# Implementing a Cost Effective GIS-Based River Classification Technique

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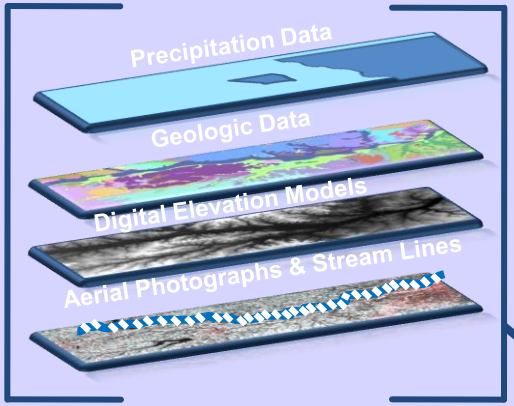
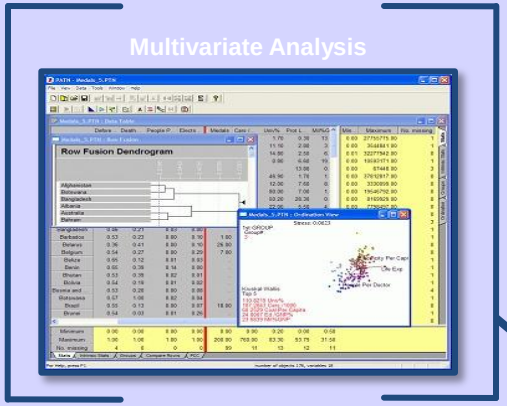
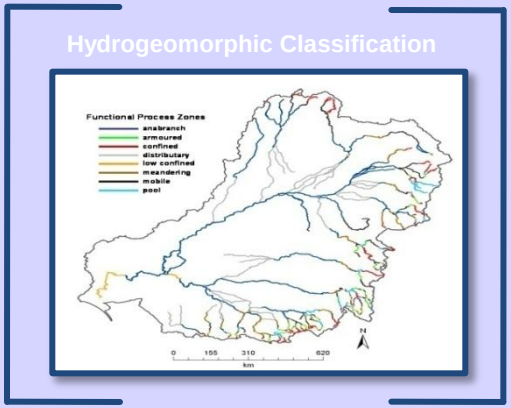


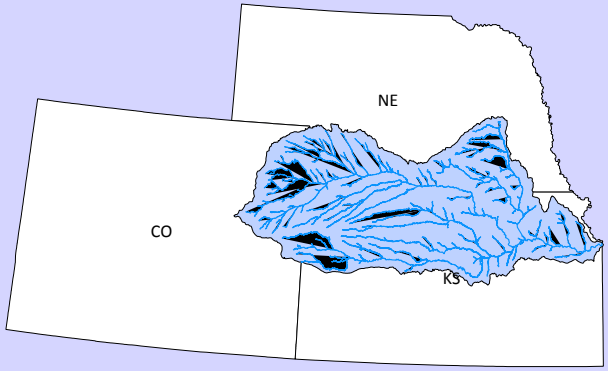



# Introduction

- The complexity of riverine landscapes makes catchment scale management plans difficult to design and implement

- River classification can aid in the development of management plans

- Current classification schemes
  - require expensive field measurements
  - often rely on subjective “judgment calls”
  - ignore geomorphology
  - lack an underlying ecological theory

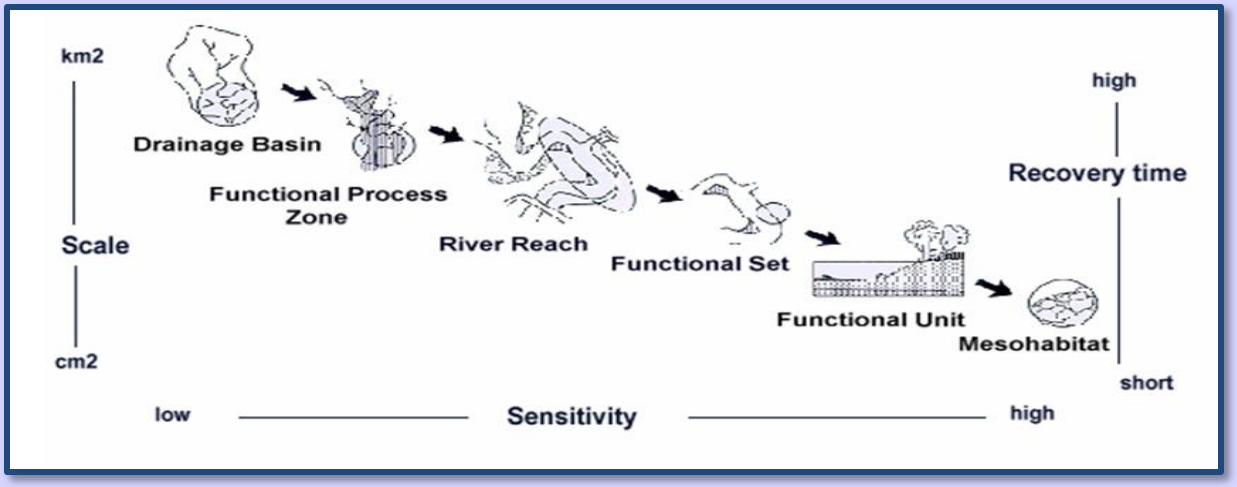


# Introduction

- We are currently evaluating a cost effective and objective GIS based river classification technique

- This technique is designed to identify **functional process zones (FPZs)** within river networks

- FPZs are hydrogeomorphic patches that occur between the catchment and reach scales and can be objectively identified using multivariate statistics

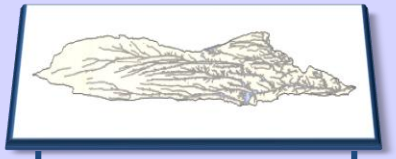


# Methods

## Data Layers

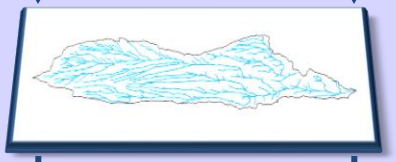
Precipitation Data

Geologic Map

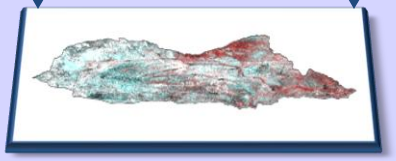


DEM

Stream Lines



Aerial Photographs



## Hydrogeomorphic Variables

| Scale | Variable |
|---|---|
| Catchment | Mean Annual Precipitation |
| | Geology |
| River Valley | Elevation |
| | Valley Width |
| | Valley Floor Width |
| | Valley Side Slopes |
| | Down Valley Slope |
| | Ratio of Valley Width to Valley Floor Width |
| River Channel | Wavelength of the Channel Belt |
| | Sinuosity of the Channel Belt |
| | Width of the Channel Belt |
| | Sinuosity of the River Channel |
| | Channel Planform |
| | Number of Channels |

# Methods

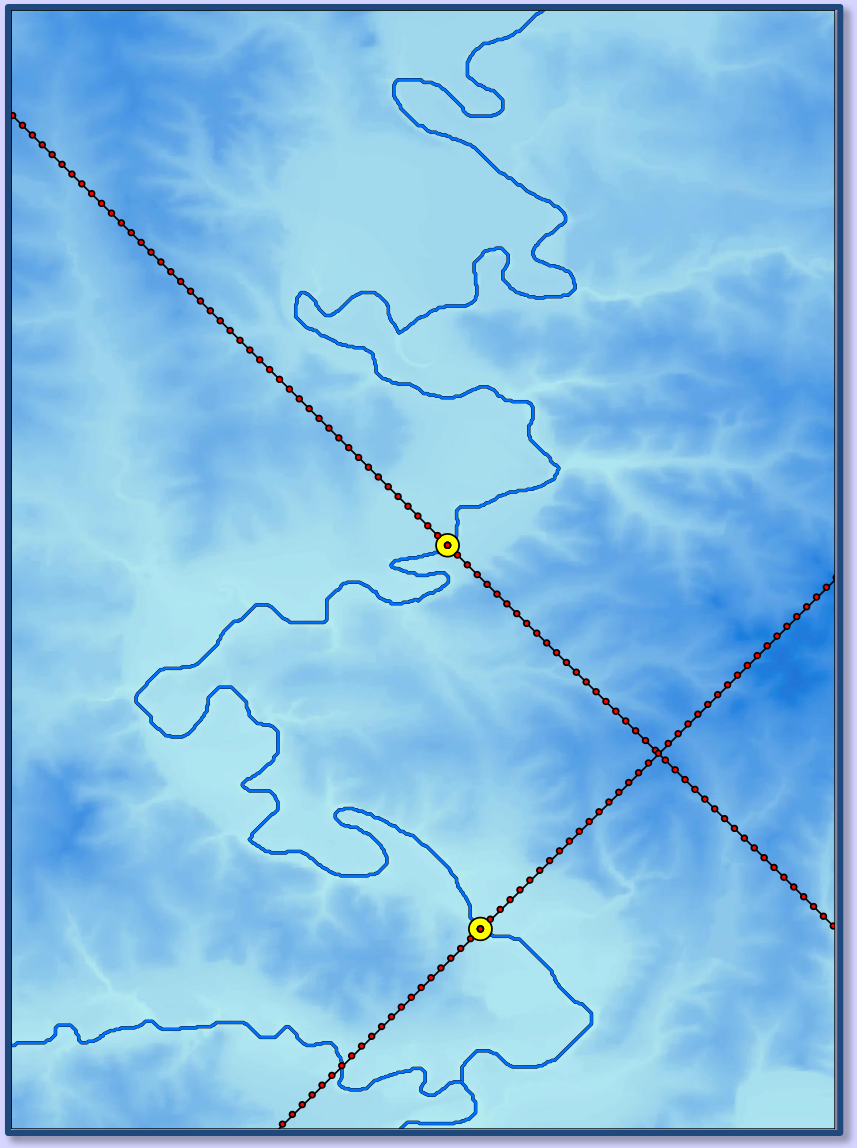
## Automated Data Extraction

- Sample points generated at 10-km intervals

- 30-km sample transects generated at each point

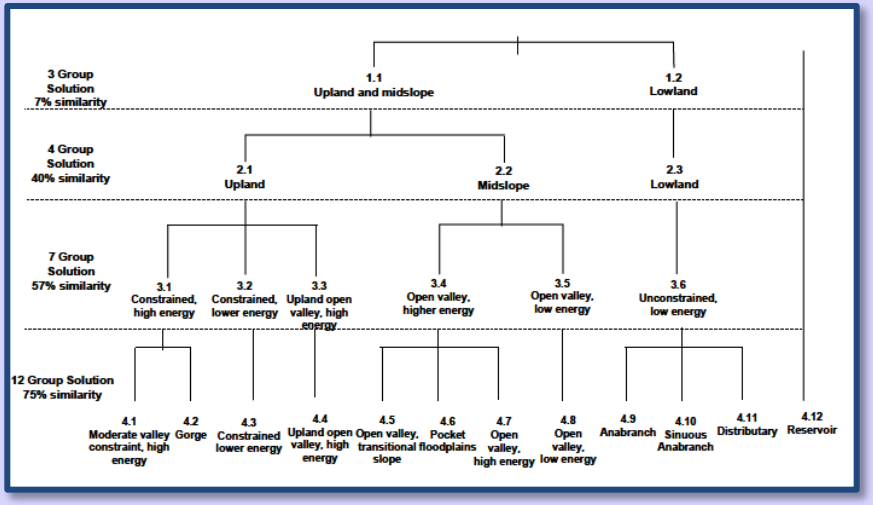
- Visual Basic scripts calculate variables from points, transects, and segments

- Planform and # of channels supplied by user



# Statistical Analysis

- UPGMA (Flexible-Unweighted Pair-Groups with Arithmetic Averages) is used to identify groups of sample segments with similar hydrogeomorphic characteristics (i.e., FPZs)



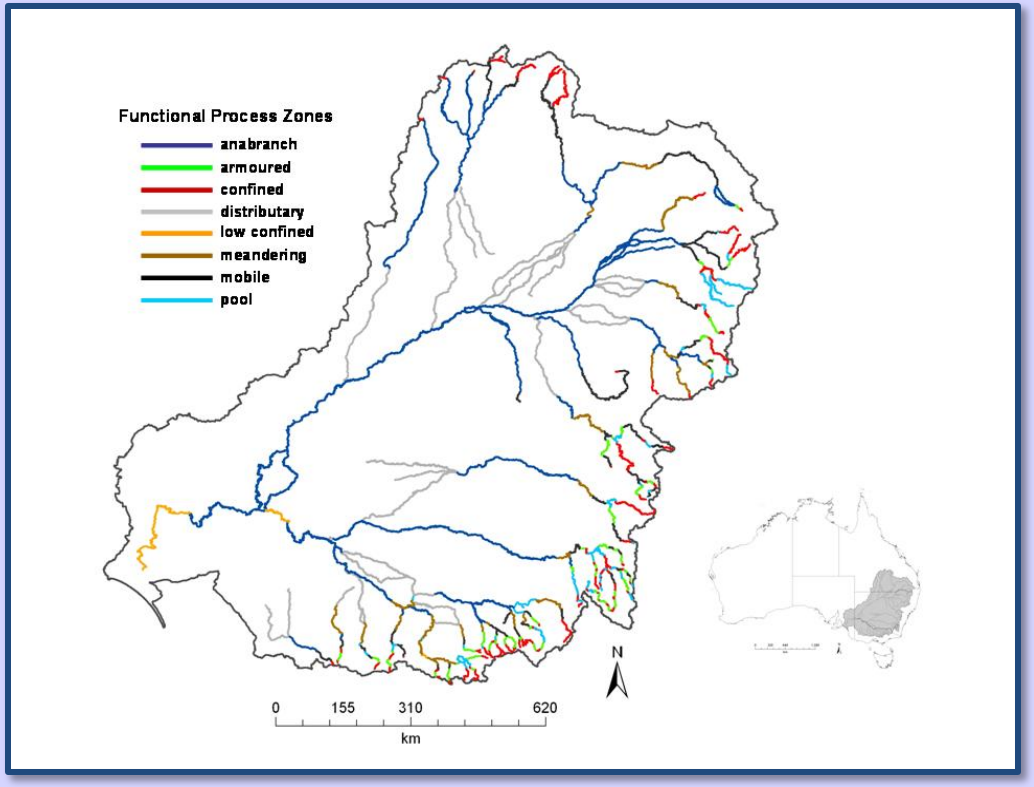

Example grouping analysis from the Namoi River catchment, Australia
(Courtesy of Martin Thoms)

-The validity of the groups is then assessed with Multidimensional Scaling

# Generating FPZ Maps

- Sample segments coded by FPZ and mapped

- Names assigned based on hydrogeomorphic features




Example FPZs of the Murray-Darling catchment, Australia (courtesy of Martin Thoms)

# Future Directions

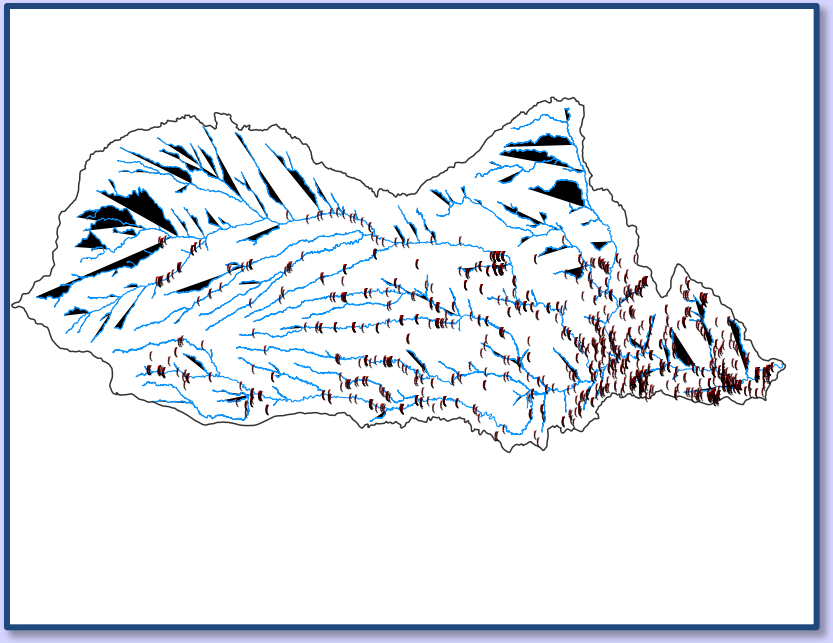
## Contribution to Catchment Scale Management Plans

- Provide a framework for evaluating ecosystem services

- Aid in the selection of appropriate sampling and reference sites

- Guide managers by providing an appropriate spatial scale for applying watershed management & rehabilitation

## Examining the ecology of FPZs using the Riverine Ecosystem Synthesis



Points indicate the availability of fish and macroinvertebrate community data