



Improving Community Health and Wellbeing through Ecological Restoration

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Great Lakes RESTORATION








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Evaluating Great Lakes Area of Concern Restoration


What have we achieved and learned after more than 30 years of Remedial Action Plans to restore Great Lakes Areas of Concern?

In 1985, the eight Great Lakes states, Ontario, and the U.S. and Canadian federal governments committed to developing and implementing comprehensive remedial action plans (RAPs) to restore impaired beneficial uses in Great Lakes Areas of Concern (AOCs). In 1987, this commitment was codified in a Protocol to the Canada-U.S. Great Lakes Water Quality Agreement.

In 2017, a symposium titled "Restoring Great Lakes Areas of Concern" was convened at IAGLR's Conference on Great Lakes Research in Detroit. Twenty-seven papers and five posters were sponsored by the Aquatic Ecosystem Health & Management Society, the Great Lakes Commission, and the Detroit River International Wildlife Refuge.

Case Studies




1. [River Raisin Area of Concern](#)
2. [Detroit River Area of Concern](#)
3. [Severn Sound Area of Concern](#)
4. [Collingwood Harbour Area of Concern](#)
5. [Hamilton Harbour Area of Concern](#)
6. [Muskegon Lake Area of Concern](#)
7. [Cuyahoga River Area of Concern](#)
8. [Buffalo River Area of Concern](#)


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Economic Development & Waterfront Community Revitalization

The unique freshwater resources of the Great Lakes fueled the region's early development, with waterfront areas historically serving as centers of economic activity. However, the industrialization and development of the basin over the past 200 years has had an impact on the ecological health of the lakes. Currently, many coastal communities are working to restore and reclaim waterfronts and leverage fresh water assets to promote economic growth, support water-dependent industry, and sustain a high quality of life in the Great Lakes region. The Great Lakes Restoration Initiative is accelerating this process, particularly in the region's worst toxic hotspots. With its member states and provinces, the Great Lakes Commission is working to support the revitalization of waterfront communities and support water-dependent economy through research, policy development, information exchange and technology transfer, and stakeholder collaboration.

The R³ Paradigm: “Its not just sediment remediation”



Remediation to Restoration to Revitalization (R2R2R)

To help transform remediation and restoration projects into sustainable revitalization of the surrounding community by maximizing the positive societal and environmental outcomes

Restoration & Revitalization



Managing Contamination
Partnering companies purchased a 15-acre parcel in Ashabula Township for a Sediment Consolidation Facility, where contaminated sediments from the riverbed would be stored. This facility was completed in 2006.

State and federal agencies implemented dredging of the Ashabula River between 2006 and 2011, removing over 700,000 cubic yards of contaminated sediment from the river and reopening it for commercial shipping and recreational boating. The contaminated material was pumped into a specifically designed landfill and isolated from the environment.



Restoring the River
Restoration of the Ashabula River began in 2008. About 2,500 feet of fish shelves and a total of 10.5 acres of river, wetland, and upland habitat were created, providing a home for mammals, birds, and fish.

Through the efforts of many, the Hush-tah-hush-lah River is returning to its former glory as a "river of many fish."



Using funds from the US EPA, USACE, industry and the State of Ohio, approximately 750,000 cubic yards of contaminated sediment were removed from the river between 2006 and 2011, pumped uphill through a 2.5 mile pipeline to a rippled sediment containment facility and into gravelly ridges, bays that sequester contaminated sediment from the river water.

The Ashabula River Partnership: A model approach to environmental cleanup



For more information, visit www.ashabulapartnership.org

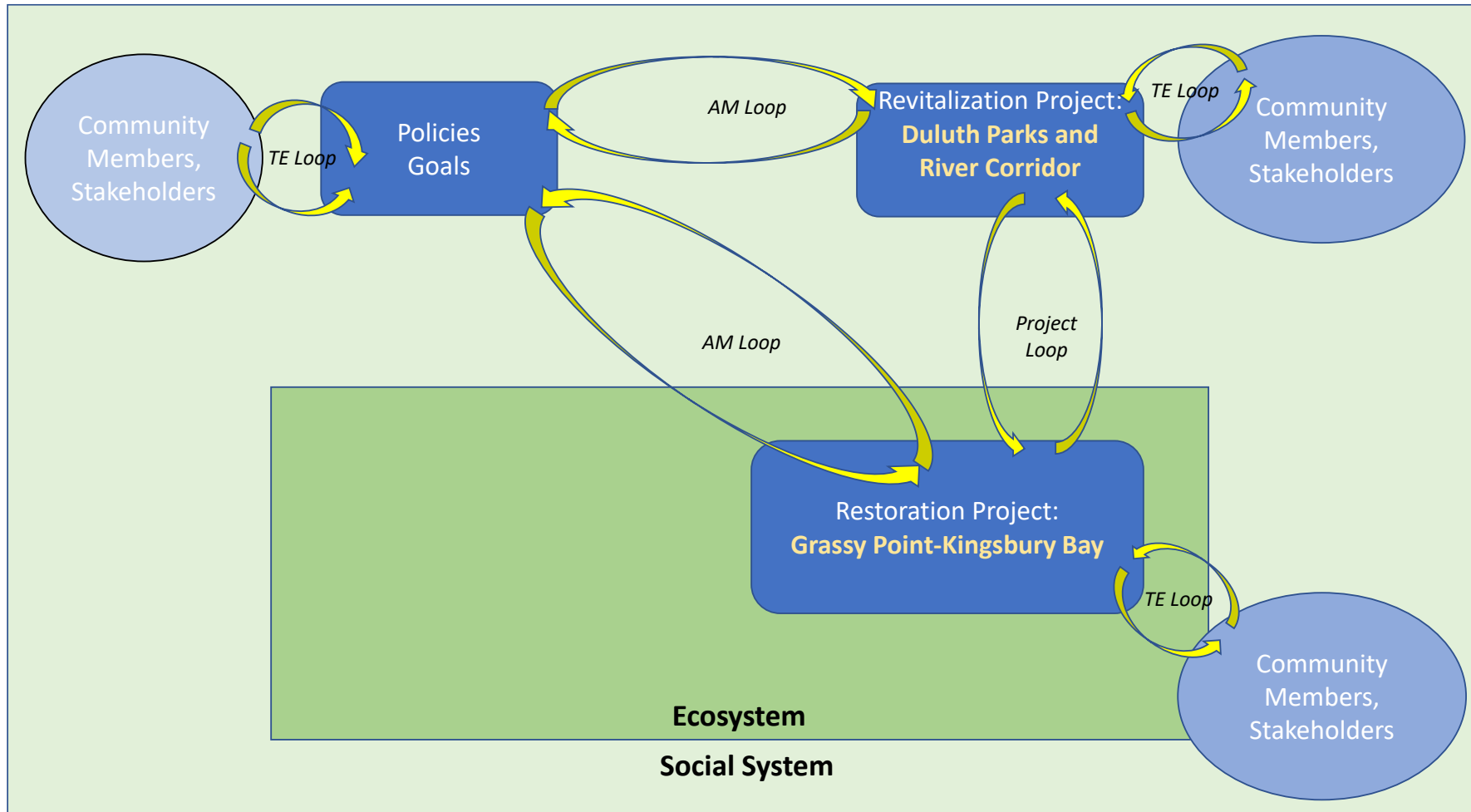


R2R2R as a Social-Ecological System*

- Ecosystem-based
- Ecosystem services ~ environmental quality, ecological integrity
- Beneficiaries
- Stakeholder engagement, data co-production
- Feedback loops
 - Project loops
 - Adaptive Management (AM) loops
 - Translational Ecology (TE) loops

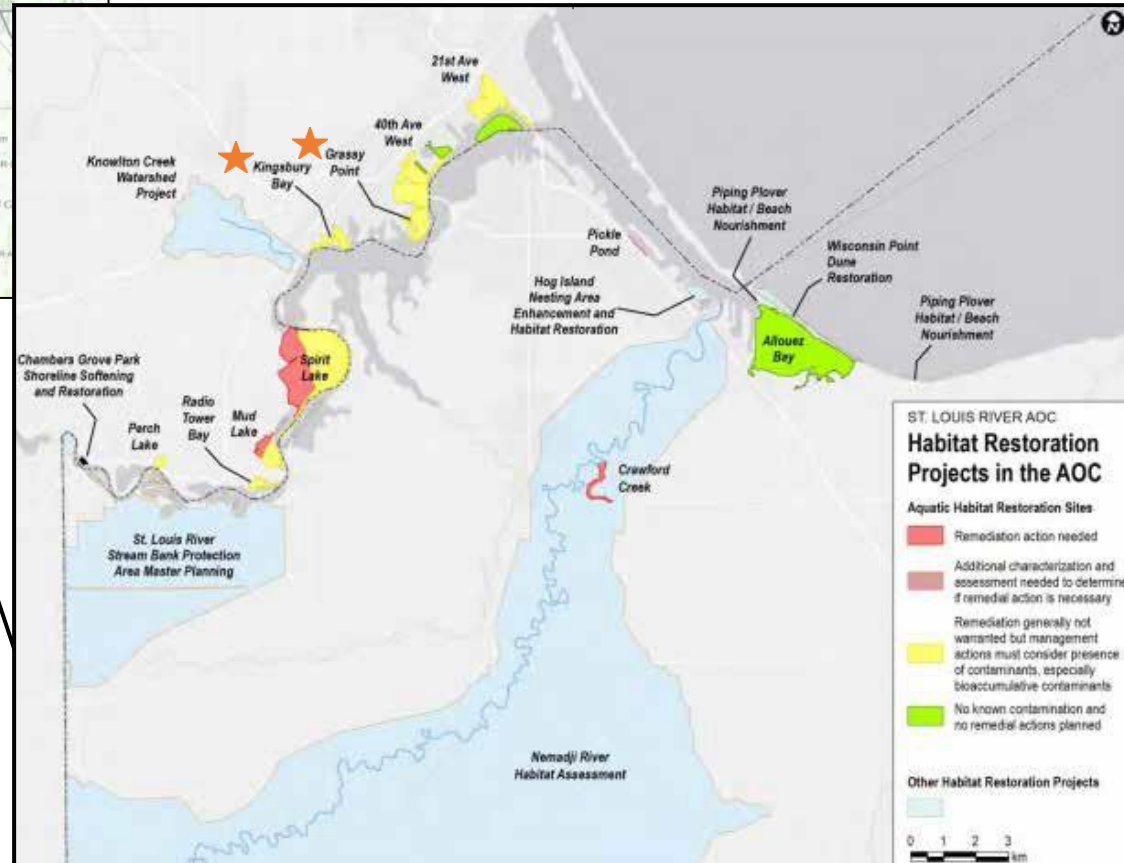
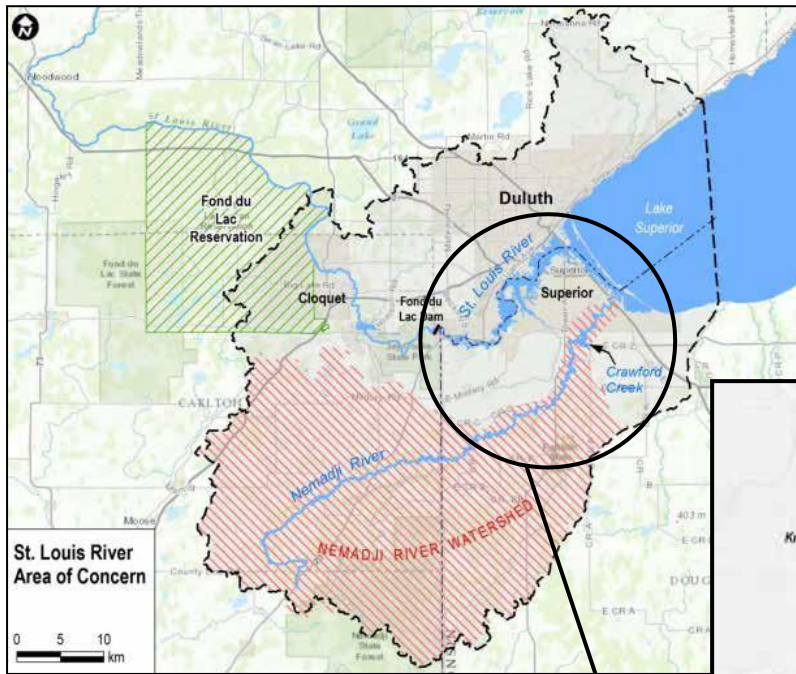


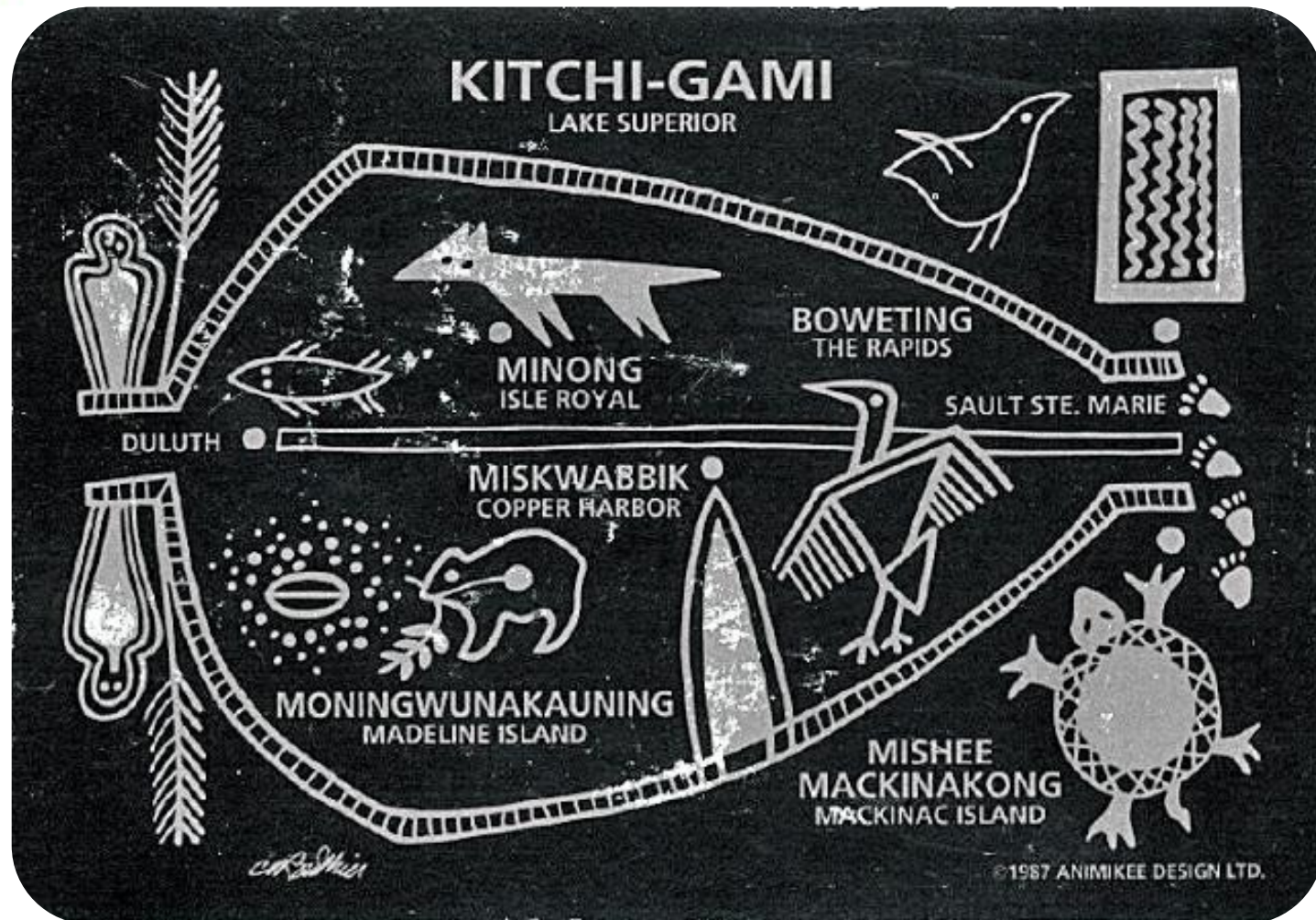
R2R2R in Practice



St. Louis River Area of Concern

- Duluth and Cloquet, MN
- Superior, WI
- Fond du Lac Reservation







Kaups, M. 1978

MINNESOTA POINT was the home base of many of Duluth's fishermen. This view (ca. 1870), looking northwest along the shore of the point, shows fishing boats and shacks and, if one looks carefully, at least one net-drying reel next to one of the shacks.

Bringing A Community Back to the River

- By what means would the Kingsbury Bay-Grassy Point Restoration affect community health and well-being?
- How big are those effects?
- How likely are those effects?



Restoration

Ecosystem Services



Amenities



Wellbeing

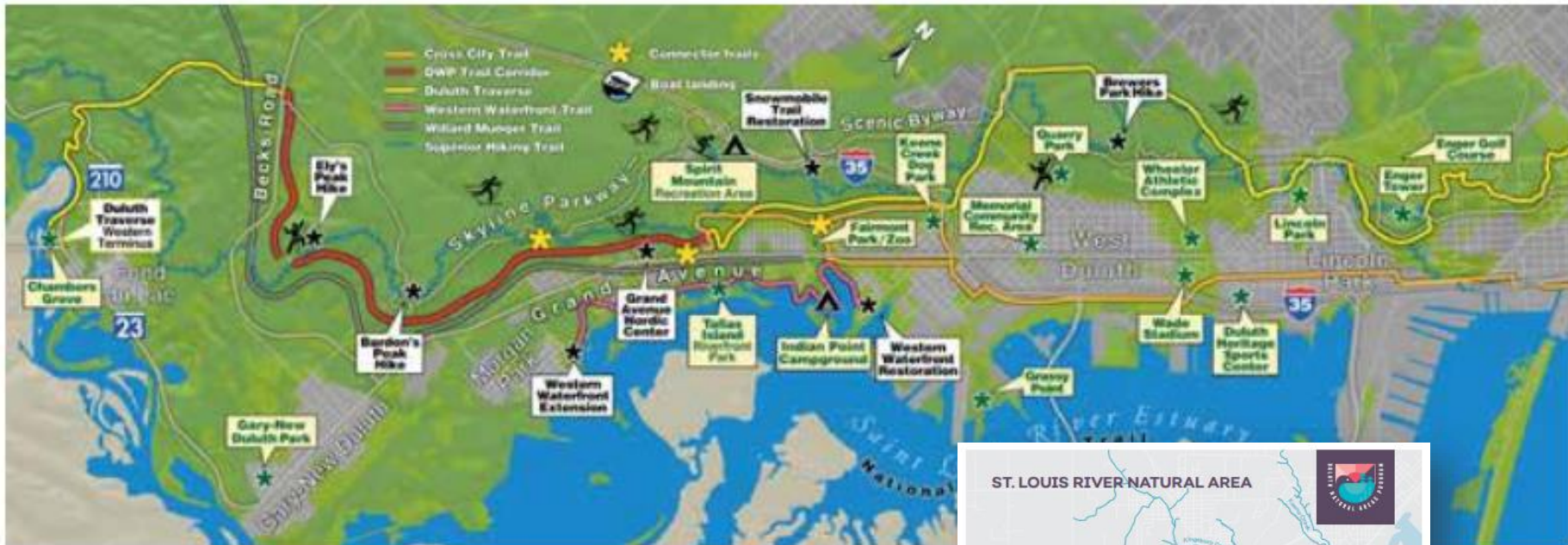


Figure 1.3 St. Louis River Corridor Ongoing Projects

Waabizheshikana (waa-bah-zhay-shay- kuh-nuh) in Anishinaabe or "The Marten Trail", in honor of the Marten Clan that settled in this part of the St. Louis River.



Figure 1.6 Existing Trail near Indian Point Campground

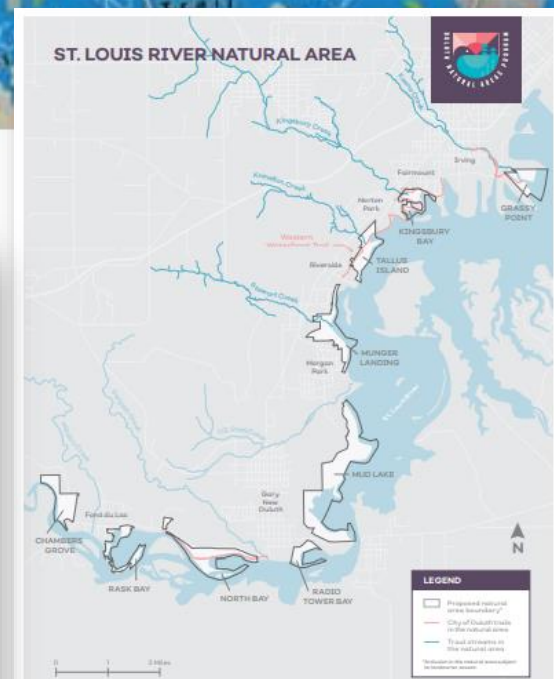


Figure 1.4 Map of the St. Louis River Natural Area

Health Impact Assessment (HIA)

HIA is a process that uses
scientific data, health expertise and public input
to factor public health considerations into the
decision-making process

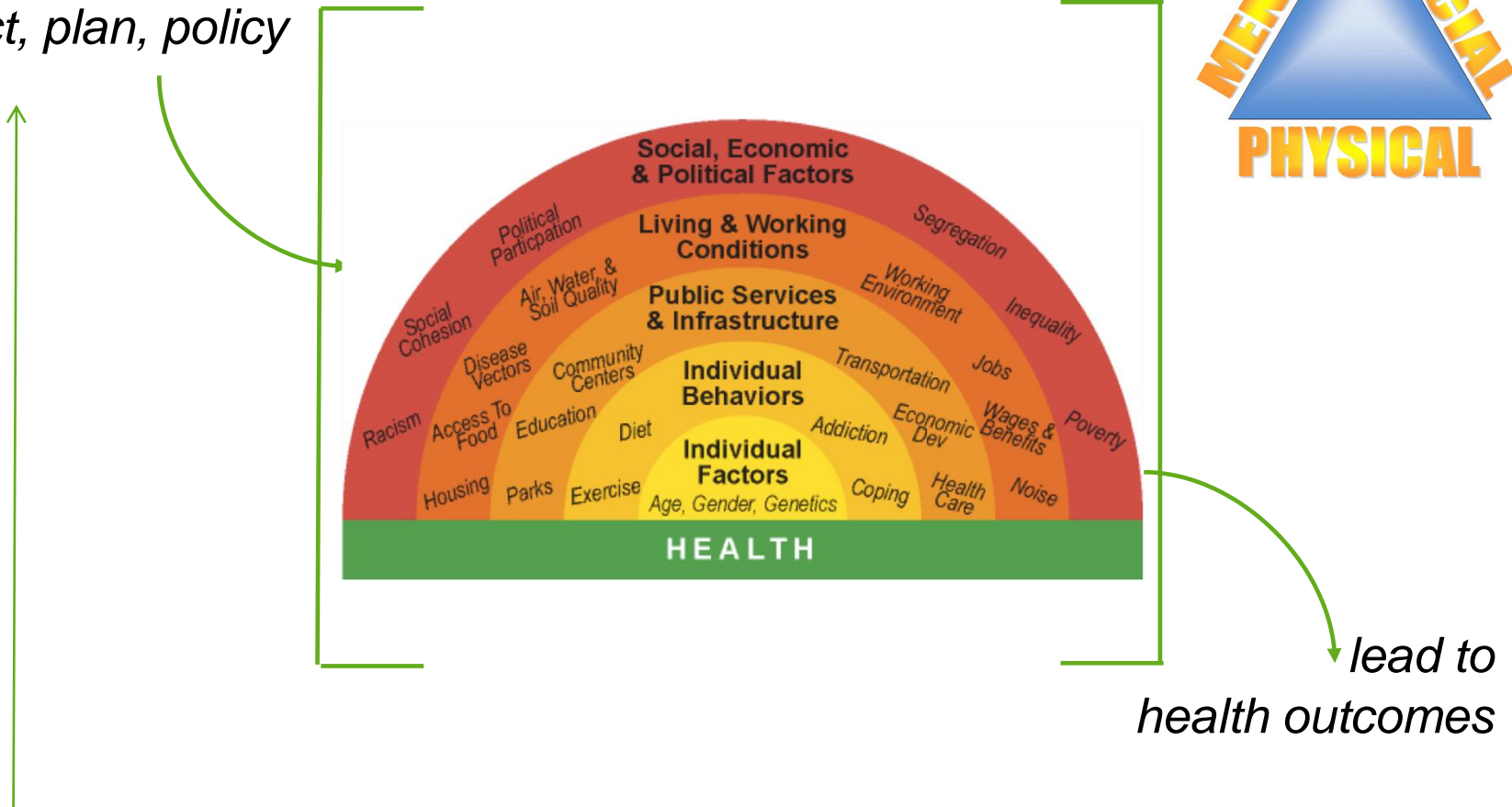
HIAs give decision-makers the information they need to consider health in pending programs, policies, plans, and projects:

- *In advance* of a decision
- Identifies *public health* consequences
- Provides *recommendations*
- Health protection **and** health promotion



*How does the proposed
project, plan, policy*

affect



recommendations

Health determinants = factors that lead to health outcomes

Kingsbury Bay-Grassy Point Habitat Restoration Project: A Health Impact Assessment

- Health Impact Assessment at St. Louis River AOC (FY17-FY19)
 - Grassy Point-Kingsbury Bay Projects
 - 81 ha, 270K m³ sediment
- Work with AOC timeline
 - Conducted in a series of workshops
 - Start in JAN 2017; final design FEB 2018
- Needs from AOC partners
 - Project scopes/plans/options
 - Contribute throughout the process
 - Listen and respond



Grassy Point Habitat Restoration



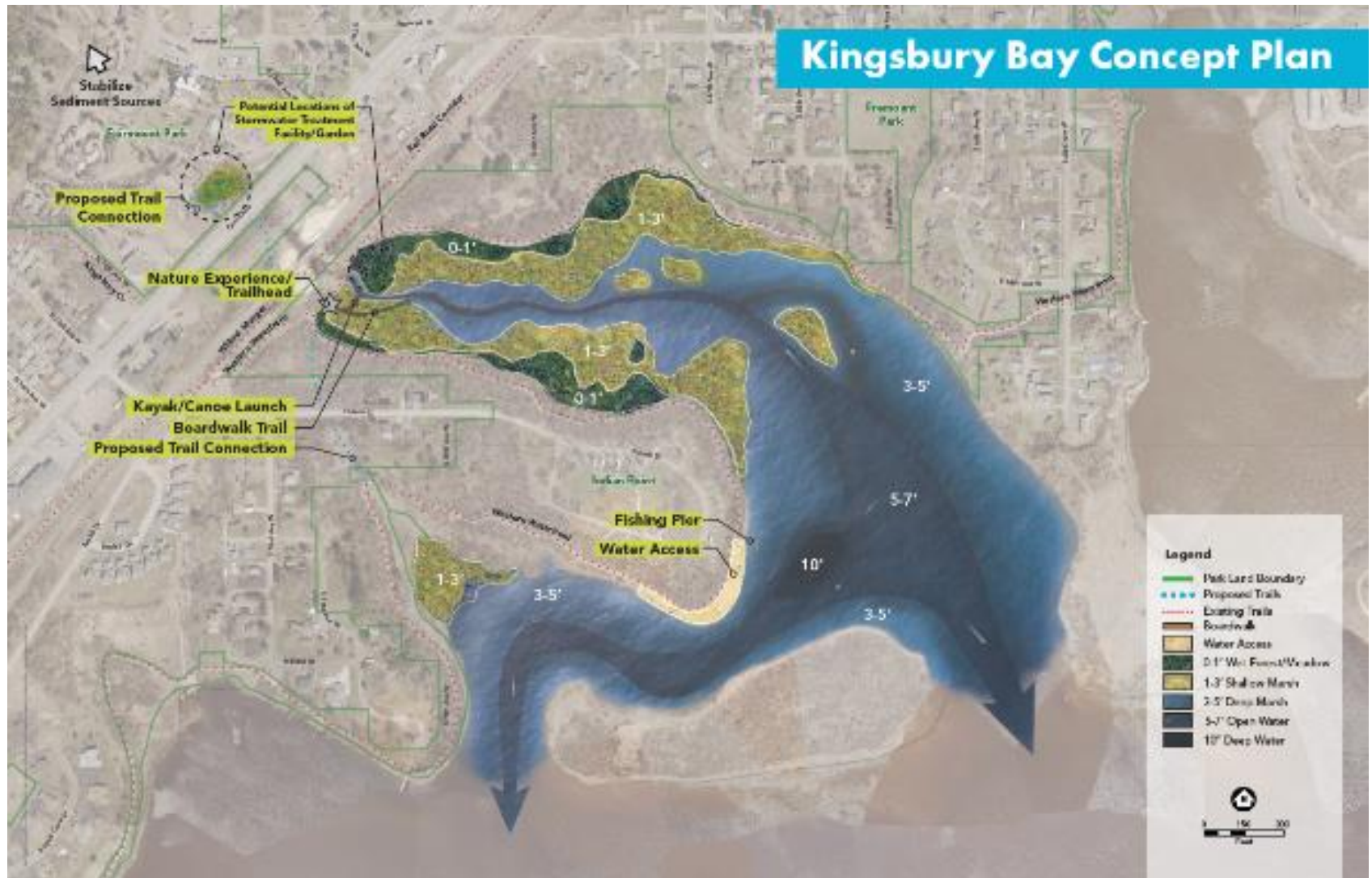
Grassy Point Construction

Footage courtesy Melissa Sjolund, MN DNR

WOOD WASTE RELOCATION Island/Sheltered Bay



Kingsbury Bay Habitat Restoration



Kingsbury Bay Sediment Removal

Footage courtesy Melissa Sjolund, MN DNR



Kingsbury Bay Restoration Progress



Community Engagement

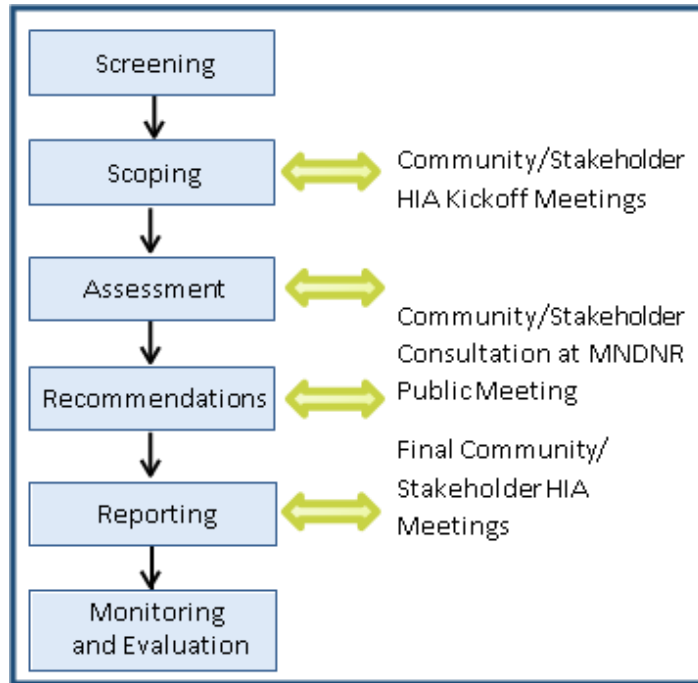
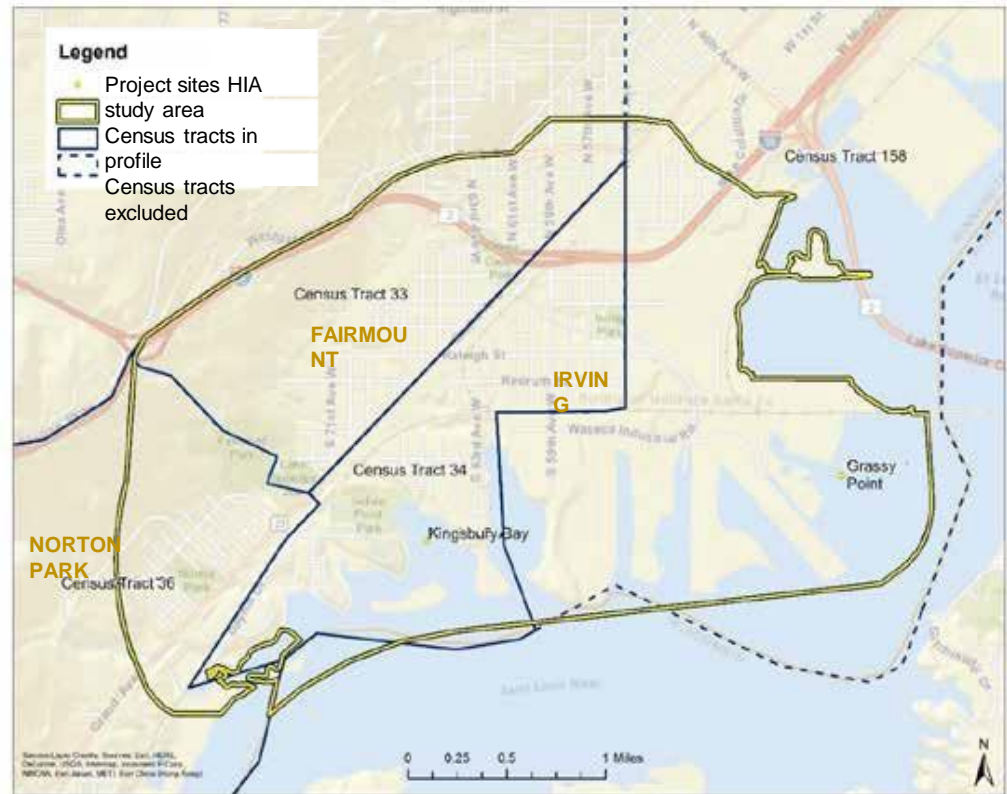


Figure 3-3. Stakeholder Engagement Plan



- Fairmount Neighborhood - high social vulnerability
- Irving Neighborhood - moderate vulnerability
- Norton Park Neighborhood - lower vulnerability

Community Engagement

HIA began with knowledge co-production

- Participatory mapping for HIA
- Engage in conversation around the restoration sites
- Used maps to capture different types of knowledge based on relationships to the river
 - Traditional
 - Professional
 - Local
 - Scientific

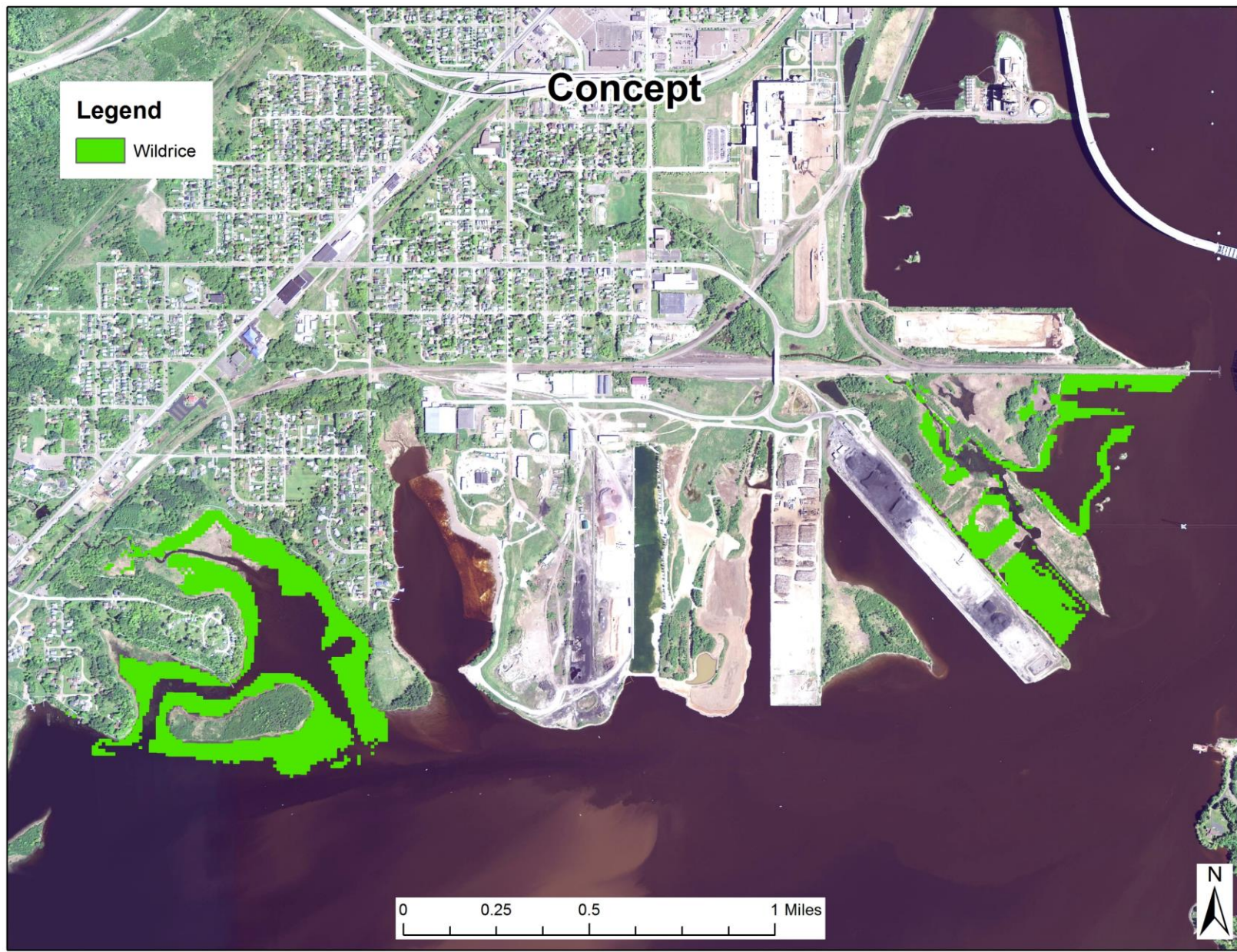


Health Pathways Assessed

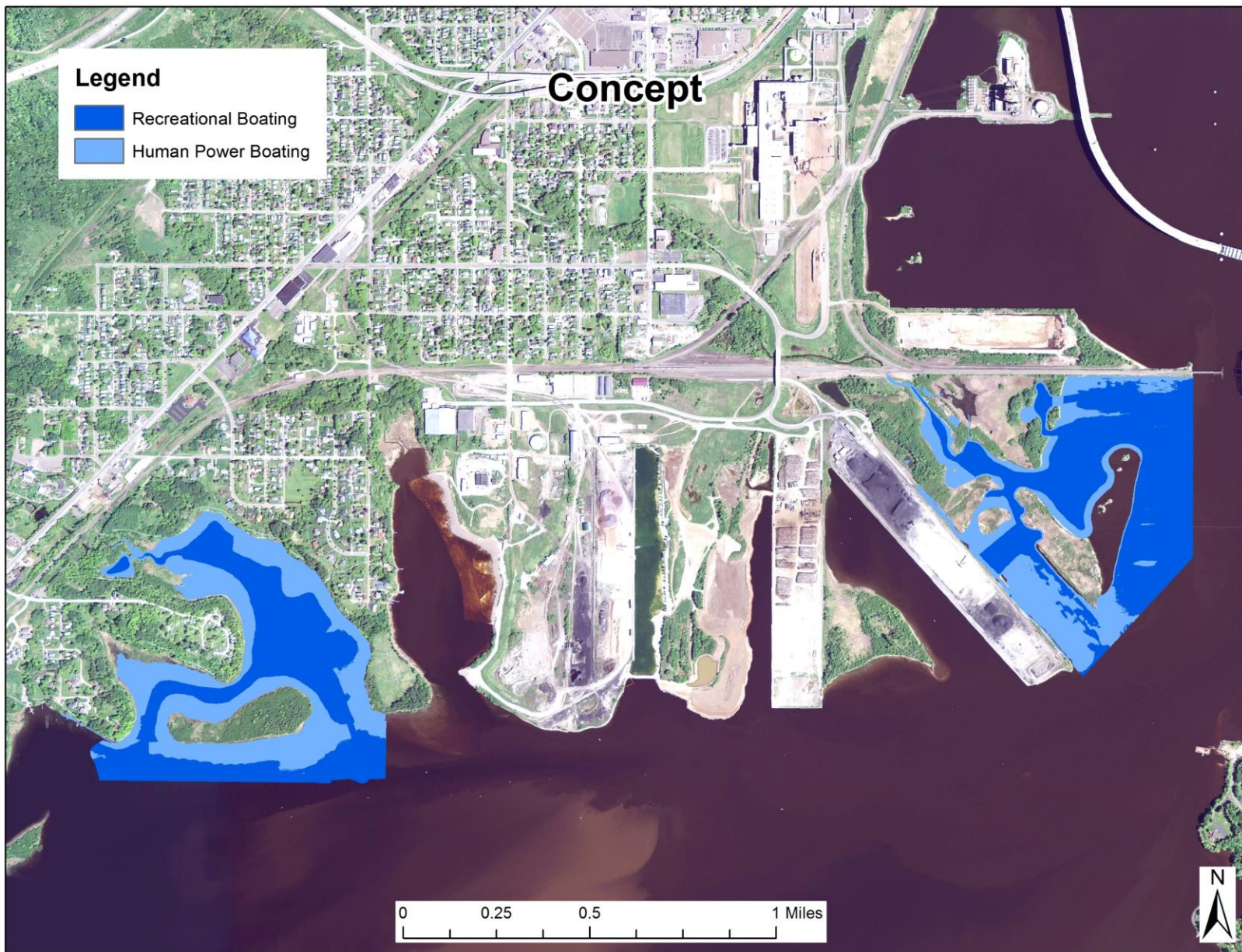


Ecosystem Service Relationships





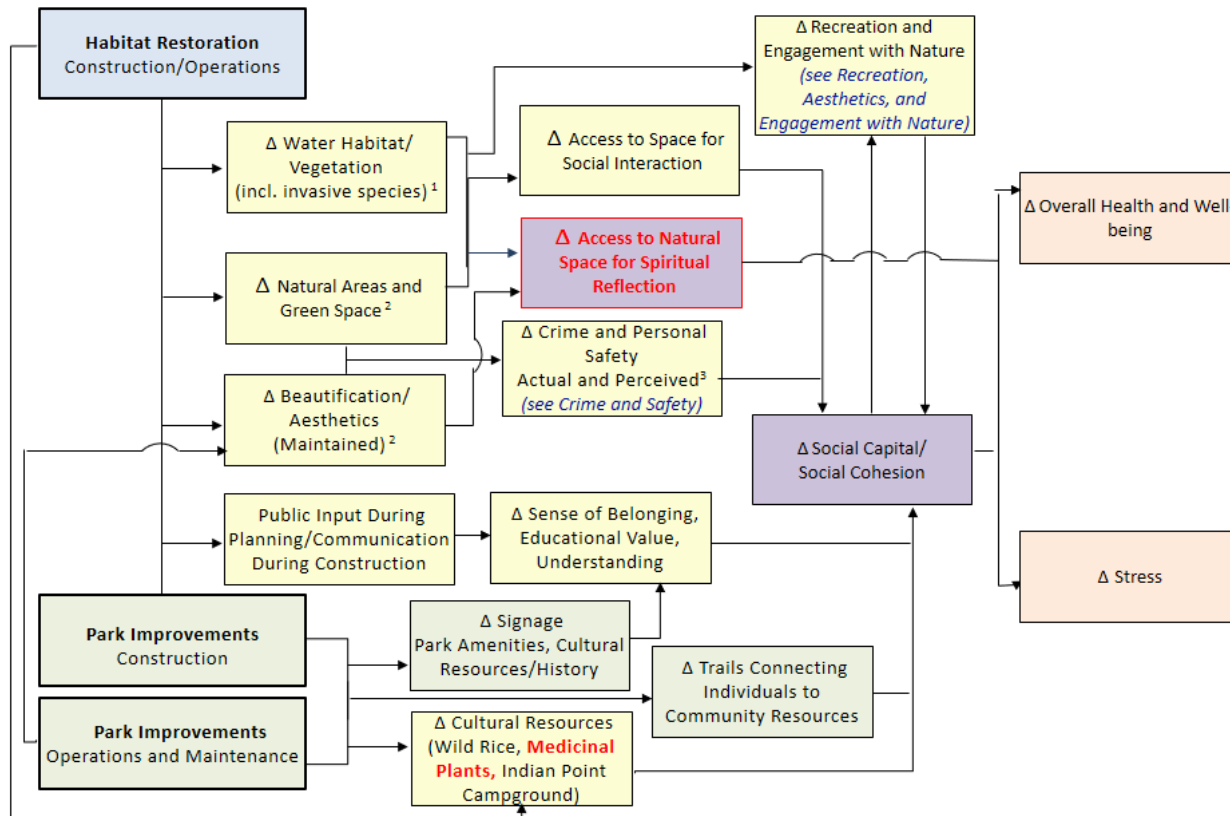
Angradi et al., 2016



Angradi et al., 2016

Social and Cultural Pathway

Social and Cultural



What's the connection to health?

Parks and green spaces provide space for socialization, which builds social capital and cohesion (the formation of social bonds and connections), spiritual reflection, and cultural resource use. The ability of the public to enjoy parks and green spaces in these capacities has been shown to improve health and well-being and reduce stress.

The opportunity for public input during the planning of these spaces can also build social capital and lead to improved community health.

¹ From Water Habitat and Quality Pathway ² From Recreation, Aesthetics, and Engagement with Nature Pathway ³ From Crime and Personal Safety Pathway

• Health impacts of stress include: poor mental health, high blood pressure, heart disease, obesity, diabetes, decreased immune response

Ecological Connection to Health

Ecosystem Component	Ecosystem Services	Beneficiaries	Associated Health Determinant or Health Outcome
Reduced sediment contamination and improved water quality	Improved habitat for resident fish	People who consume fish from the river, including subsistence and recreational anglers	Improving water and sediment quality can decrease contaminant bioaccumulation, improve nutrition, and decrease chronic disease incidence due to consumption of contaminated fish
Wetland habitat	Habitat for marsh birds, wading birds, and migratory waterfowl	Recreational birdwatchers	Outdoor recreation can provide opportunities to engage with nature; reduce stress, cardiovascular disease, obesity, and other chronic disease; and provide opportunities for social cohesion
Natural area and green space	Accessible natural areas	Park visitors, hikers on adjacent trails,	Green spaces can decrease crime; provide opportunities for physical activity, spiritual reflection, cultural fulfillment, engagement with nature, and social cohesion; reduce stress, and improve mental and overall health and well-being

Social, Cultural, and Spiritual Well-being: Short-term: (–) lack of access or impaired social, cultural, and spiritual experiences at these sites during construction; (+) community input and communication of project plans and activities important

Long-term: (+) creation of space for social interaction and enhanced safety improves social cohesion and social capital; also provides opportunity for wild rice generation (a culturally important and highly nutritious food source) and spiritual reflection

Recreation: Short-term: (–) lack of access or impaired experiences at Grassy Point, Indian Point Campground, and Western Waterfront Trail during construction
Long-term: (+) habitat restoration provides opportunity for recreation

Aesthetics/Engagement with Nature:
Long-term: (+) creation of aquatic habitat and beautified natural areas improves aesthetics and provides space for engagement with nature

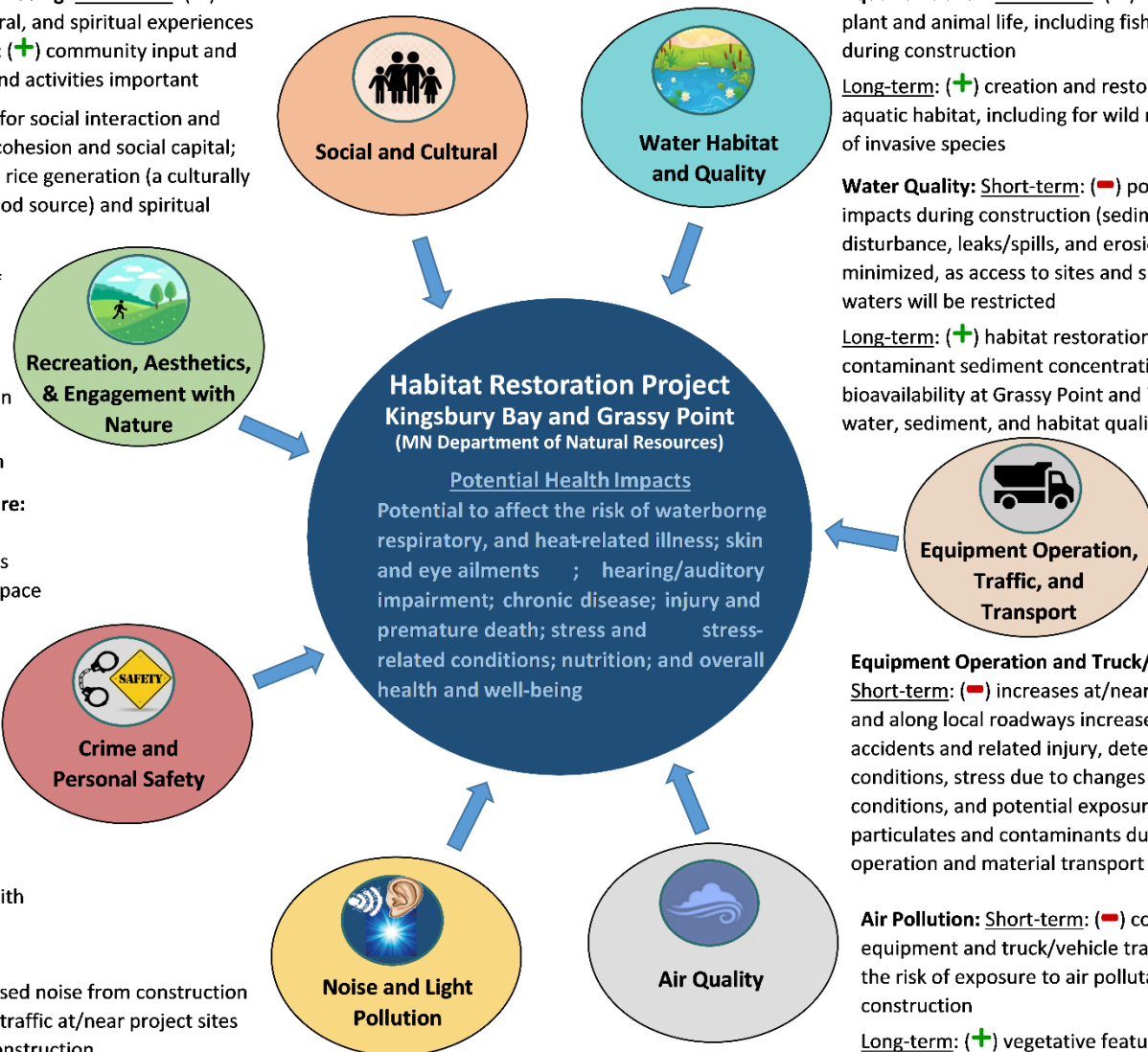
Crime: Long-term: (+) beautified natural areas deter crime

Safety: Short-term: (–) increased truck and vehicle traffic impacts pedestrian and bicycle safety

Long-term: (+) improvements in personal safety expected at sites with beautification and deterred crime

Noise: Short-term: (–) increased noise from construction equipment and truck/vehicle traffic at/near project sites and along roadways during construction

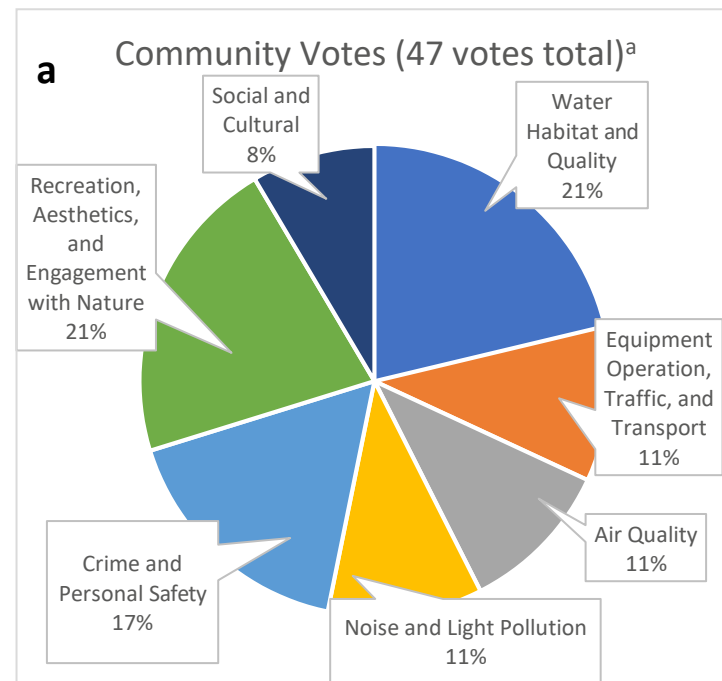
Light: Short-term: (–) if nighttime dredging needed, lighting impacts to individuals and animals at/near project sites and along roadways possible



Mitigating Health Impacts, Improving Health Outcomes

73 evidence-based recommendations

- water, sediment, and biota management;
- aquatic and terrestrial habitat plans;
- equipment operation, traffic, and transport of materials;
- mitigation of air, noise, and light pollution;
- crime and safety;
- park access and amenities;
- cultural and social resources;
- communication and informational signage; and
- health supportive measures, such as means for resident and stakeholder engagement and feedback



Caring about the bottom of the river...

- **Foundation:** build trust and incorporate equity
 - translation (health)
 - two-way communication
 - formal decision-support
- **Process:**
 - Stakeholders were involved in creating the recommendations
 - Research was responsive to the project design
- **Impact:** MNDNR has included many recommendations – *projected to improve eco and health outcomes*



Currently planning post-project ecological and social monitoring

Thank you!

Timothy G. O'Higgins
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Ecosystem-Based Management, Ecosystem Services and Aquatic Biodiversity

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Remediation to Restoration to Revitalization: Engaging Communities to Support Ecosystem-Based Management and Improve Human Wellbeing at Clean-up Sites



Kathleen C. Williams and Joel C. Hoffman

Abstract Remediation to Restoration to Revitalization (R2R2R) is a framework to identify ecological and policy-based relationships between large-scale aquatic sediment remediation projects, subsequent habitat restoration projects, and waterfront revitalization. A defining feature of R2R2R is that it possesses three essential feedback loops: a translational ecology feedback loop, an adaptive management feedback loop, and a project management feedback loop. The R2R2R framework builds on Ecosystem-Based Management (EBM) theory by addressing the role of humans through these feedback loops, and by recognizing the ability of communities to learn and make choices that improve the environment through translational science. In this framework, translating ecological changes from remediation and restoration projects to public benefits (e.g., swimmable water, potential for urban greenspace) using the concept of ecosystem services is critical to support decision-making. In practice, community perceptions and uses of the remediated and restored ecosystem or habitat are central to EBM. We use the Great Lakes Area of Concern program to illustrate how R2R2R exemplifies EBM for large, complex sediment remediation and aquatic habitat restoration projects.

Lessons Learned

- The Remediation to Restoration to Revitalization (R2R2R) framework is integrative of diverse interests through ongoing opportunities for engagement and a synthesis of input to inform research and project alternatives
- Consideration of translational ecology and adaptive management, in addition to the project, create distinct opportunities for engagement with the community, stakeholders, and project implementers

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KB-GP HIA Report

Coming June 2021

www.epa.gov/healthresearch/health-impact-assessments

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