



EPA Tools & Resources Webinar: Remediation to Restoration to Revitalization (R2R2R) as a Method to Connect Programs and Research

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Problem

- Agencies are increasingly encouraged to apply social science in their work to implement environmental justice mandates
- This is new expertise to many environmental agencies
- It is unclear how social sciences contribute to environmental work

Remediation to Restoration to Revitalization (R2R2R)

- Contaminated sediment *remediation* to aquatic habitat *restoration* to community *revitalization*
- Integrating ecological and social science research to help *maximize* the *positive societal* and *environmental outcomes* from remediation and restoration projects and to support local decision-making

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 habitat 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 Hah-tah-hah River is returning to its former glory as a "river of many fish."

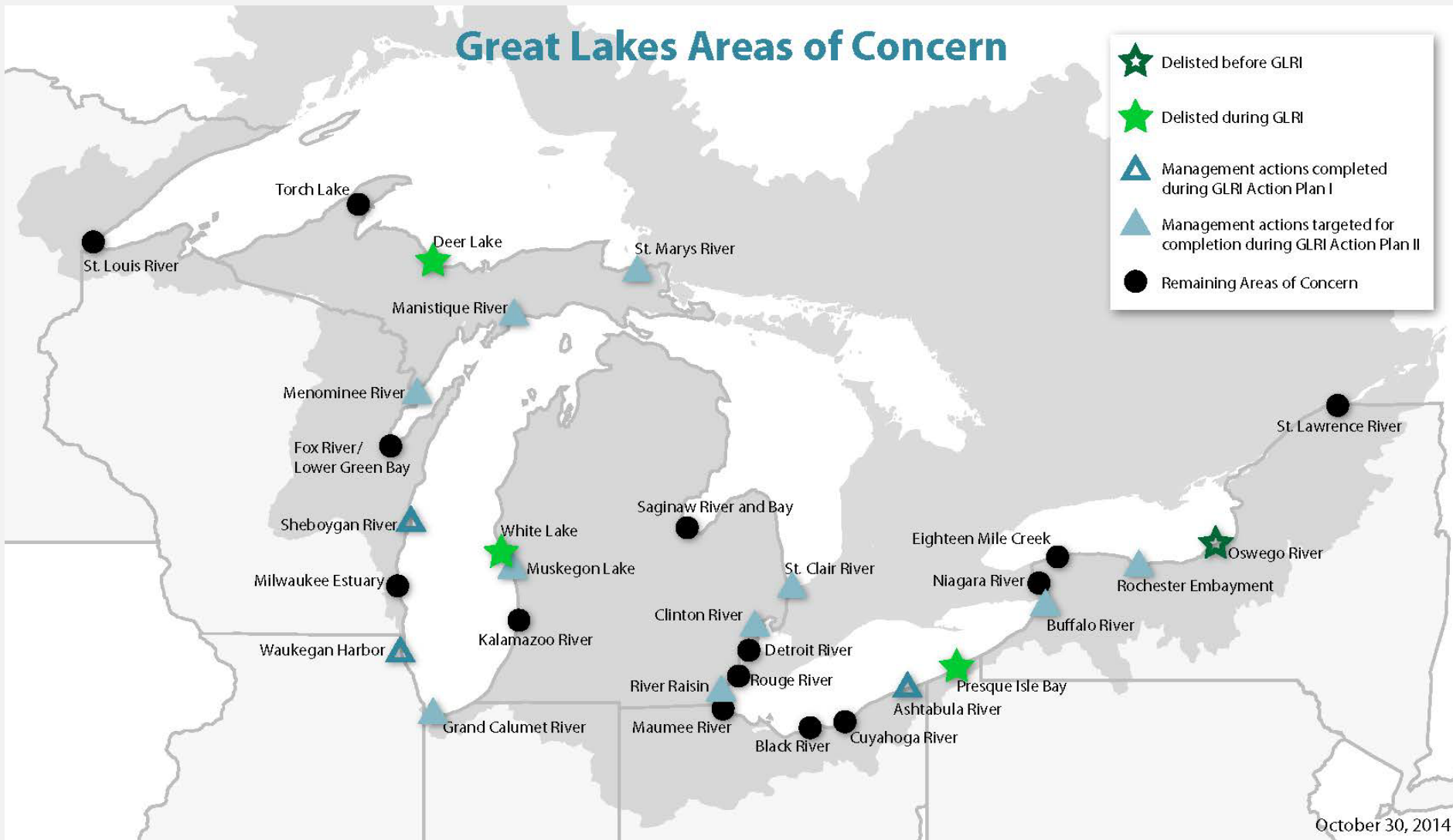


Using funds from the U.S. EPA, U.S. ACP, industry and the State of Ohio, approximately 700,000 cubic yards of contaminated sediment were removed from the river between 2006 and 2011, pumped upland through a 2.5 mile pipeline to a solid sediment containment facility and into specially culled, bag-like separate containment solution from the heavy water.

The Ashabula River Partnership: A model approach to environmental cleanup

for everyone from grassroots to every dollar in government spending

Areas of Concern (AOC)



Boundary work

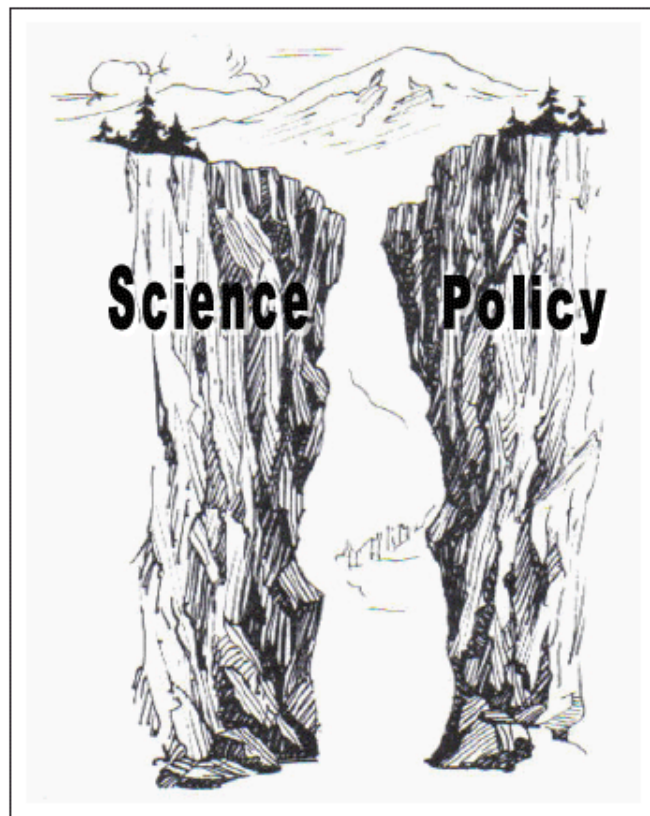


FIGURE 3
The science-policy chasm

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- Organizations, individuals and objects
- Facilitate translation across boundaries of science and policy
- Process-oriented and utilize maps, models
- An element of solutions-driven research
- Ecosystem goods and services (EGS, the benefits that humans receive from nature) used as a boundary concept

Case study methodology

- Case study method used in social sciences when object of study (R2R2R) cannot be removed from its context
 - Interactions between EPA's Great Lakes National Program Office and State agencies
 - Interactions between EPA Region 5 and City of Duluth
 - Area of Concern Program and Making a Visible Difference
- Community decision makers



Volunteers at Lake Superior Zoo

- [illegible]

*Exploratory case study approaches can be used to build theories.
In the social sciences, theories are the tools.*

Duluth as a representative case



- City of Duluth is adjacent to St. Louis River AOC
- Extensive revitalization activity based
- Brownfields redevelopment
- Many collaborative venues for observation

Data collection and analysis

Data collection

- Document analysis
 - Planning documents
 - Grant applications
 - Community meetings
- Participant observation at public and other planning meetings
- Participant action research

Analysis

- Qualitative analysis
 - Read and code documents and meeting notes
 - EGS: final, intermediate, complementary or negative service
 - Institutional arrangements

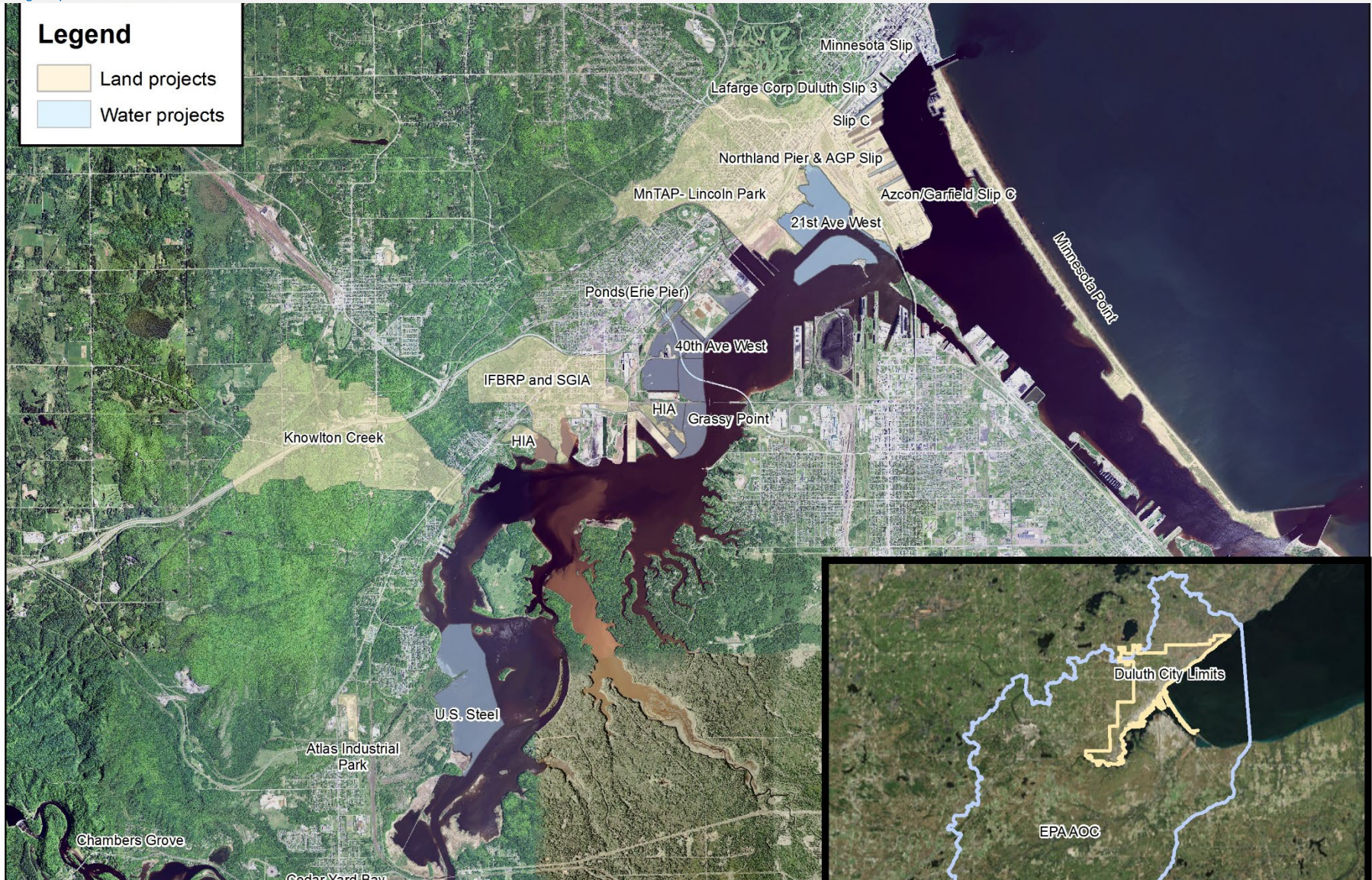
Observation sites

- St. Louis River AOC
- St. Louis River Habitat Committee
- City of Duluth St. Louis River Corridor planning process
- City of Duluth Technical Advisory Committee
- City of Duluth Comprehensive Planning
- Health in All Policies (HiAP) survey
- Community organizations
- GLNPO and 2016 USEPA AOC Conference
- St. Louis River Summit

Who participates and where in R2R2R?

Group/ Setting	AOC Mgmt.	Habitat Committee	St. Louis River Summit	St. Louis River Technical Committee	Park Plan	Comprehensive, Brownfields or Other Plans
State agencies	X	X	X	X		X (brownfields plan only)
Federal agencies	X	X	X	X		
USEPA	GLNPO ORD R5	ORD	ORD	ORD R5	ORD	ORD R5
City agencies		X (Parks)		X (Economic Development, Parks, Community Planning)	X (Parks)	X (Economic Development, Community Planning, Parks)
NGOs	X	X	X	X	X	X
Researchers	X	X	X			
Community					X	X

Making a Visible Difference in Duluth



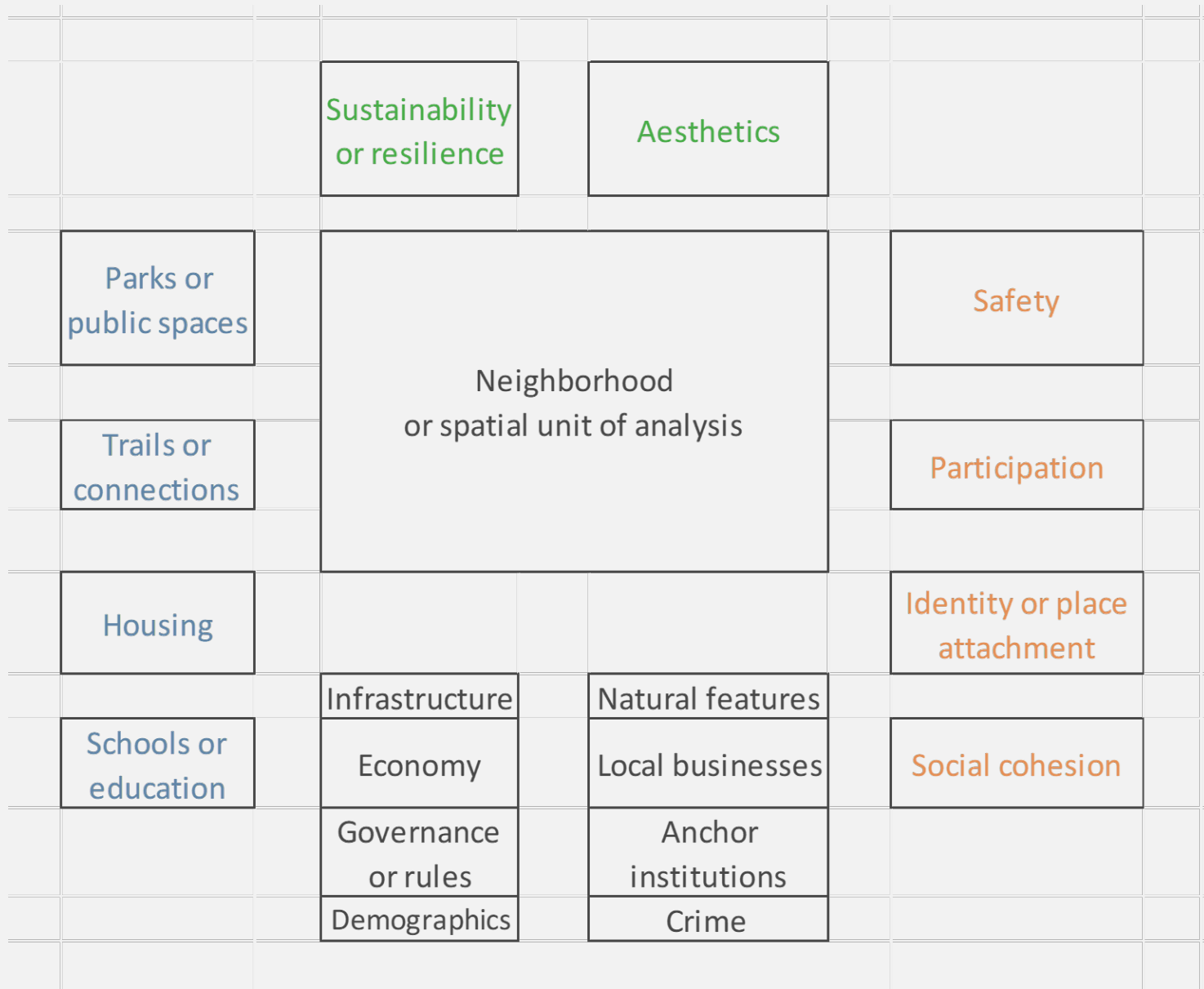
Context, policy, and participants

- Area of Concern
 - Policy has been created (Roadmap to Delisting)
 - Decision makers are resource managers and stakeholders
 - Practitioners consult with experts (academics, agencies)
- City of Duluth
 - They do everything from creating policy to pulling weeds
 - Decision makers are staff, they utilize consultations and consult with stakeholders
 - Gather public input, but also more intensive and intentional consultation with other stakeholders
- Community
 - Spend time organizing and advocating for valued services
 - They reach out to the City of Duluth and other experts

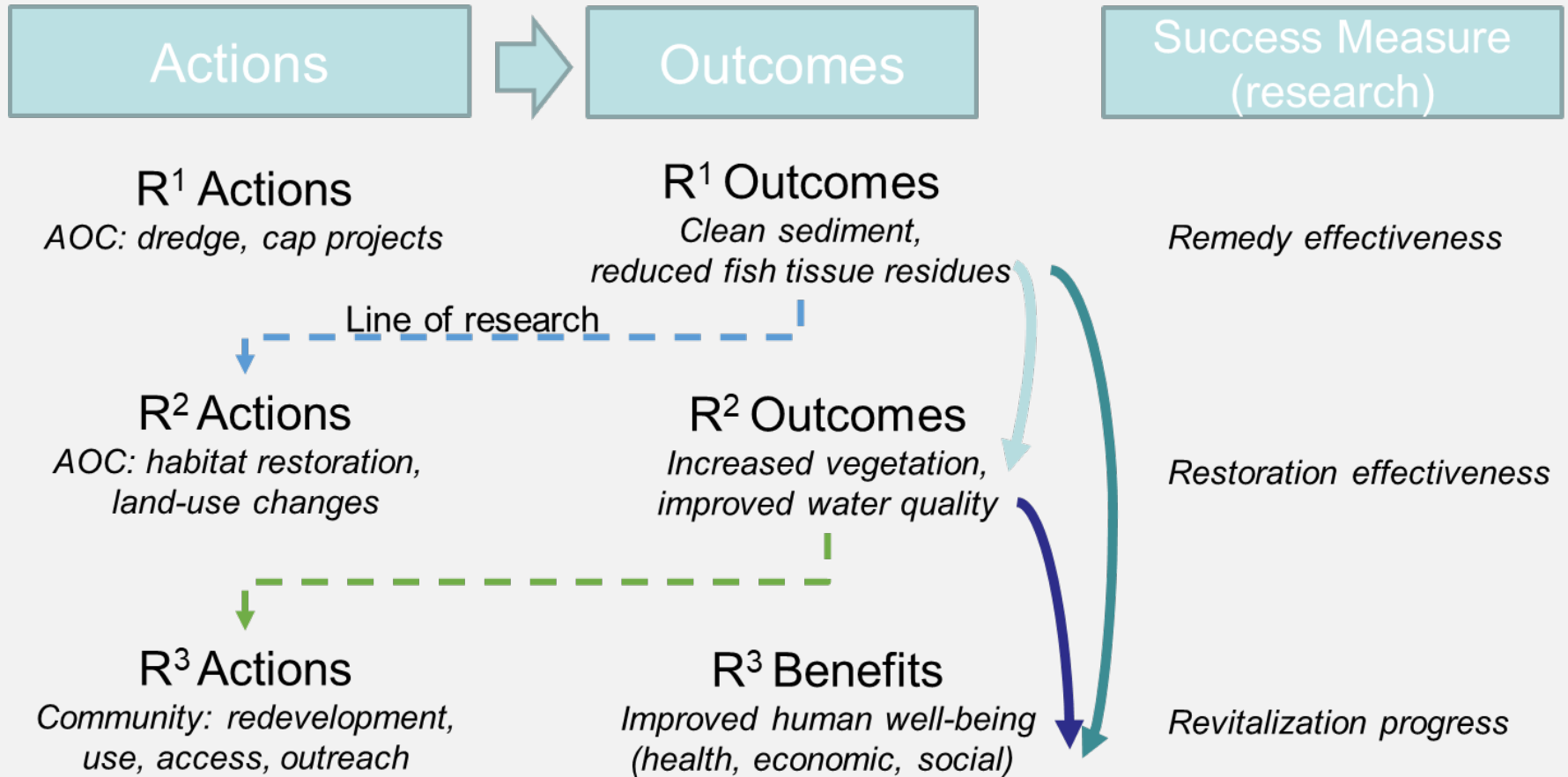
Concept Model 1: Who-What-How-Outcomes



Concept Model 2: The Neighborhood Model



Integrative Framework: Actions- Outcomes-Success Measures



Integrative framework

Biophysical Science

Remediation Effectiveness Restoration Effectiveness

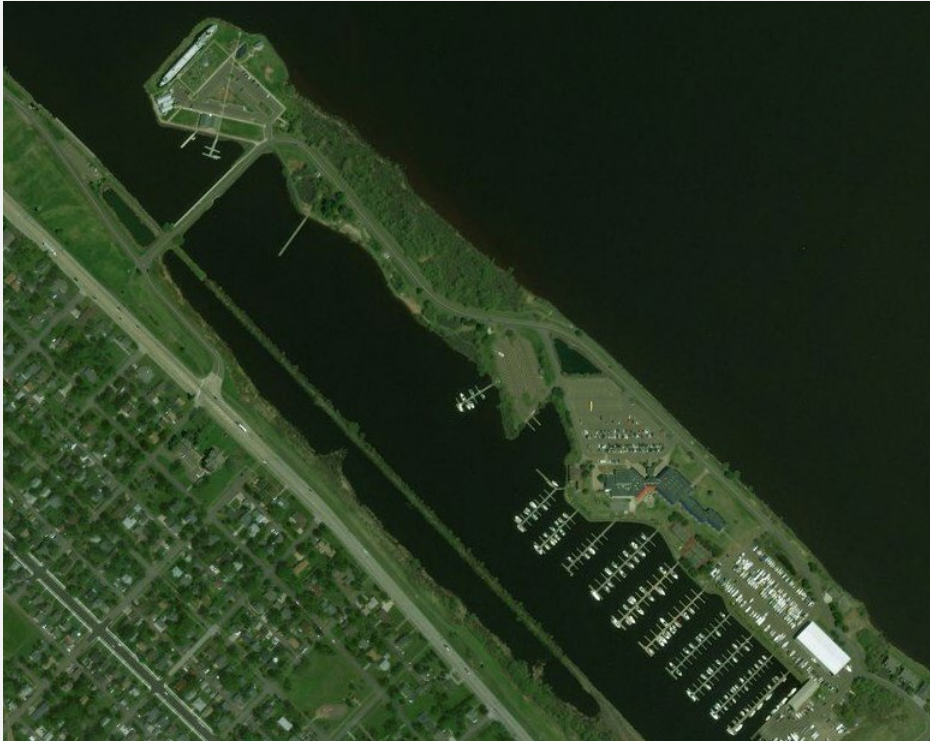
- Links environmental changes (aka program actions)
 - Biota and vegetation response
 - Remediation and/or restoration project goals
- Work closely with managers
- Ecology, toxicology, biology, GIS

Social Science

Revitalization Progress

- Document landscape change
- Record recreational use
- Participatory science
- Work closely with community (local government and citizens)
- Anthropology, geography, sociology, sustainable peacebuilding, economics

Example 2: Pickle Pond, Superior WI



Cleanup project plans

- Remove contaminated sediments
- Improve water circulation & quality
- Improve habitat quality
- Reduce stormwater loading

R2R2R assessment elements:

- Remediation: remove contaminants
- Restoration: improve ecology
- Revitalization: improving human access, increasing human health & wellbeing

Multiple agencies & groups involved:

- USEPA/ORD, Duluth & Cincinnati
- USEPA/GLNPO
- US Army Corp of Engineers
- US Geological Survey

Complex research

R2R2R assessment elements

- Remediation: remove contaminants
- Restoration: improve ecology
- Revitalization: improving human access, increasing human health & wellbeing

Multiple agencies & groups involved:

- USEPA ORD & GLNPO
- US Army Corps of Engineers and US Geological Survey
- State agencies and local stakeholders

Research methodologies

R1 and R2

- Fish and invert sampling
- Water circulation
- Water quality
- Fish community
- Benthic community
- Vegetation structure

R3

- Trail counters
- Web and trail cams
- Intercept survey
- Site observation
- Aesthetics monitoring

Policy application: Health Impact Assessment (HIA) screening

- Utilized Who-What-How-Outcomes concept model
- Applied during the screening phase to identify relevant project
- Recognized project with optimal timing
- In close proximity to city-led Brownfields area wide planning effort



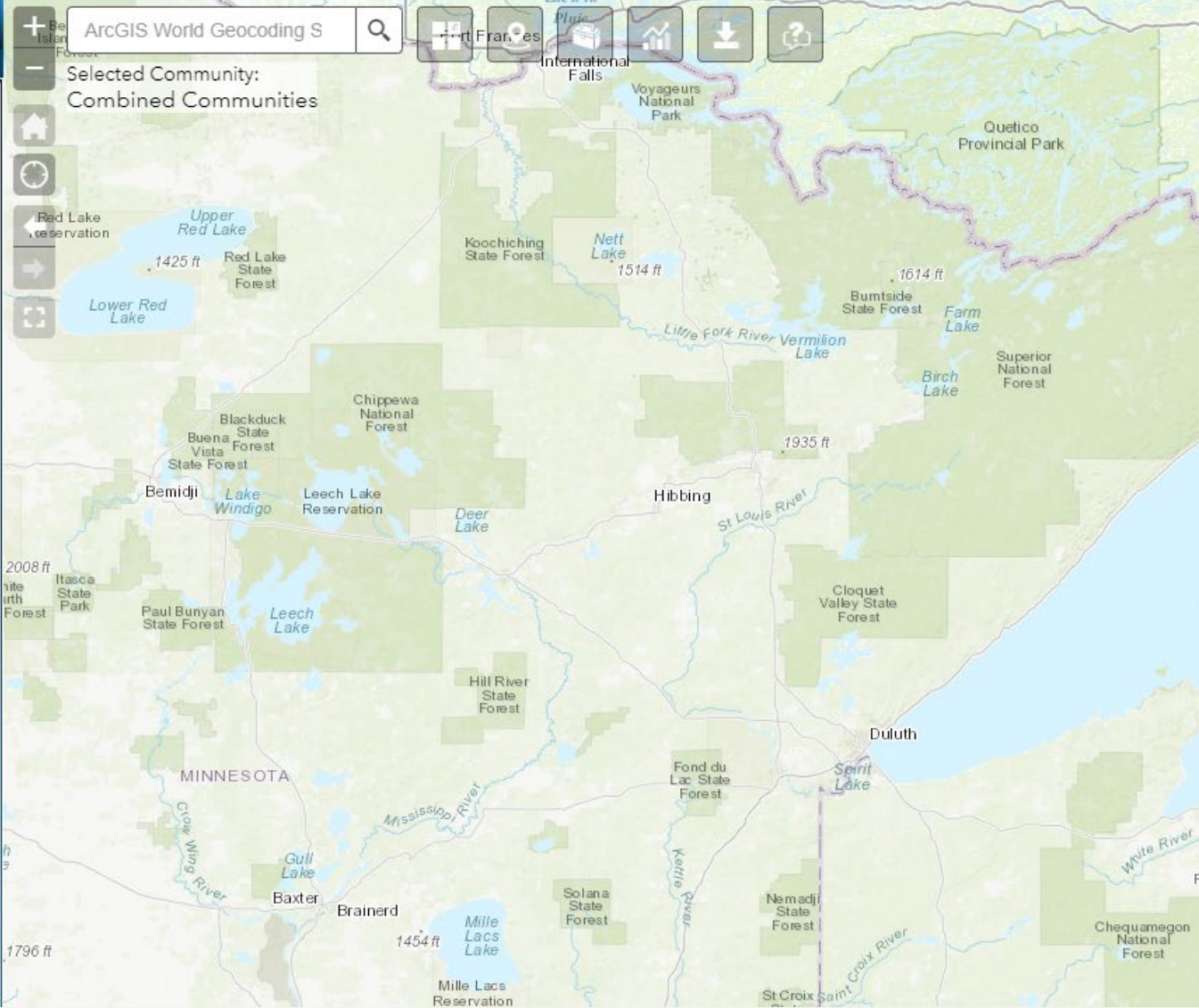
Western Waterfront Trail near
Kingsbury Bay

HIA stakeholder and community input

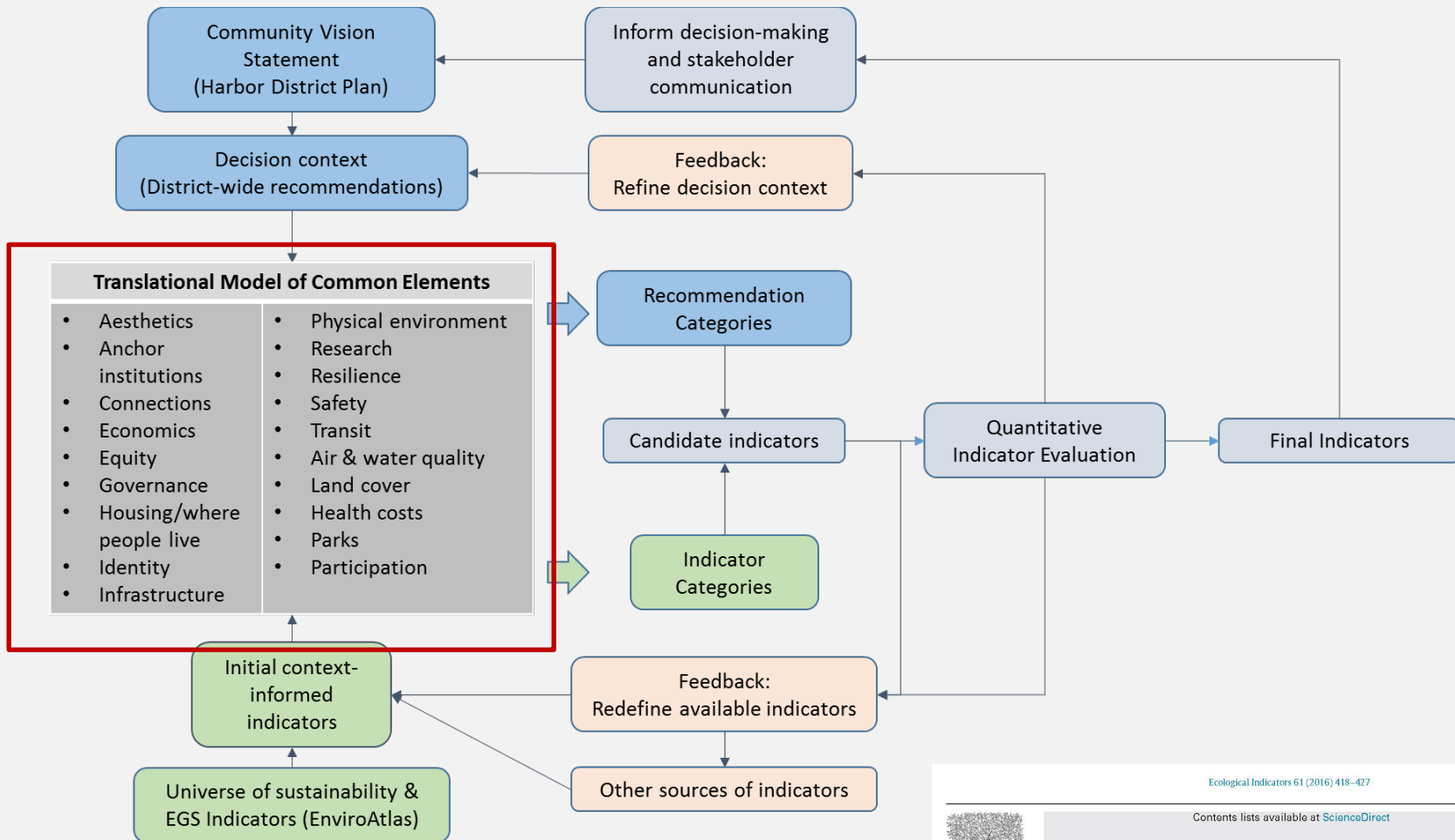
- Used boundary work to structure participatory mapping
- Engage in conversation around the restoration sites
- Used maps to capture different types of knowledge based on relationships to the river
 - Traditional
 - Professional
 - Local
 - Scientific



Ethnographic mapping captures multiple kinds of knowledge on one map



EnviroAtlas Indicator Selection Framework



Neighborhood Model serves as a boundary object to connect community vision and EPA EGS indicators

Ecological Indicators 61 (2016) 418–427

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

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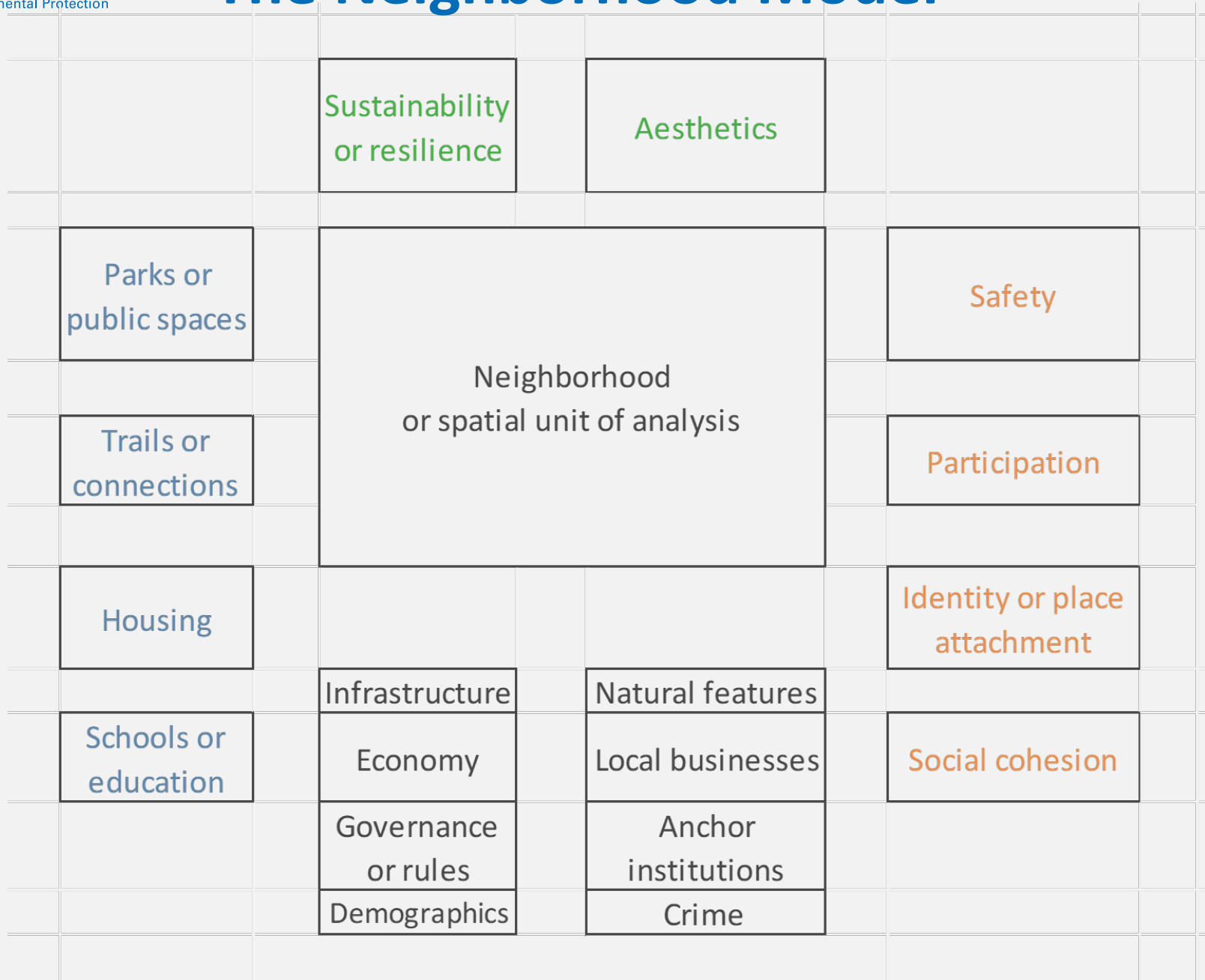
An interactive method to select a set of sustainable urban development indicators

Liem Tran*

Geography Department, University of Tennessee at Knoxville, Knoxville, TN, USA

CrossMark

The Neighborhood Model



Building a bridge between local plan and EnviroAtlas with translational model

Layer name	Dimension of the model	Neighborhood Model Category	Secondary code
<u>Agricultural land per capita (m2/person)</u>	Structural or statistical	Physical environment	Available land
<u>Agricultural land per capita (m2/person)</u>	Structural or statistical	Economy	Agriculture
<u>Day care centers with < 25 percent green space in viewshed</u>	Built environment	Schools	Day care centers
<u>Day care centers with < 25 percent green space in viewshed</u>	Built environment	Parks	Place to play
<u>Day care centers with < 25 percent green space in viewshed</u>	Structural or statistical	Physical environment	Presence of green space (undefined)

Building a bridge between local plan and EnviroAtlas

HDI Land Use Recommendations v2 (Recovered).nvp - NVivo Pro

DATA ANALYZE QUERY EXPLORE LAYOUT VIEW

Look for: Search In: Nodes Find Now Clear Advanced Find


Nodes

Name	Sources	Referenc
Aesthetics	1	27
Anchor Institutions	1	1
Connectivity-TrailsPeds	1	22
Connectivity-Transit	1	10
Crime-Statistics	0	0
Demographics	1	8
Economy and Industry	1	14
Equity and Inclusion	1	14
Governance and Rules	1	19
Health-Statistics	0	0
Housing	1	4
Identity and Place	1	21
Infrastructure	1	19
Local Business	1	4
Parks	1	11
Participation	1	8
Physical or Natural Env	1	10
Research	1	1
Resilience	1	6
Safety-Perceptions	1	1
Schools and Education	0	0
Social Cohesion	0	0

Chapter 4-Harbor District DRA

in facade, awnings, texture, coordinated landscaping, and other architectural detailing.

- Locate garages, garage entrances, loading docks, and overhead doors so they are not the dominant feature on the front facade and are screened from public view.
- Minimize curb cuts and driveways, especially on primary streets. Access for loading docks and parking should be combined. On primary streets, encourage alley or side street vehicle access.
- Discourage demolition of buildings for the sole purpose of constructing surface parking lots.
- Encourage surface parking lots to be to the rear of buildings. In cases where surface parking must be located on the side or front of buildings, deploy strategies to mitigate against the negative impacts on the pedestrian realm such as high quality plantings and landscaping and minimize parking along the primary street frontage.
- Where parking lots are located between the public sidewalk and the front entrance of a building, each building should be served by a clearly identifiable pedestrian walkway paved with non-asphalt materials.
- Preserve existing buildings whenever possible, and highlight historic elements such as architectural details or signage.
- Include special architectural design features on the corners of any buildings located at the intersections of two primary streets or at the visual termination of any primary street.



The Clock Shadow Building in Walker's Point demonstrates context sensitive development that contributes to a walkable environment.

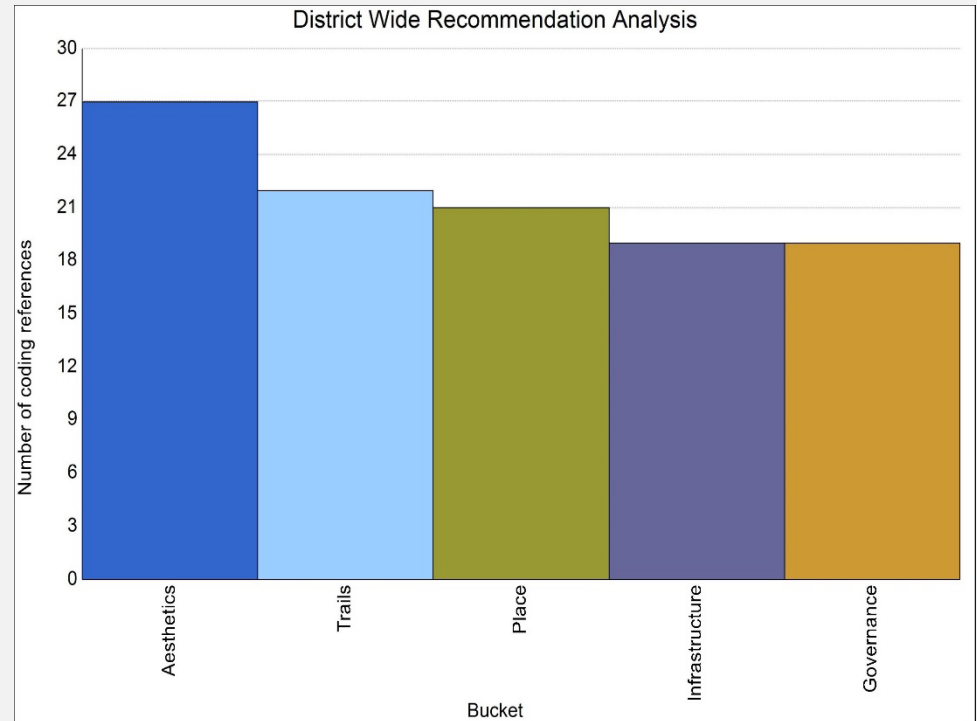
Infrastructure
Parks
Connectivity-Transit
Local Business
Governance and Rules
Physical or Natural Env
Coding Density
Identity and Place

Drag selection here to code to a new node

Nodes Code At Enter node name (CTRL + O)

Relate the data to the community problem

- Aesthetics
 - How neighborhood should look
- Connectivity
 - More bike trails
- Identity
 - Who we are, history
- Infrastructure
 - Flow of traffic



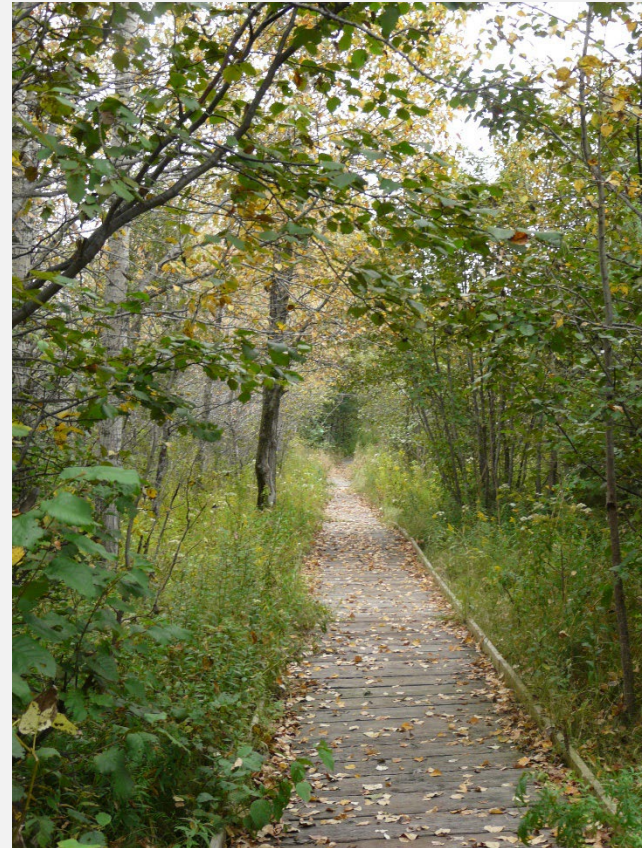
From EPA Report, [Ecosystems goods and services case studies and models support community decision making using the EnviroAtlas and Eco-Health Browser](#)

Key takeaways

- Improved understanding among stakeholders, including EPA, of decision contexts and social dynamics
 - Create conditions for collaboration
- Increased the breadth and depth of stakeholder engagement in R2R2R
 - Connect agency and community interests
- Demonstrated use of social science methods for engaging stakeholders in research
 - Social science improves translation outcomes

Key takeaways (cont.)

- Improved ability to understand and connect to community members, local governments, state and other federal agencies
- Empowers agencies to improve environmental, health, and economic outcomes for all



Trail at Grassy Point

Additional resources

- Kingsbury Bay HIA fact sheet:
<https://www.epa.gov/system/files/documents/2021-09/kingsbury-bay-grassy-point-hia-fact-sheet.pdf>
- EPA HIA website:
<https://www.epa.gov/healthresearch/healthimpact-assessments>
- EnviroAtlas: <https://www.epa.gov/enviroatlas>
- Mud Lake Community Values technical memo (HIA approach):
https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=CCTE&dirEntryId=347954
- Social science case study fact sheet:
<https://www.epa.gov/research/case-studies-social-sciences>

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Special thanks to research
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officials, and community groups



St. Louis Bay at sunrise