

Mainstem Channel Geometry

Overview of Procedure

1. Geomorphic units defined on terrain/photobase
2. SRH-2D model run at 4000 cfs for the full 40 miles
3. WSELs at mesh nodes used to create grid in ArcMap
4. WSEL grid overlain on 2012 terrain to create depth grid
5. Depth grid clipped to depth ≥ 2.5 ft
6. Depth grid points aggregated to create edge polygon
7. Depth grid split into geomorphic units
8. Grid points exported to ascii
9. Perl script computes summary depth statistics
10. Statistics analyzed to classify unit types

Mainstem Channel Geometry

Initial Products

Delineation of 226 geomorphic units

Lengths and slopes of geomorphic units (L , S)

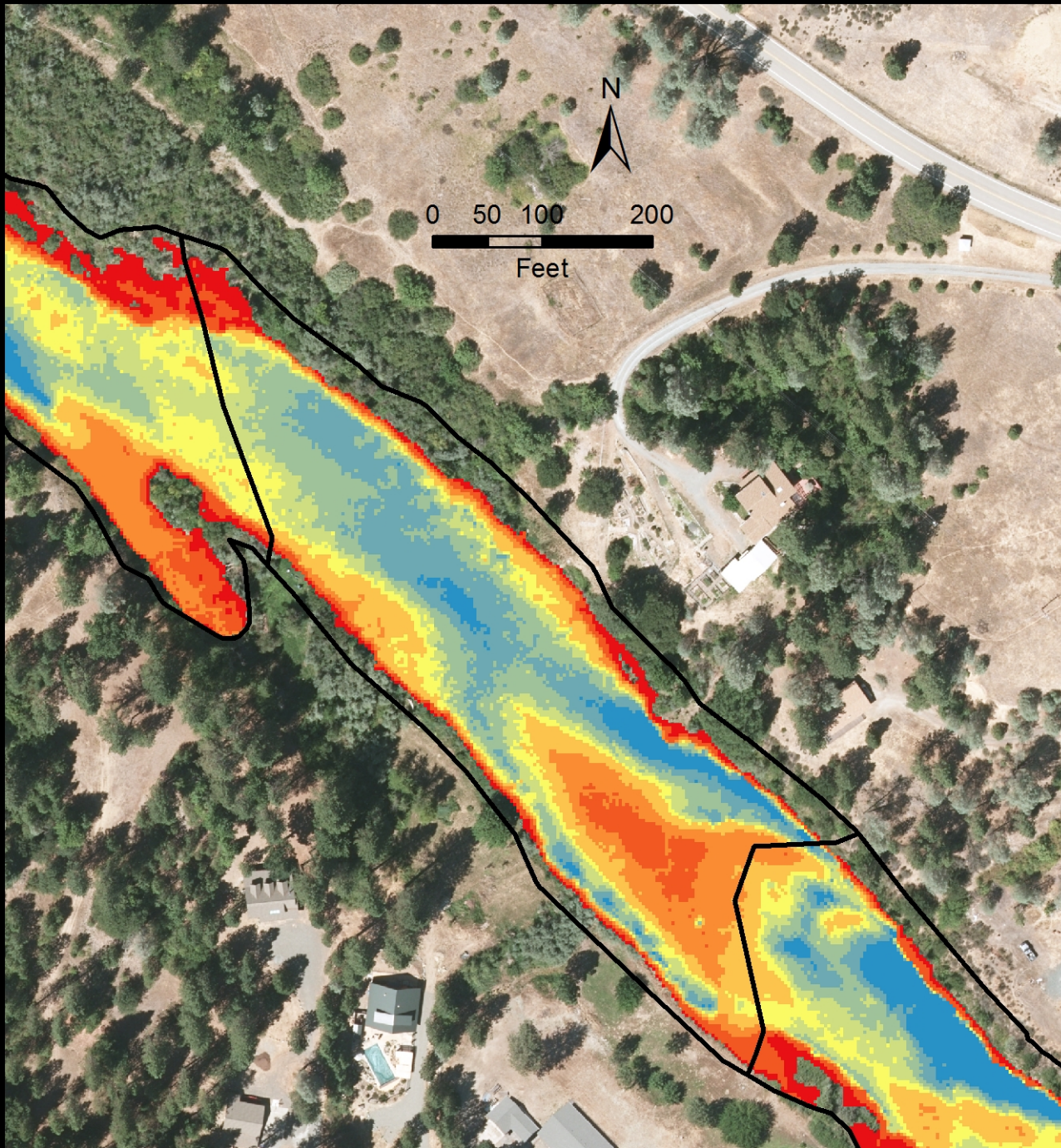
Mainstem shore length per unit length at approximately 1500-2000 cfs (E^*)

Depth statistics:

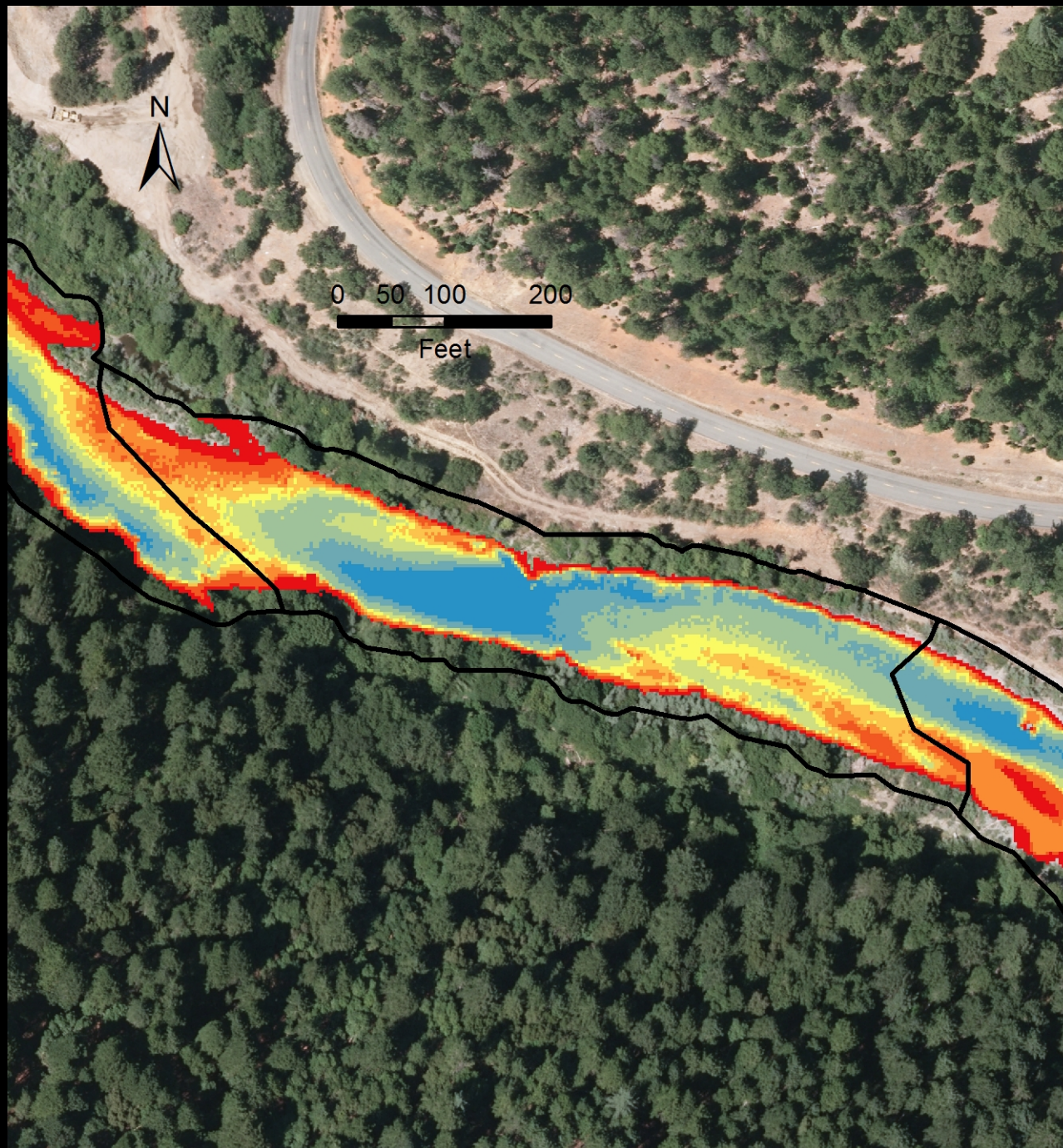
Average, standard deviation, median (h_{50}), skew
10th, 25th, 75th, and 90th percentiles (h_{10} , h_{25} , h_{75} , h_{90})

$$\text{IQR}^* = (h_{75} - h_{25}) / h_{50}, \text{IDR}^* = (h_{90} - h_{10}) / h_{50}$$

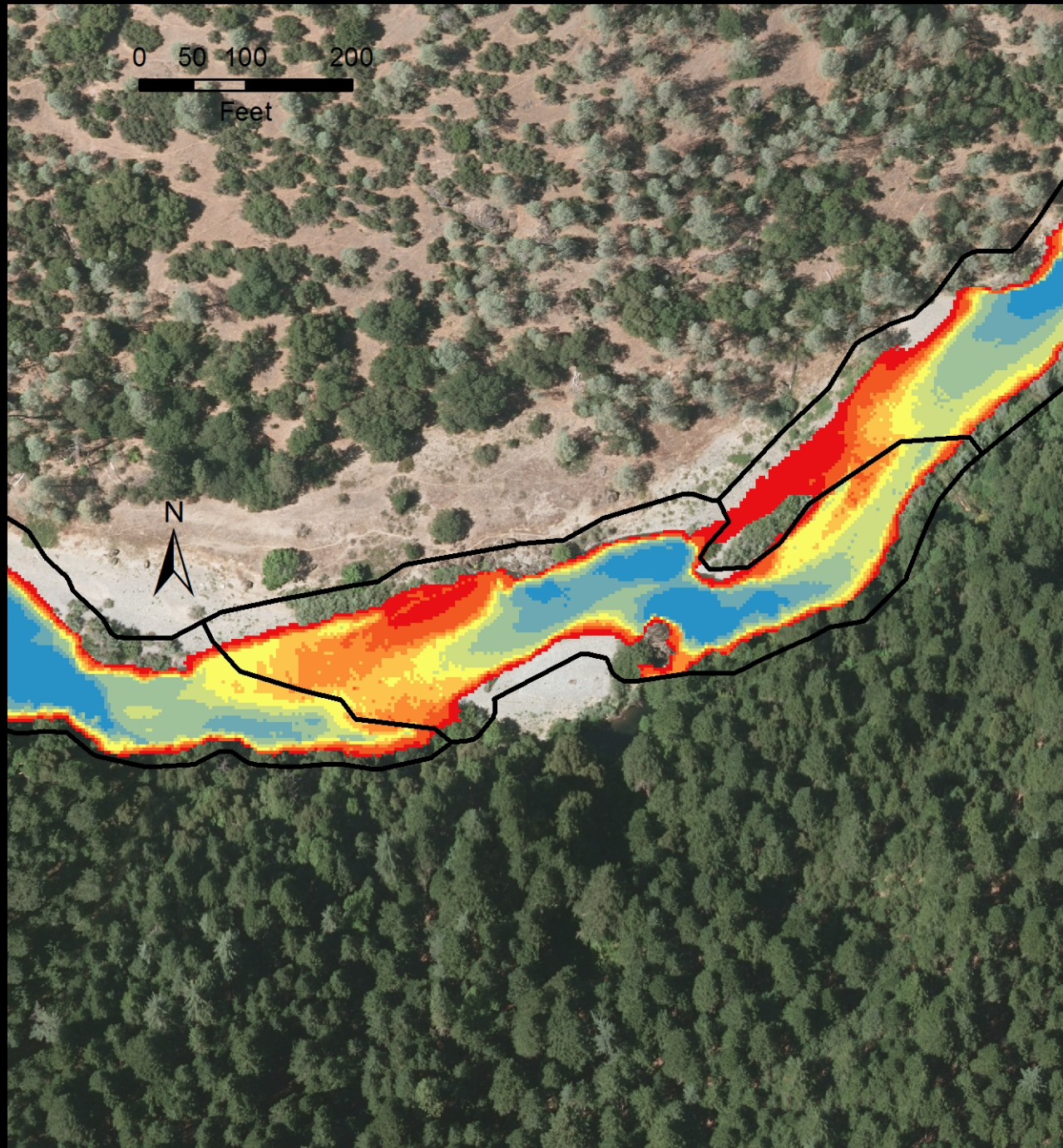
$$R^* = (\text{IQR}^* + \text{IDR}^*) / 2$$



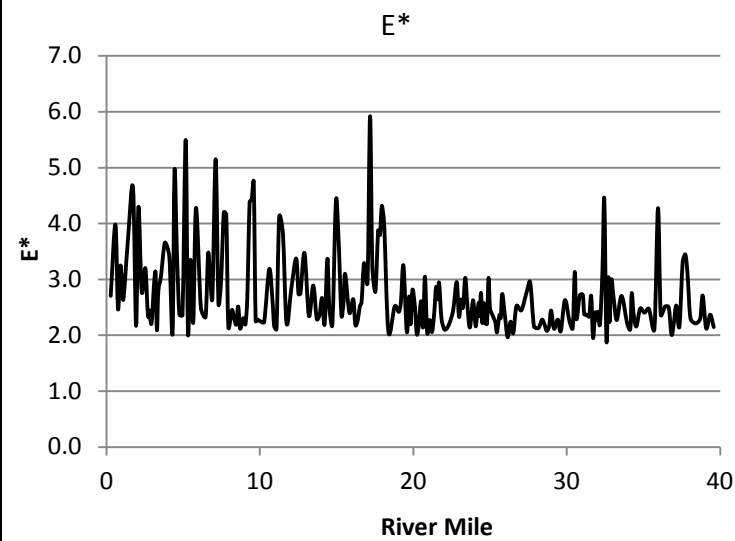
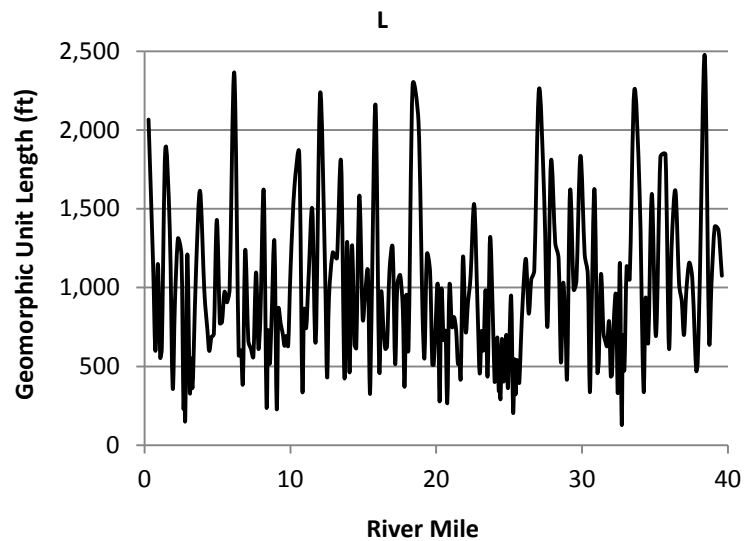
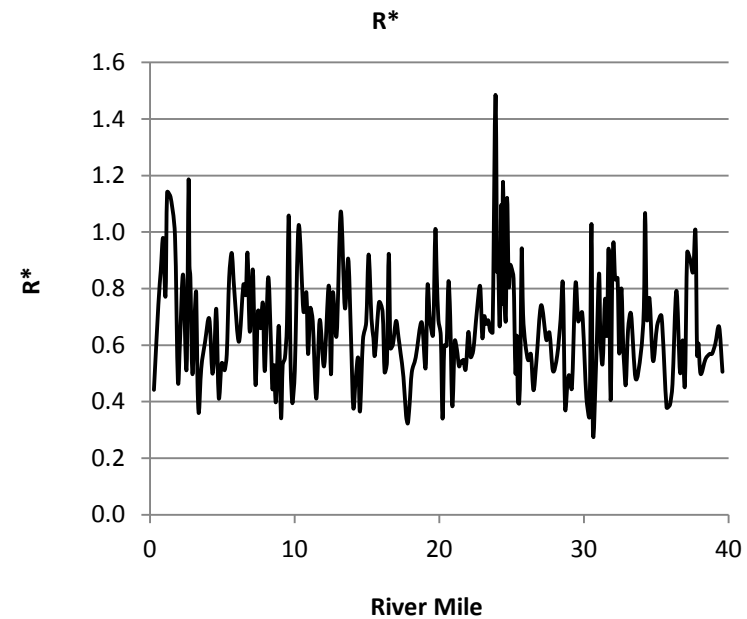
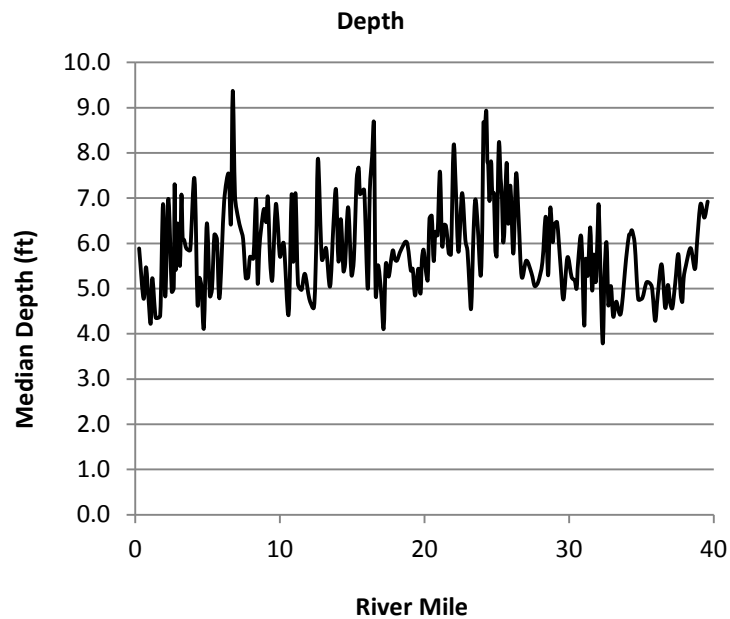
$$h_{50} = 6.08 \text{ ft}$$
$$R^* = 0.36$$



$$h_{50} = 6.41 \text{ ft}$$
$$R^* = 0.53$$

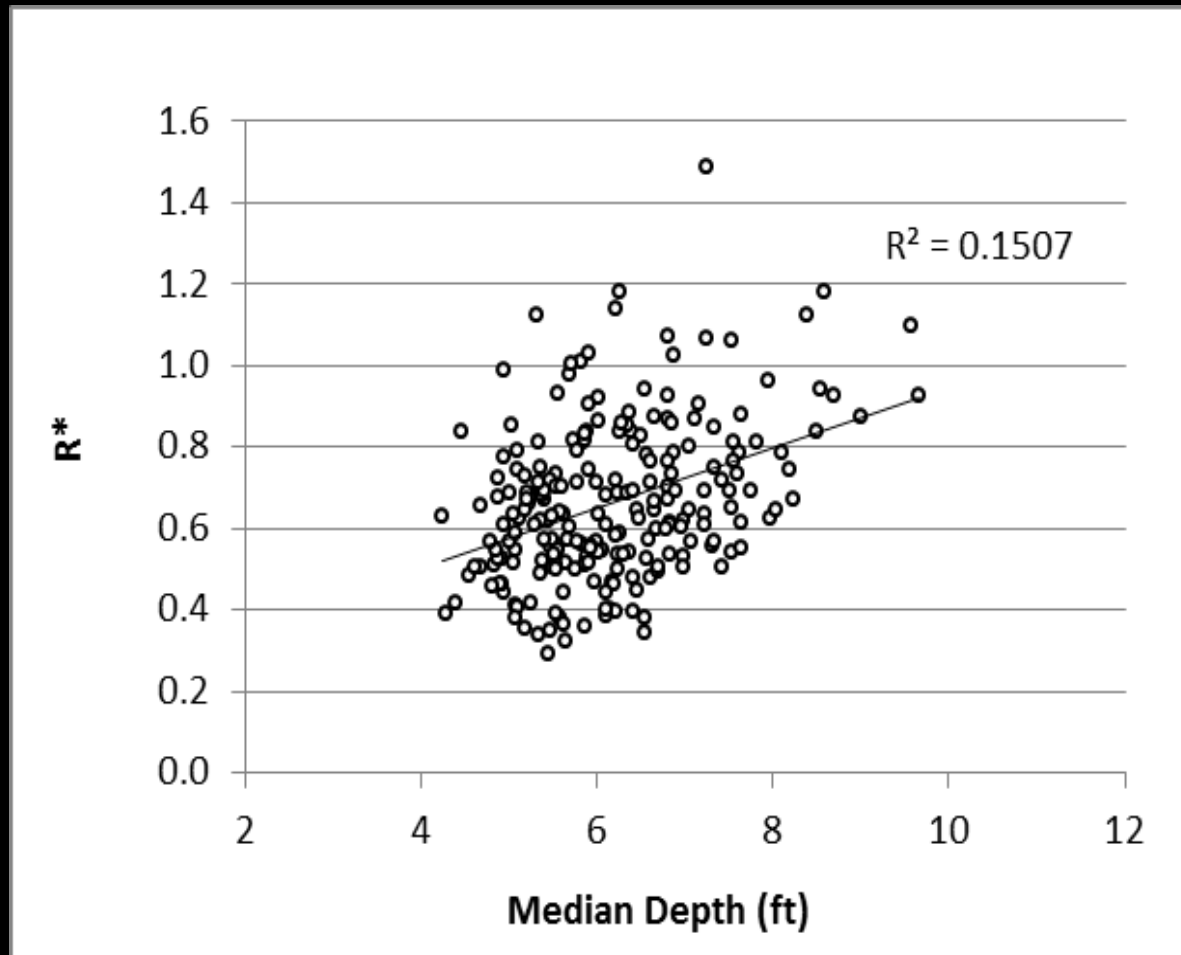


$$h_{50} = 5.72 \text{ ft}$$
$$R^* = 0.87$$

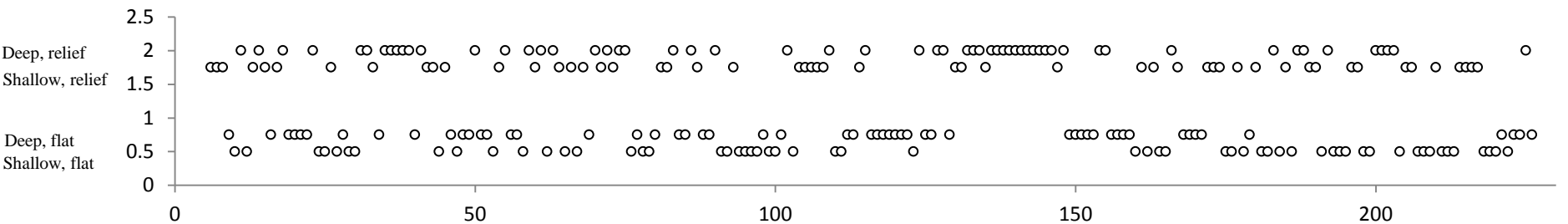
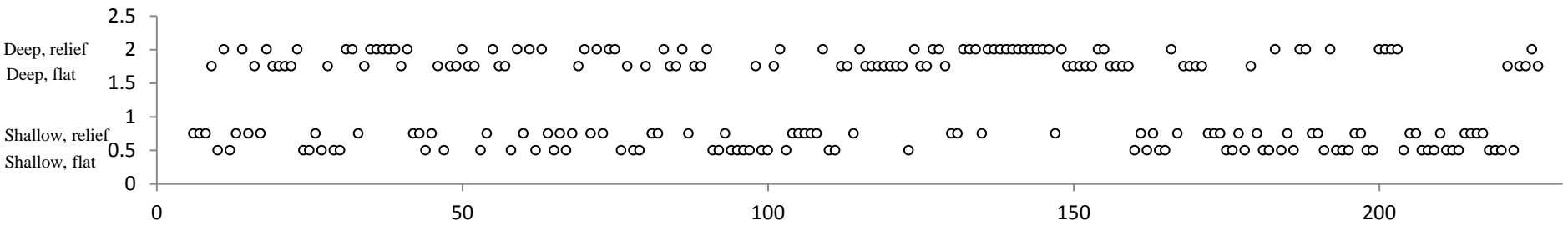


Objective 1: Identify zones with broadly similar channel morphology

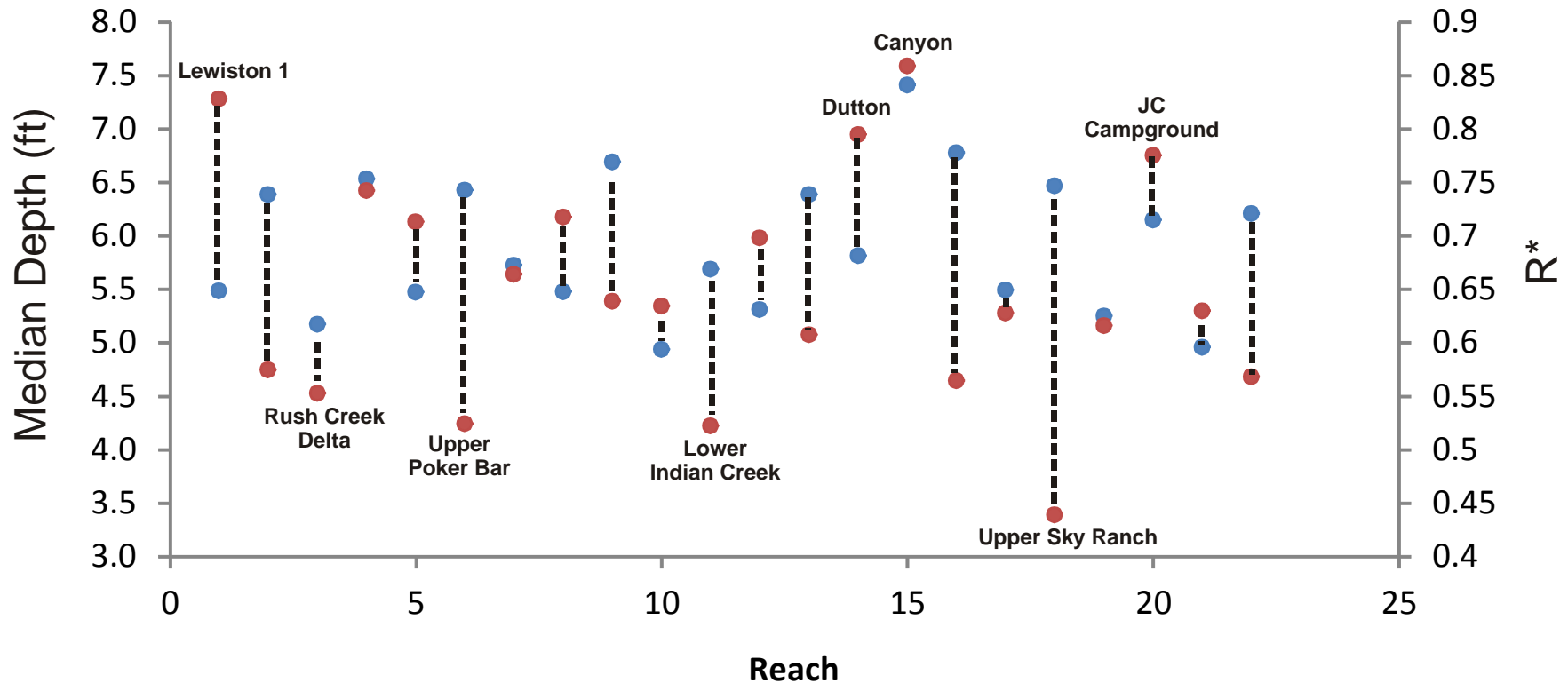
Use h_{50} and R^*



Manual “cluster” analysis using medians and 65th-35th percentiles of h_{50} and R^* values (medians shown here)

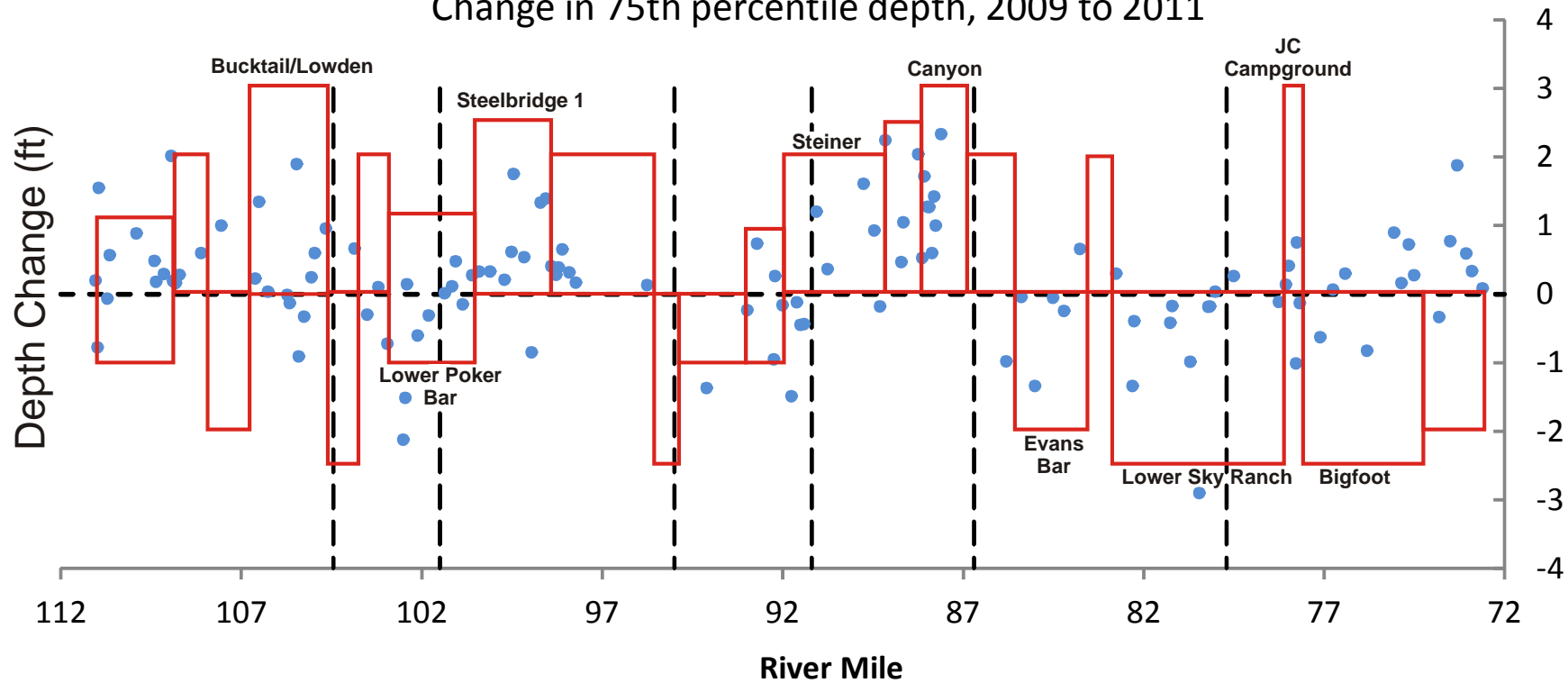


Define 22 reaches and aggregate h_{50} and R^* by reach



h_{50} is shown in blue, R^* is shown in red

Change in 75th percentile depth, 2009 to 2011

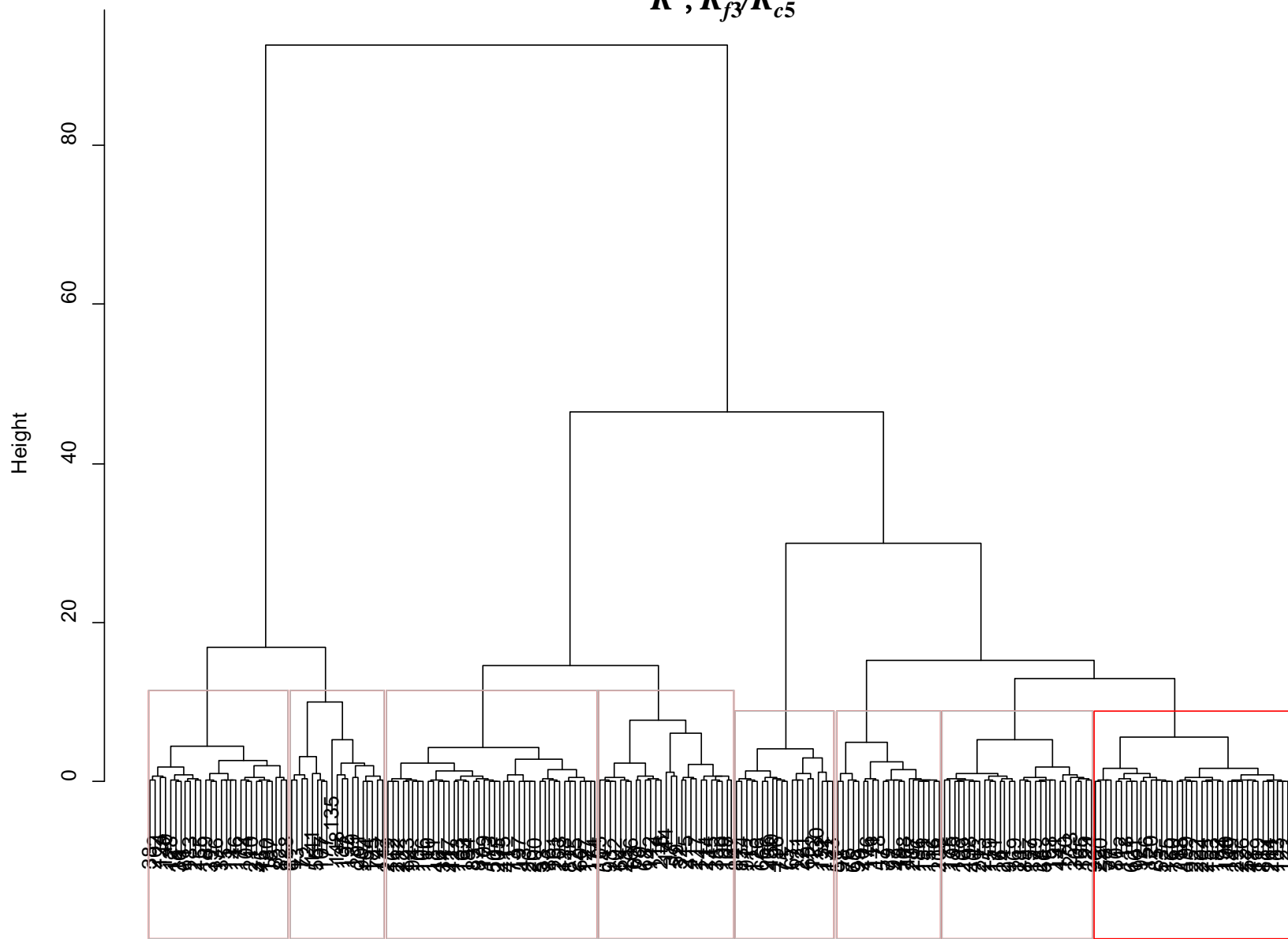


Objective 2: Quantify Mainstem Channel Complexity

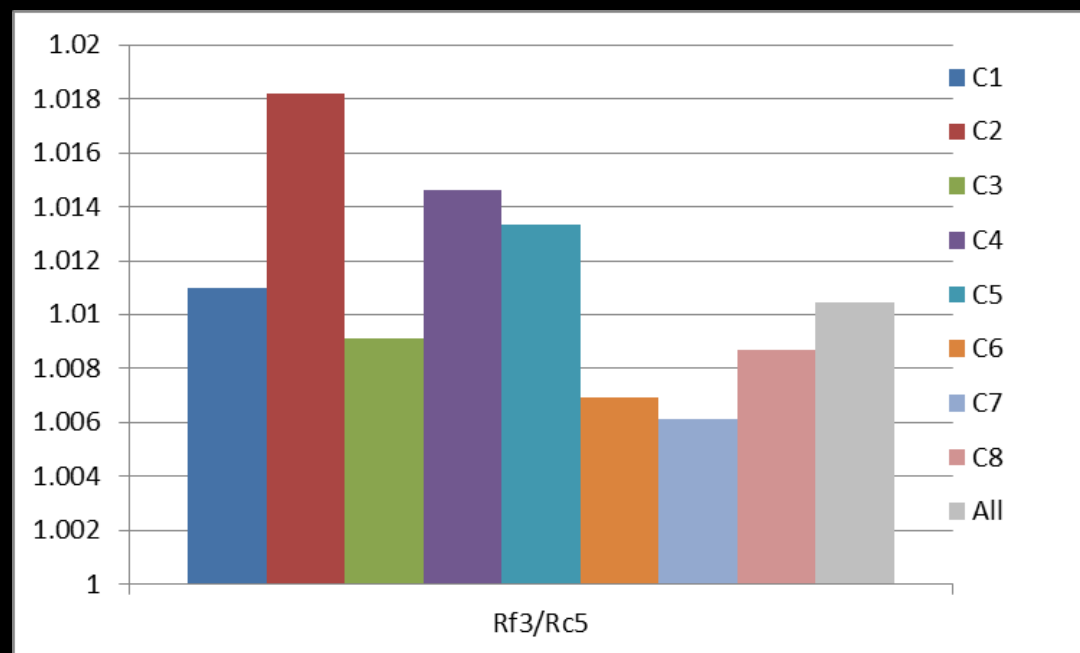
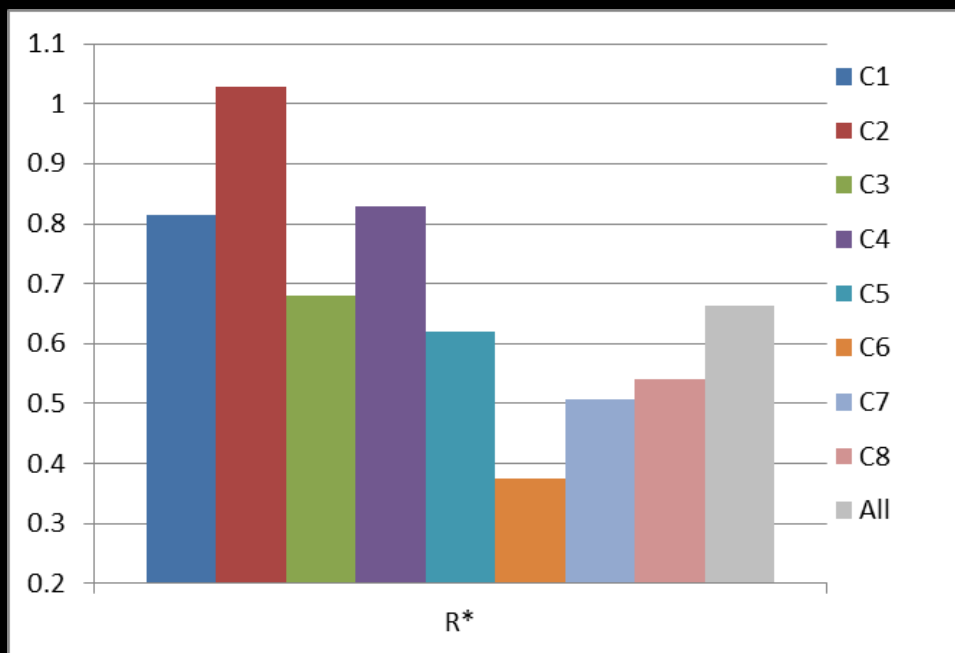
R^* , E^* , L , skew, h_{50} , etc.

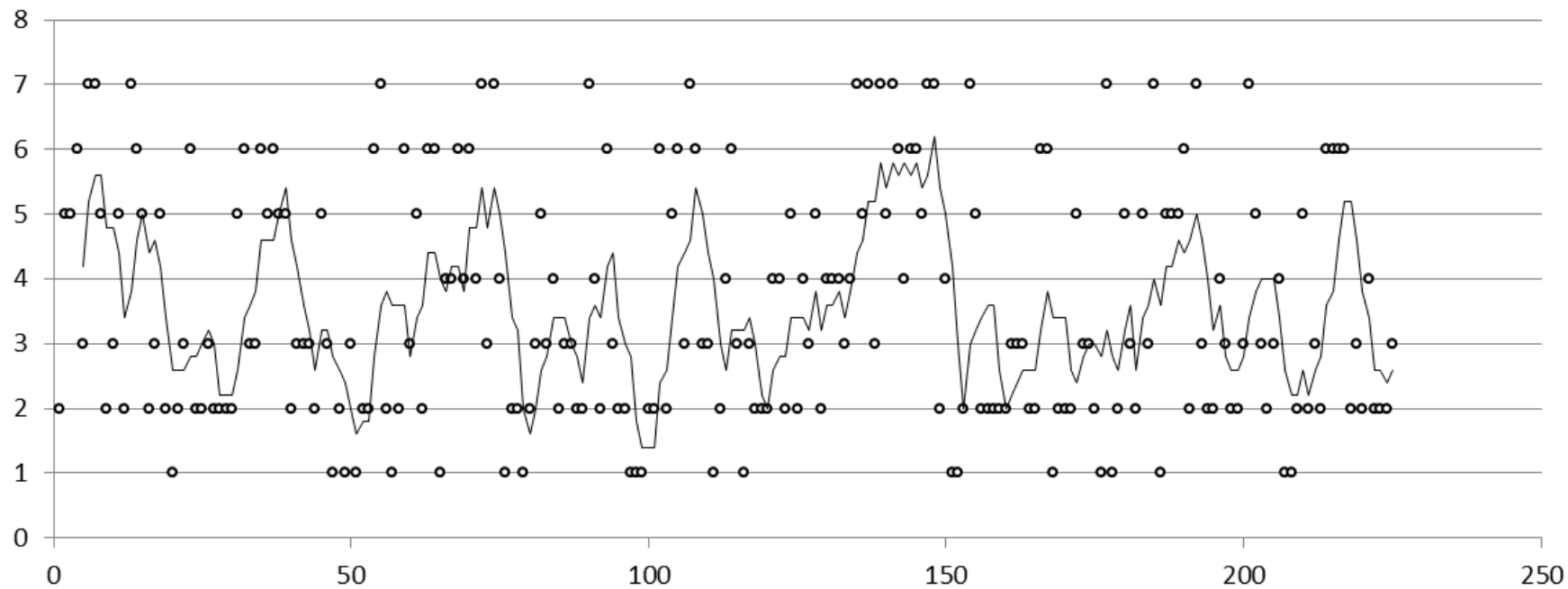
Rugosity of some sort

Cluster Dendrogram
 $R^*, R_{f3}/R_{c5}$



hclust function, R Project for Statistical Computing





Next steps for reach deliniation

Overlay mainstem types with valley scale types

Next steps for channel complexity

Investigate classifications based on R^* , L , E^* and R_{fi}/R_{cj}

Next next steps for both

Link reach characteristic and complexity measures
to physical habitat quality

