Getting Salmon Back in Salmon Creek

systematizing comparative water quality analysis for targeted restoration

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WHY?

• Millions of dollars spent annually on restoration and green infrastructure efforts

• Limited funding for monitoring

• Efficacy of restoration efforts minimally understood
  – Are we prioritizing restoration efforts appropriately?
Project Context – Simplifying Complexity

- Land Cover Change
  - Extent
  - Type
  - Distribution

- Restoration
  - Extent
  - Type
  - Goals

- Cultural and Institutional Policies
  - Sphere of influence/Networks
  - Perceptions
  - Policy instruments

- Climate – Hydrology
  - Precipitation
  - Flow volumes
  - Types/Features

- Geomorphological variation
  - Soils
  - Topography
  - Geology

- Stormwater Systems
  - Type
  - Extent
  - Distribution

- Water Quality
  - Biotic Integrity
  - Abiotic Measures
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Figure 3  Three spatial scales widely used in relating landscape variables to some physical or biological measure of stream condition. The catchment typically is a subcatchment of a larger basin. Buffer widths of 100–200 m (each bank) are common. Modified from Morely & Karr (2002).

What is the value of existing data?

- How best to patch together existing data sets?
  - Just using Metro as a case study we have 4 distinct data sets to combine of 12 abiotic variables and a number of biotic indices
  - Problems with aggregate indices

- How can we systematically examine trends in existing data sets?
  - Consequence of spatial and temporal scales?

- What explanatory variables can we use?
  - Land Use, Policy, Etc
  - *Novel distance weighted metrics*
Inverse Distance Weighting

Blend known physical interactions with A statistical metric

A first order approximation for understanding the impacts of patterns of land use on process of water quality degradation

A cell (of any attribute) farther away has less weight than one closer to the stream channel

Includes slope as proxy for flow rate
And distance as proxy for signal degradation effects
Outcomes

• A solid comparative framework to analyze
  – Trends in abiotic and biotic indicators of water quality
  – Statistical relationships to explanatory variables of
    • Distance weighted land use
    • Land management policy
    • Restoration types and extents

• Leading to:
  – Data gap identification
  – Prediction of restoration impacts