobo MX water level logger

Wetland Hydrology Equipment Modified

Potential use: Inform water appropriation permits



Should have spent more time with the team before .

Ask “if we have long term water levels, what are the steps”

What are the deliverables?

What goes into models

credit: Steve Kloiber

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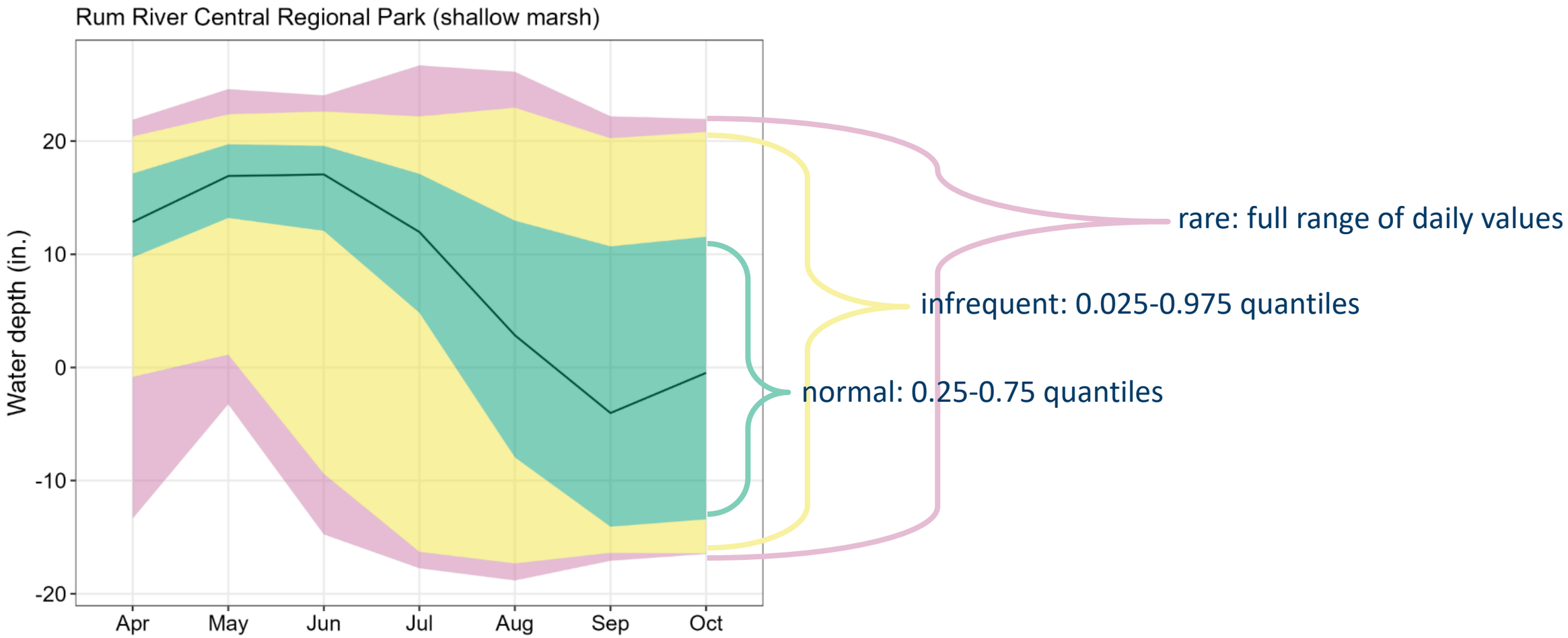
Checking our Assumptions – Continuing to Learn Lessons



Thank you

More info on our MN DNR Wetlands Webpage
https://www.dnr.state.mn.us/wetlands/index.html

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