Habitat Modeling- For DSS

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Juvenile Rearing Habitat

- We are modeling juvenile salmonid rearing habitat
- Chinook and Coho fry and presmolt utilize similar habitats
- Generally, rearing habitat is described by velocity, depth and distance to cover

Why model habitat?

- The time juvenile fish rear in the river from emergence to outmigration is a critical period of their lives
- The TRFES and ROD hypothesized that rearing habitat is the main limiting factor on the Trinity River
- Habitat modeling will help inform the means objective of increasing rearing habitat and the fundamental objective of increasing natural fish production

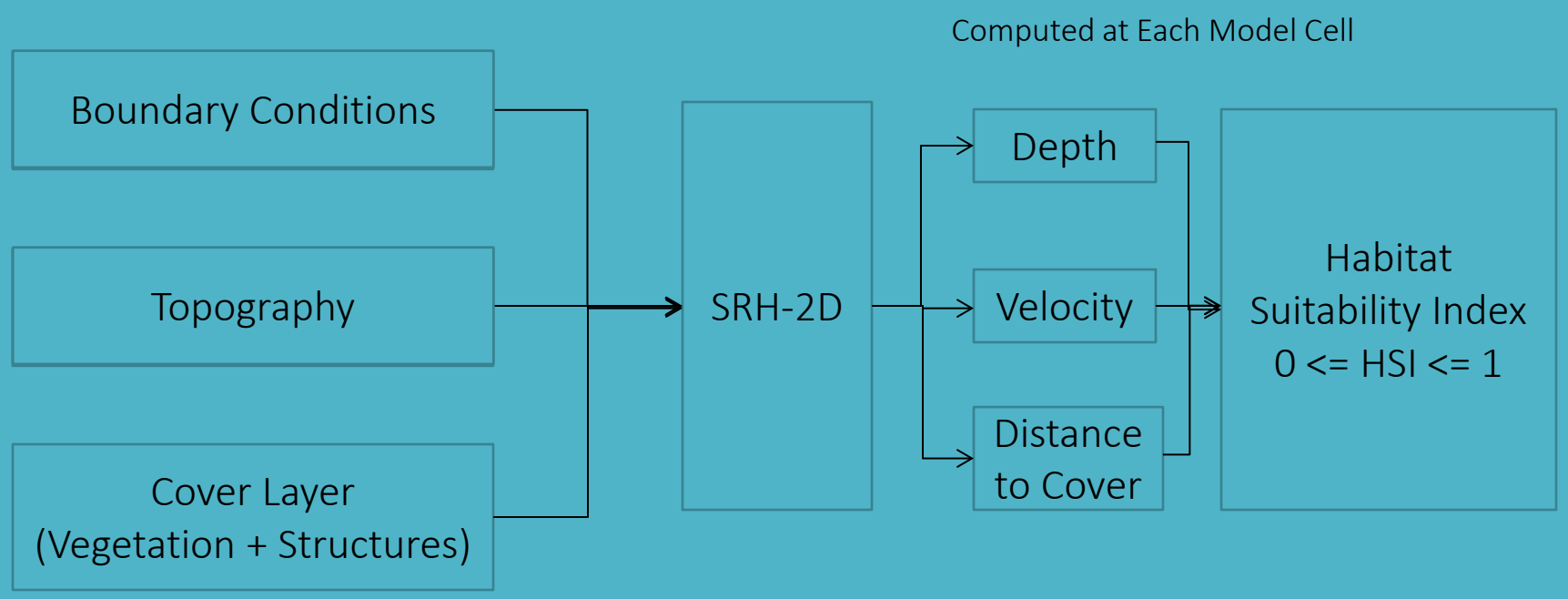
Estimating Juvenile Rearing Habitat

- Outputs from the SRH hydraulic model are used to estimate rearing habitat
- Each cell in the model averages depth, velocity and distance to cover
- Modeling habitat using the SRH2D model provides us an opportunity to estimate available habitat across all flows throughout the project reach

Estimating Juvenile Rearing Habitat

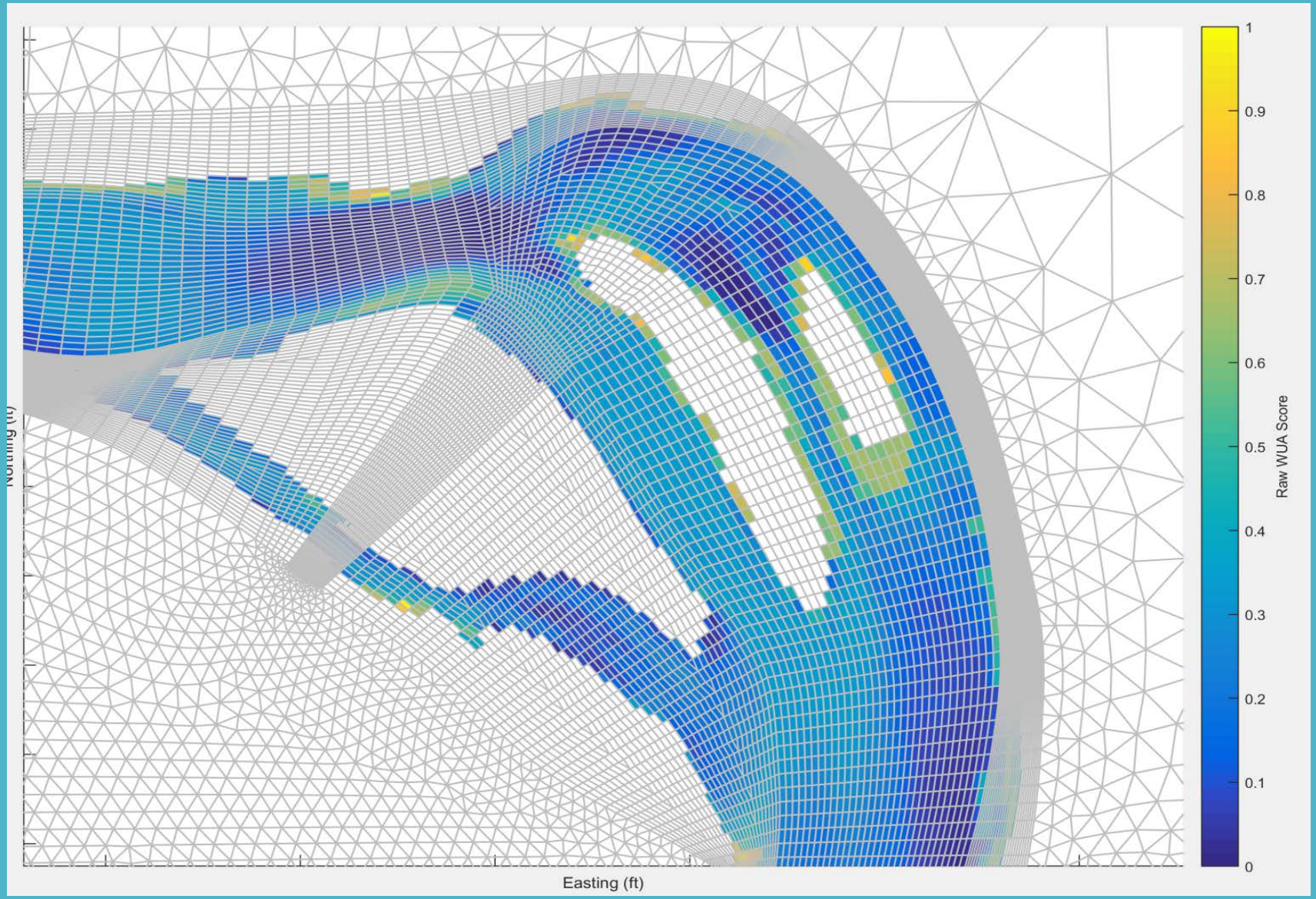
- Multiple years of observing juvenile fish in the river allowed us to create an equation to estimate the habitat value of each model cell
- Outputs of depth, velocity and distance to cover are combined to describe the habitat quality of each cell
- The combined value is called weighted usable area (WUA)
- WUA (at a single flow) can be summed for all cells in a particular section or reach of river to describe the habitat within

Habitat Estimates from Hydraulics

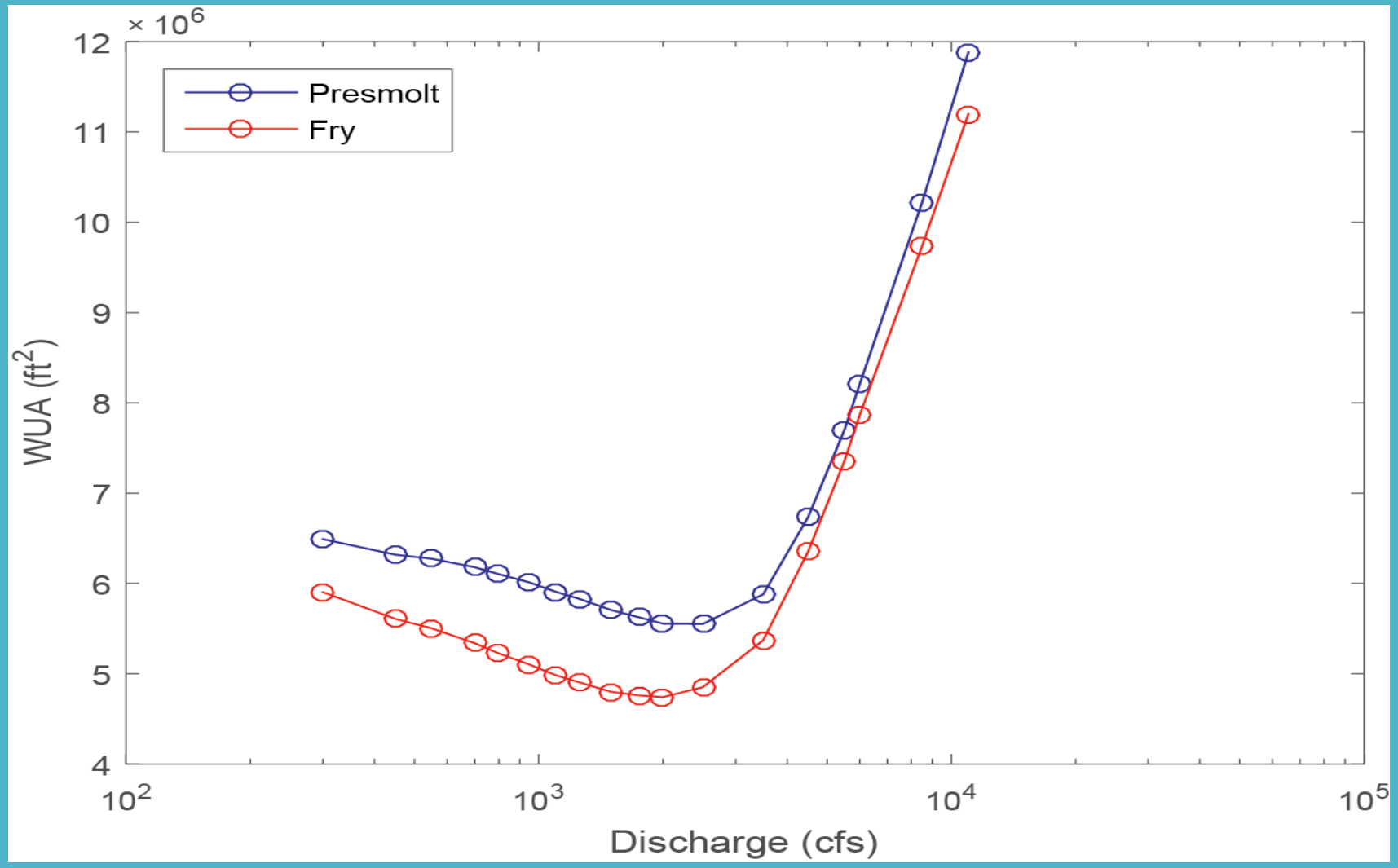


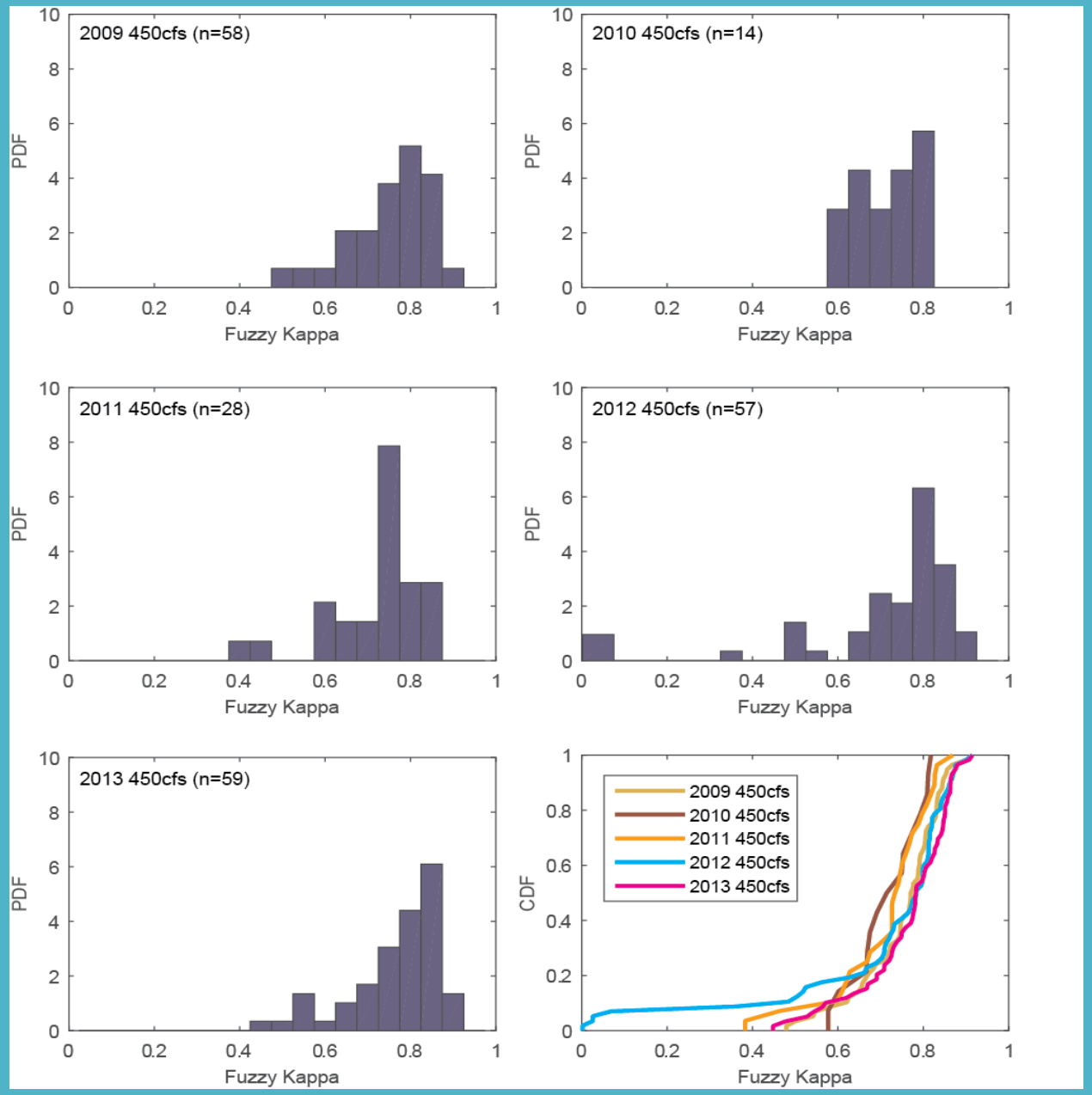
$$\sum_{i=1}^{N_{cells}} HSI_i \times A_i = \text{Weighted Useable Area (WUA)}$$

WUA Map at Oregon Gulch (800 cfs)



Project reach habitat by flow





Accuracy

- Comparisons were made with existing habitat mapping data
- The SRH2D habitat outputs matched well to the habitat maps

How do the habitat estimates fit into DSS?

- The habitat outputs are a major component of the fish production model (S3)
- Fish are distributed using the habitat values: better habitat can hold more fish
- This will be described by Russel Perry next

Habitat Modeling

- The SRH2D habitat model was developed by the BOR TSC office in Denver, with help from TRRP staff.
- It is complete, and is built into the S3 fish production model
- In the future it can be updated if new terrain is acquired by the Program.

Questions?