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# Getting Salmon Back in Salmon Creek: Systematizing Comparative Water Quality Analysis for Targeted Restoration


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# Getting Salmon Back in Salmon Creek



systematizing comparative water quality analysis for targeted restoration

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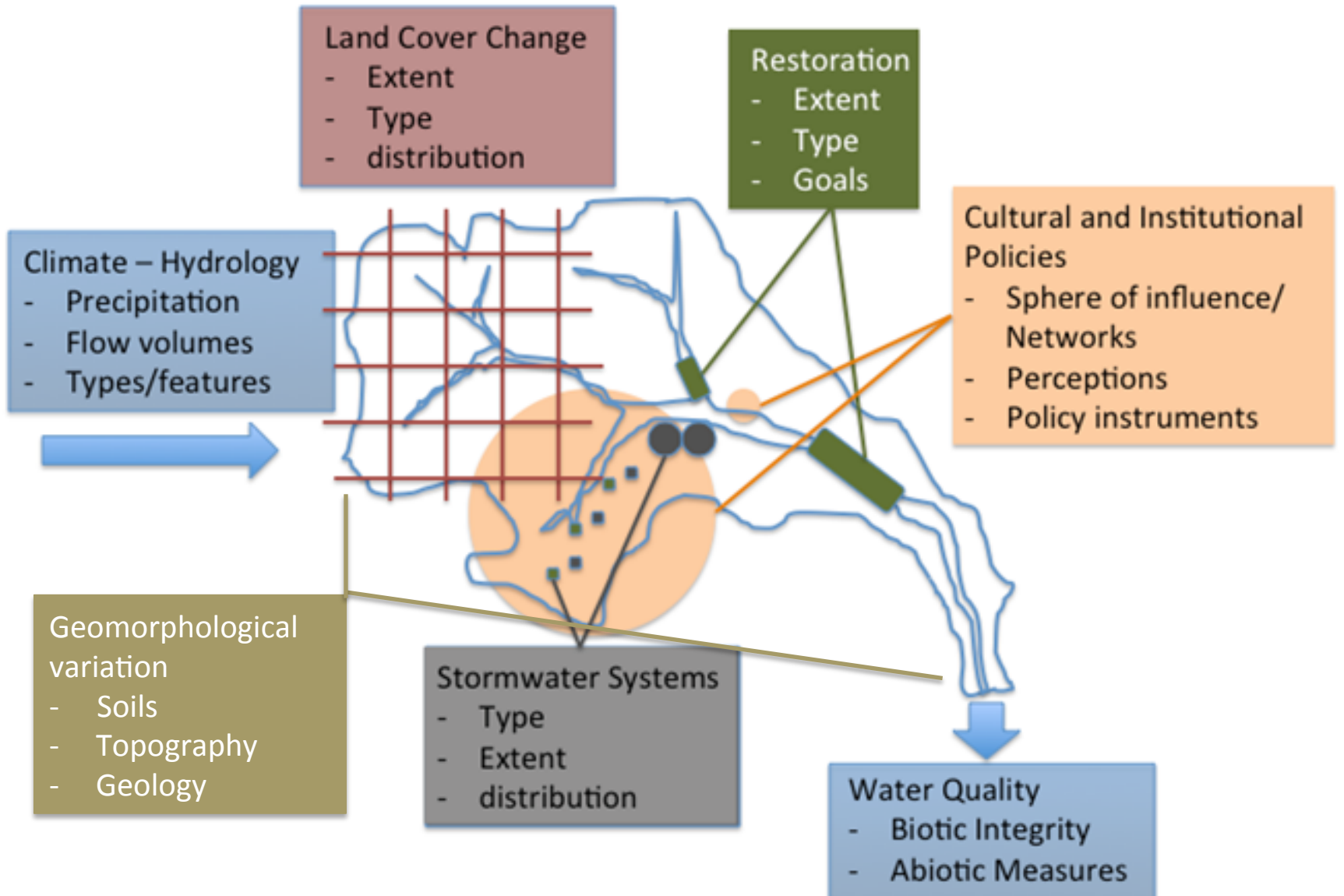


**IGERT**  
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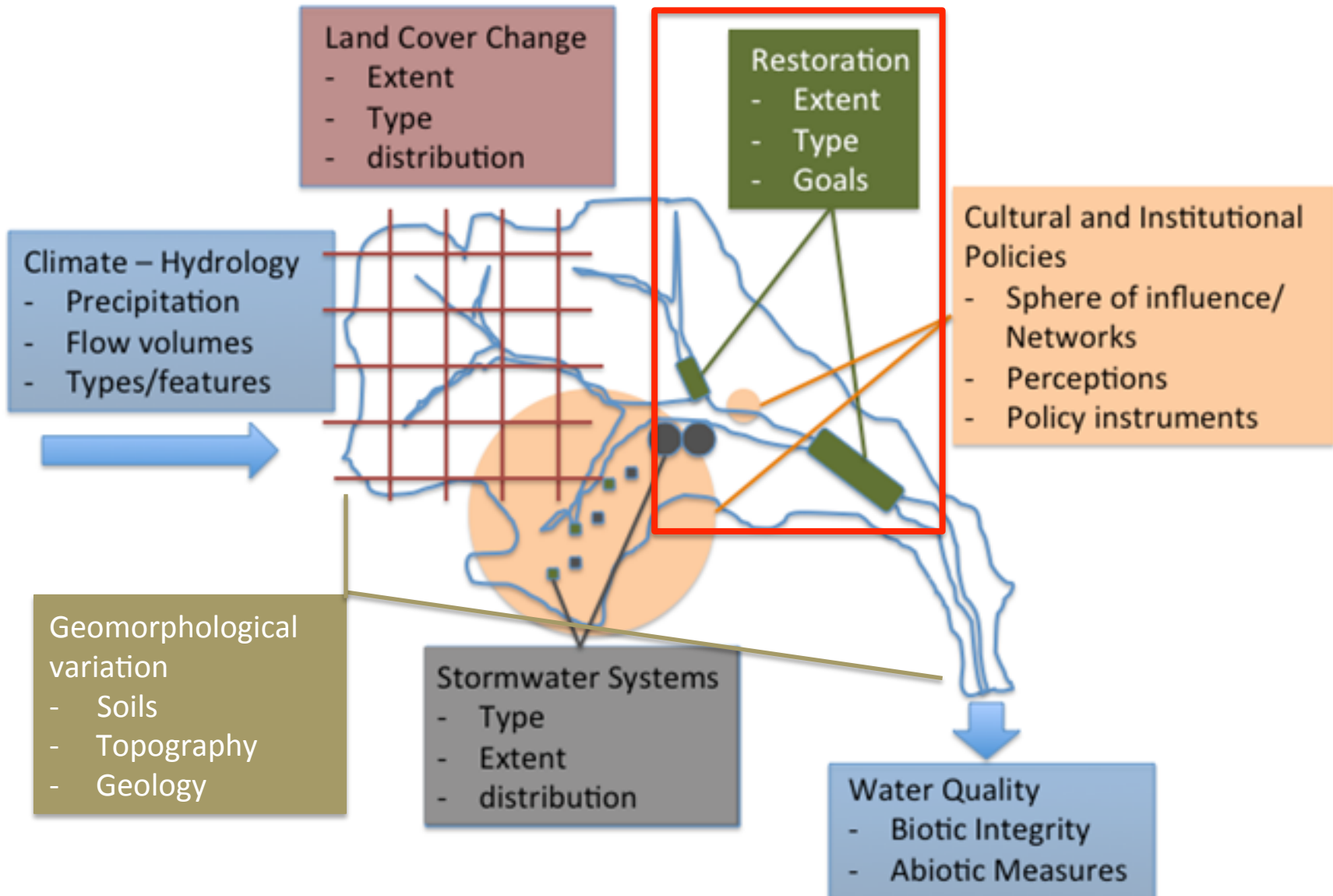
# WHY?

- 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?

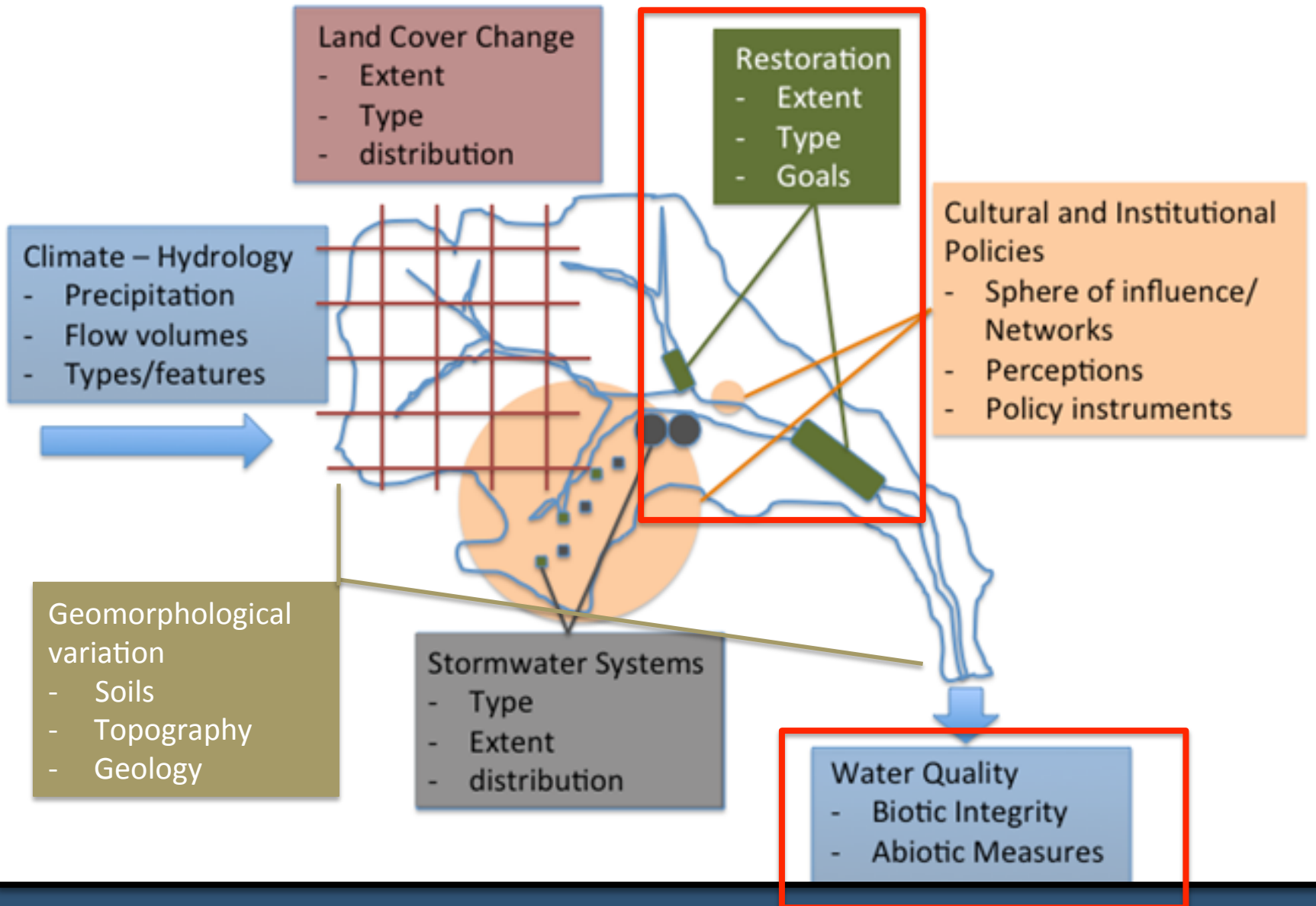
# Project Context – Simplifying Complexity

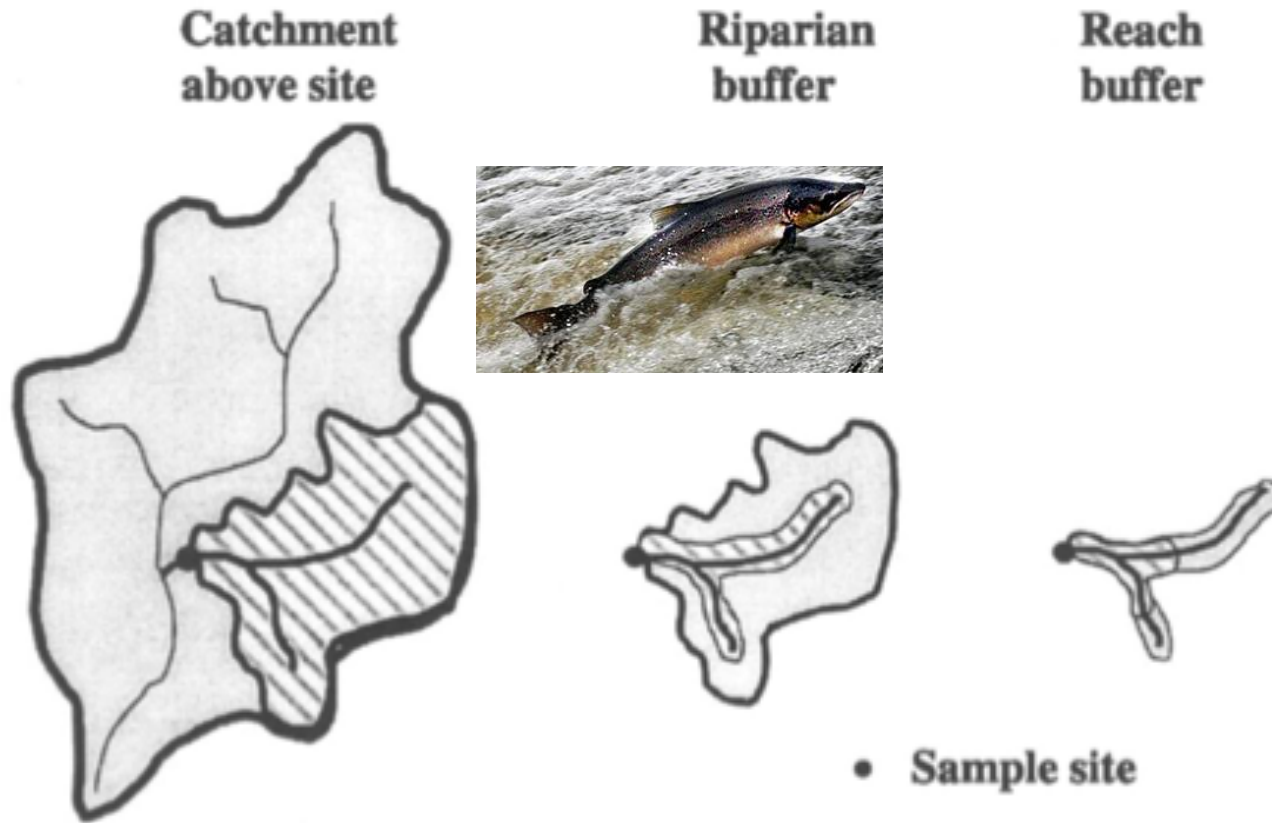
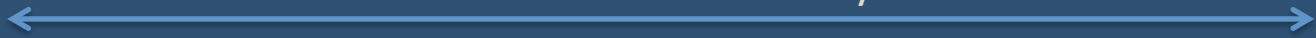


# Project Context – Simplifying Complexity



# Project Context – Simplifying Complexity





**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).

Modified from Allan, D. 2004. Landscapes and Riverscapes: The influence of land use on stream ecosystems. *Annual Review of Ecology, Evol and Systematics* 35. (picture from salmonaid.org)

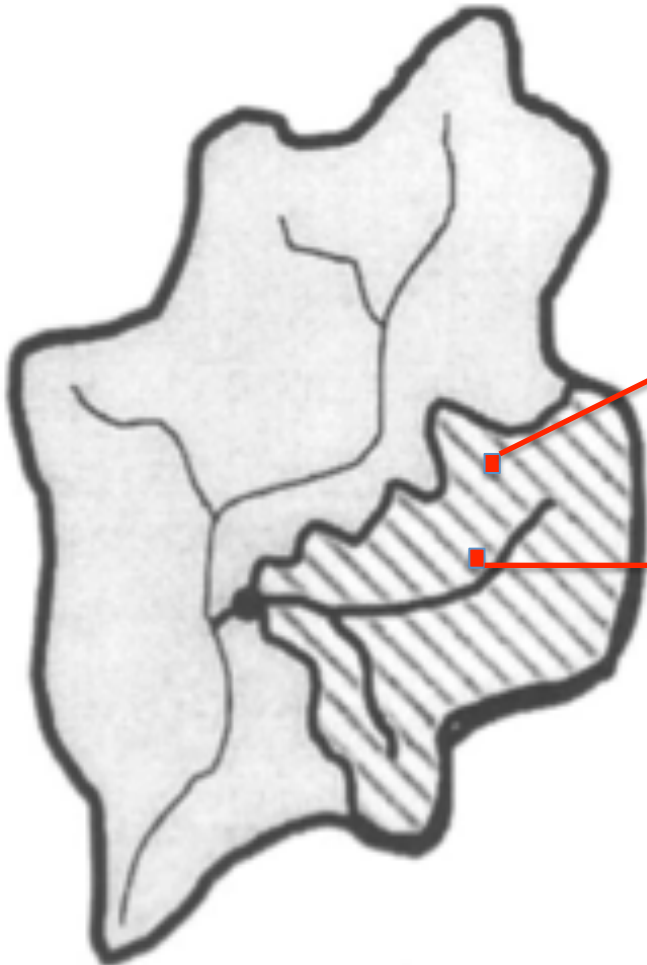
# What is the value of existing data?

- 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

**Catchment  
above site**



Blend known physical interactions with  
A statistical metric

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

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

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