How do social factors influence coastal cultural ecosystem services?

A case study in the St. Louis River Estuary

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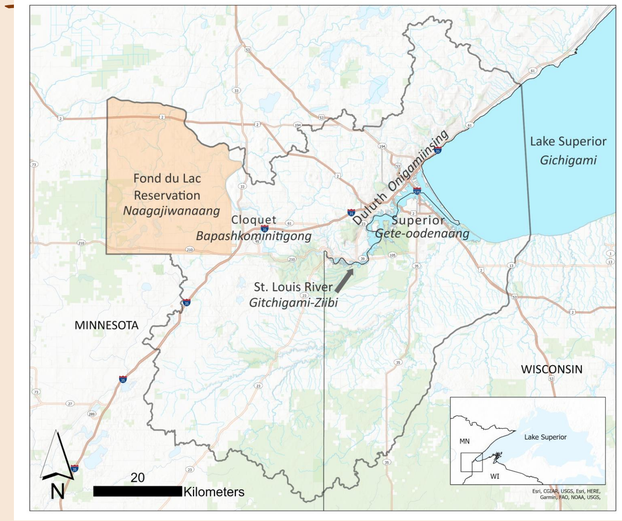
Study objective Address how social factors influence cultural ecosystem services (CES) using a mixed methods approach in a freshwater estuary community.

Background More than $3.8 billion have been spent since 2010 under the U.S. EPA's Great Lakes Restoration Initiative (GLRI), one of many initiatives to clean up U.S. coasts (GLRI, 2021). Few studies have assessed the equity or human well-being impacts of these investments (Angradi et al., 2019). CES assessment could help fill that need, but the application of CES has been limited by a lack of undertsanding of how social factors influence CES delivery.

Community engaged research Two advisory groups, a community and an Indigenous group, are helping guide this study design, recruiting participants, and helping interpret and share results

Cultural Ecosystem Services are the intangible benefits that arise from the interaction of people with their environment (Chan et al., 2016). They can include benefits from the following experiences:

- Cultural and traditional
- Spiritual and emotional
- Social ties
- Aesthetic, inspirational, art
- Education and learning
- Work and stewardship
- Fishing, hunting, foraging



Study area

The St. Louis River estuary of Lake Superior is the focus of ongoing sediment remediation and habitat restoration under GLRI. Ojibwe place names sourced from GLIFWC (2007).

Research design

Environmental

How do **biophysical conditions** (access, amenities, habitat type, and ecosystem condition) and their spatial distribution influence CES experiences for diverse beneficiaries?

1. Waterway Benefits Survey
3. Compiled SLRE Biophysical and U.S. Census Data

RQ1

interaction

co-production

Social

RQ2

How do **sociodemographics** (race, age, income, gender) influence CES experiences?

1. Waterway Benefits Survey

RQ3

How do **personal and social identity and social context** influence CES experiences?

2. Follow-up Interviews

Cultural ecosystem services

and associated benefits experienced by an individual

Datasets + methods

- *Quantitative + deductive*
- *Qualitative + inductive*

Data collection methods

1. **Waterway Benefits Survey** will collect data on participant water experiences, barriers to water experiences, locations of experiences, and sociodemographics.
2. **Follow-up semi-structured interviews** will be conducted with a subset of survey participants to collect qualitative data on how participants experiences with water relate to their sense of identity and social context.
3. **Existing Data** will be compiled including data on water access, amenities, ecosystem condition, and habitat type, as well as US Census data, which will be used to explore distributional equity of CES experiences.

Challenges

Challenges to measuring CES are associated with their social nature:

- CES are experienced subjectively.
- CES are incomensurate and not amenable to tradeoffs.
- CES experiences depend on human behavior which is often unpredictable.
- Increased CES supply doesn't necessarily yield increased benefit.
- Studies are sensitive to framing of CES framing.

(Winthrop, 2014; Comberti et al., 2015; Kirschoff, 2019; Hirons et al., 2016; Gould et al., 2014)

Significance This study will help identify environmental interventions to increase the supply, quality, and equity of CES benefits in a freshwater coastal estuary. It will also establish a holistic framework to expand the application of CES to guide equitable decision-making in diverse communities.

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