

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)

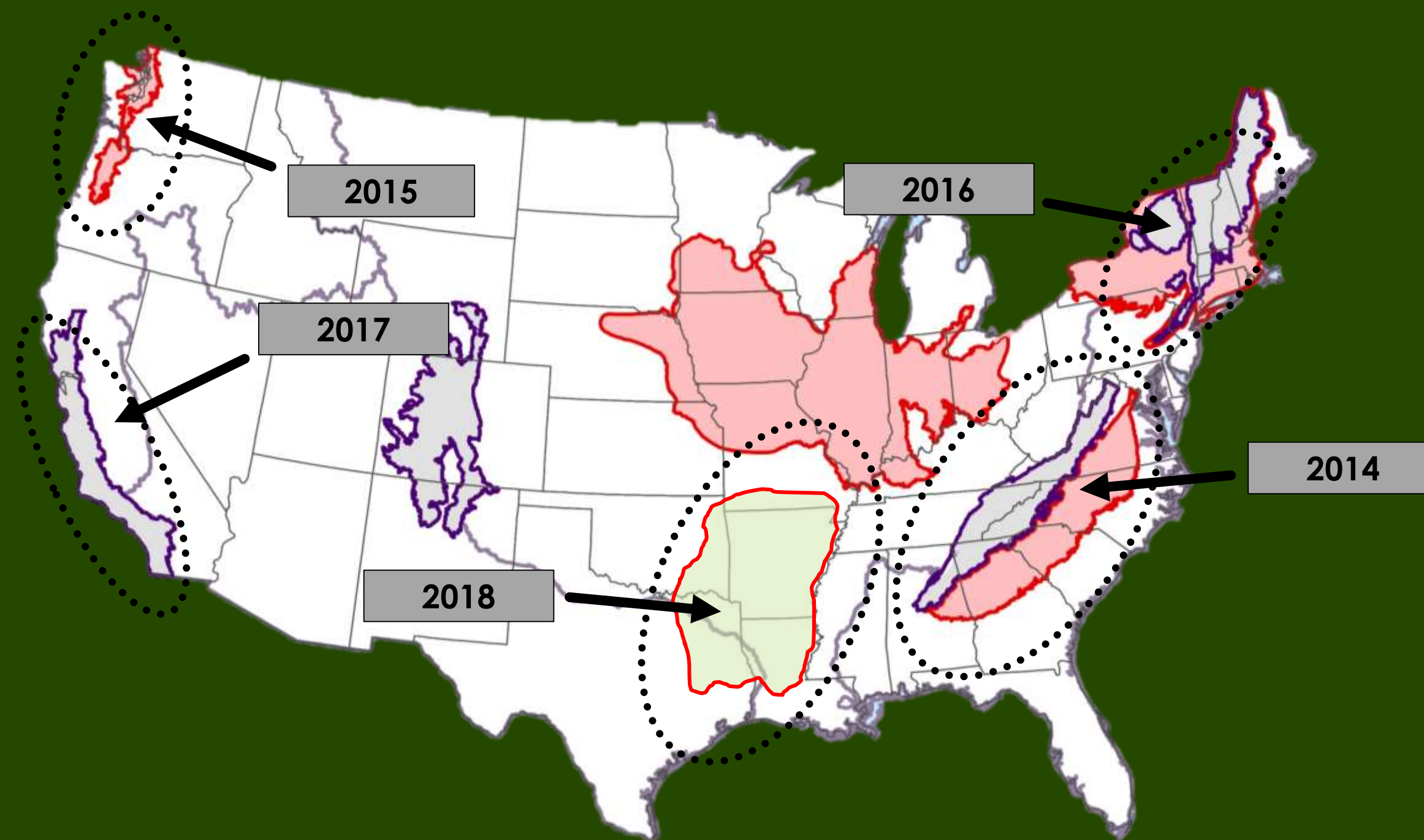
- Assesses the Nation's streams, rivers, and waterways
- Long-term assessments of chemical stressors, pesticides, sedimentation, biological communities, and overall stream health
- Significant science program in USGS



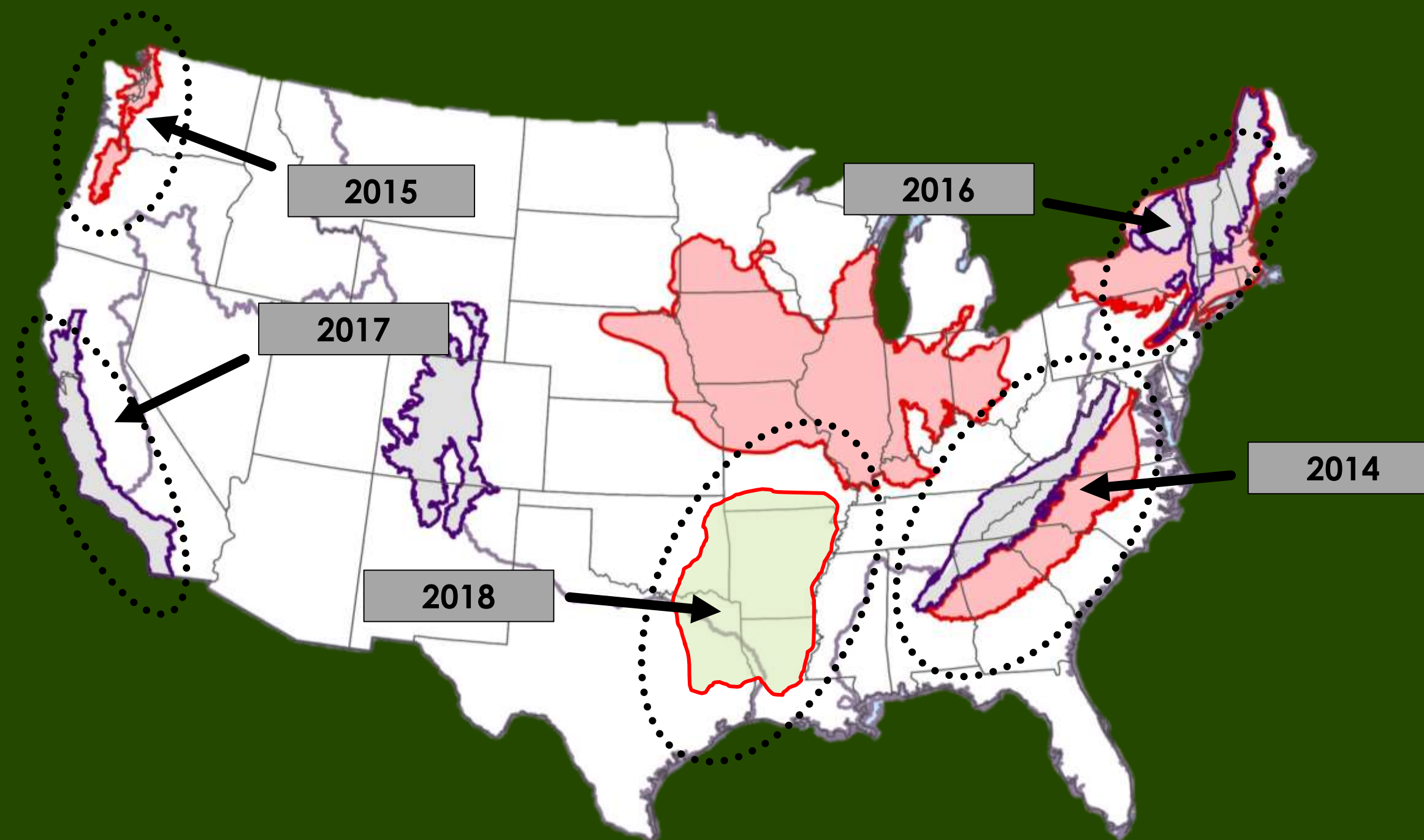
NAWQA Regional Stream Quality: *Field Data Collection*



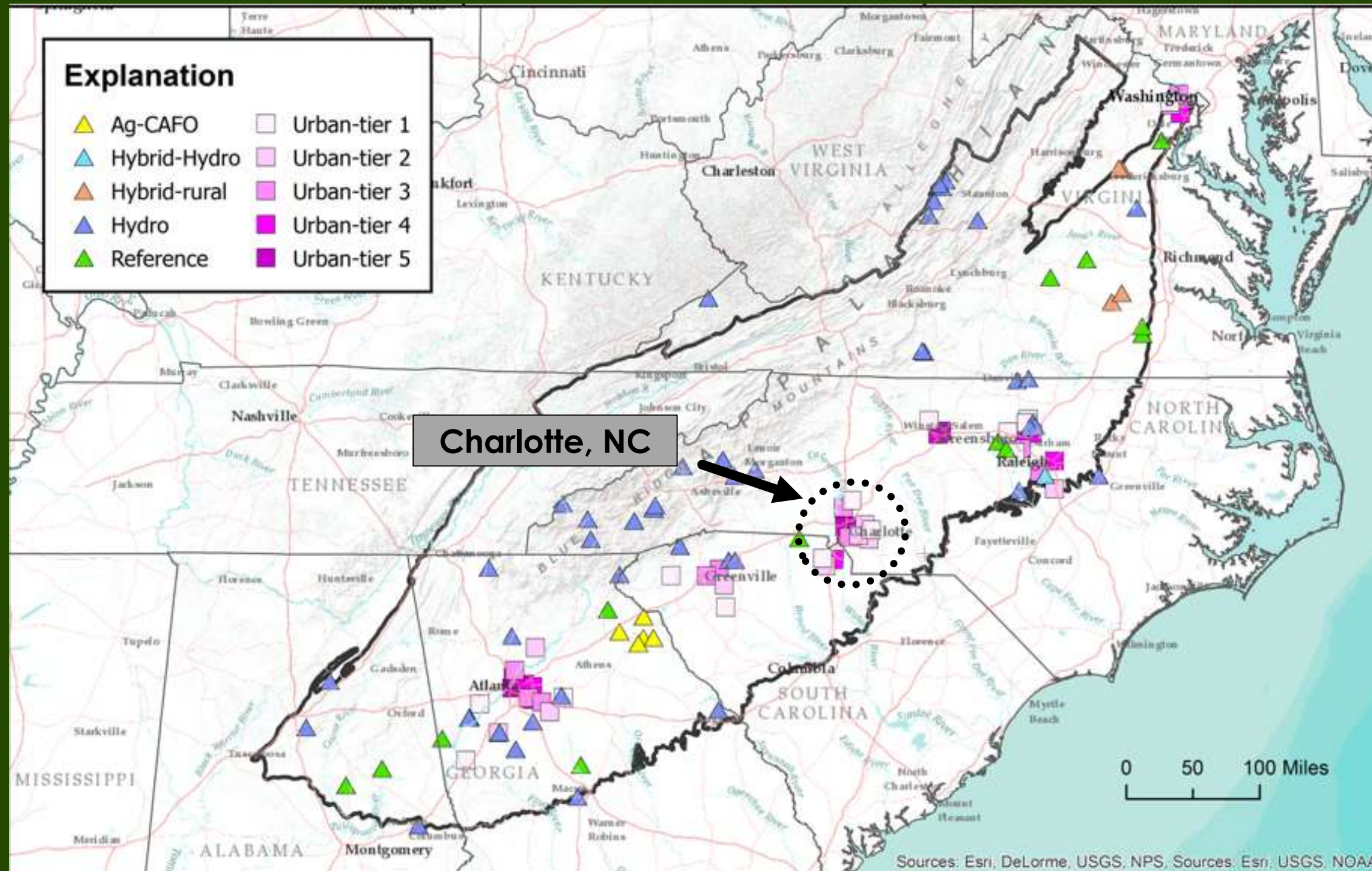
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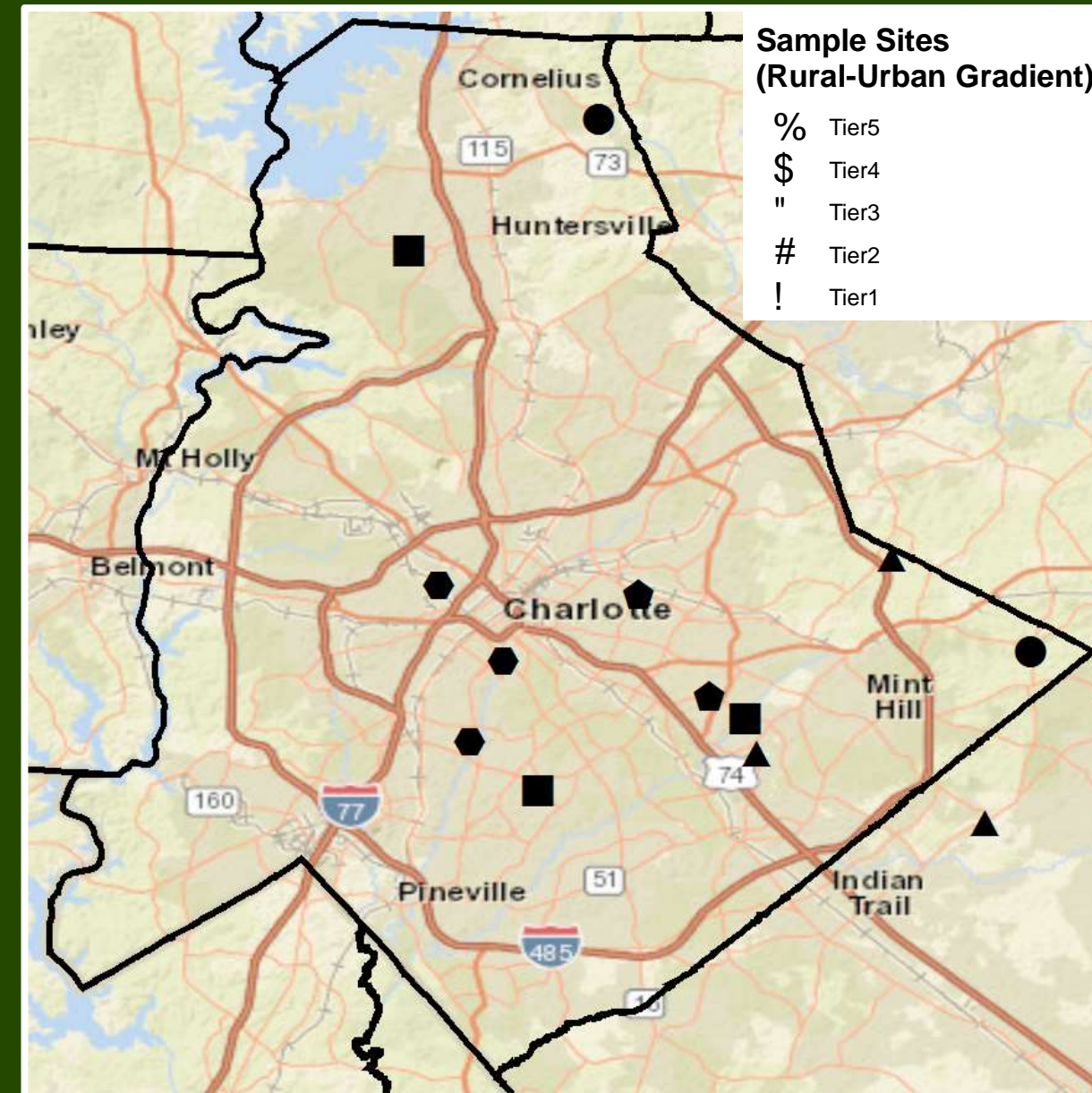


NAWQA Southeast Regional Assessment



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
- $Price = \alpha + H_i\beta_i + N_j\beta_j + L_k\beta_k + WQ_l\beta_l + \varepsilon$
 - 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

- $Price = \alpha + H_i\beta_i + N_j\beta_j + L_k\beta_k + WQ_l\beta_l + \varepsilon$

H: House and property attributes

N: Neighborhood attributes (demographics, socioeconomics)

L: Location attributes (distance to the hospital or open space)

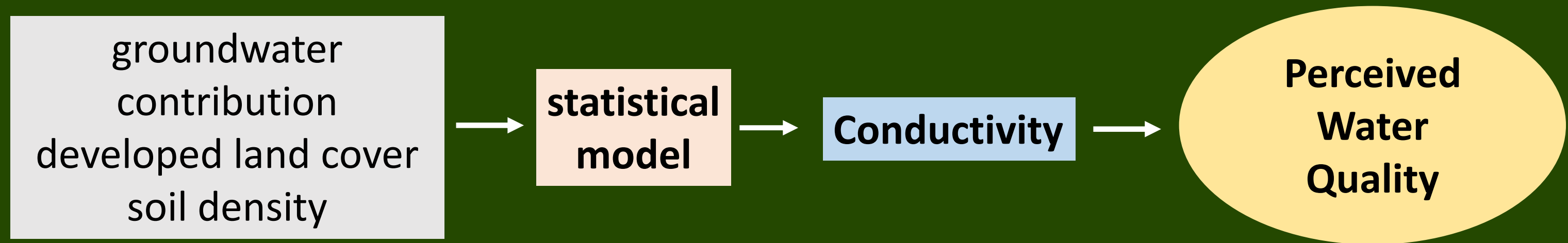
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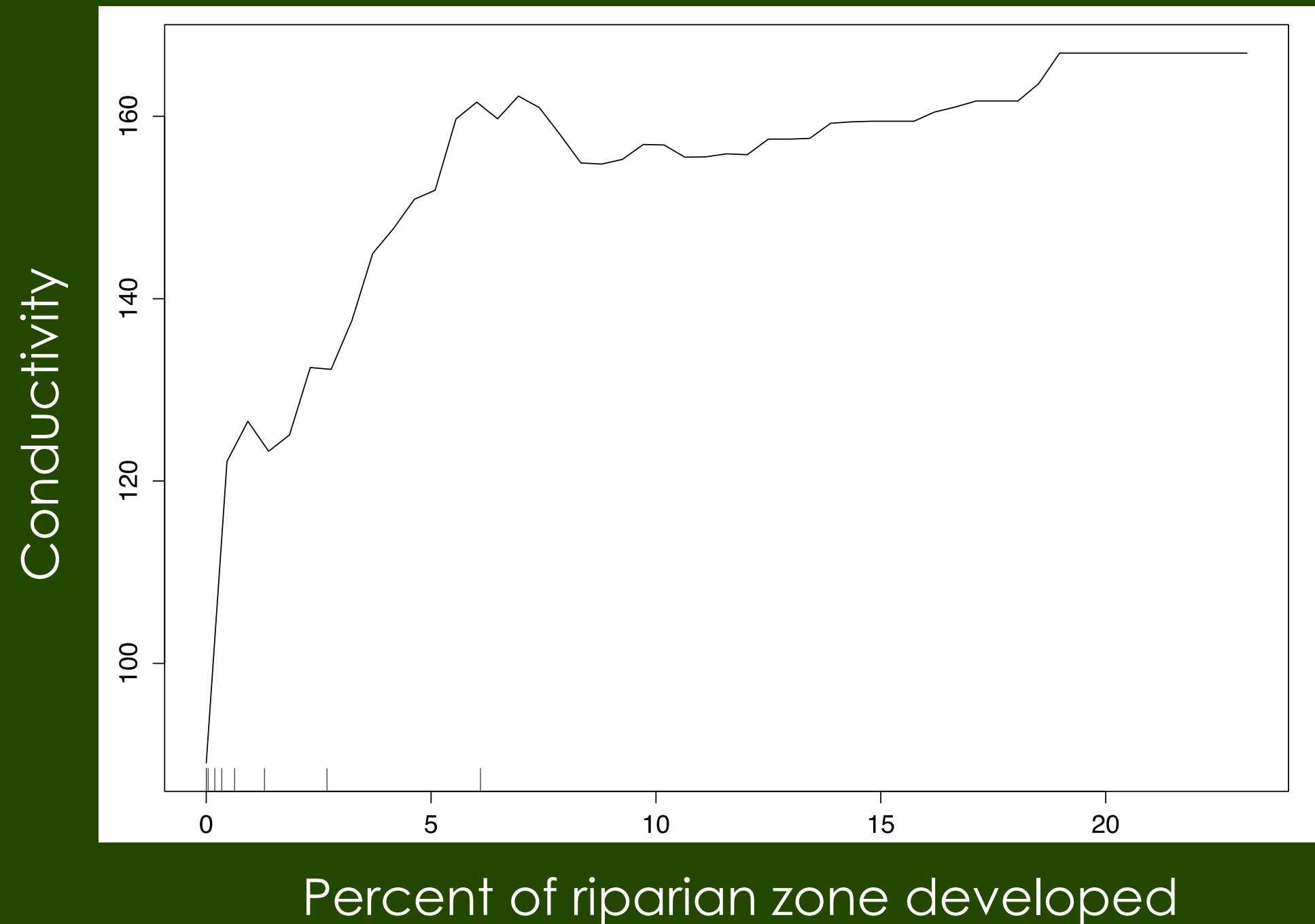
Possible NAWQA Indicators of Stream Quality



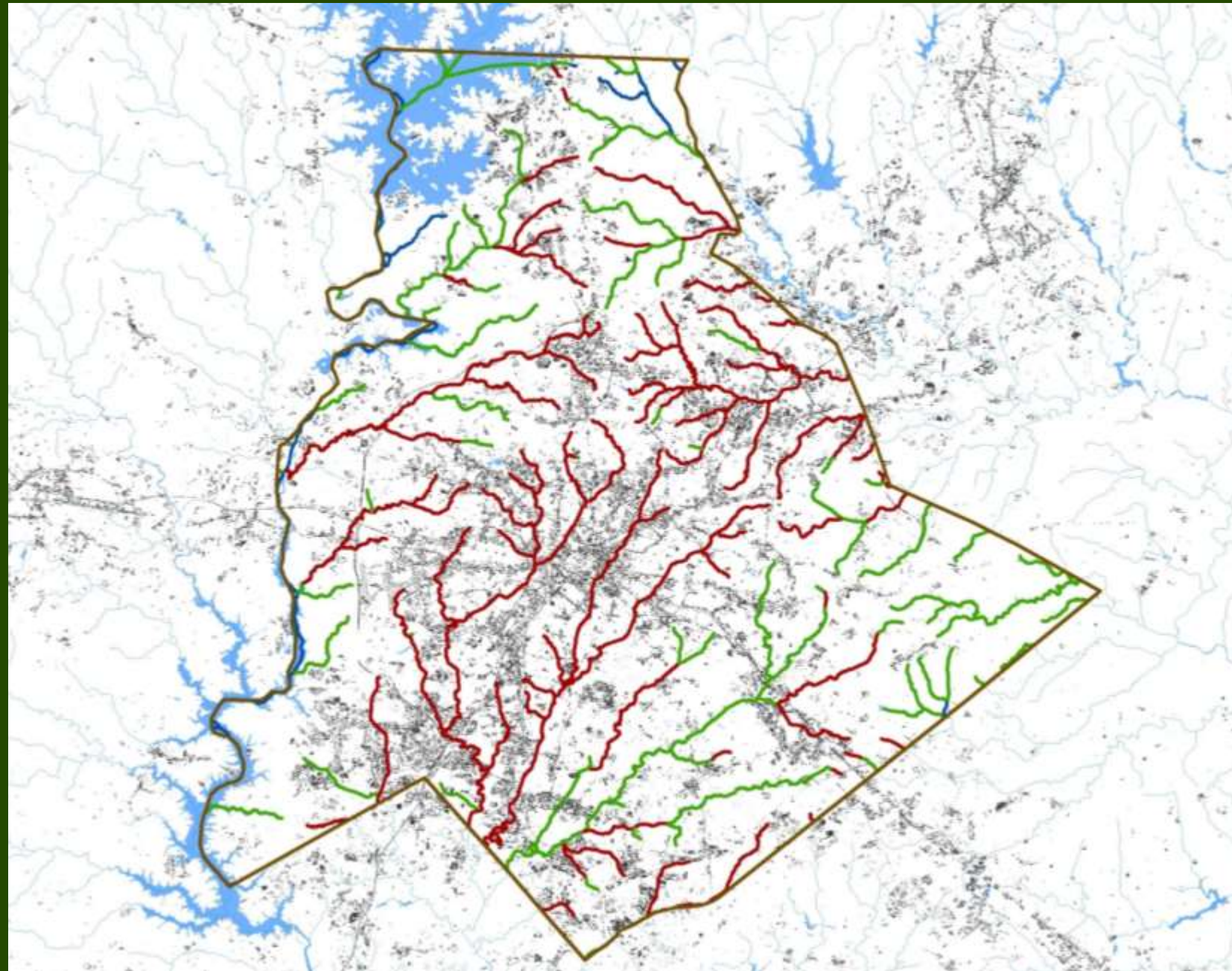
Example WQ Indicator: Conductivity



Environmental Quality Index



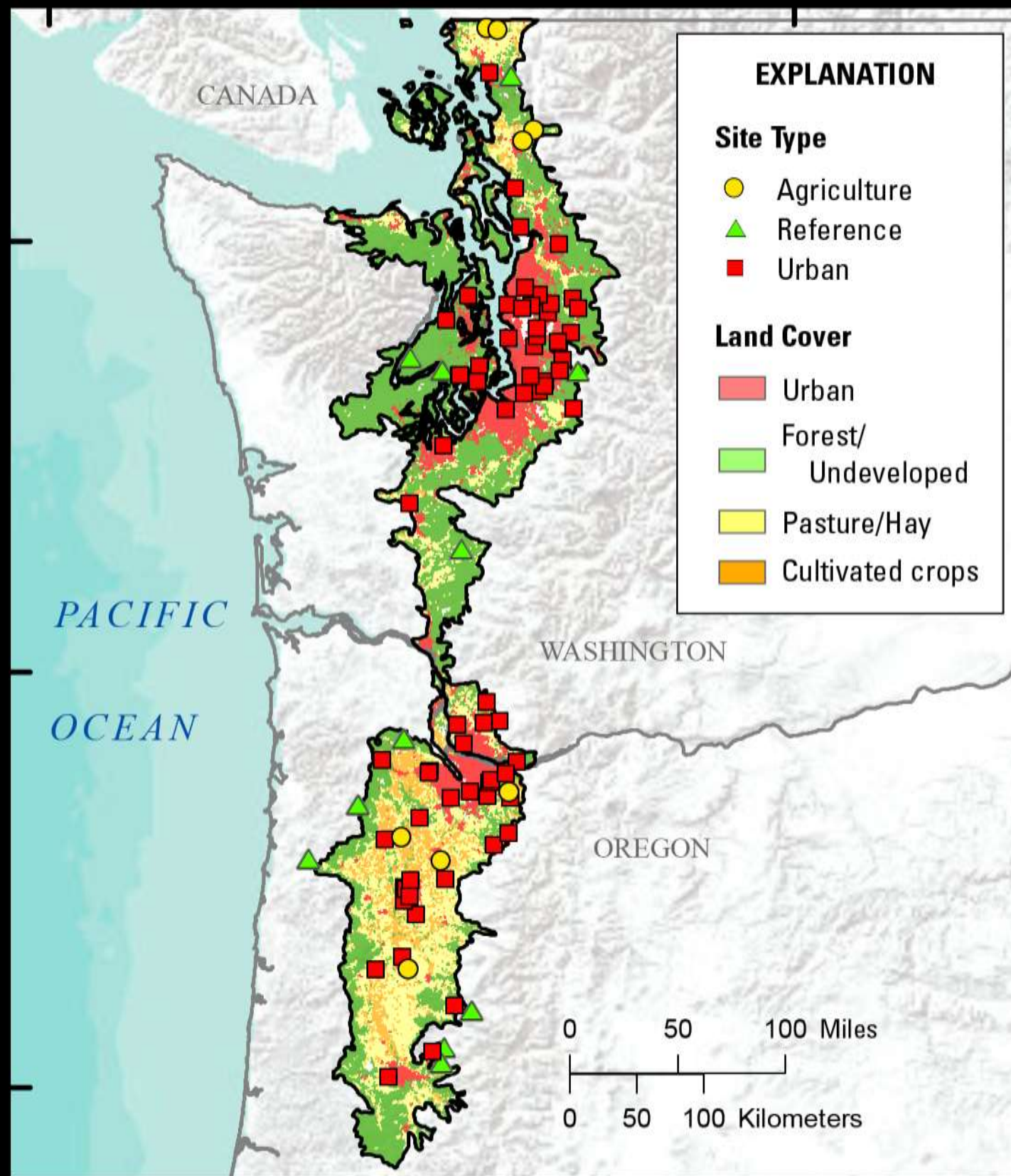
Estimated Conductivity: Mecklenburg County (Charlotte, NC)



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!