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

Areas of Concern (AOC)

Great Lakes Areas of Concern

Legend:
- ☆ Delisted before GLRI
- ★ Delisted during GLRI
- △ Management actions completed during GLRI Action Plan I
- ▲ Management actions targeted for completion during GLRI Action Plan II
- ● Remaining Areas of Concern

Torch Lake, Deer Lake, St. Marys River, St. Louis River, Manistique River, Menominee River, Fox River/Lower Green Bay, Sheboygan River, White Lake, Saginaw River and Bay, Muskegon Lake, St. Clair River, Milwaukee Estuary, Clinton River, Eighteen Mile Creek, Oswego River, Niagara River, Rochester Embayment, Kalamazoo River, Waukegan Harbor, Detroit River, Rouge River, Buffalo River, River Raisin, Presque Isle Bay, Grand Calumet River, Maumee River, Black River, Cuyahoga River, Ashtabula River, St. Lawrence River

October 30, 2014

Boundary work

FIGURE 3
The science–policy chasm

- 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
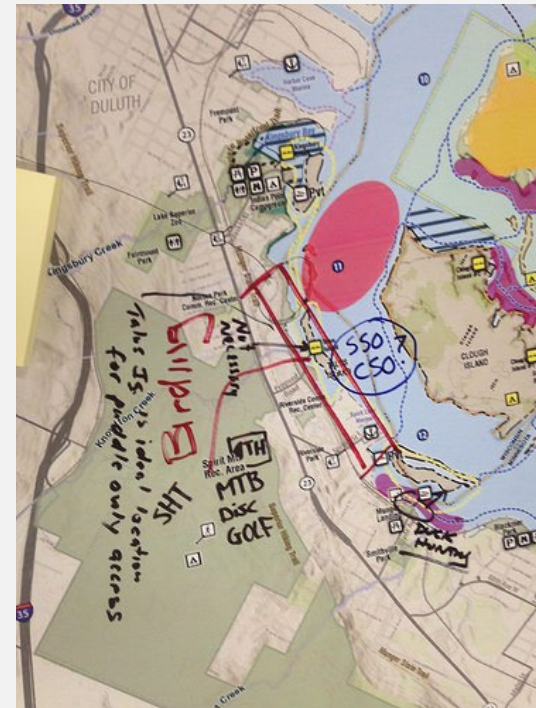
Exploratory case study to identify "how" and "why" in R2R2R

- Who makes decisions

- Types of decisions

- Settings where decisions or elements of decision are discussed

- Lessons learned in Duluth can be applied or tested in other AOCs or programs

Participatory mapping

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
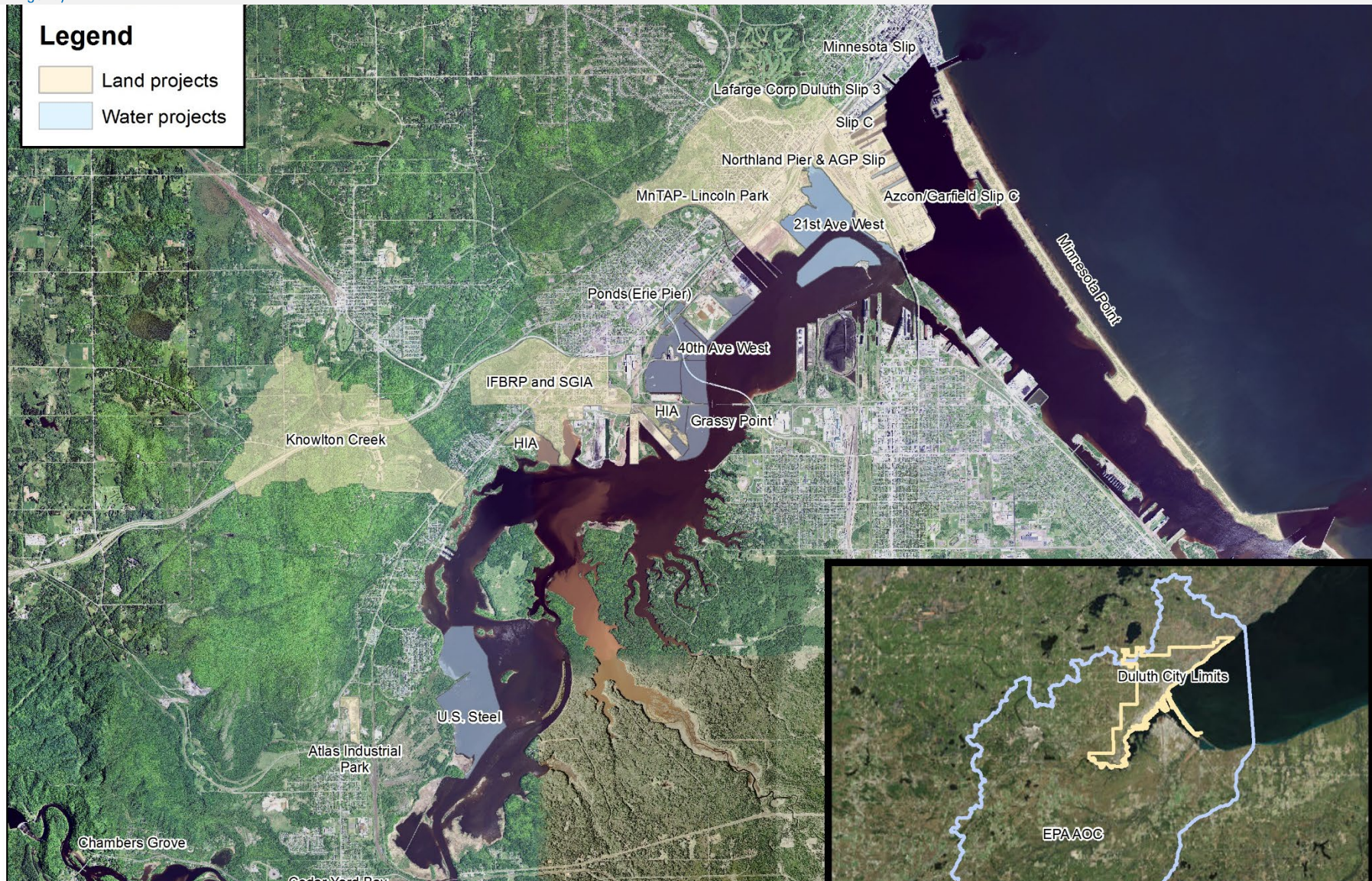
Observation sites

- 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

Legend
- Land projects
- Water projects

Minnesota Slip
Lafarge Corp Duluth Slip 3
Slip C
Northland Pier & AGP Slip
MnTAP- Lincoln Park
Azcon/Garfield Slip C
21st Ave West
Minnesota Point
Ponds(Erie Pier)
40th Ave West
IFBRP and SGIA
HIA
Grassy Point
Knowlton Creek
HIA
U.S. Steel
Atlas Industrial Park
Chambers Grove
Cedar Yard Bay
Duluth City Limits
EPA AOC

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
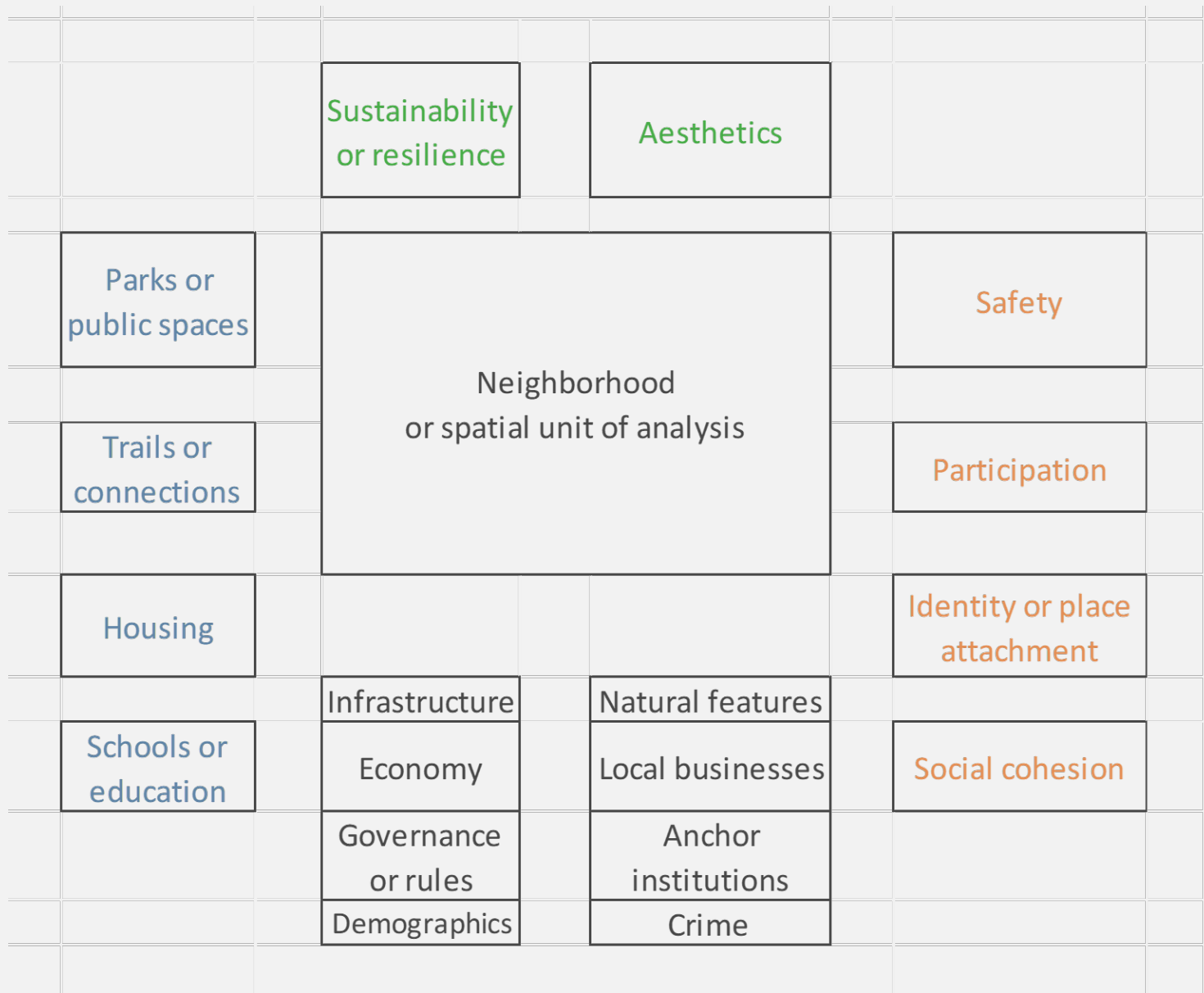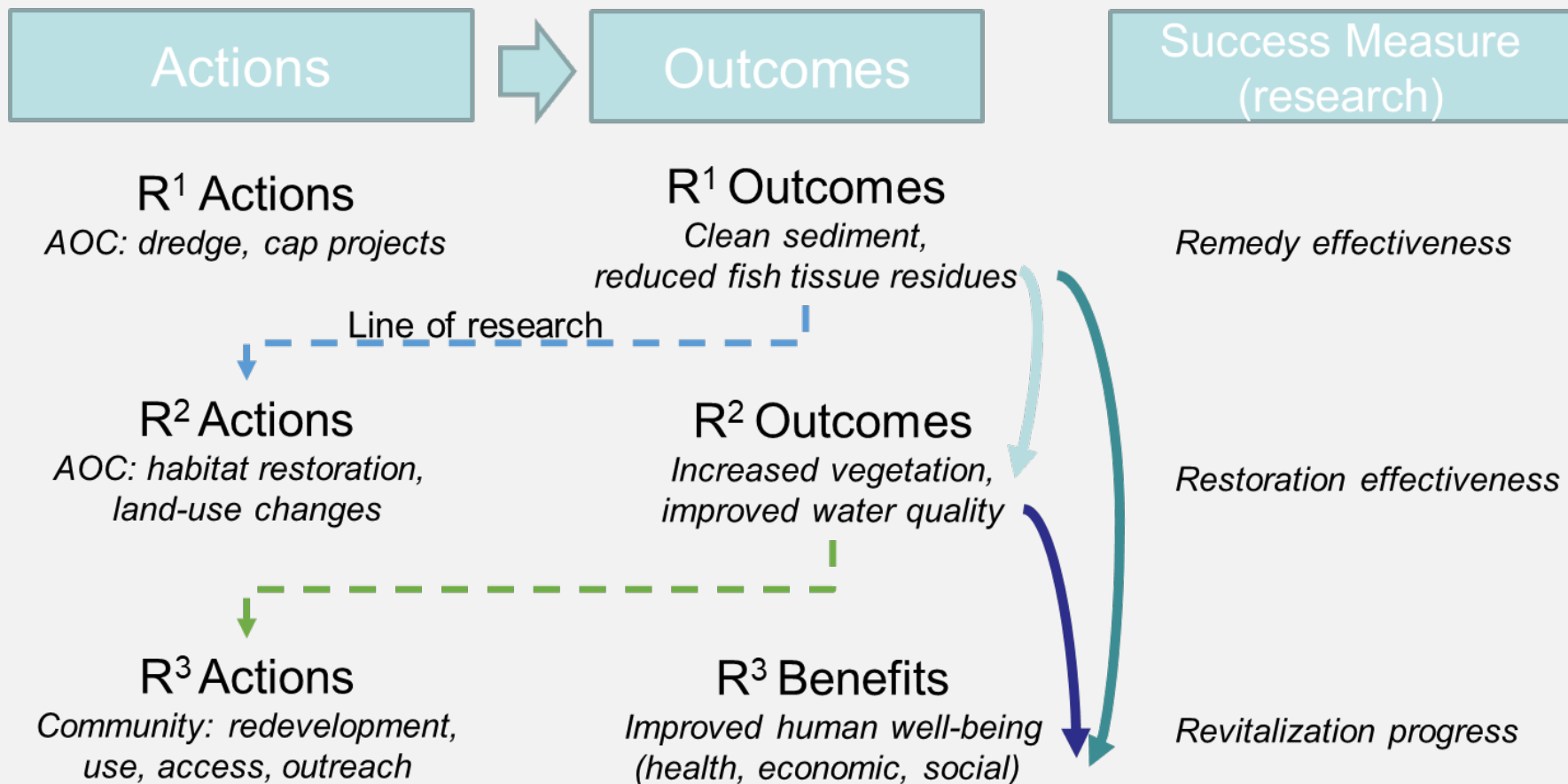 - They reach out to the City of Duluth and other experts

From EPA Report, How the community value of ecosystem goods and services empowers communities to impact the outcomes of remediation, restoration, and revitalization projects

Concept Model 1: Who-What-How-Outcomes

Who
EPA Regional Offices
Local governments
Nonprofit Organizations

Changes
Trails
Retail, restaurants
Riverwalks
New manufacturing
Housing
Marinas

Mechanisms
Comprehensive planning
Land use and neighborhood planning
Park and/or transportation plans
Brownfields remediation
Stormwater management
   /green infrastructure

Results
Increased use of water
Stormwater reduction
Improved aesthetics
Land reuse
Neighborhood enhancements

Cleaner water, soil, air create opportunities for activity

Land side of AOC

Water side of AOC

Changes
Clean sediment
Restored habitat
Increased ecosystem services

Mechanisms
Remedial Action Plans
Public Advisory Councils
Great Lakes Restoration Initiative

Who
Great Lakes National Program Office
State agencies

Results
Remove Beneficial Use Impairment
Cleaner water
Safer fish
More habitat

Environmental R2R IS the desired end

Concept Model 2: The Neighborhood Model

	Sustainability or resilience	Aesthetics	
Parks or public spaces			Safety
Trails or connections	Neighborhood or spatial unit of analysis		Participation
Housing			Identity or place attachment
Schools or education	Infrastructure / Economy / Governance or rules / Demographics	Natural features / Local businesses / Anchor institutions / Crime	Social cohesion

Integrative Framework: Actions-Outcomes-Success Measures

| Actions | Outcomes | Success Measure (research) |

R^1 Actions
AOC: dredge, cap projects

R^1 Outcomes
Clean sediment, reduced fish tissue residues

Remedy effectiveness

Line of research

R^2 Actions
AOC: habitat restoration, land-use changes

R^2 Outcomes
Increased vegetation, improved water quality

Restoration effectiveness

R^3 Actions
Community: redevelopment, use, access, outreach

R^3 Benefits
Improved human well-being (health, economic, social)

Revitalization progress

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
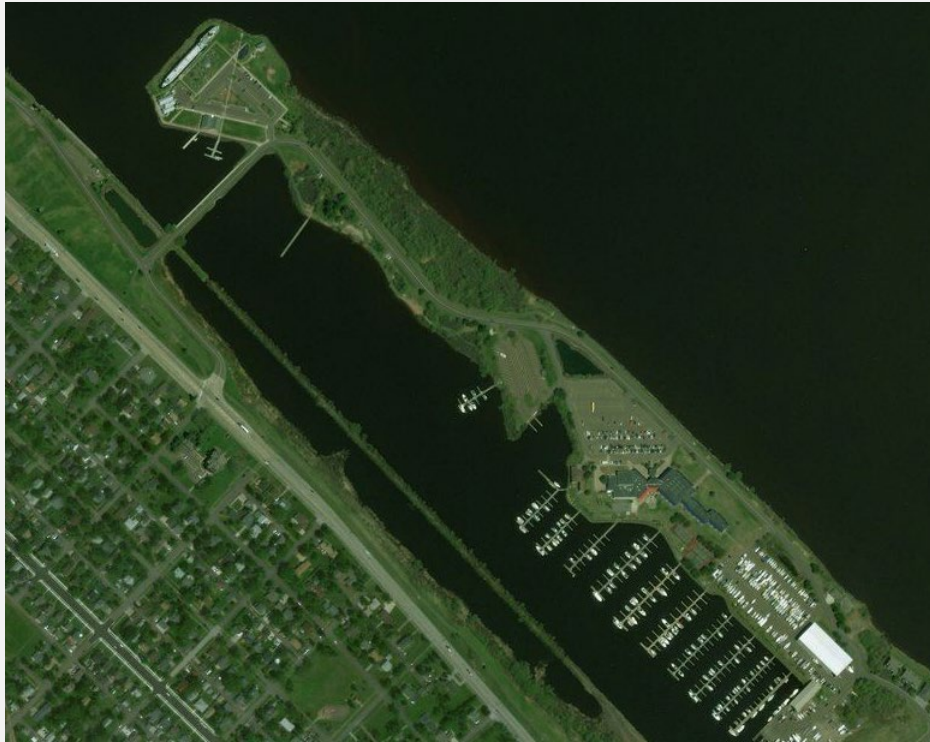
Cleanup project plans

- 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

More at Grassy Point-Kingsbury Bay Health Impact Assessment documents

Application: EnviroAtlas and salience in community decisions
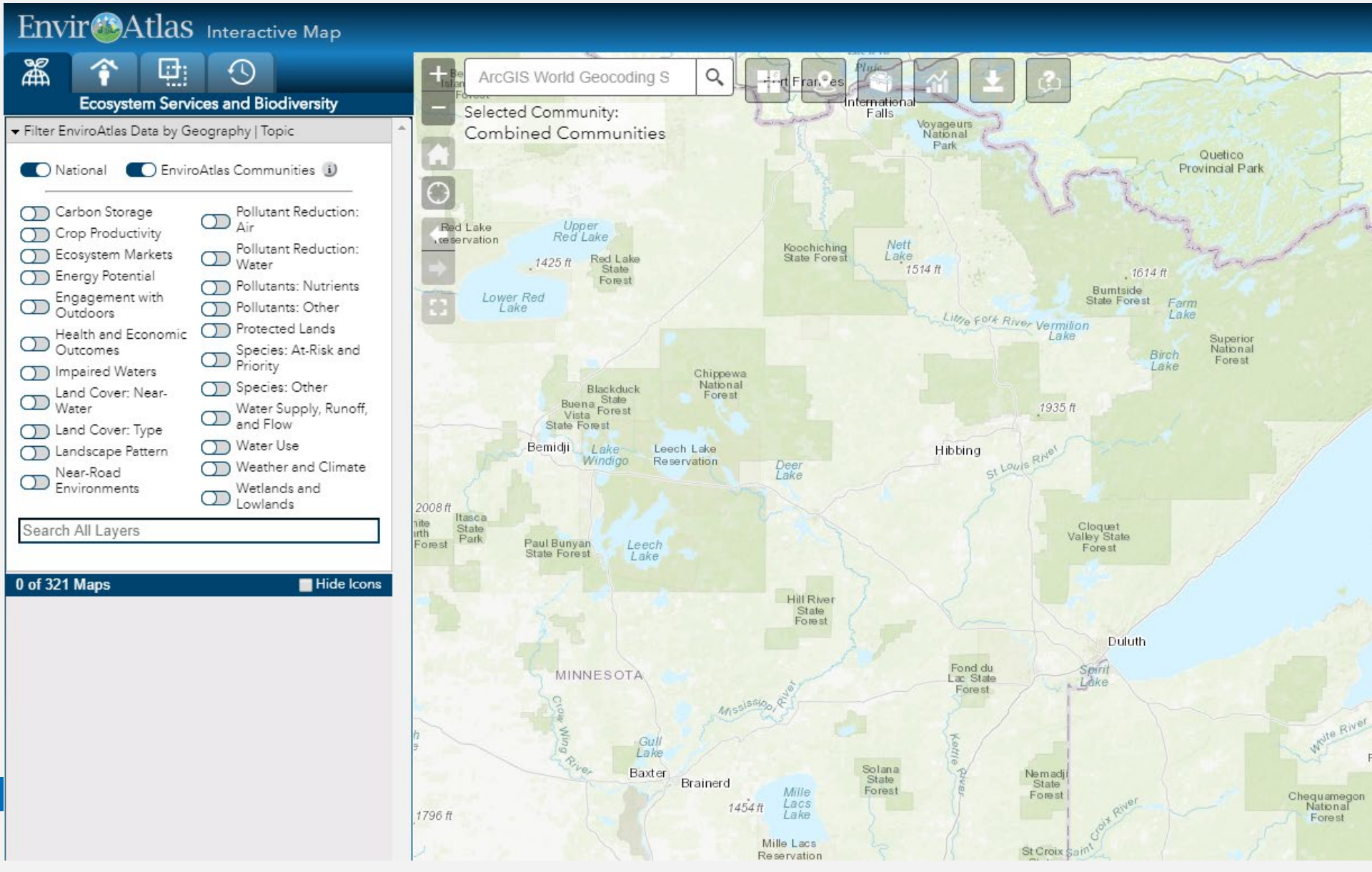
EnviroAtlas Indicator Selection Framework
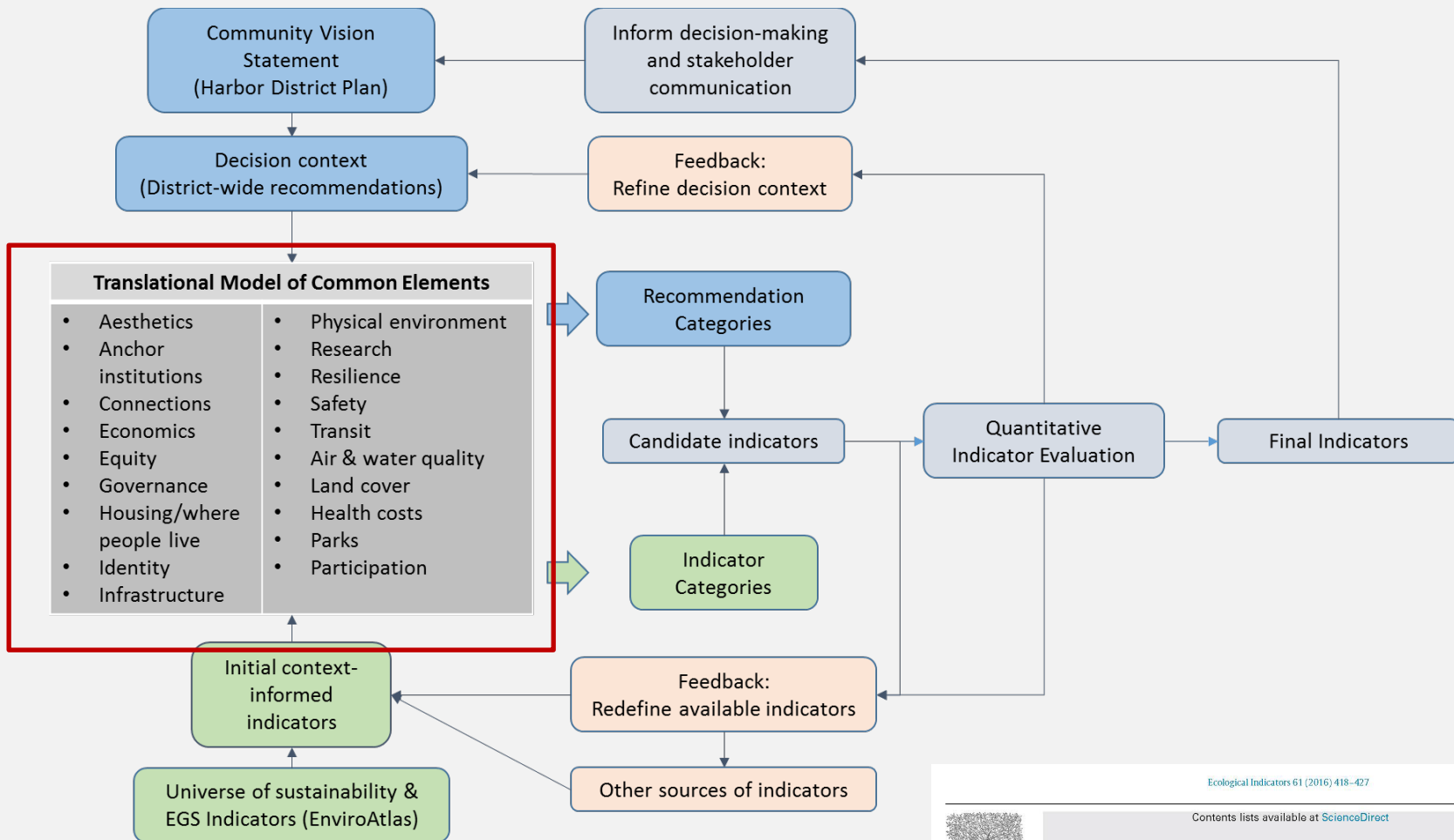
Neighborhood Model serves as a boundary object to connect community vision and EPA EGS indicators

The Neighborhood Model

Sustainability or resilience	Aesthetics	
Parks or public spaces	**Neighborhood or spatial unit of analysis**	**Safety**
Trails or connections		**Participation**
Housing		**Identity or place attachment**
Schools or education	Infrastructure — Natural features	**Social cohesion**
	Economy — Local businesses	
	Governance or rules — Anchor institutions	
	Demographics — Crime	
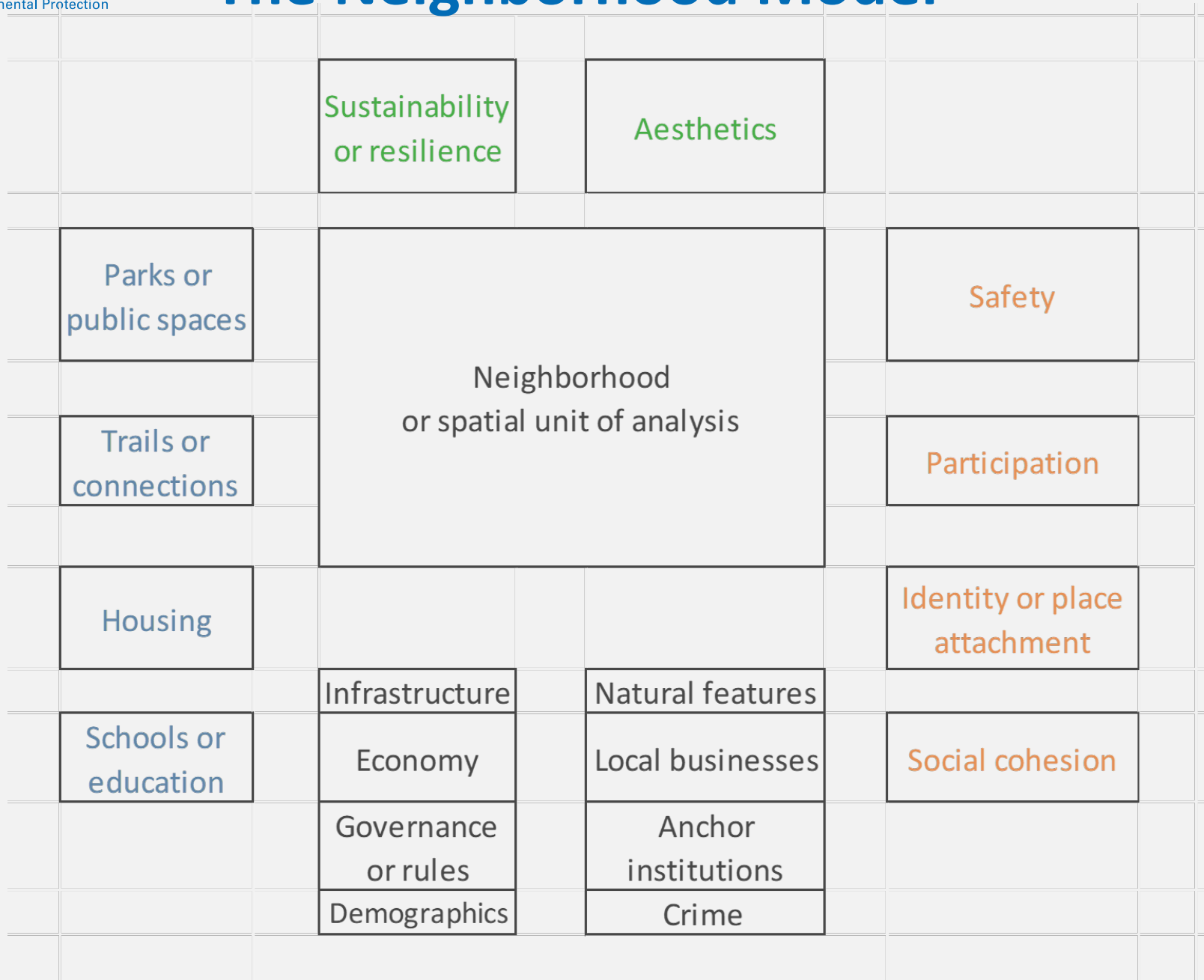
Building a bridge between local plan and EnviroAtlas with translational model

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

Building a bridge between local plan and EnviroAtlas

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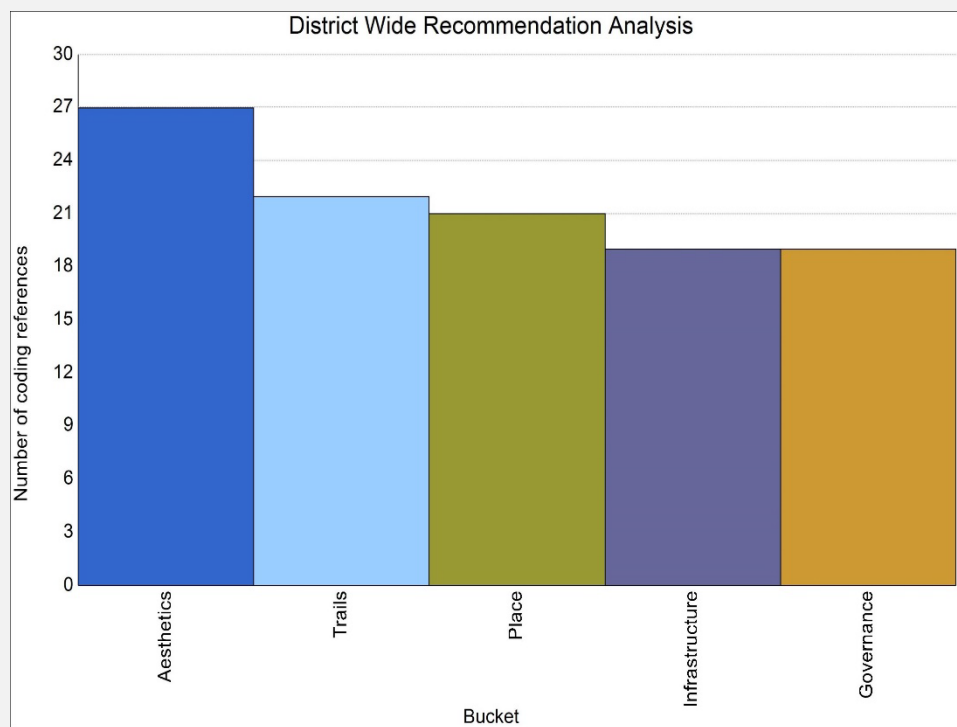
Relate the data to the community problem

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

District Wide Recommendation Analysis

From EPA Report, Ecosystems goods and services case studies and models support community decision making using the EnviroAtlas and Eco-Health Browser
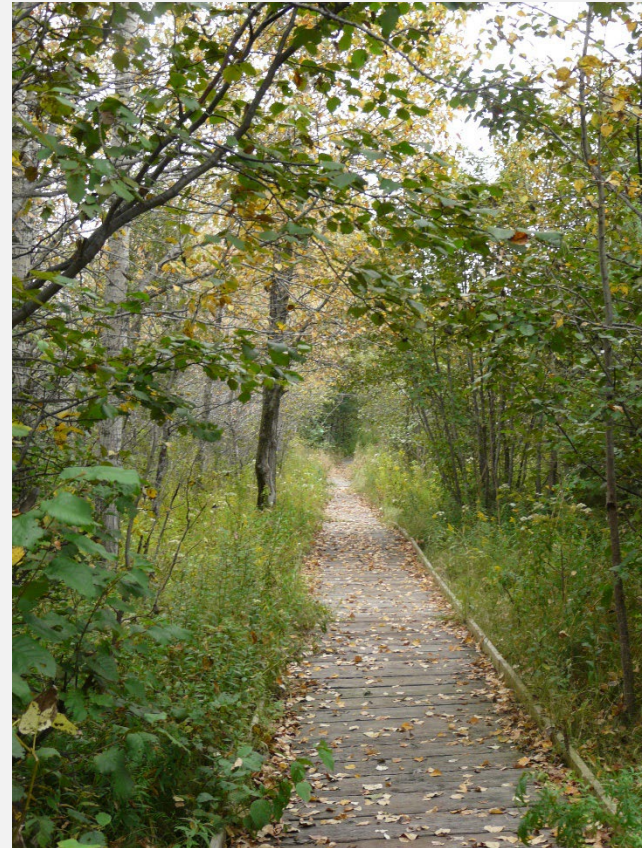
Key takeaways

- 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

- <u>Empowers</u> 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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St. Louis Bay at sunrise