

St. Marys River Coastal Wetland Resilience Plan

Advancing Collaborative Stewardship & Adaptive Management

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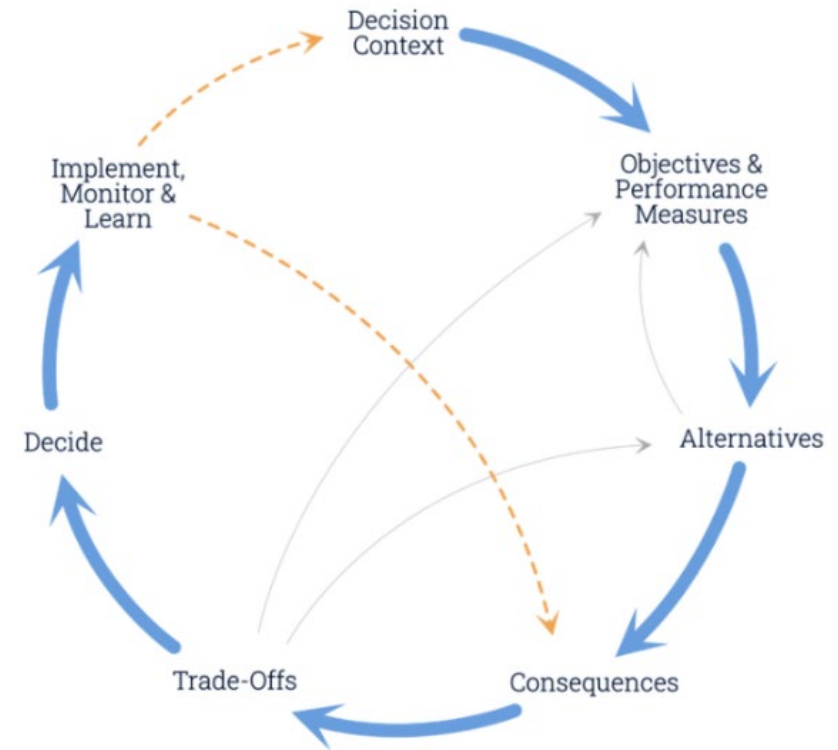
Project Context

- The St. Marys River (SMR) is a culturally and ecologically significant waterway supporting diverse coastal wetlands and manoomin (wild rice).
- Wetlands have been degraded by development, hydrologic alterations, invasive species, and climate-driven water level fluctuations.
- Tribal Nations, agencies, and partners seek coordinated stewardship to restore wetland health and cultural relationships.



Project Purpose and Phases

- **Overall Aim:** Build a shared, decision-focused coastal wetland resilience plan that integrates ecological, cultural, and social interests.
- **Phase 1:** Map and quantify resilience interests across the SMR.
- **Phase 2:** Develop adaptive management frameworks for restoration in Munuscong Bay.



Phase 1 Objectives



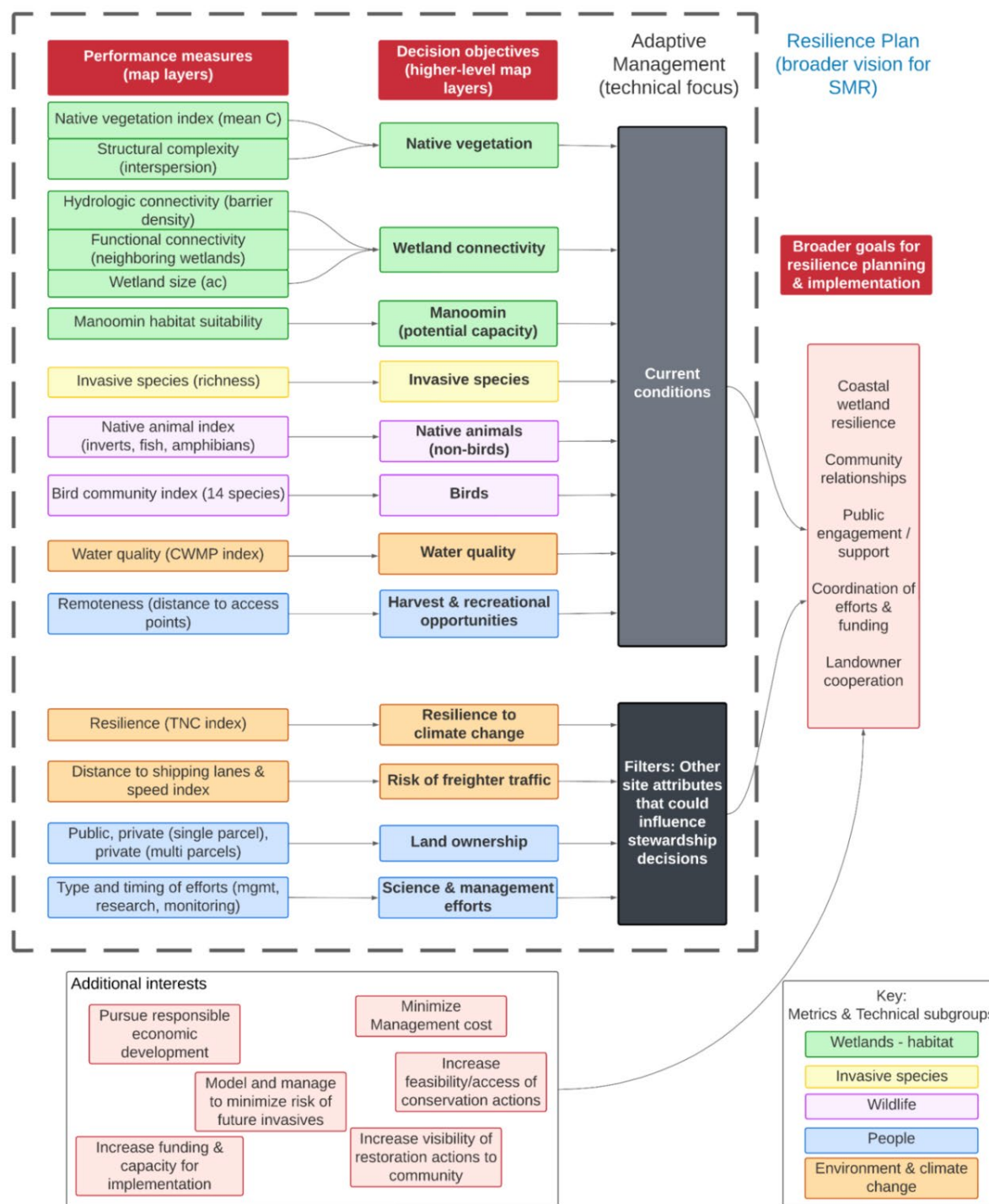
Identify and refine ecological, cultural, and social objectives for coastal wetland resilience.

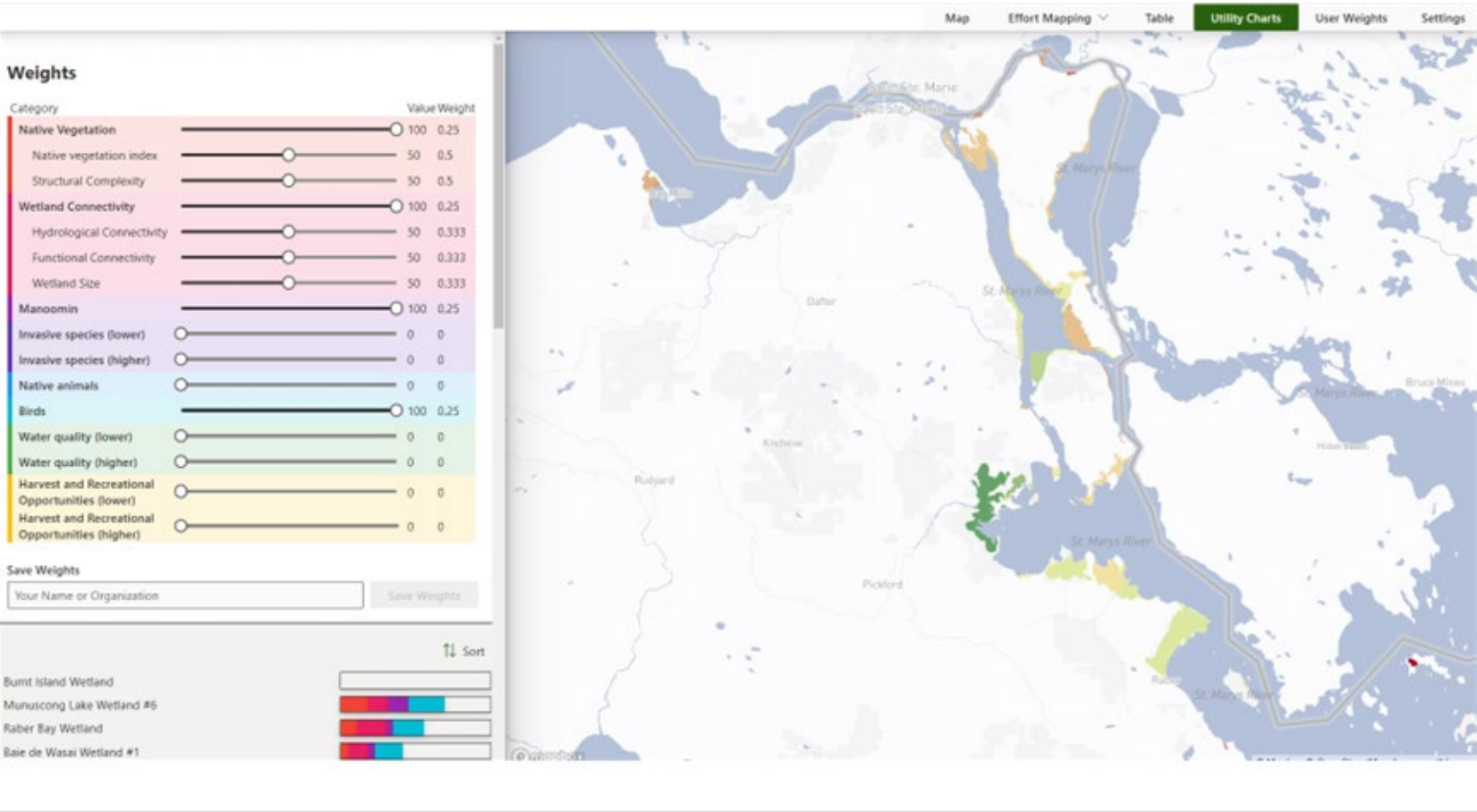


Develop performance measures (PMs) to track wetland conditions (e.g., vegetation quality, manoomin suitability, invasive species, water quality).



Create a prototype coastal wetland mapping tool to reveal priority restoration sites and overlapping interests.





What We Learned in Phase 1

- Eight core objectives captured key interests: native vegetation, connectivity, manoomin, native fauna, birds, water quality, harvest/recreation, and reducing invasive species.
- Mapping results highlighted Munuscong Bay as a region of consistently high priority across interests.
- Partners identified shared opportunities for stewardship, monitoring, and coordinated research.

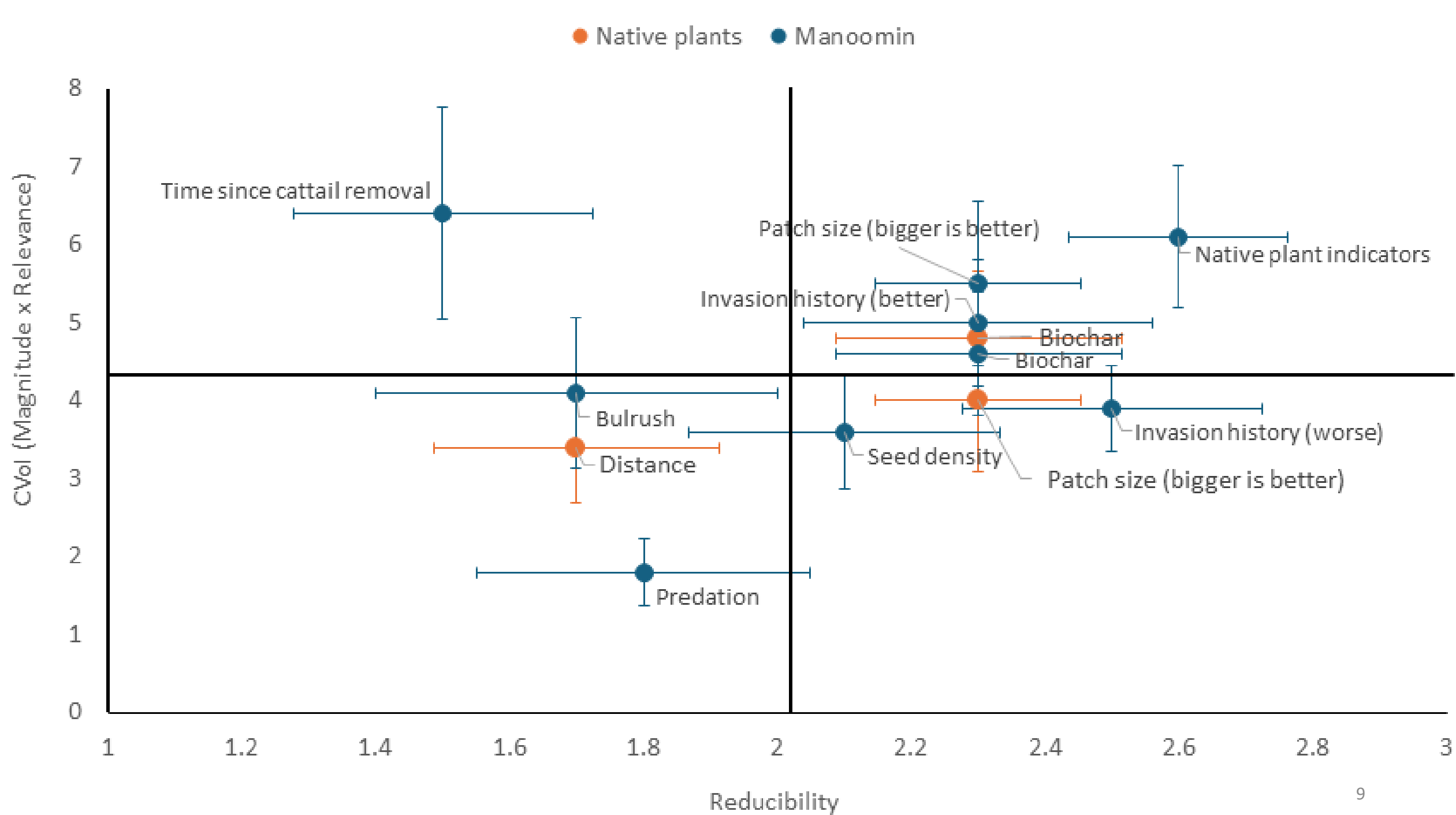
Phase 2 Focus

- Based on Phase 1 findings, Phase 2 focused on Munuscong Bay—a high-priority area with active restoration efforts.
- Goal: Develop adaptive management (AM) frameworks to improve restoration outcomes for:
 - Manoomin
 - Native vegetation (via cattail removal)
- Used conceptual models, expert judgment, and a constructed value of information (CVol) approach.

Key Uncertainties Identified (CVol)

- Partners identified 12 major uncertainties affecting restoration success, including:
 - Effects of invasion history on manoomin establishment
 - Importance of patch size for both manoomin and native vegetation
 - Influence of biochar as a soil amendment
 - Optimal timing for seeding after cattail removal
 - Seed density thresholds
- Highest-priority uncertainties had high relevance, high uncertainty, and were feasible to reduce through AM.

Objective	Hypothesis number, name, and description	Magnitude (0 to 4)	Relevance (0 to 3)	CVOI (Mag x Rel) (0 to 12)	Reducibility (0 to 3)	Rating (0 to 100)	No. of people who rated it ≥ 80	Draft priority category
Manoomin	1. Native plant indicators: manoomin does better when seeded at sites with indicator species present	2.3	2.7	6.1	2.6	83	7	High
Manoomin	2. Invasion history (worse): manoomin does better when seeded in uninvasion sites	2.1	1.9	3.9	2.5	61	3	Med-High
Manoomin	3. Invasion history (better): manoomin does better when seeded in previously invaded (and treated) sites	2.4	2.1	5.0	2.3	63	3	High
Manoomin	4a. Patch size: manoomin does better when seeded in larger patches	2.2	2.3	5.5	2.3	70	5	High
Native plants	4b. Patch size: native veg does better when removing cattails in larger patches	2.0	2.0	4.0	2.3	69	5	Med-High
Native plants	5. Distance: native veg does better when removing cattails near uninvasion areas	2.0	1.6	3.4	1.7	42	2	Low
Manoomin	6. Predation: manoomin does better when seeded in sites with low goose use intensity	1.3	1.6	1.8	1.8	42	0	Low
Manoomin	7. Bulrush: manoomin does better when seeded in sites with bulrush	2.2	1.7	4.1	1.7	55	2	Low
Manoomin	8a. Biochar: manoomin does better when seeded in sites where biochar is also added	2.6	1.8	4.6	2.3	55	2	High
Native plants	8b. Biochar: native veg does better when removing cattails and also adding biochar	2.4	2.0	4.8	2.3	58	3	High
Manoomin	9. Time since removal: manoomin does better when seeding 2-3 years after cattail removal	2.9	2.2	6.4	1.5	55	3	Med-High
Manoomin	10. Seed density: manoomin does better when seeding at higher densities	1.8	2.0	3.6	2.1	60	3	Med



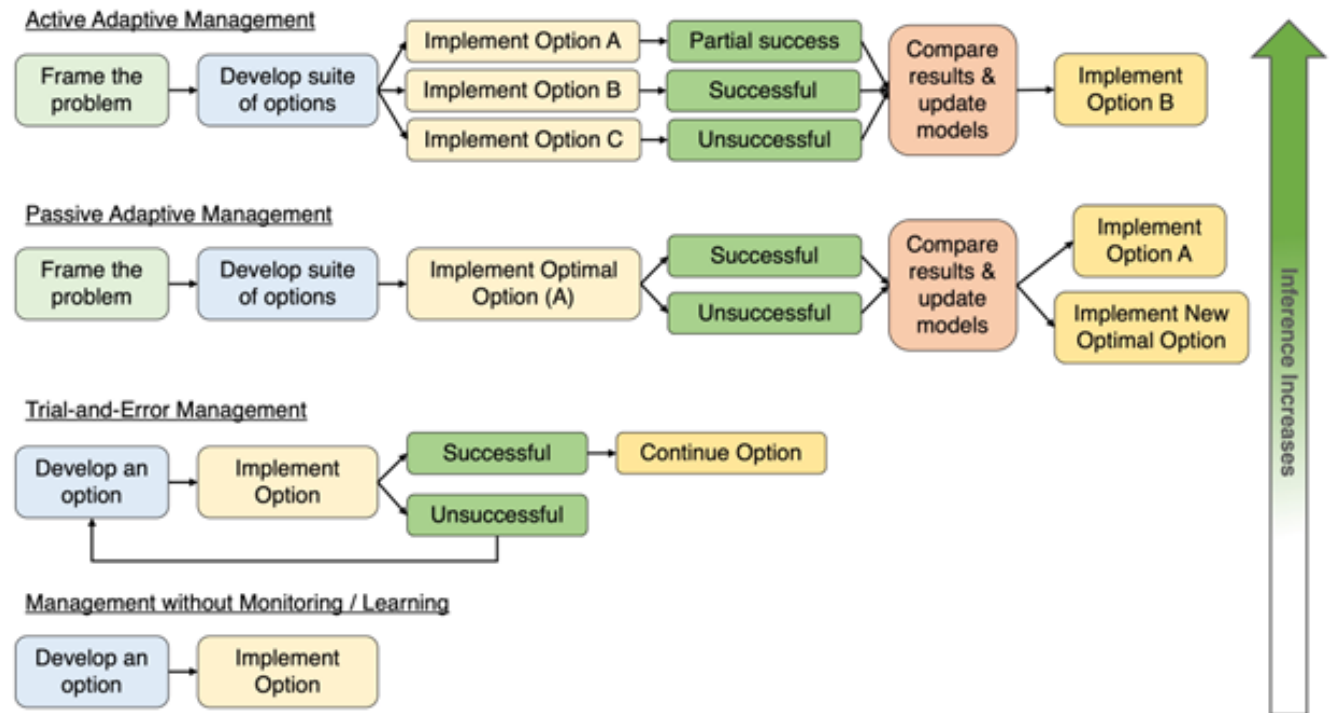
Adaptive Management Framework: Manoomin (Passive AM)

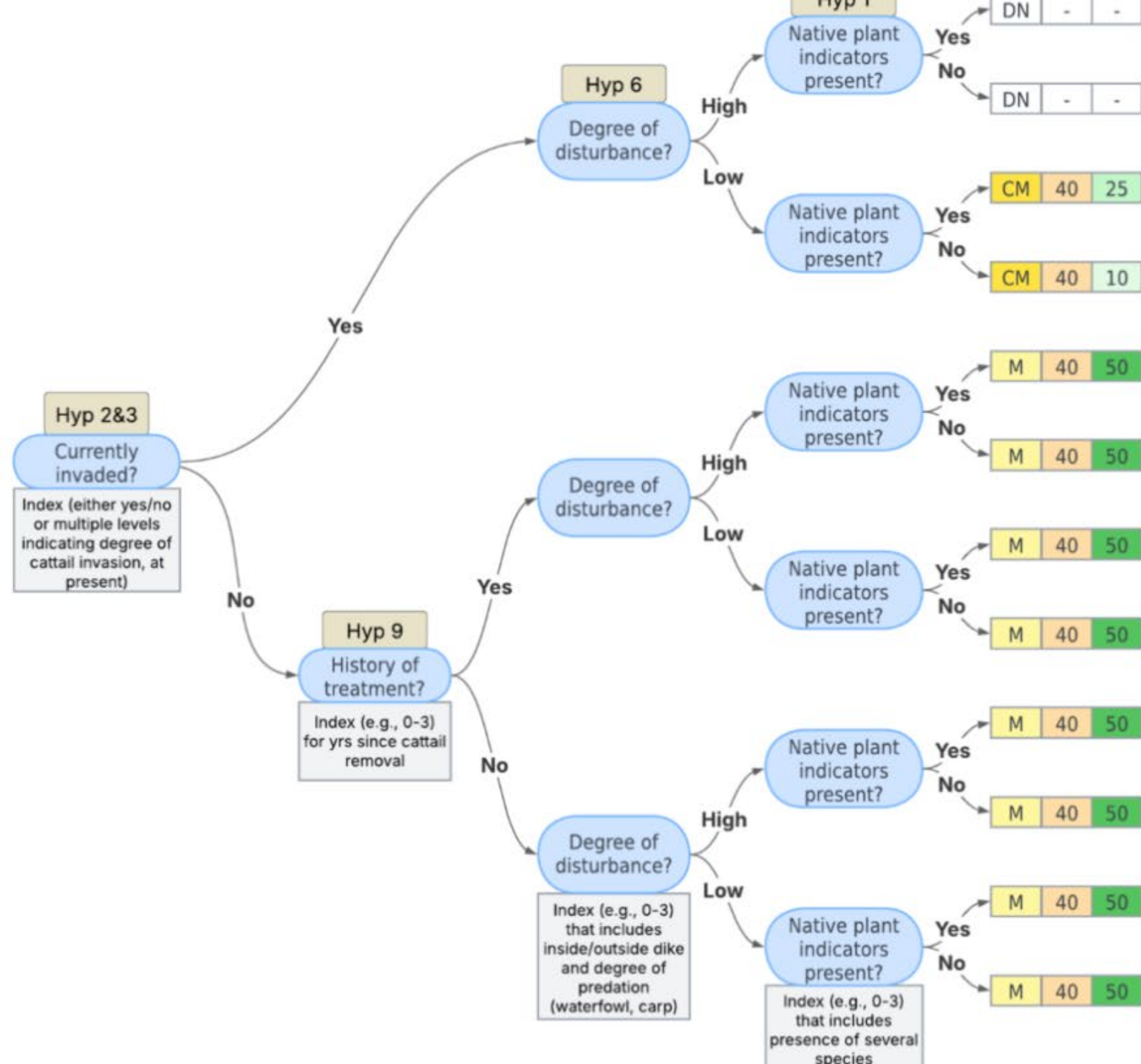
Goal: Improve manoomin biomass and self-sustaining acres across Munuscong Bay.

Actions:

- Seed manoomin (varied densities)
- Remove cattails + seed manoomin
- Implement treatments at varying patch sizes
- Use “do nothing” areas as reference sites

Uncertainties tested: patch size, seed density, invasion history, time since removal, indicators, disturbance.





Action key	Hyp 4		Hyp 10
	Action	Patch size	Seeding density
	DN = Do nothing	Sm (e.g., 4x4m)	Low (e.g., 10lbs/ac)
	M = Plant manoomin	↓	↓
	CM = Remove cattails & plant manoomin	Lg (e.g., 100x100m)	High (e.g., 50lbs/ac)
Example action:	M	40m ²	50lbs/ac

Adaptive
Management
Framework:
Native
Vegetation
(Active AM)

Goal: Improve density/diversity of native vegetation and reduce cattail dominance.

Actions:

- Cattail removal (varied patch sizes)
- Biochar additions
- Bulrush planting (optional)
- Control/reference areas

Focus uncertainties: patch size and biochar effectiveness.

Approach: Structured experimentation to learn quickly and reduce uncertainty.

Pathways for Implementation

- Develop quantitative models linking site conditions, actions, and outcomes.
- Standardize monitoring for key variables (vegetation indices, disturbance, time since removal, water quality).
- Establish a central data repository to share results across partners.
- Coordinate annual and tactical meetings; engage community members in seeding, monitoring, and stewardship.
- Pursue multi-source funding (BIA, GLRI, NFWF, NRCS, state programs, private foundations).



Looking Ahead

This plan strengthens collaboration across Tribes, agencies, NGOs, universities, and planning groups.

The adaptive frameworks will inform long-term, coordinated restoration of manoomin and native plants.

Implementation can expand beyond Munuscong Bay to other SMR and Great Lakes wetlands.

Continued engagement with Anishinaabe communities and knowledge systems will deepen stewardship and cultural revitalization.



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