Invasive Phragmites (*Phragmites australis*) Monitoring and Management

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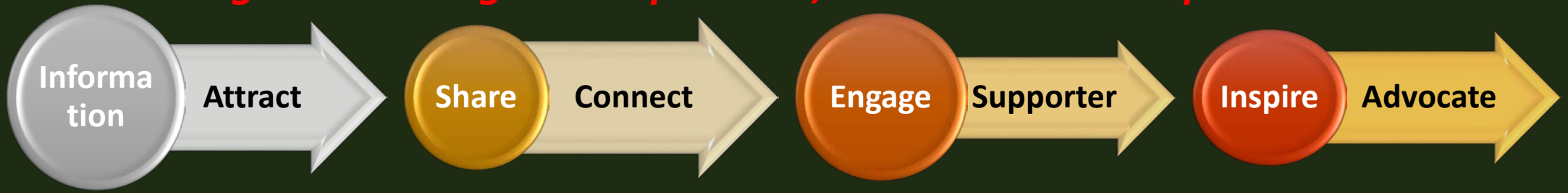
Challenge Working on this Species

- How much is enough to invest?
- No safe and effective control method with least or no potential harm
- Investment without compromising visitor operational priority
- Lack of measurable and visible success documented in the literature
- Unpredictable habitat restoration potential
- Climate change

- ***Sharing our challenges with partners, stakeholders and public***



Outline: Invasive Phragmites (*Phragmites australis*):

1. Phragmites invasion and Monitoring
2. Impacts on Ecological Integrity and more
3. Previous Work: Habitat Preference, Invasiveness and Benefit of Phragmites Stem Cutting
4. Impact of High Water Level on Phragmites Growth
5. GBINP Phragmites Conservation and Restoration Project (2019-2023)

Phragmites Invasion in GBI and Monitoring

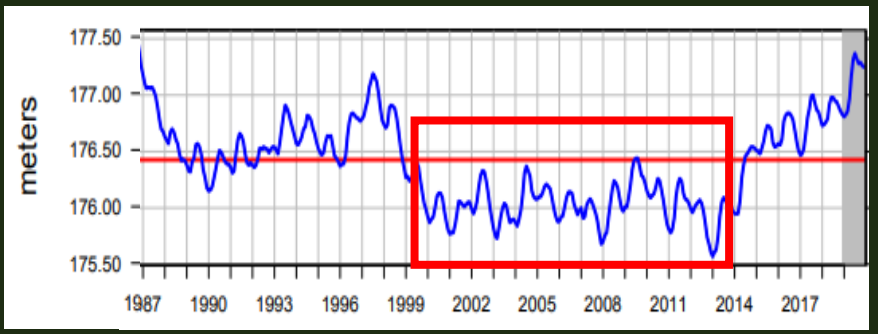
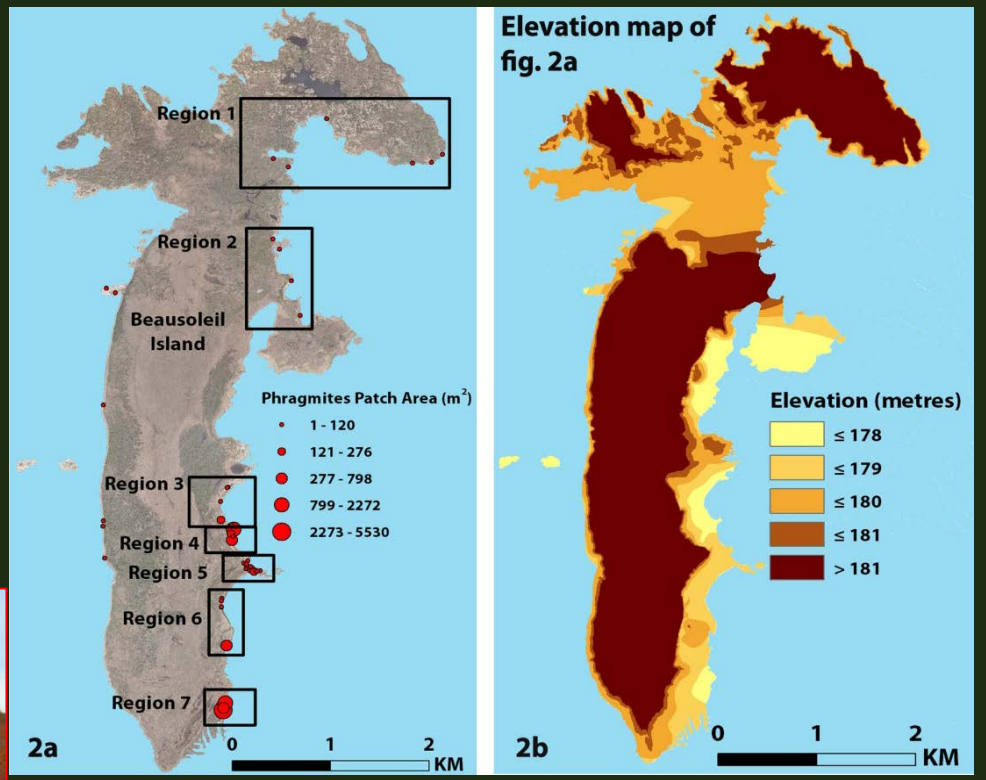


Fig 1 Historical Water Level (Source: CHS)



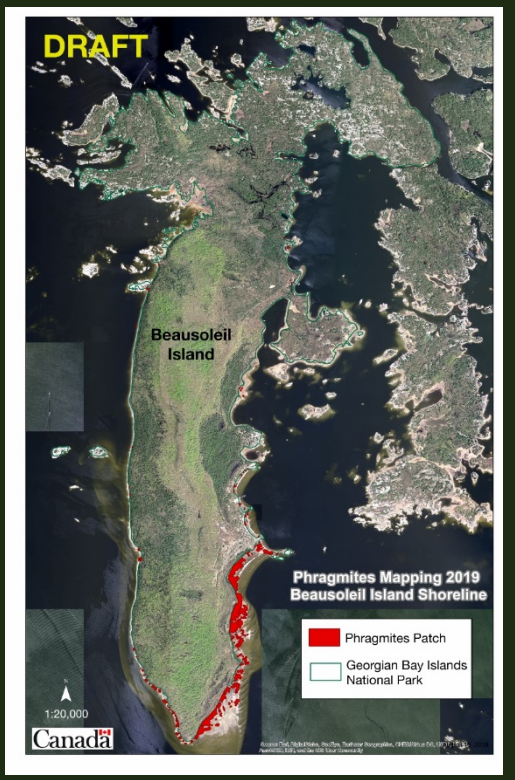


Fig 3. Phragmites monitoring in B. Island

Phragmites: Impact on Ecological Integrity and More

Indicators	Measures	Trend
Forest	Tree Health	↔
	Forest Regeneration	↔
	Soil Decay Rate	↔
	Forest Birds	↔
	Redback Salamander	↓
Coastal Shoreline	Water Level	↑
	Colonial Waterbirds	●
	Invasive Plants	Not Rated
	Turtle Abundance	●
	Stiff Yellow Flax	●
Wetlands	Exotic and Invasive Aquatic Plant	↓
	Water Quality	↑
	Frog Abundance	↓
	Wetland Plant Community	Not Rated
	Phragmites	Not Rated

Sources: *Parks Canada's Information Center for Ecosystems (ICE). Data current as of 2018*

Fig 1. SOPR- EI

Fig 2. Impact on Species

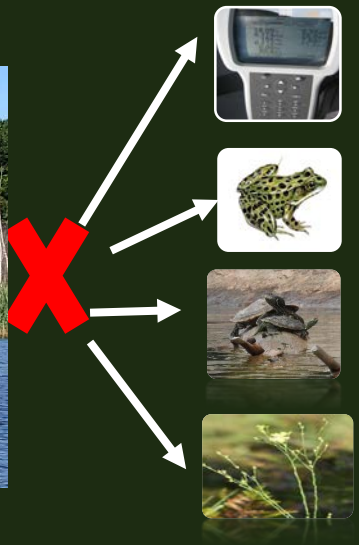
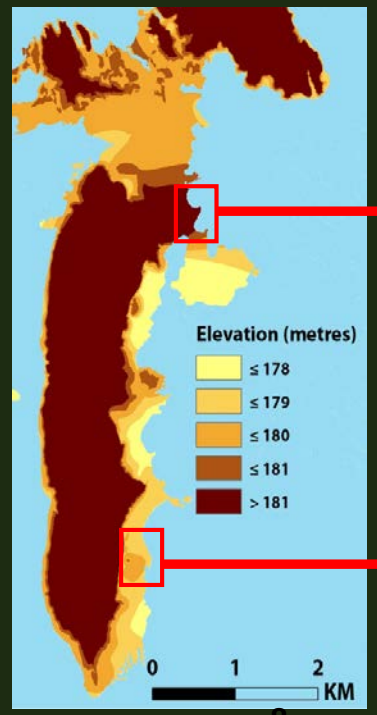


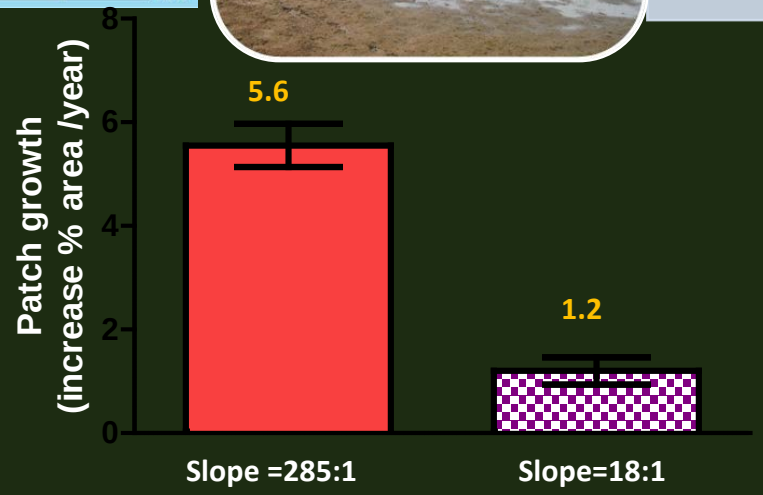
Fig 3. Impact on VE and Assets

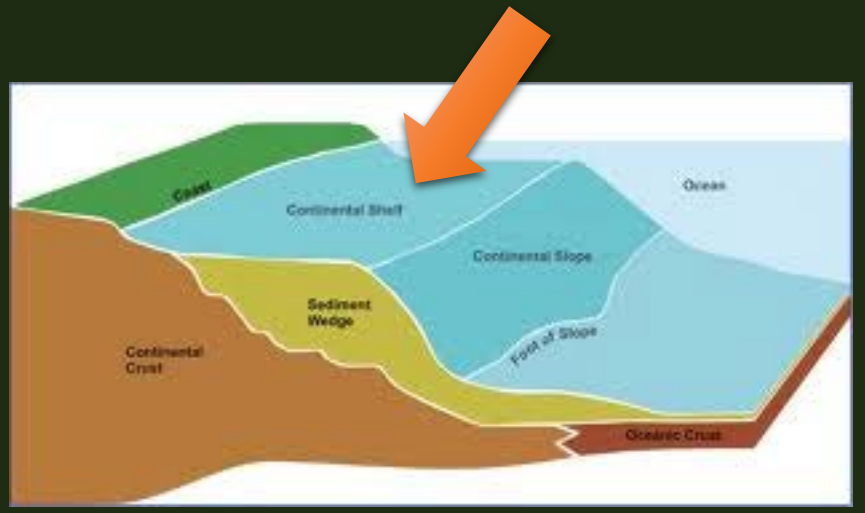
Habitat Preference for Invasion



- Slope = 18:1
- Soil: Silt and Rocky
- Habitat: Shoreline
- Landscape: Water completely drain out if flooded

- Slope = 285:1
- Soil: Organic/ Loamy
- Habitat: Marsh / shallow wetland
- Landscape: Seasonally flooded but not completely drain the area





Soil: Wet organic disturbed soils

Landscape: Seasonally flooded

Water control: lowers but does not drain

Invasiveness: Impact on Native Plants

Vegetation Composition of Experimental Plots

Plants name	% Plants covers/m² Experimental Plots		
	Rush(%)	Sedge(%)	CBJ *(%)
Phragmities	0	0	15.5±1.57
Bull Rush	90.5 ± 1.03	2.5±0.59	0
Sedge	0.5 ± 0.59	88±1.46	0
CBJ	0	0	43.5±1.78
Other grasses	9 ±1.19	9.5 ±1.57	41±0.84

Rush (*Scirpus acutus*)
Sedge (*Carex sp*))
*CBJ, Canada blue joint grass (*Calamagrostis Canadensis*)

Rush Plot

Fig 1. Bull Rush decreased to 79% and Phrg increased 21

Sedge Plot

Figure 2. Sedge decreased to 74% & phrag increased 26%

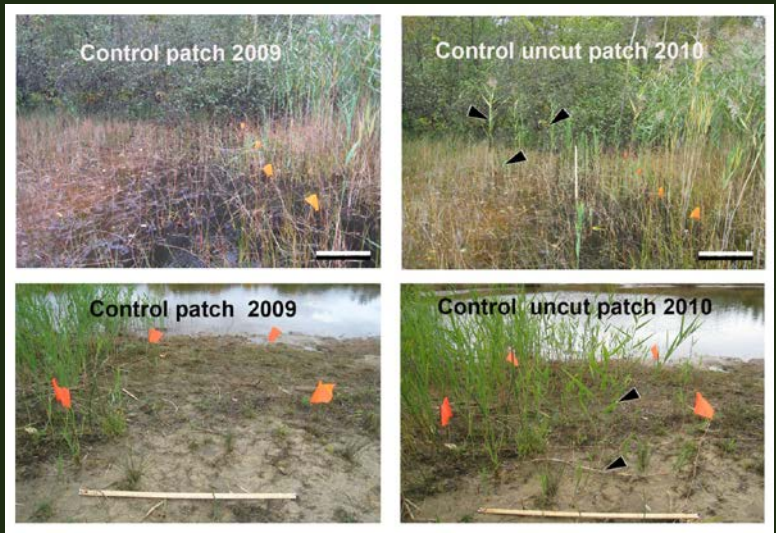
Blue Joint Grass Plot

Figure 3. CBJ grass decreased 19.5% & phrag increased 15%

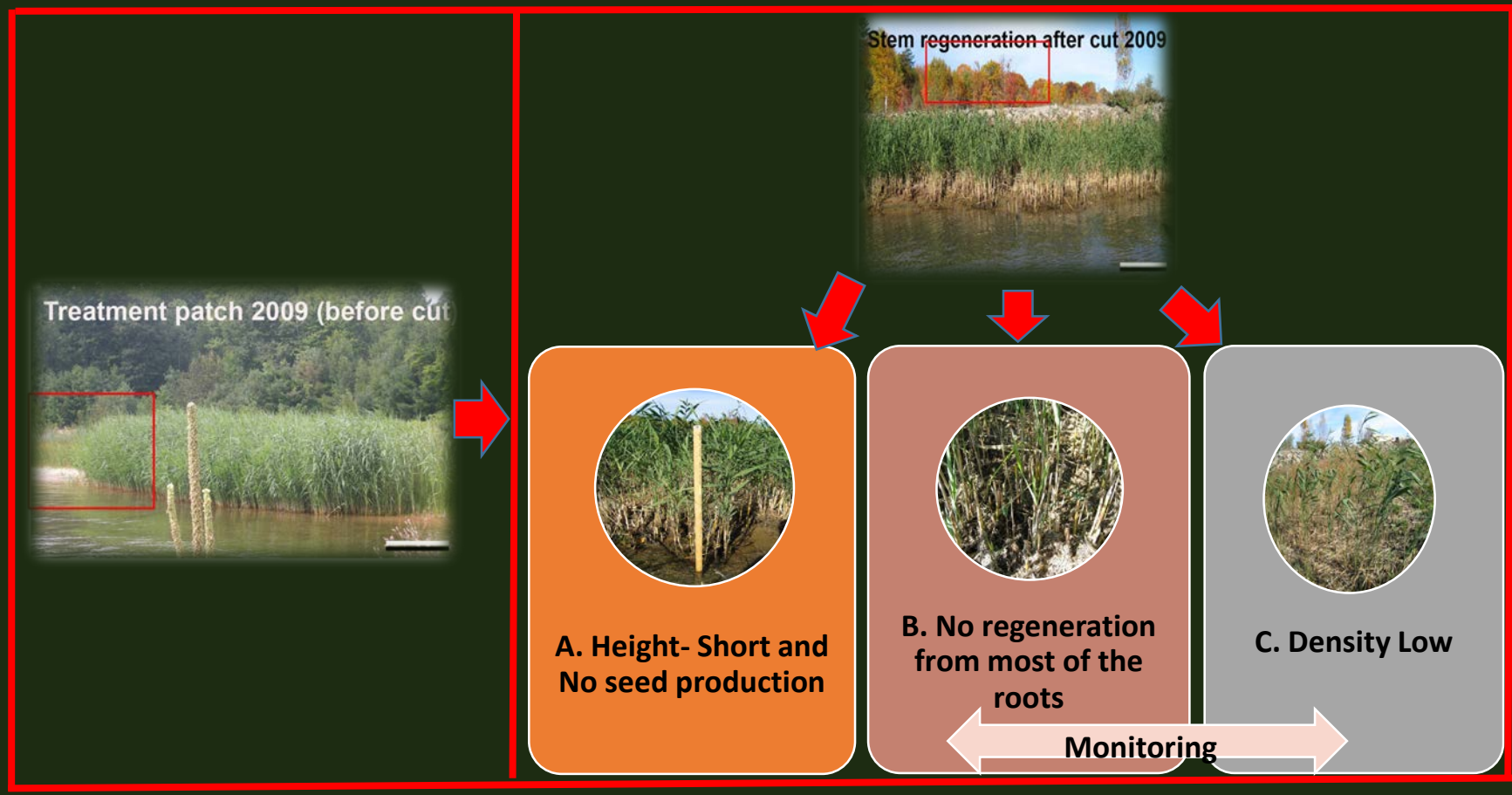
Impact of Stem Cutting

Impact of Stem Cutting

Control Patches: No Cut



Treatment Patches: Cut



Impact of Phragmites Stem Cutting on Patch Growth

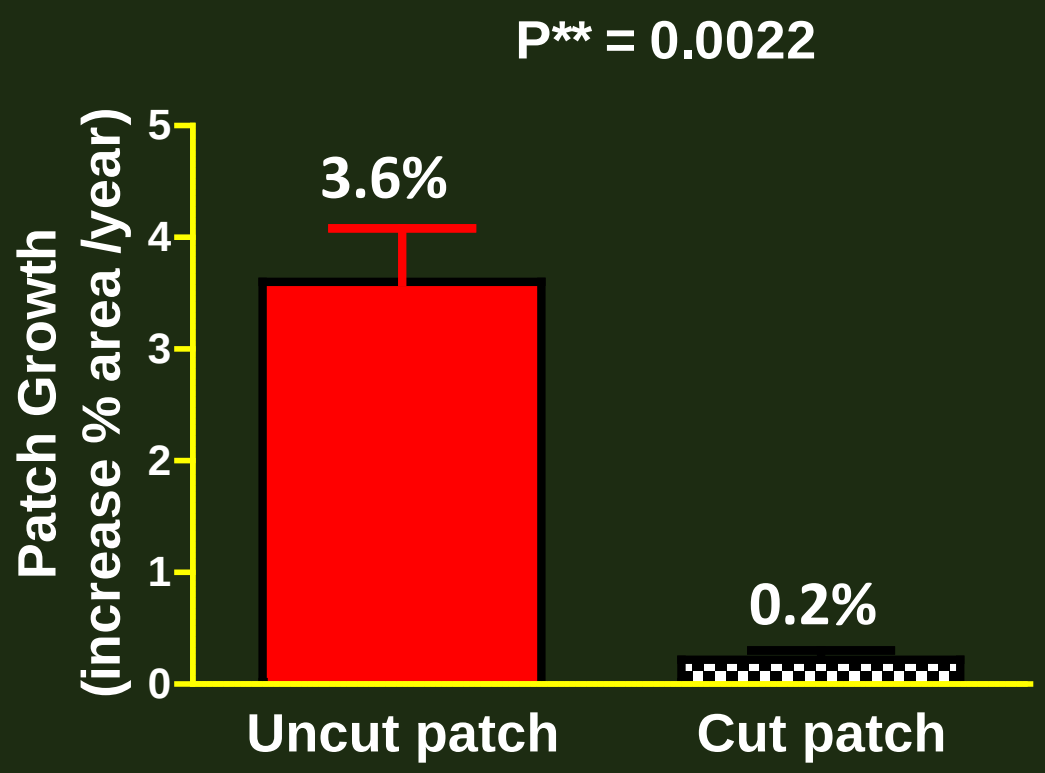


Figure 1. Cutting Phrag Stem did not increase Patch

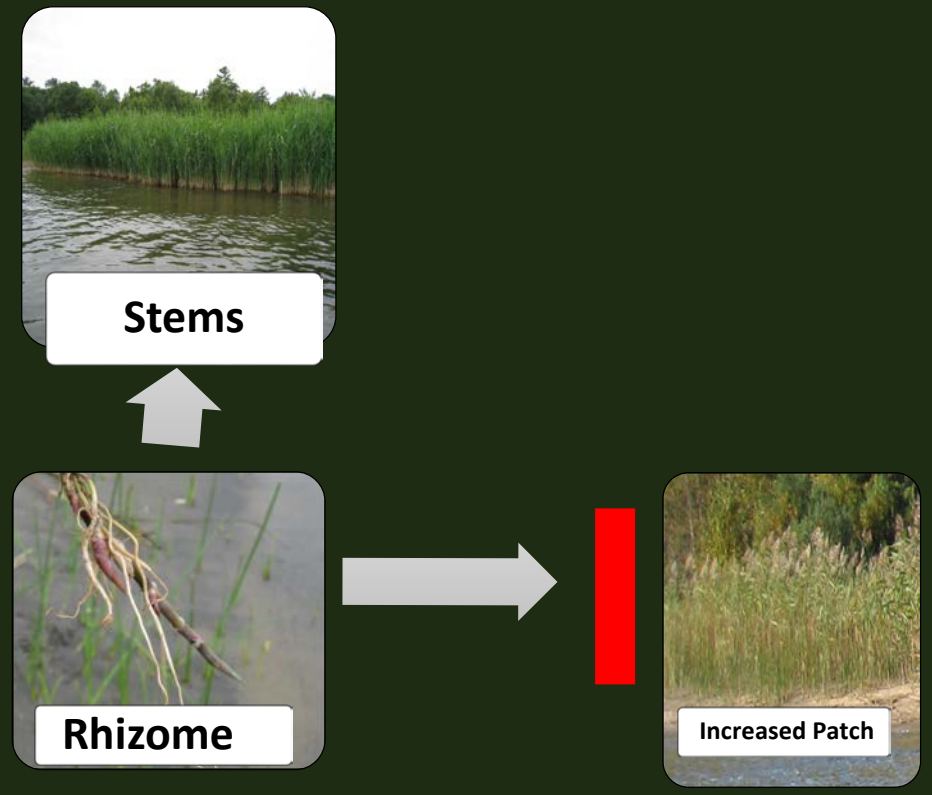
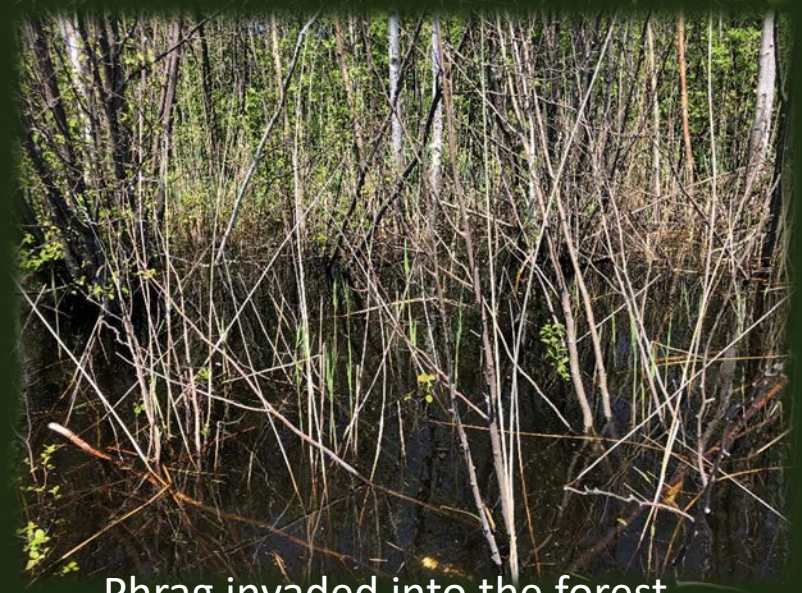


Figure 2. Stem cutting prevented patch growth

Impact of High Water Level: Habitat Gained

Phrag Patch Floated

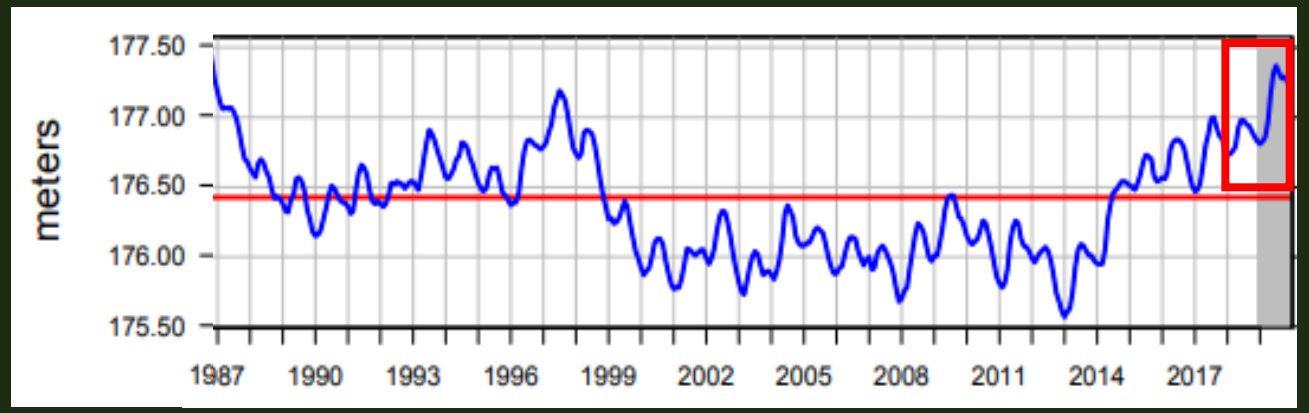


Phrag invaded into the forest

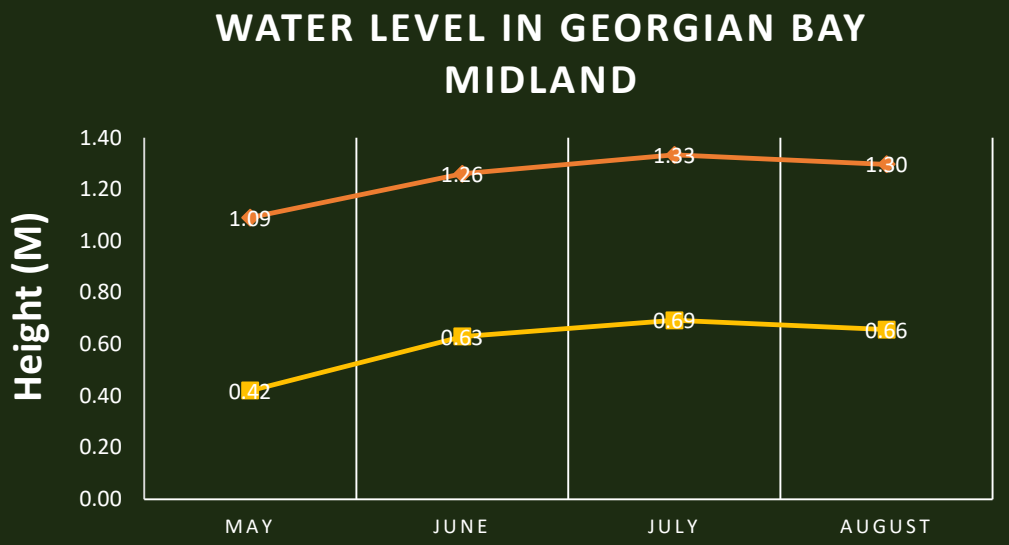
Phrag gained Habitat

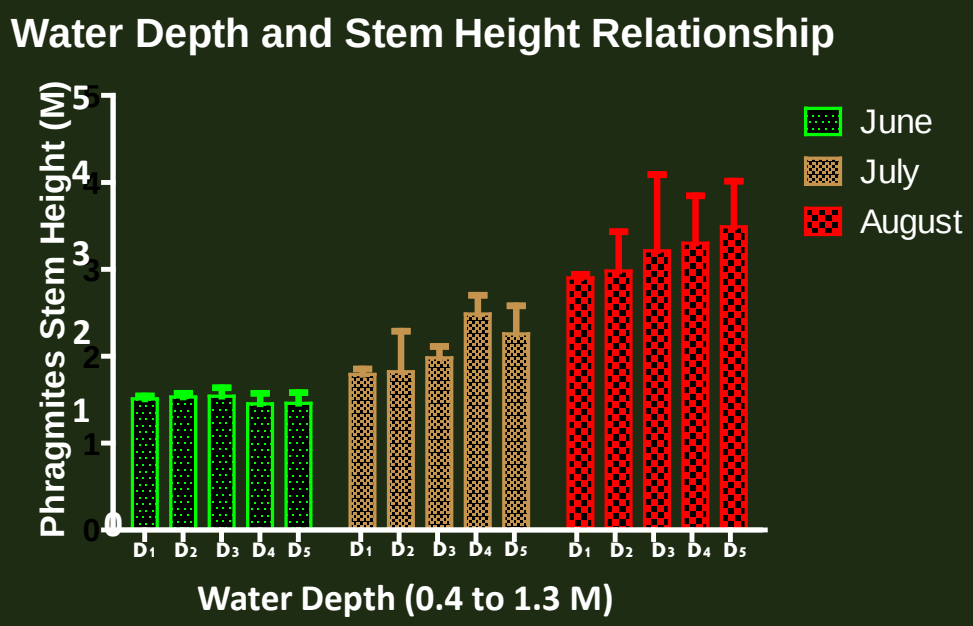
Impact of High Water Level: Better Growth

Impact of High Water Level



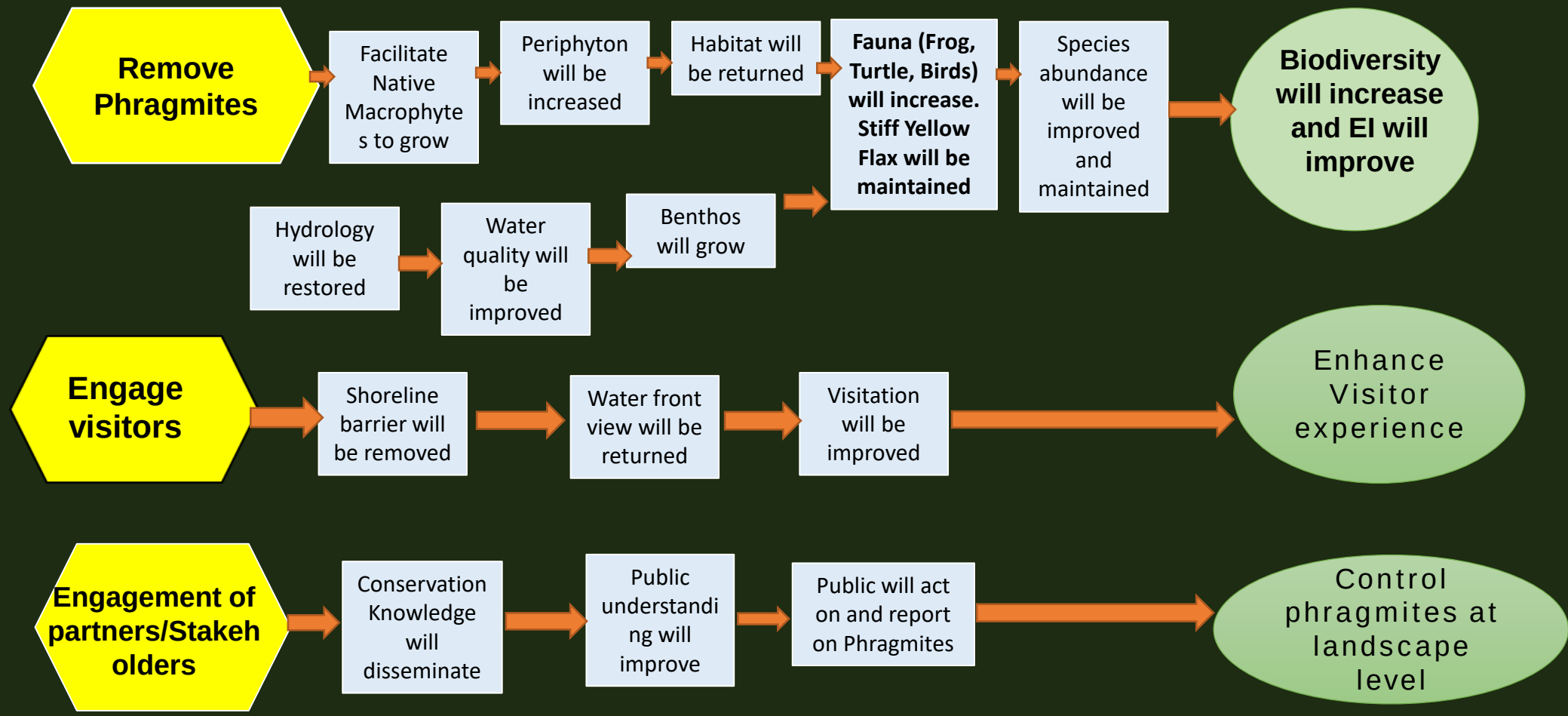
The monthly average water levels of Lake Michigan-Huron
(Source: USACE)





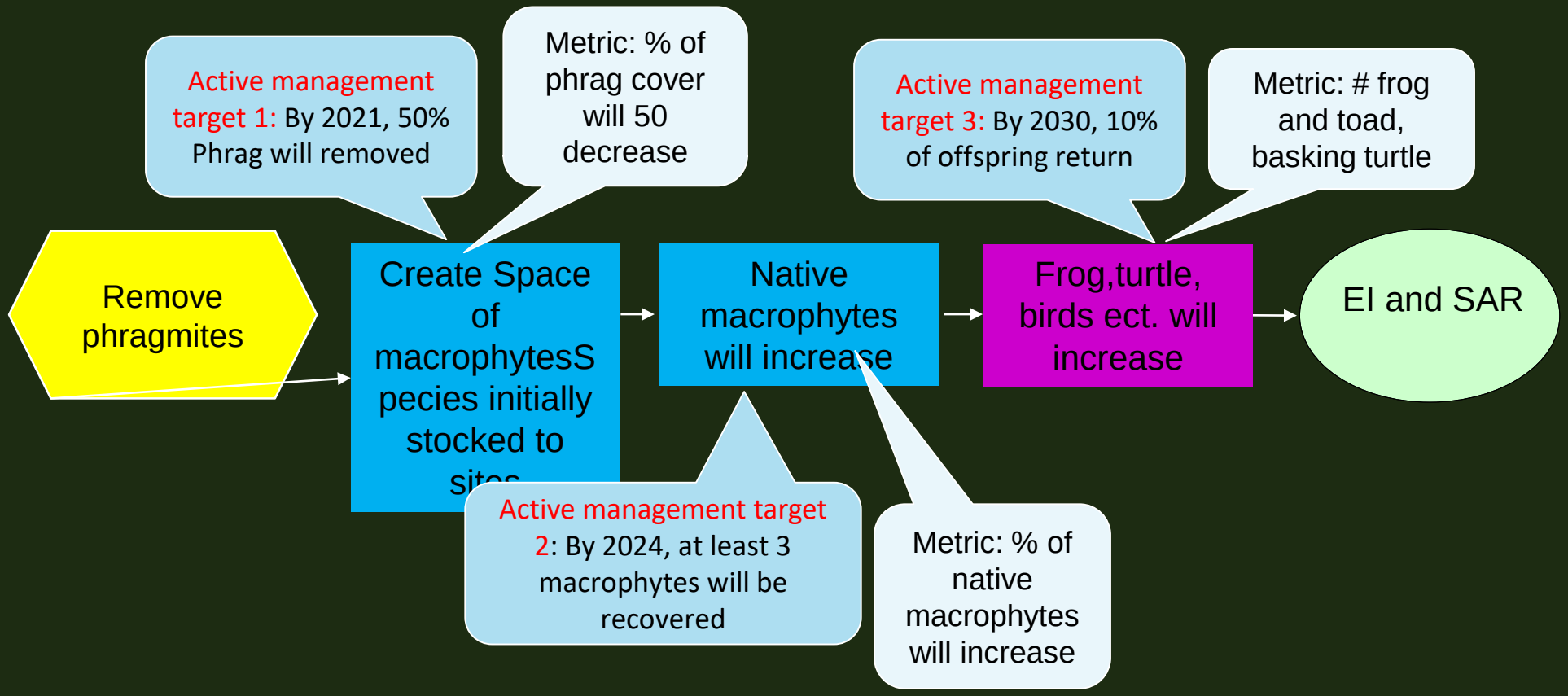
Impede the Reed Project:

Results Chains Action



Impede the Reed Project:

Active Management Targets



Working with the Greater Park Ecosystem

Strategy to achieve together