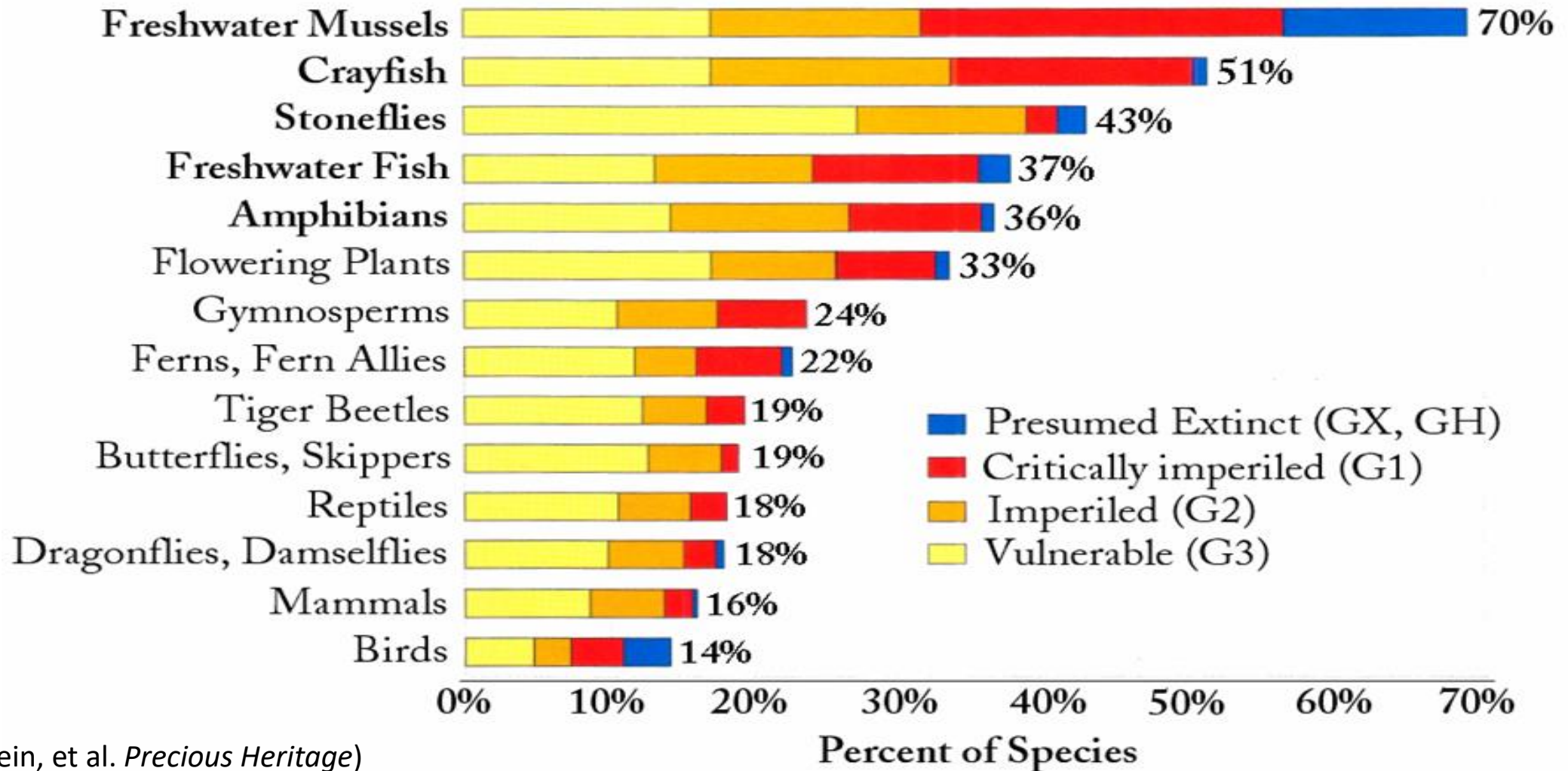


# Modeling Fundamentally Suitable Freshwater Mussel Habitat Duck River Drainage, Tennessee



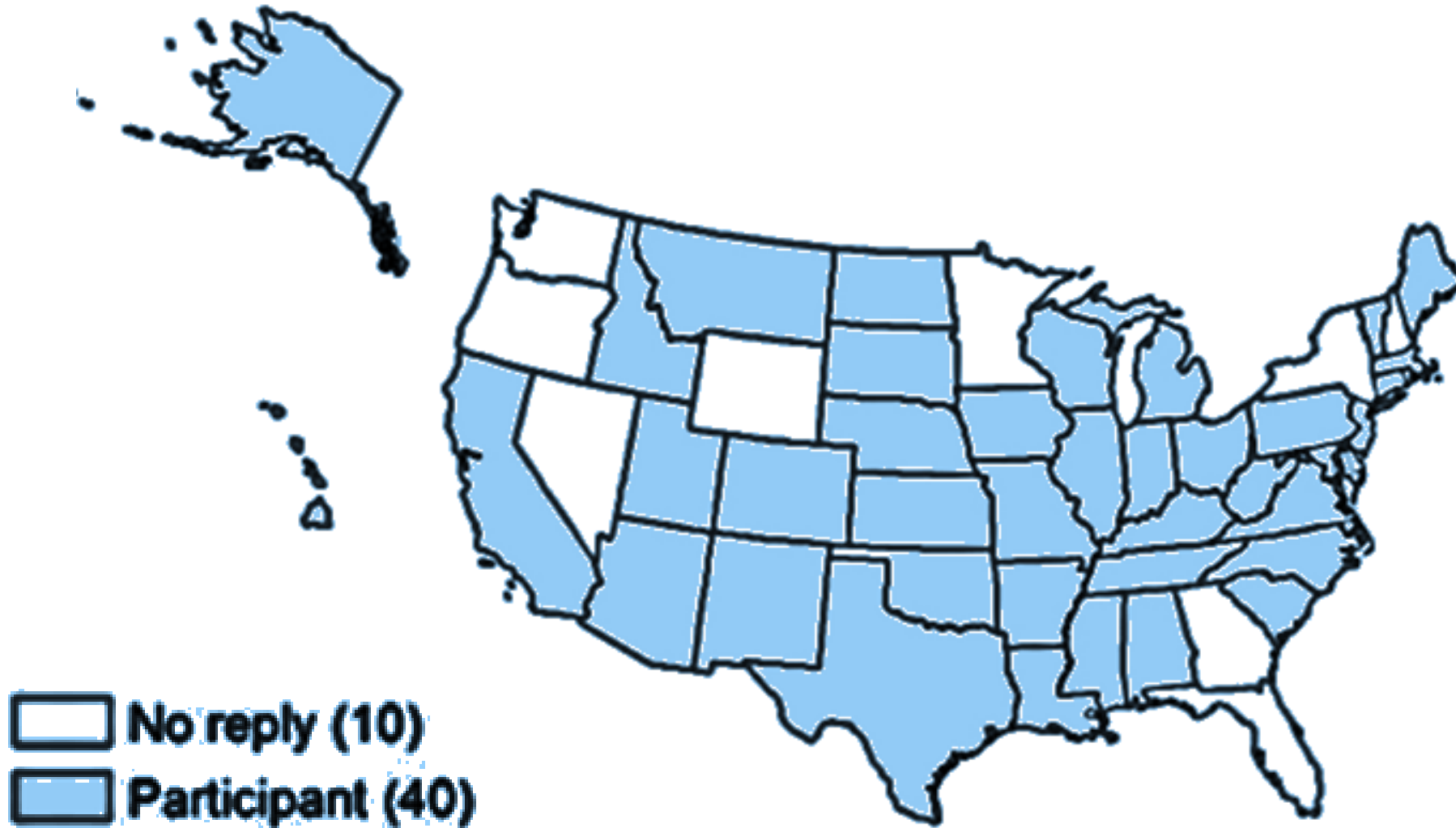


# How are the Freshwater Mussels Doing?...



(Stein, et al. *Precious Heritage*)

# State Mussel Conservation Programs



# Identifying a Nationwide Problem



No Active Management



Invasive Species Only



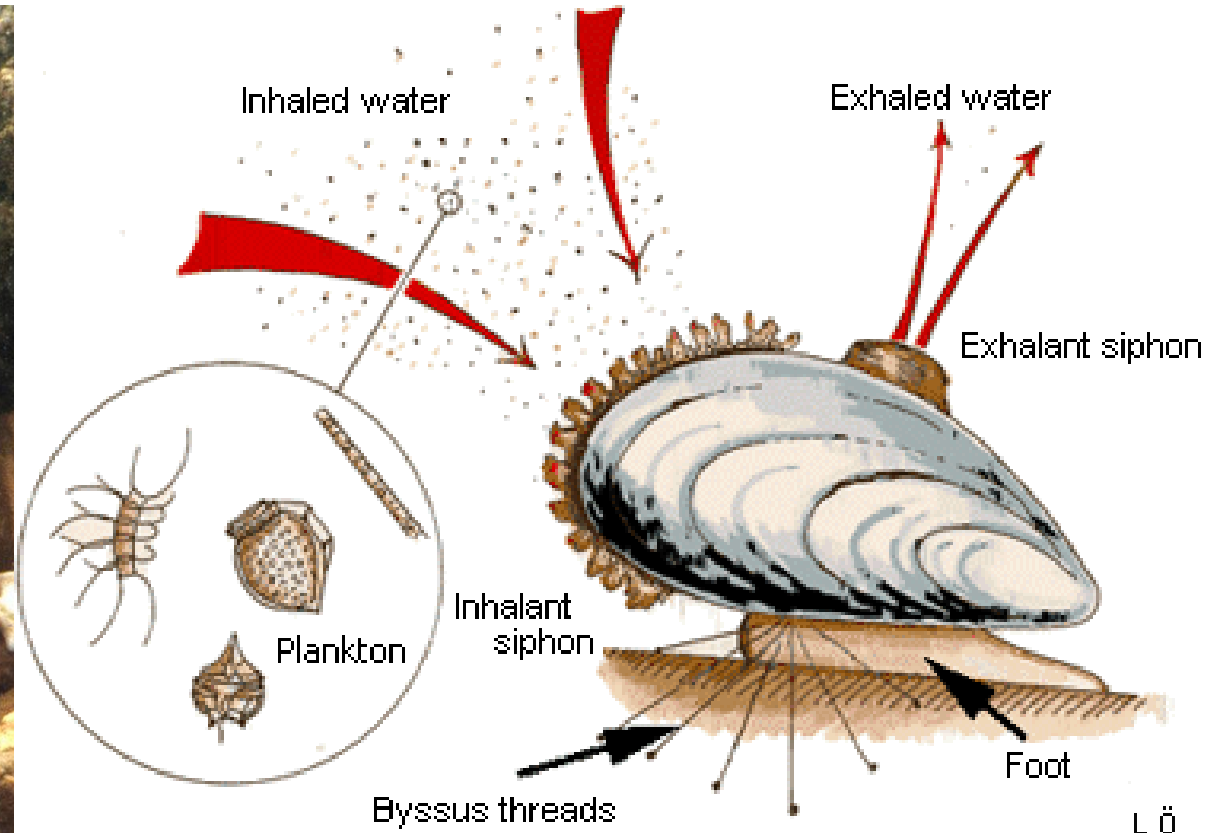
Species of Concern Only



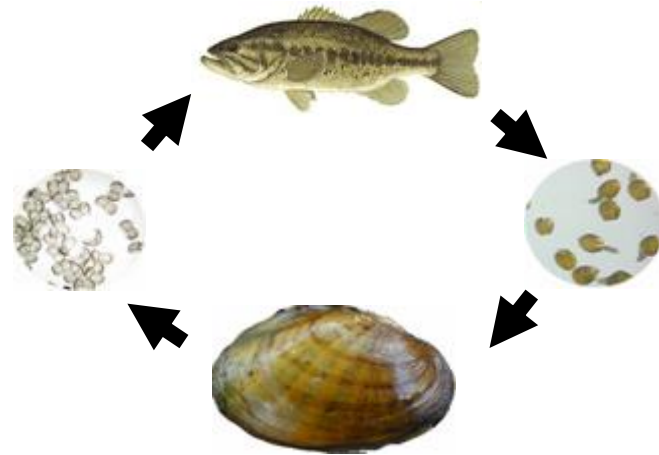
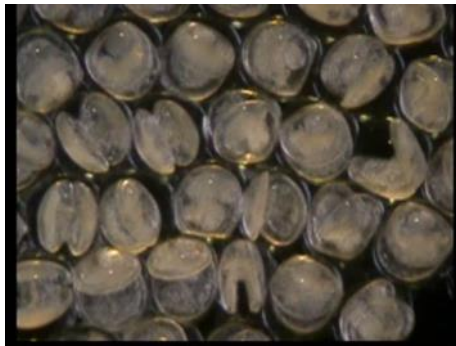
Mixed- focus Management



# Other Challenges

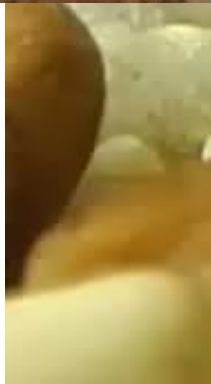


# Mussel Lifecycle





# Mussel Reproduction



# The Mussel Bed

This Bed is  
too Hard



This Bed is  
too Soft



This Bed is just  
Right!!





# Ozark Rivers – A Hierarchical Process

- Delineate fundamentally suitable habitat
- Determine occupancy, ID threats
- Rank reaches continuously according to risk
- Recommend action based on risk



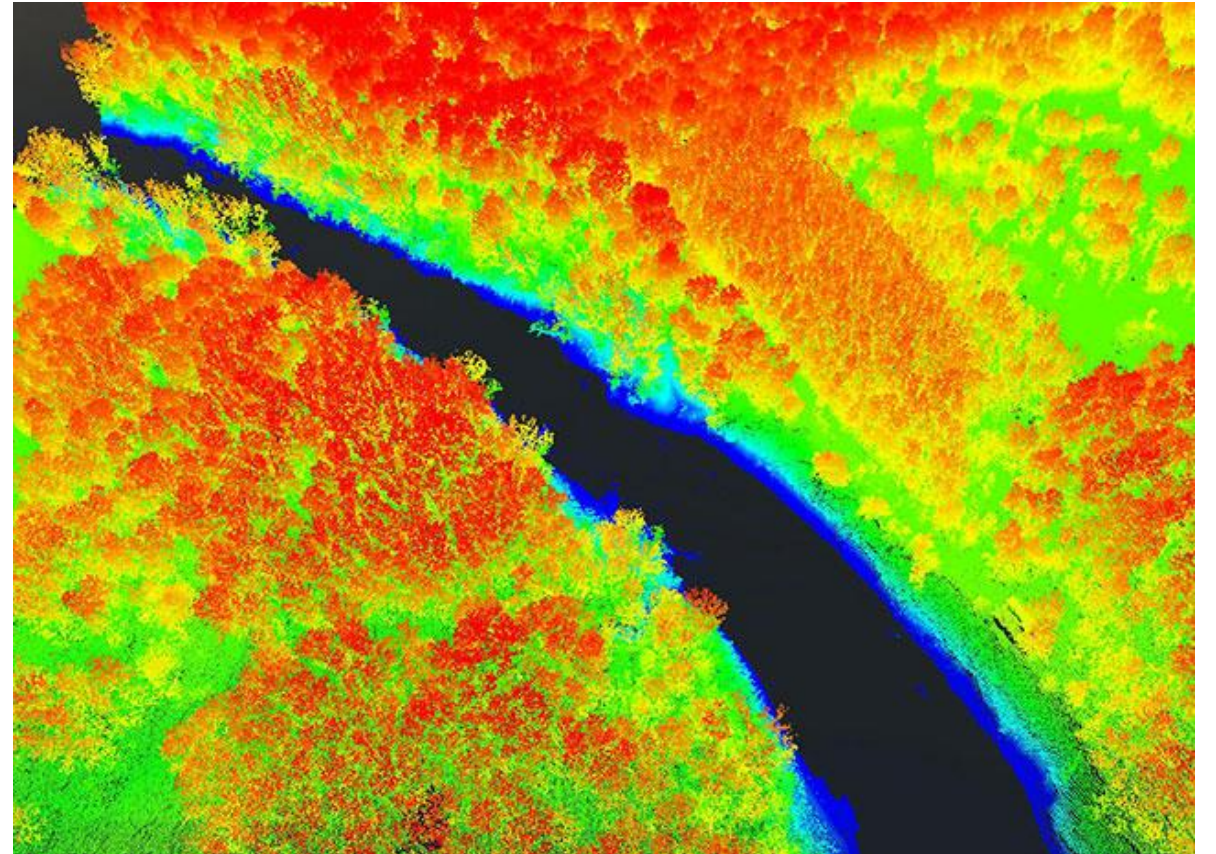


# Where There's a Will... There's a Way !!

## Reach- Scale Measurements

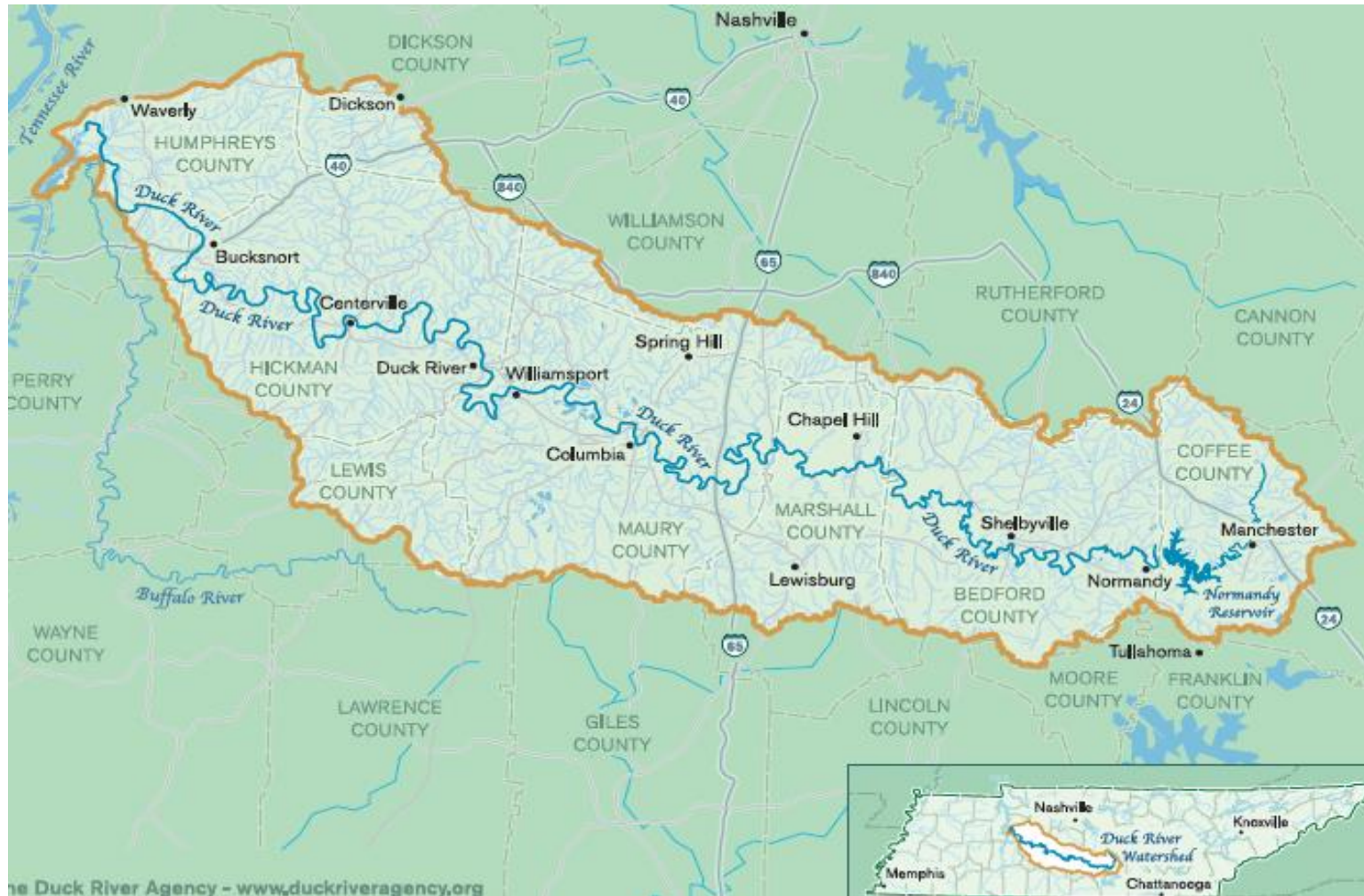


## Landscape- Scale Measurements





# The Duck River

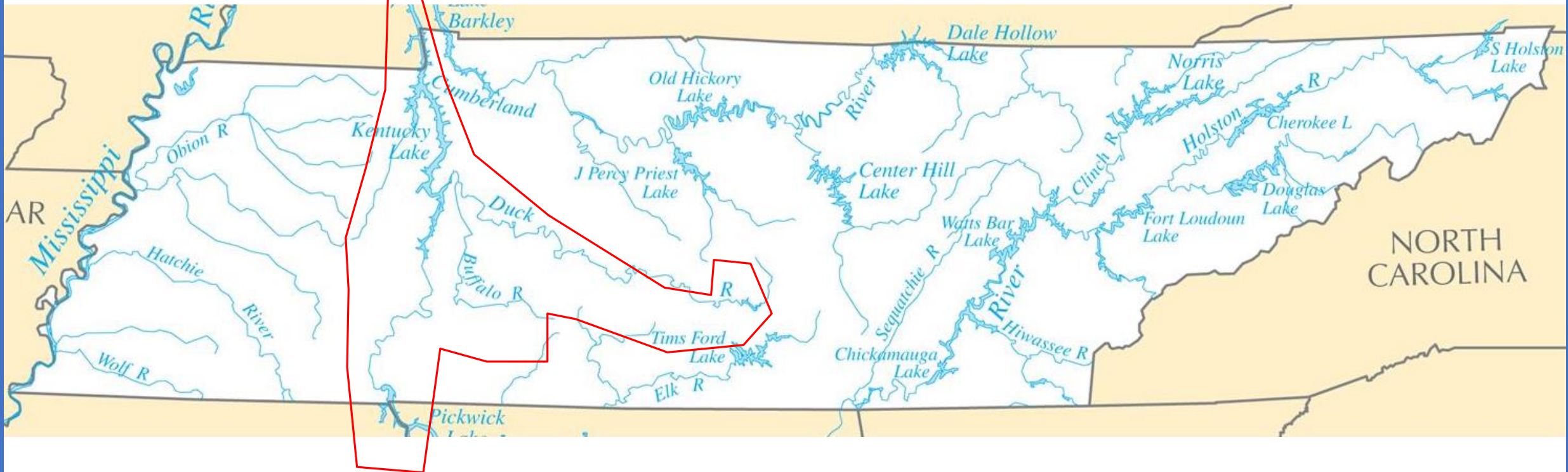


## Objectives

- Remotely-sensed Habitat Data in GIS for DR.
- Predict mussel habitat at continuous, riverscape scale.

# Why the Duck River?

\*Diversity \* History \*Opportunity





# Diversity

- 151 Fish Species
- 22 Snail Species
- 60 Freshwater Mussels





# History





# Opportunity

- Documented Mussel Beds
- Ongoing Research
- Threatened and Endangered Species



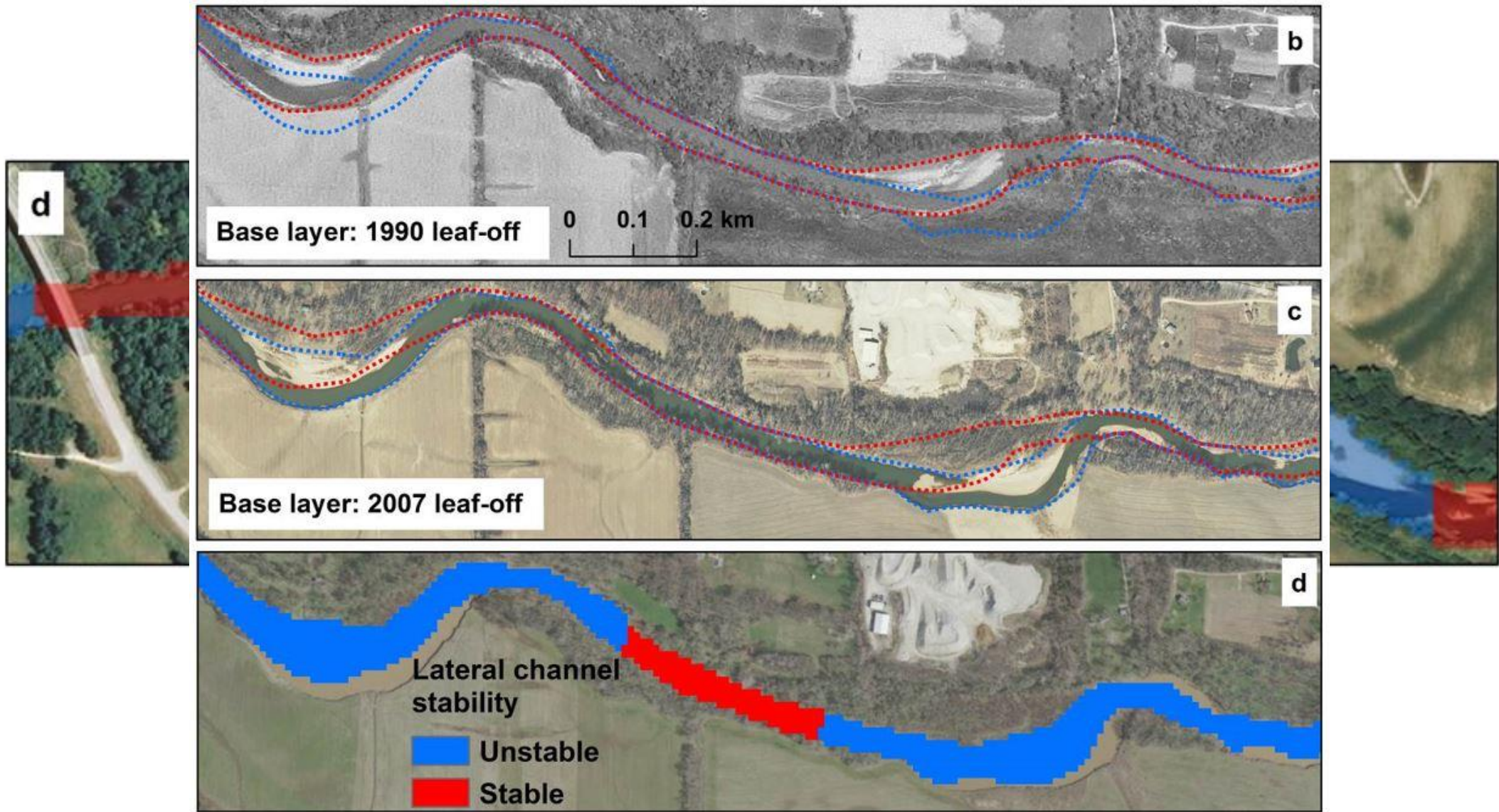
# Landscape-level Habitat Model

Applying methodology from an existing Meramec River drainage model  
(Key and Rosenberger)

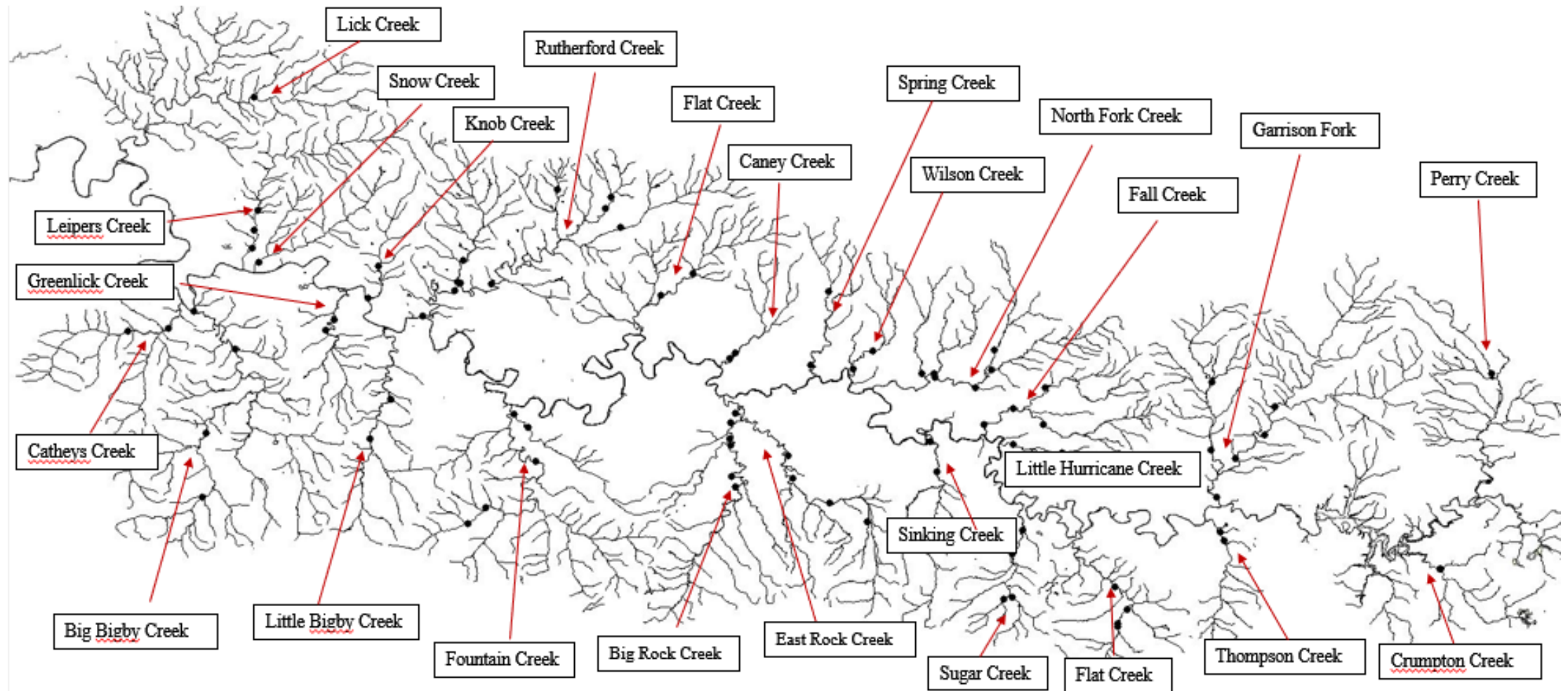
- Stream power
  - Lateral channel stability
  - Proximity to stable gravel bars
- Proximity to channel controls (bluffs)
  - Presence of drought refugia



# Landscape-scale Habitat Model



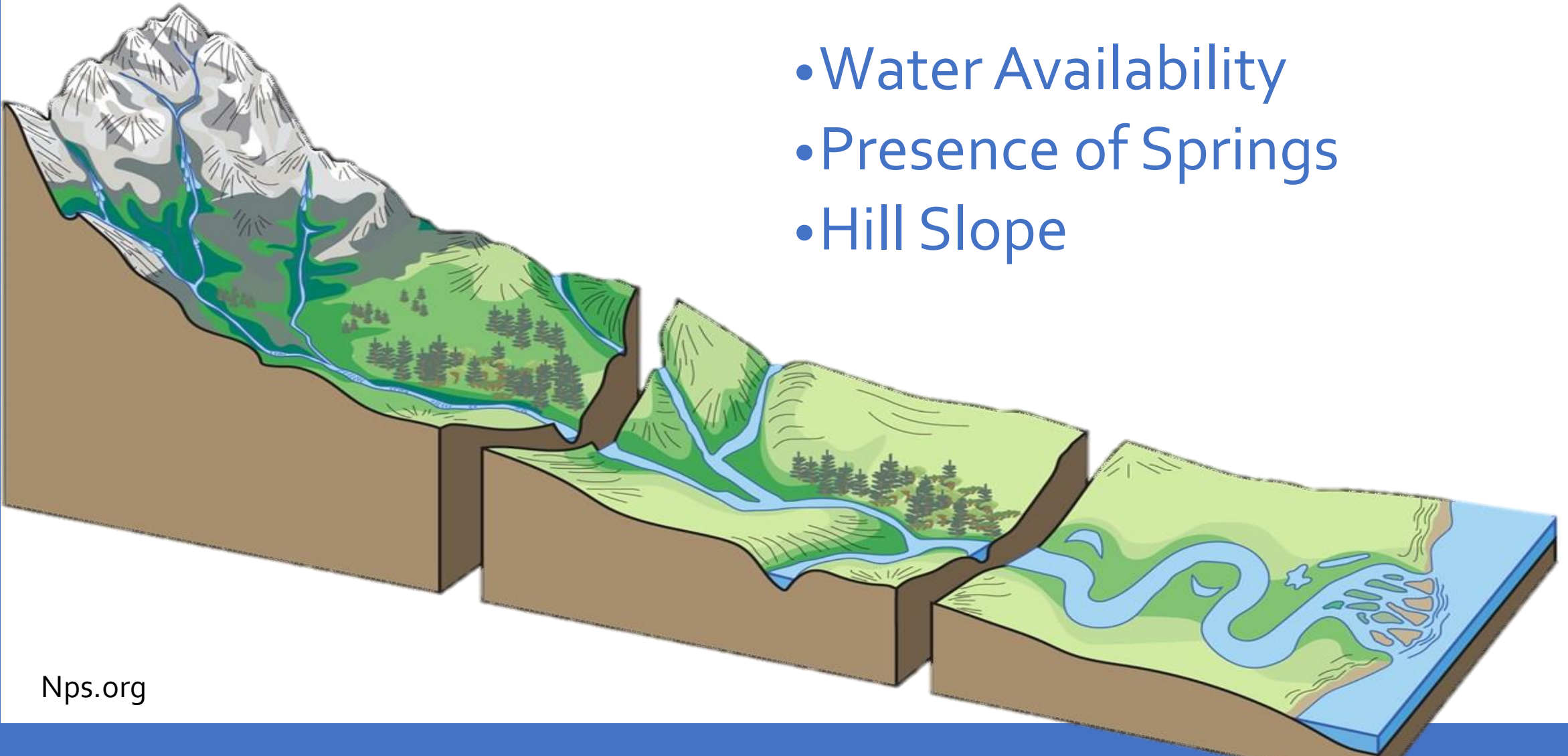
# Additional Tributary Modeling





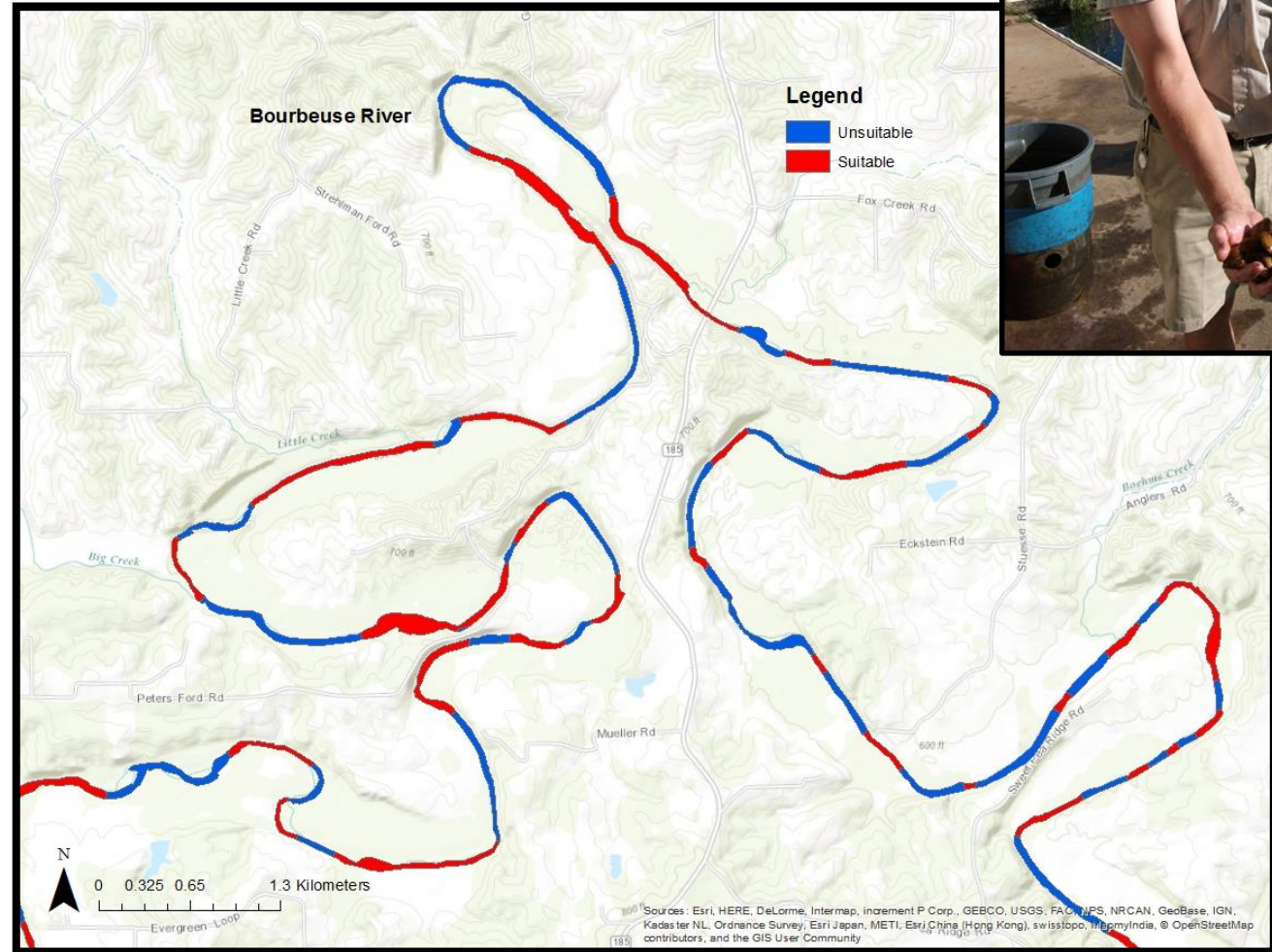
# Comparison of Headwaters and Main Channel

- Water Availability
- Presence of Springs
- Hill Slope



# Conclusion

- Model showing reaches of habitable and inhabitable habitat
- Identification of areas of concern
- Recommendations for biological managers







J. Jones/FWS

*It's not what  
we are doing,  
but where we  
are doing it.*

# Acknowledgments

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# Questions?

