Leveraging the USGS National Water-Quality Assessment Program Data in Hedonic Property Models

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Overview

- Research Questions & Motivations
- Regional Stream Quality Assessments
- Economic Model
- Next Steps & Future Opportunities
Research questions & motivations

- **Goal 1:** Can existing National Water Quality Assessment (NAWQA) data be used to assess ecosystem services?
  - Can NAWQA data be used to estimate the economic value of changes in water quality?

- **Goal 2:** Are there ways to “standardize” assessments?
  - Regionally?
  - Other applications?
National Water Quality Assessment (NAWQA)

- Assesses the Nation’s streams, rivers, and waterways
- Long-term assessments of chemical stressors, pesticides, sedimentation, biological communities, and overall stream health
- Significant science program in USGS
NAWQA Regional Stream Quality:
Field Data Collection
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[Map showing regional stream quality data collection years 2014-2018 across the United States.]
NAWQA Regional Stream Quality:
Field Data Collection
Southeast US: Charlotte, NC

✓ One county
✓ Twelve field sites
✓ Strong urban-rural gradient
✓ Strong local interest in green-belts for water quality
The Hedonic Method

- Sales data from county assessor’s office

- \[ \text{Price} = \alpha + H_i \beta_i + N_j \beta_j + L_k \beta_k + WQ_l \beta_l + \varepsilon \]

  - **H**: House and property attributes
  - **N**: Neighborhood attributes (demographics, socioeconomics)
  - **L**: Location attributes (distance to the hospital or open space)

- Recent federal example: EPA and water quality improvement in Florida lakes (Walsh and Milon, 2016)
The Hedonic Method

- Sales data from housing market

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Possible NAWQA Indicators of Stream Quality

[Images of different water quality indicators and fish]

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Example WQ Indicator: Conductivity

groundwater contribution
developed land cover
soil density

[Diagram]

statistical model

Conductivity

Perceived Water Quality
Environmental Quality Index

Percent of riparian zone developed

Conductivity
Estimated Conductivity: Mecklenburg County (Charlotte, NC)
Next Steps

- Construct water quality indices
- Identify other environmental variables
- Estimate econometric models
Future Opportunities

- Apply approach to other NAWQA regional assessments

- Integration of other data sources (e.g., EPA’s lake health)

- Revealed preference estimates may be useful for USGS Natural Capital Accounting research (Bagstad, Shapiro, and others)

- CGE modelling
Thank you!