

UTILITY OF PROBABILITY-BASED SURVEY DESIGN FOR TRACKING FISH SPECIES OF INTEREST



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Presentation Outline

- Background
- Analysis of database
- Case studies
- Analysis tools



Background

Constant justification of expenditures

Many beneficial uses touted for probability-based sample design

Many different purposes for sampling streams

Regulatory agency use of stream sampling

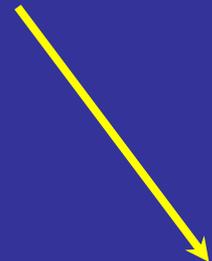
Impaired waters list (303d)



Targeted sampling of known impairments



303d list



Waters of the state list (305b)



Random sampling



Apply results to all waters=305b list



Impaired waters located



Fish locations and population trends information incidental

Conservation agency use of stream sampling

Species
Conservation



Species locations and
population trends



Sampling of past and
modeled locations



Species
conserved



Conservation
Planning



Are we improving streams?

Where should we focus our resources?



Sampling of treatments in
watershed



Actions evaluated
and refined



Clean Waters Act requirements incidental

The \$100,000 question?

- Does our probability-based monitoring program sufficiently address species conservation issues (locations and population trends)?



Analysis

- 213 random sites sampled across the state of Missouri from 2002-2005
- Visual scan of database for interesting fish locations
 - locations of rare or protected species
 - locations of exotic species
 - locations where species are thought extirpated
 - locations outside known range of the species
 - locations that close gaps within range of the species

Locations of a rare or protected species

- 261 individuals of 13 species considered to be in need of conservation (S1-S3) were found at 30 sites



Locations of exotic species

- common carp- 79 at 21 sites
- goldfish- 4 at 2 sites
- silver carp- 1 at 1 site



Locations where species are thought extirpated

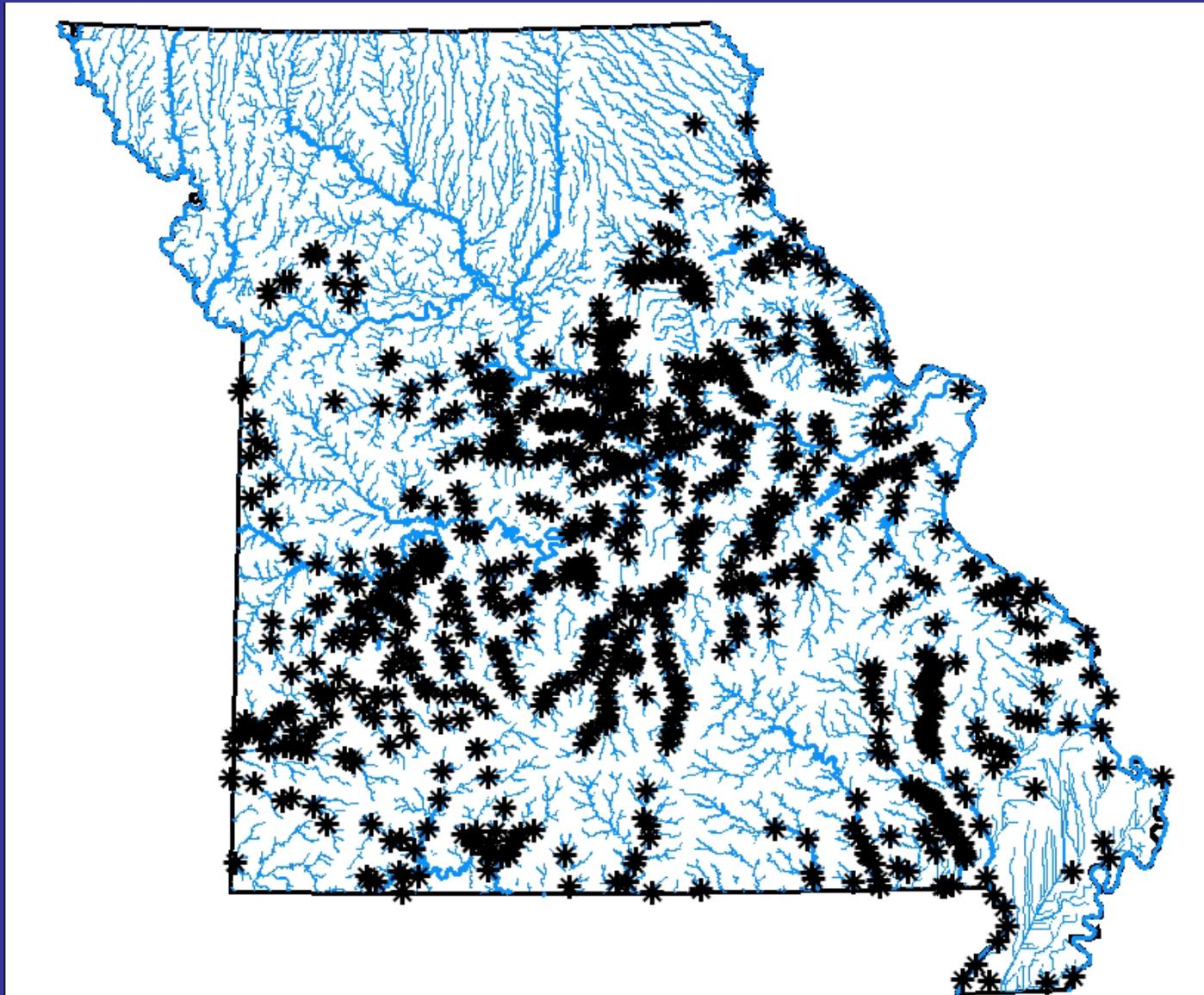
- Least darter, ghost shiner, and Ozark shiner found in watersheds they were considered extirpated from
 - Not collected in more than 50 years
 - Sampling had occurred during the 50 years

Locations outside known range of species

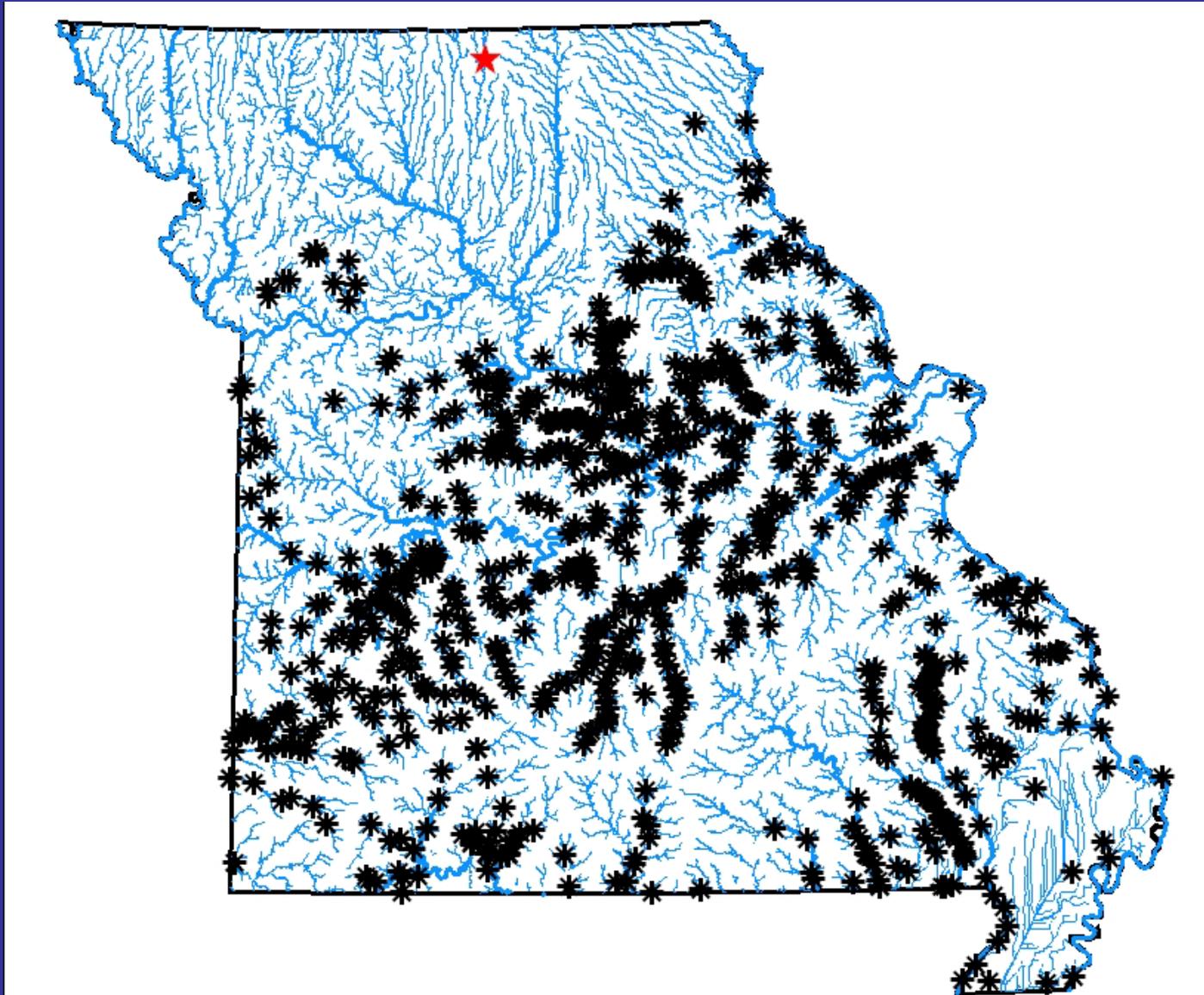
- Case studies
 - logperch (*Percina caprodes*)
 - chestnut lamprey (*Ichthyomyzon castaneus*)
 - warmouth (*Lepomis gulosus*)
 - slenderhead darter (*Percina phoxocephala*)



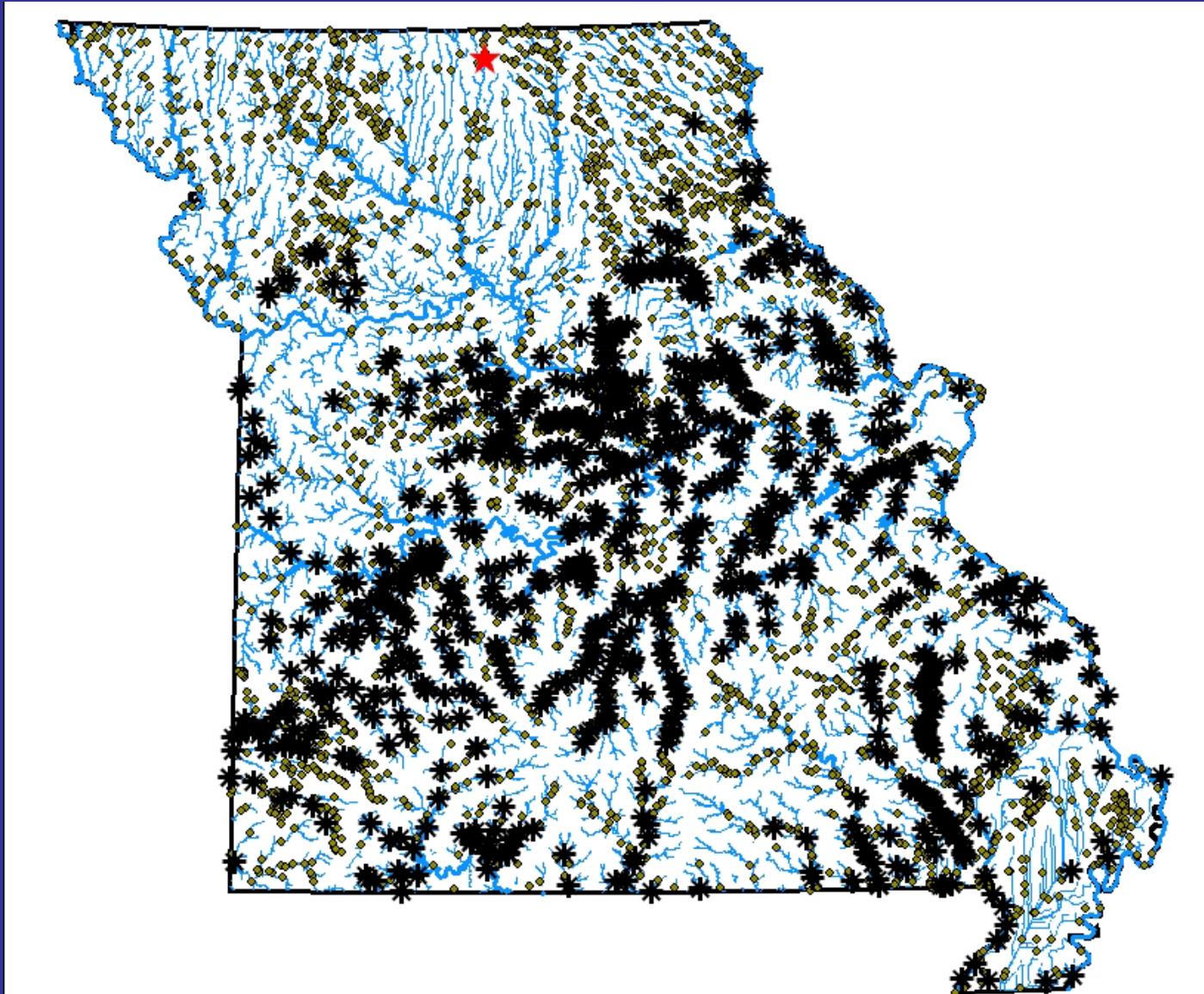
Case Study- logperch



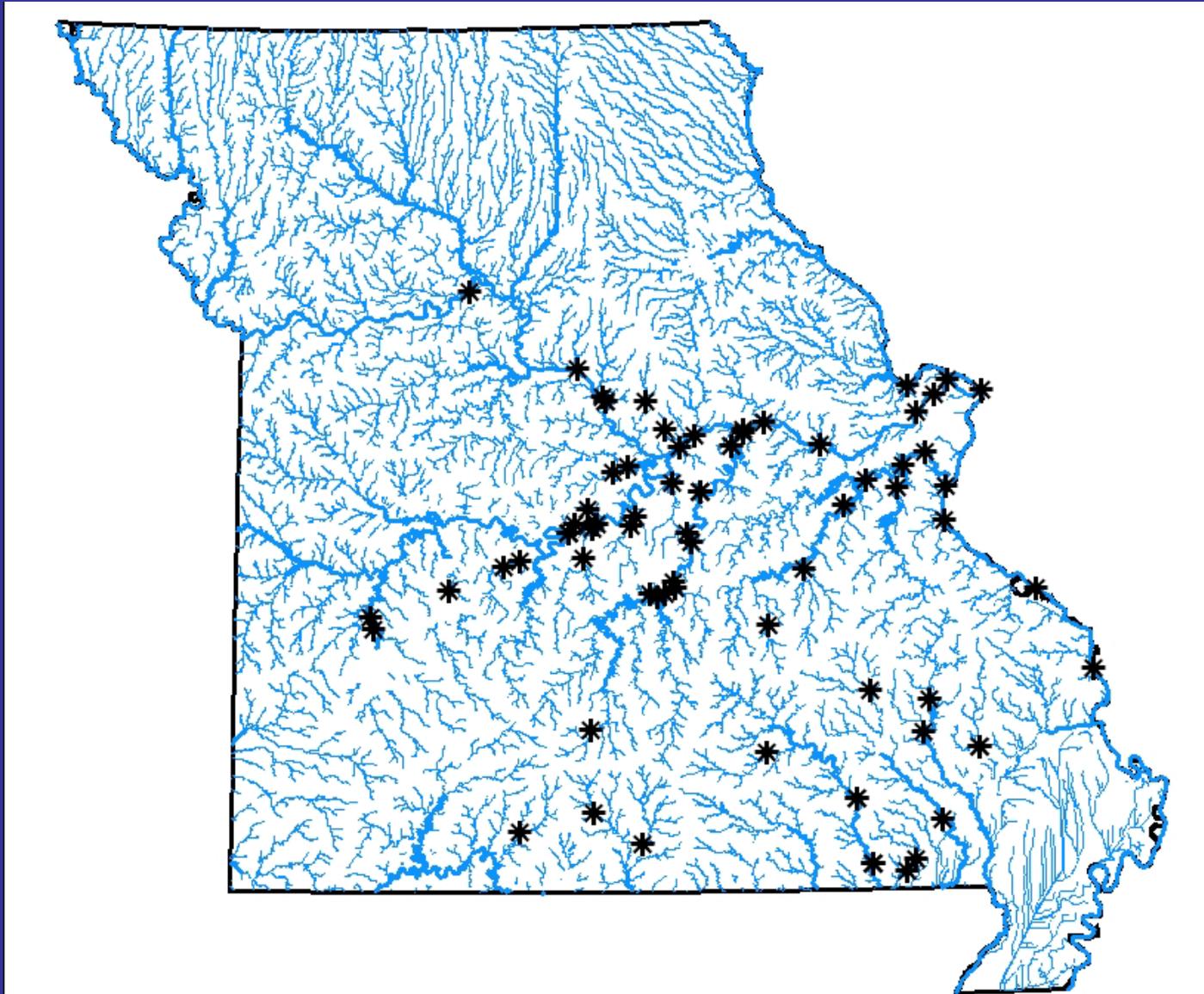
Case Study- logperch



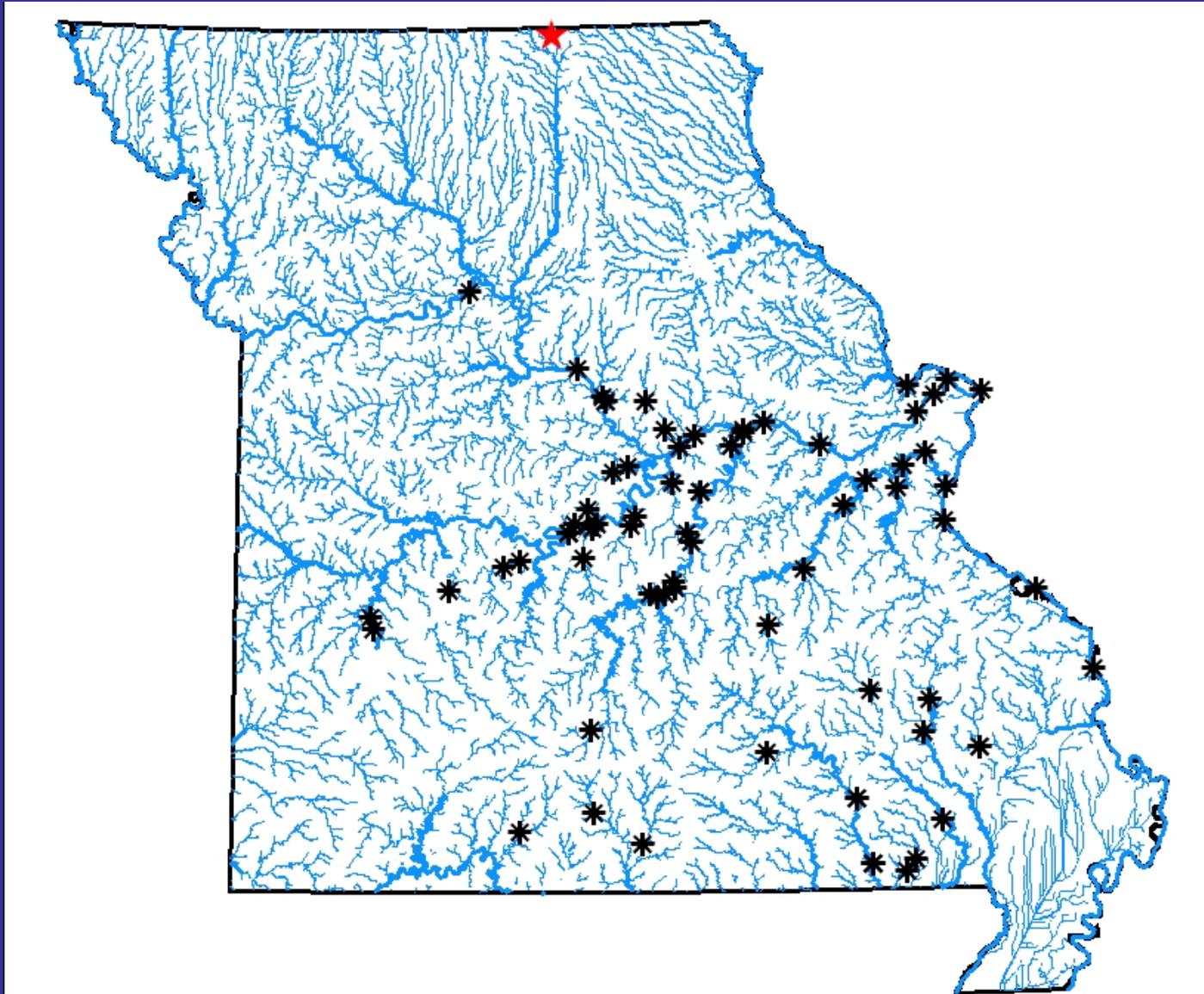
Case Study- logperch



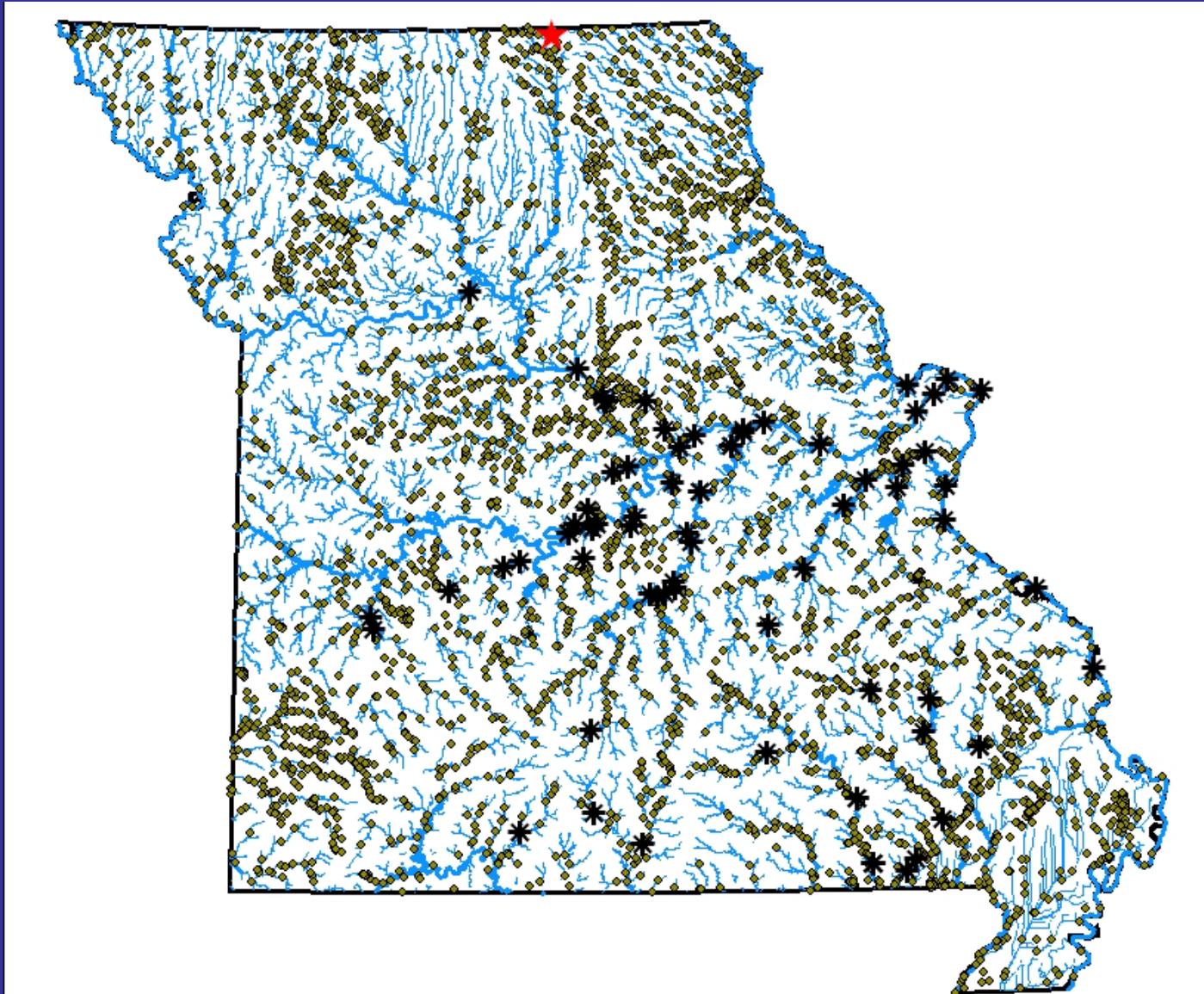
Case Study- chestnut lamprey



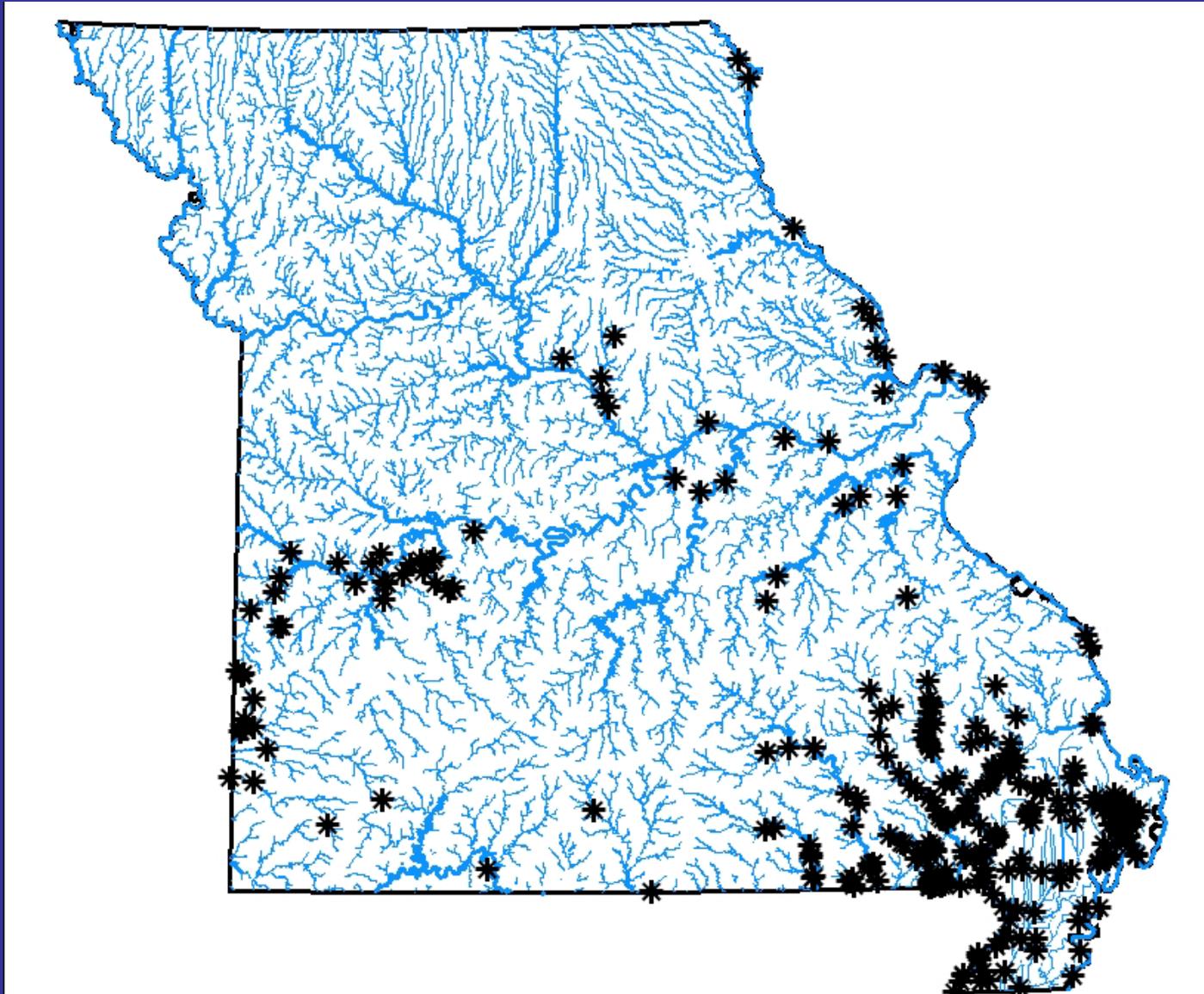
Case Study- chestnut lamprey



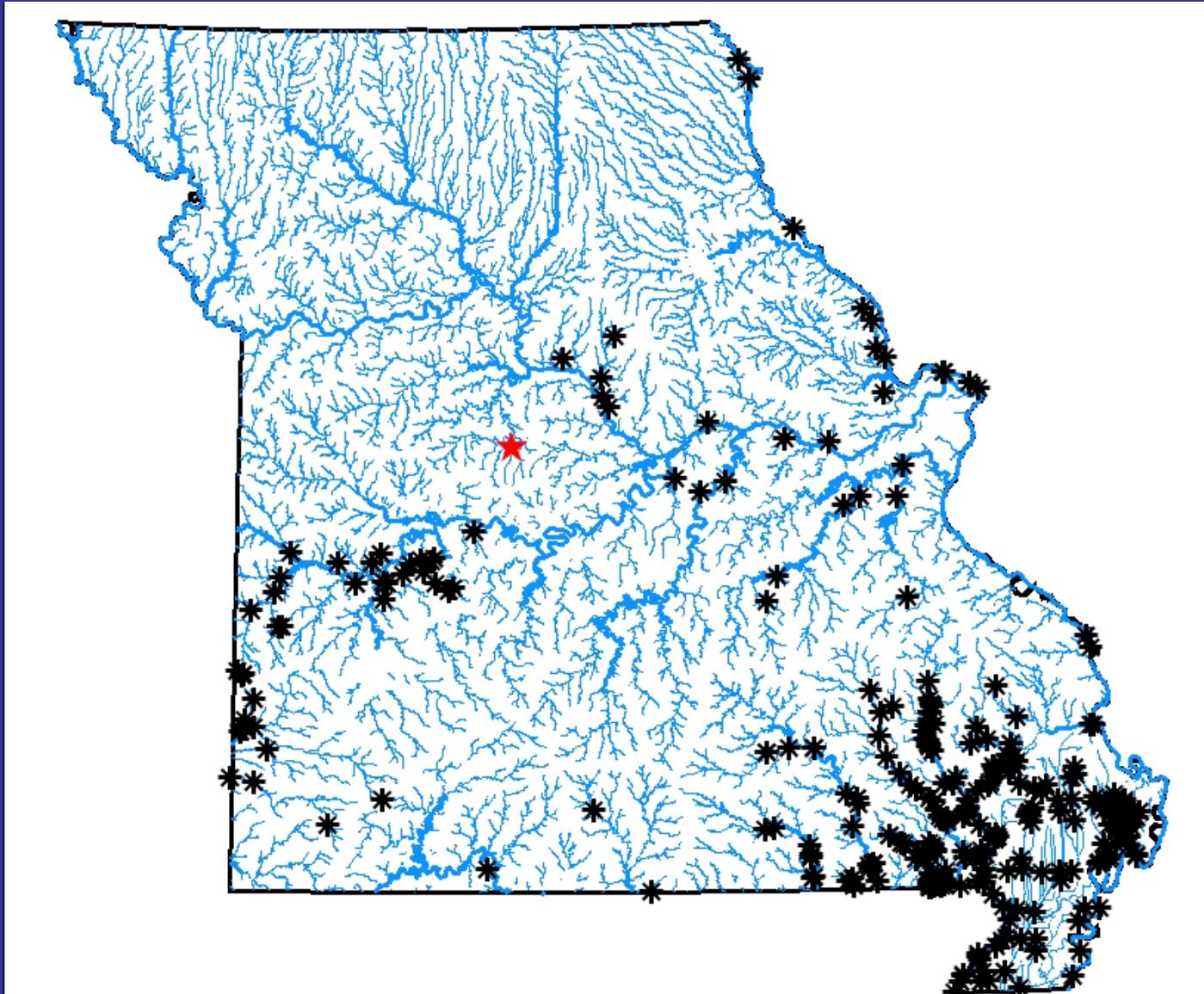
Case Study- chestnut lamprey



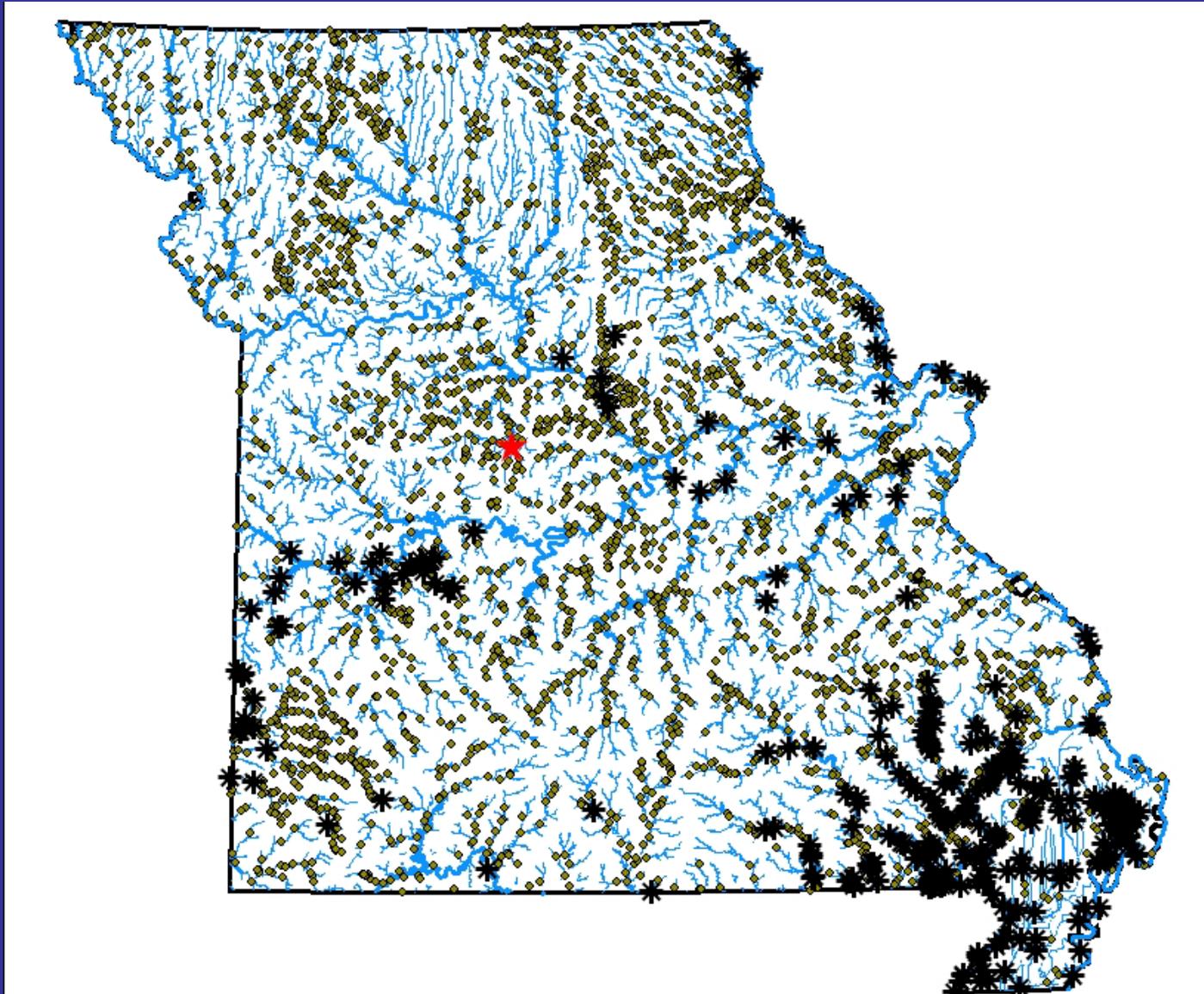
Case Study- warmouth



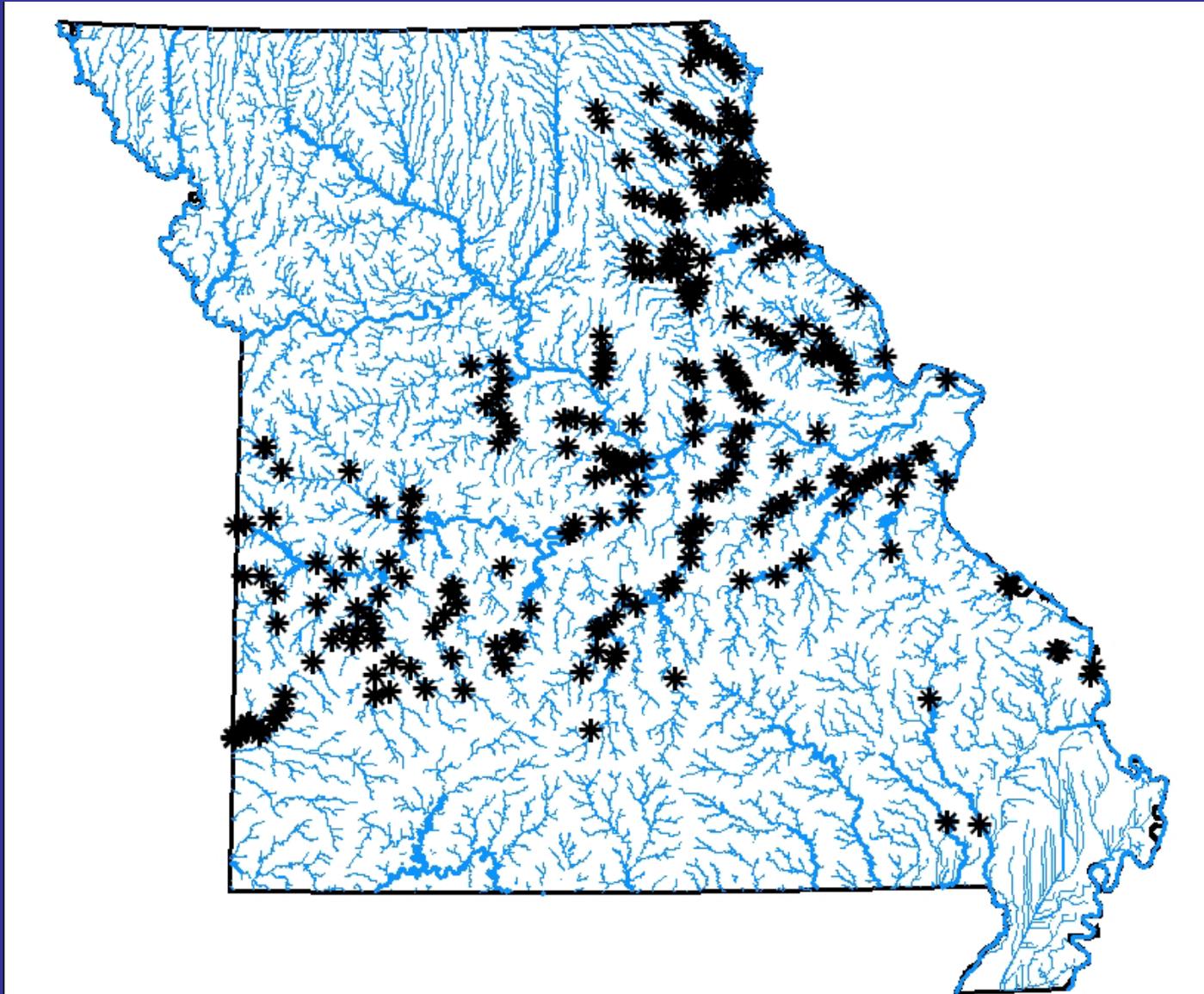
Case Study- warmouth



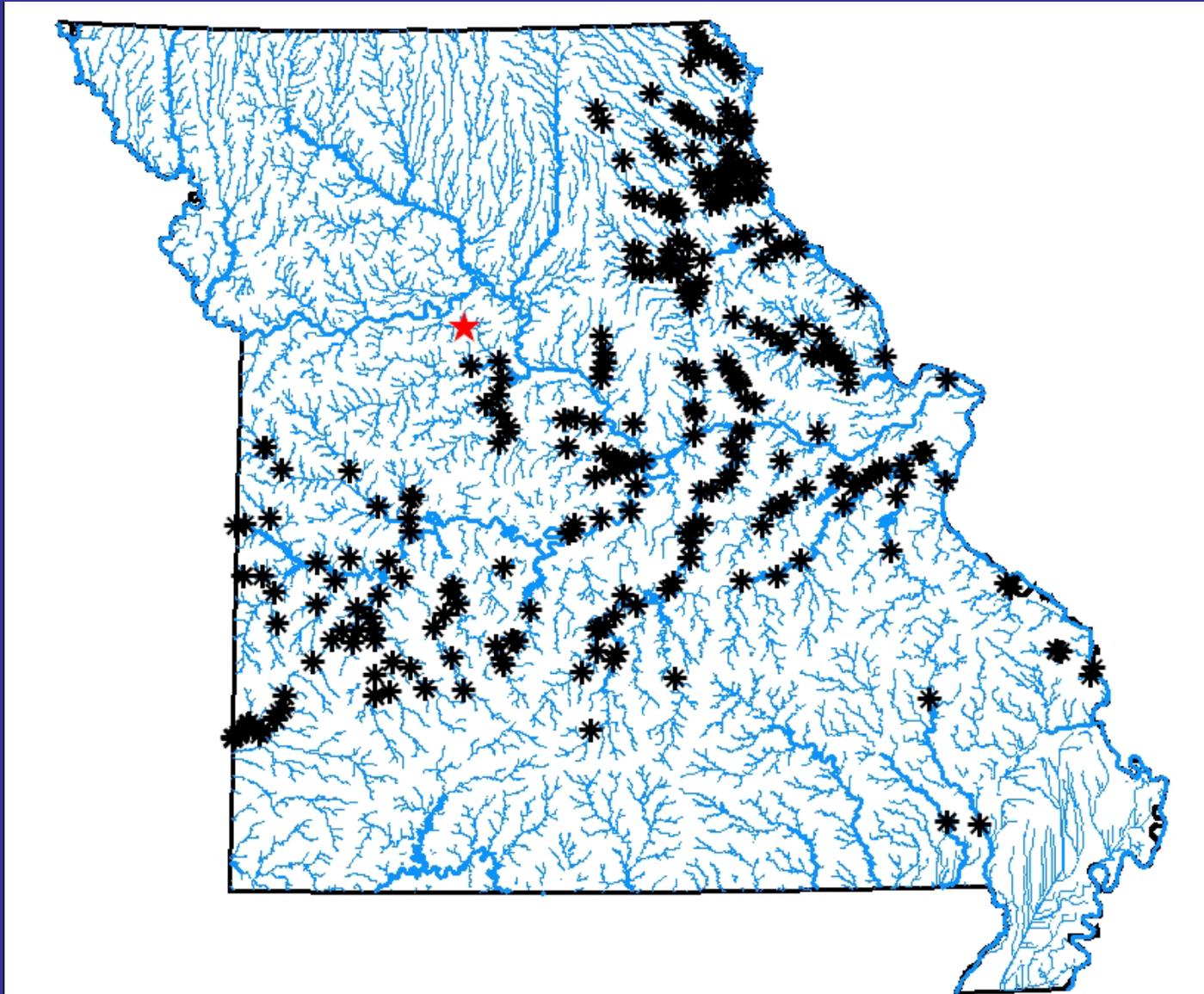
Case Study- warmouth



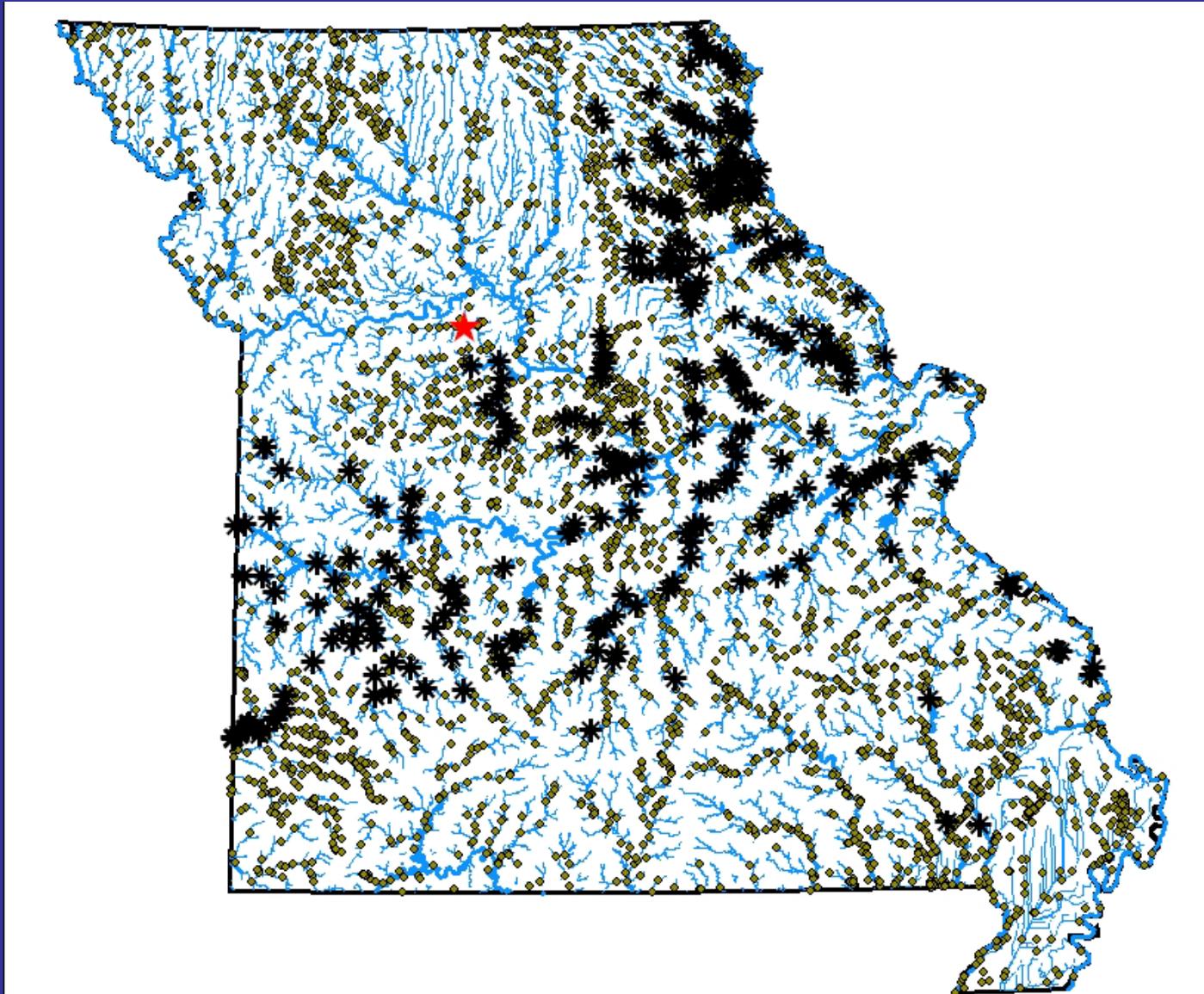
Case Study- slenderhead darter



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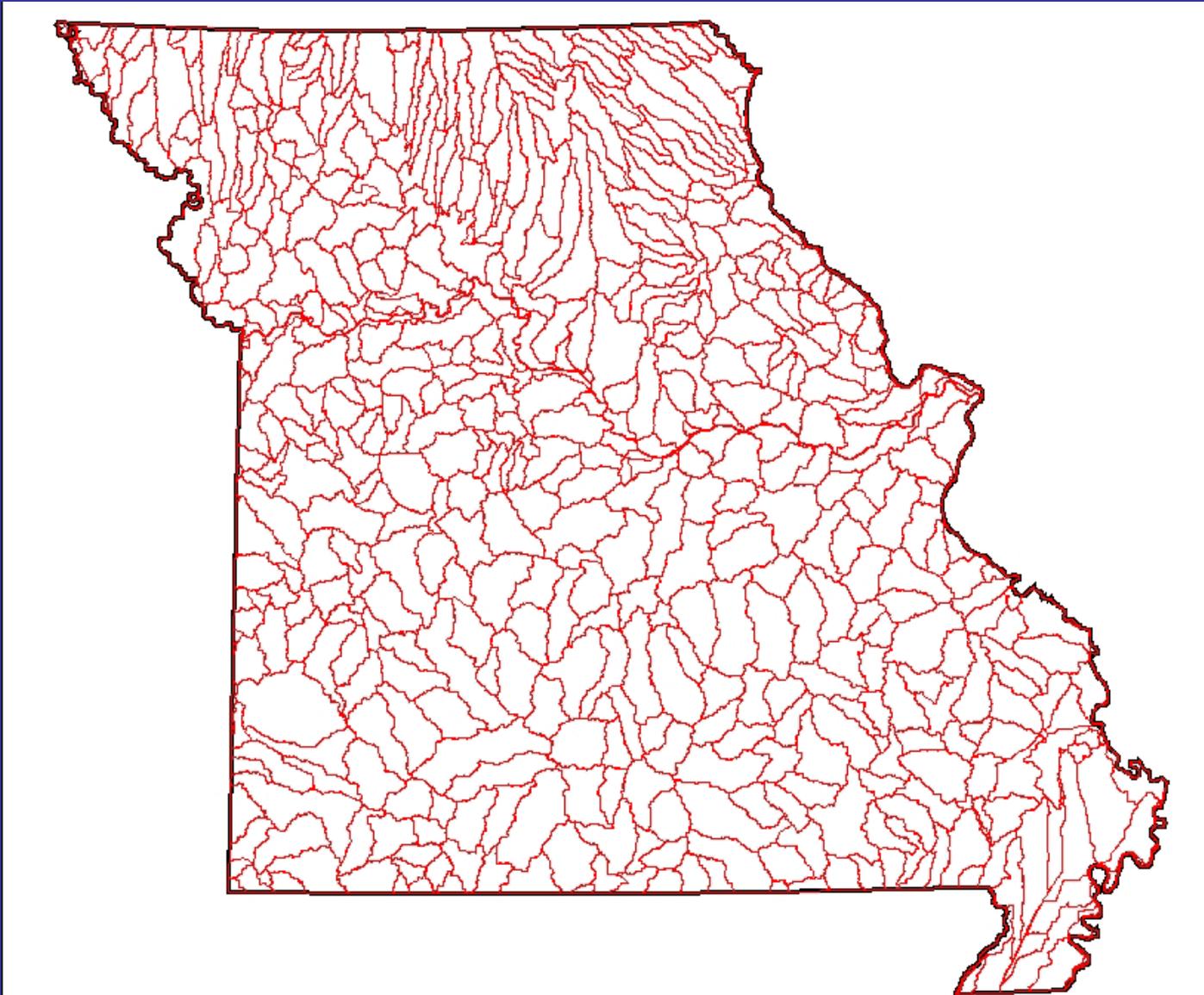
Case Study- slenderhead darter



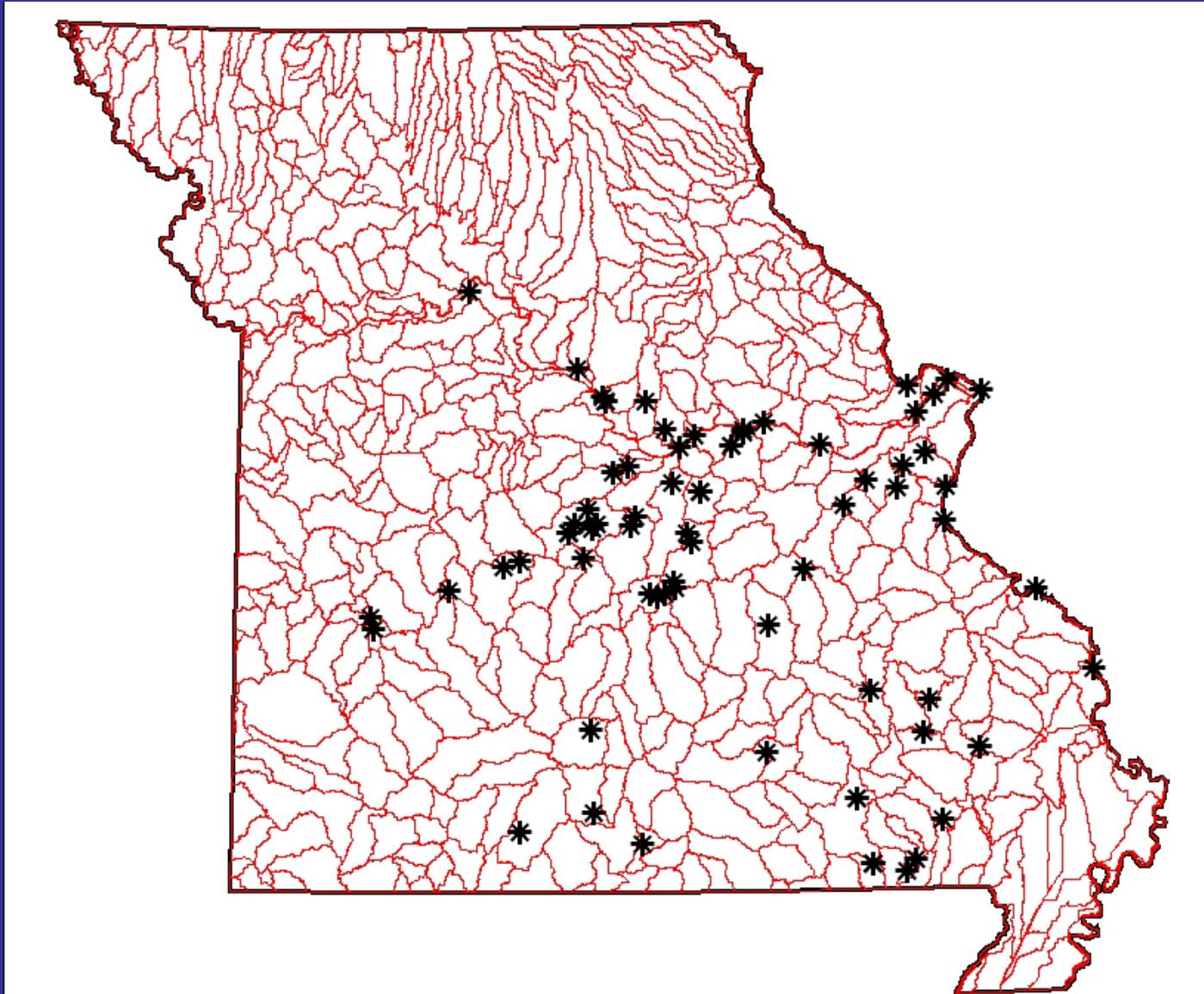
Analysis Tools

- Visual comparison of new locations to historic locations for approximately 100 species per year is impractical
- Should be able to automate the process

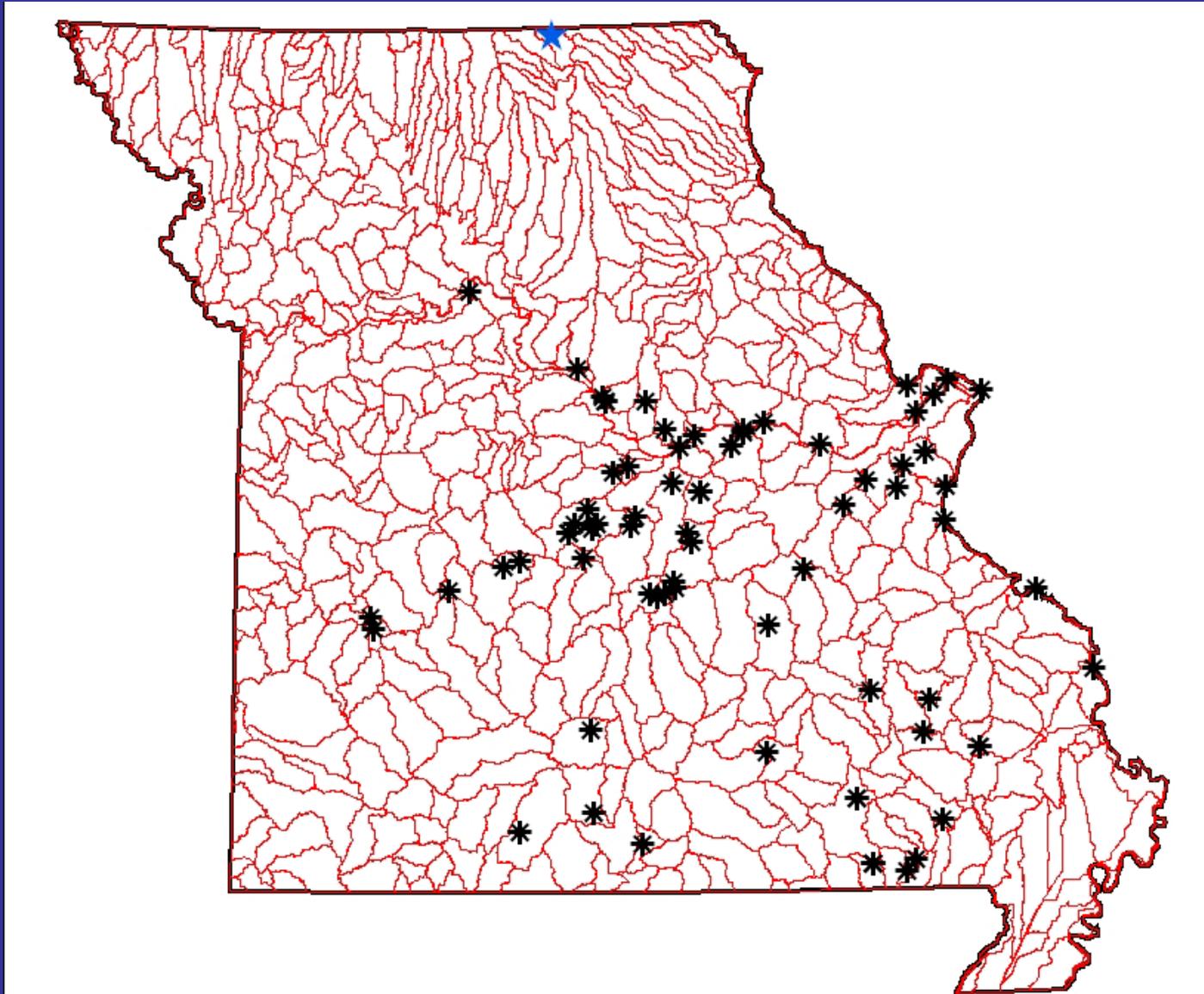
Analysis Tools



Analysis Tools



Analysis Tools



Summary

- Often asked if probability-based sample design meets species conservation objectives
- Able to:
 - locate rare and protected species
 - locate exotic species
 - locate species where they are thought extirpated
 - locate species outside of known range
 - close gaps within known range of the species
- Trying to automate the procedure

Conclusions

Yes!

