A black spot on our record: invasion history of the nonnative Blackspotted Topminnow (*Fundulus olivaceus*) in the Spring River Subbasin of Kansas, with a comparison to long-term trends in Blackstripe Topminnow (*Fundulus notatus*) prevalence

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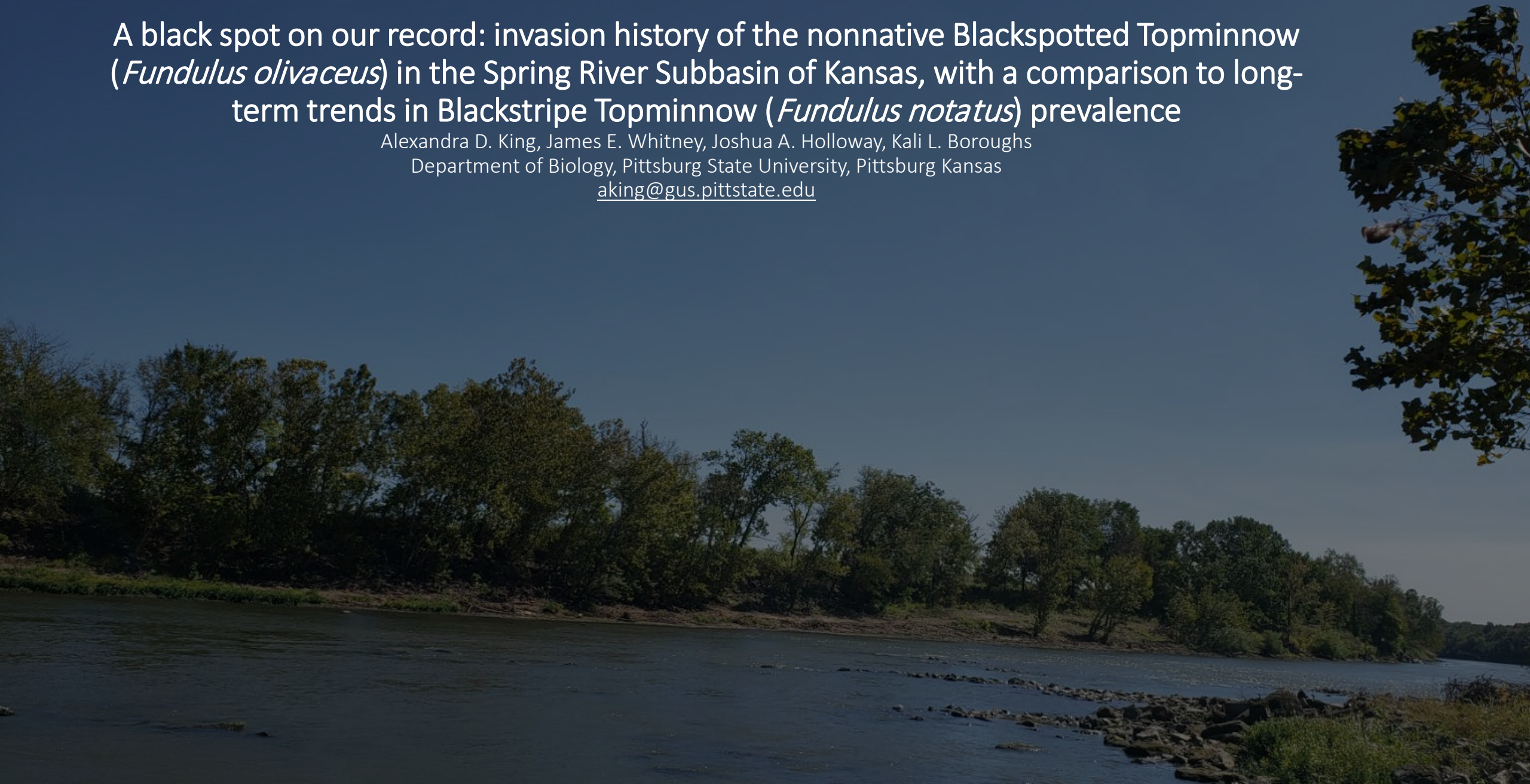
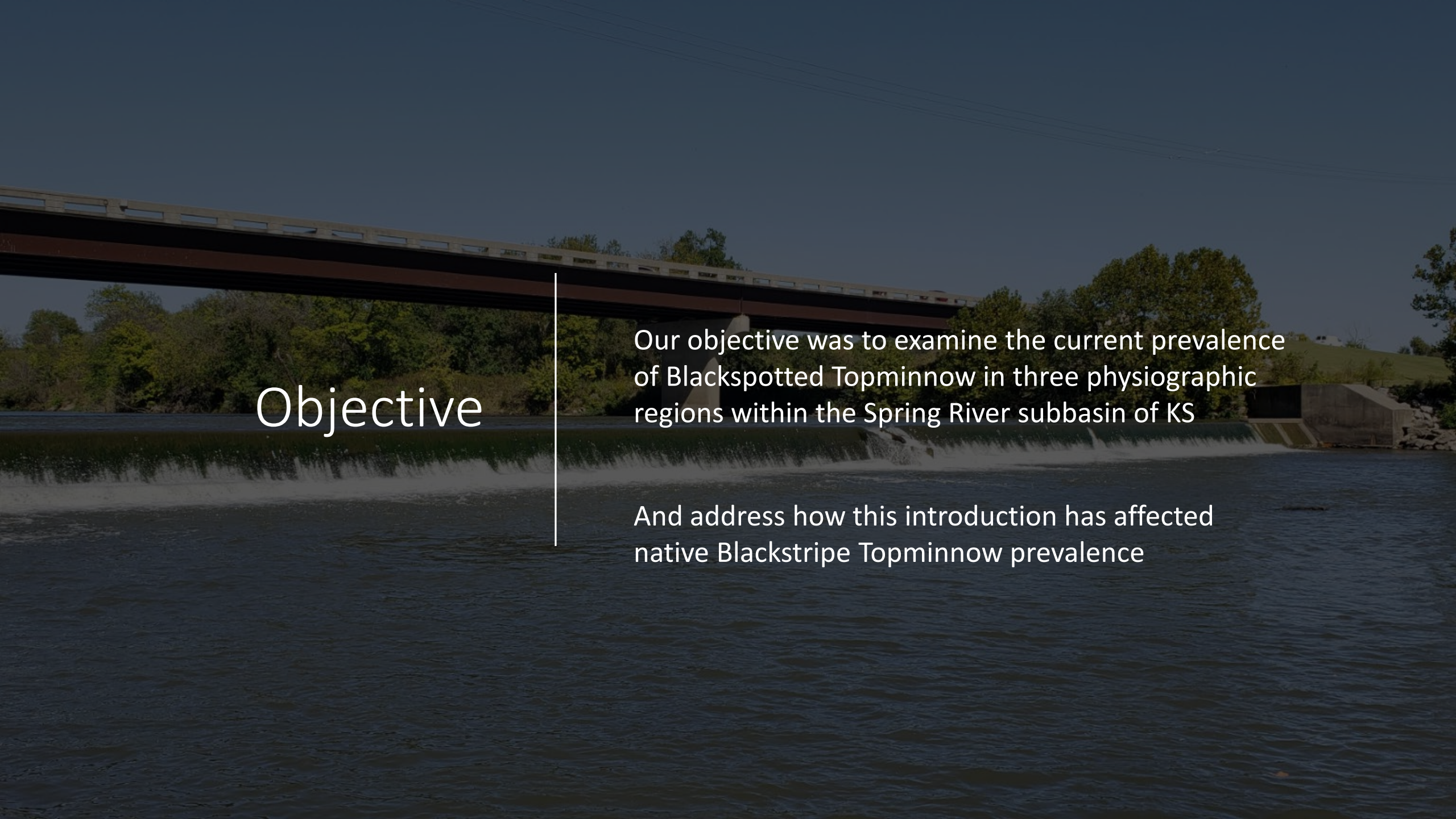


Introduction

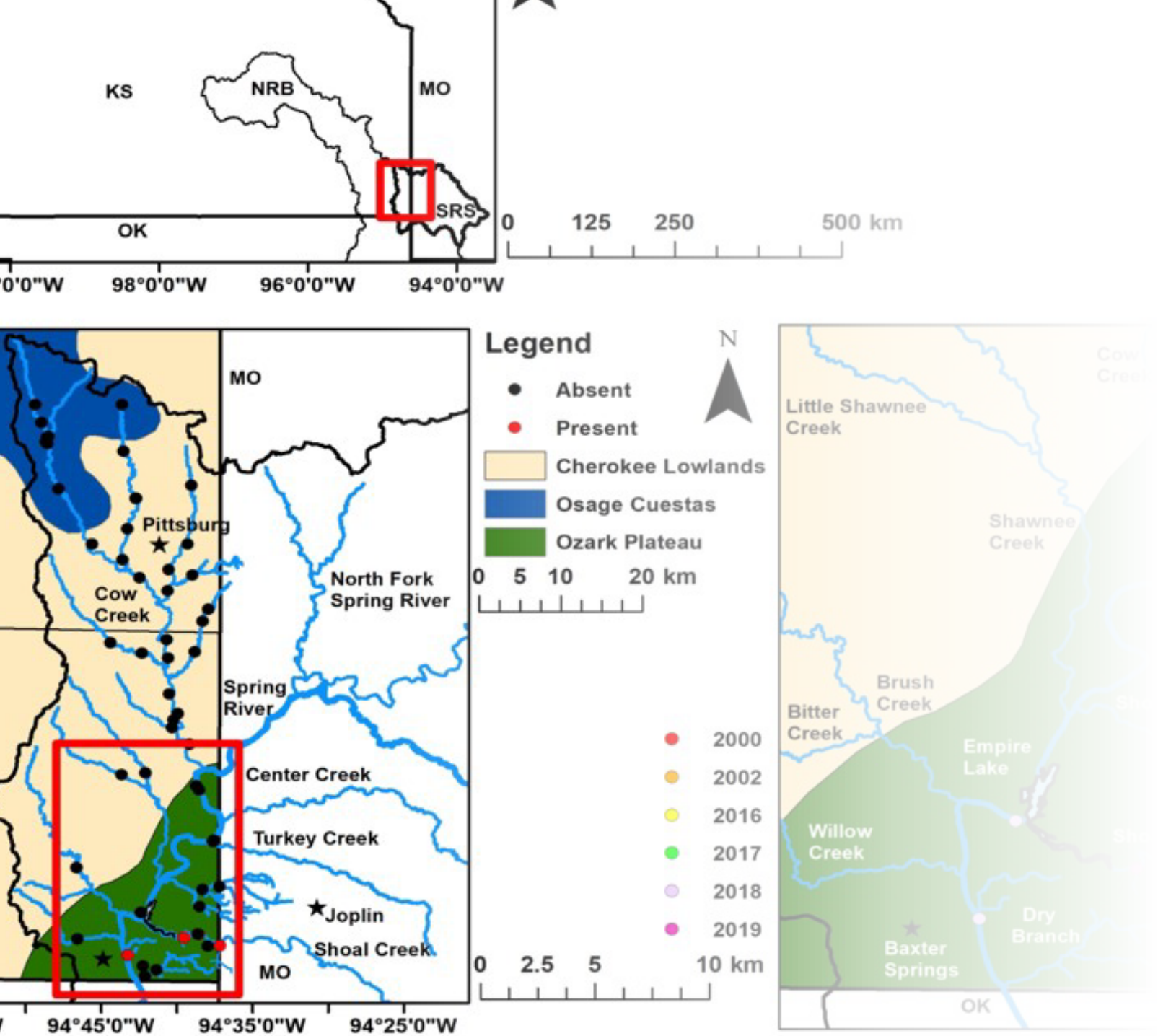
- The Blackspotted Topminnow is not native in Kansas (Pflieger 1997; Schaeffer 2014a)
- Suspected to be a bait bucket release in Shoal Creek
- The first record in Kansas came in 2000 from Shoal Creek in Schermerhorn Park, Galena (Holcroft 2004)
- Importance- Little is known regarding the ecological impacts (if there are any) of the Blackspotted Topminnow invasion in KS



Objective

Our objective was to examine the current prevalence of Blackspotted Topminnow in three physiographic regions within the Spring River subbasin of KS

And address how this introduction has affected native Blackstripe Topminnow prevalence

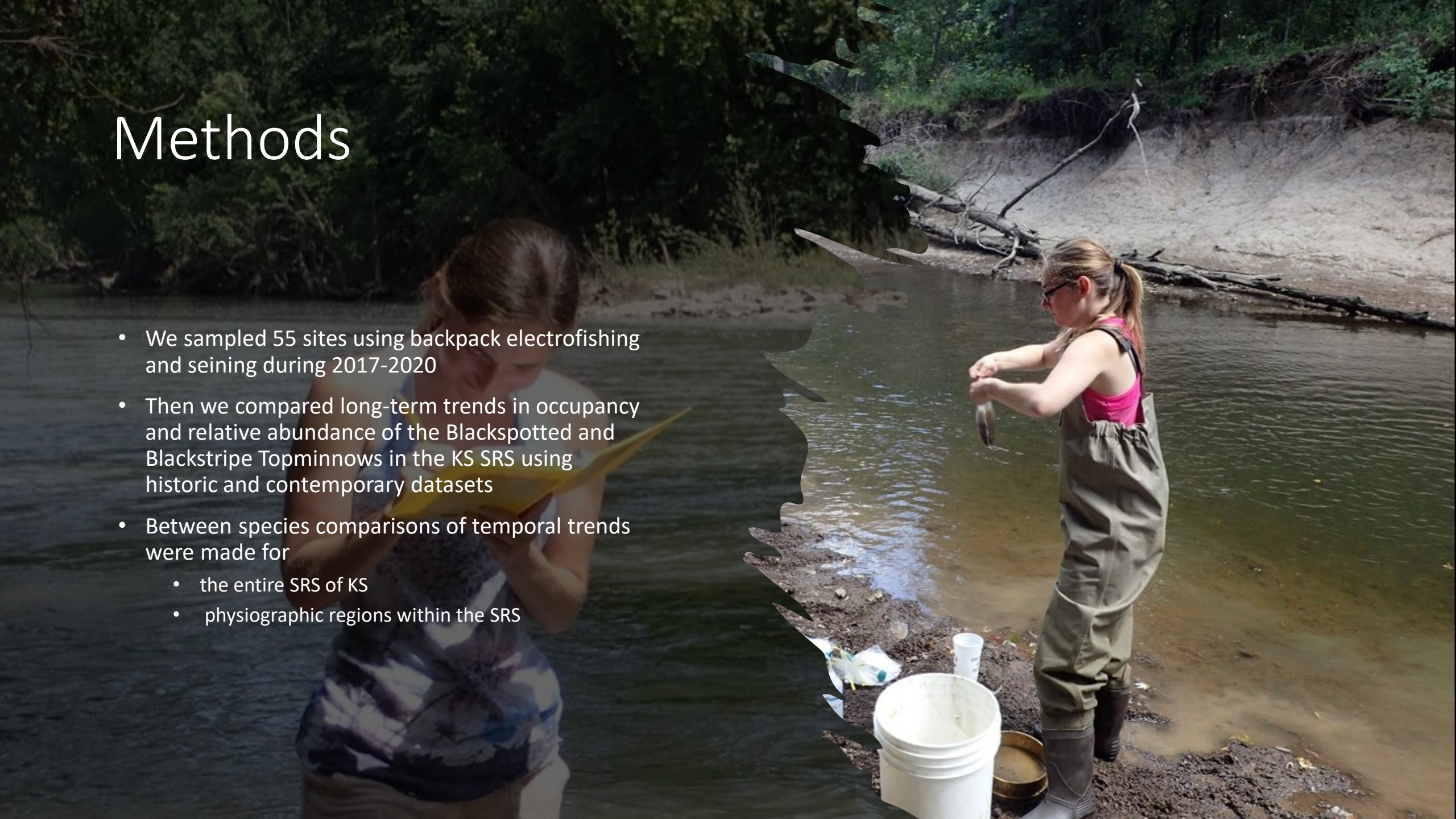


Study Area

- The Spring River and its Ozarkian tributaries tend to have
  - clear water
  - coarse substrate
  - high velocity
  - perennial flow
- The non-Ozarkian tributaries of the Spring River arising from the Cherokee Lowlands and Osage Cuestas are generally more
  - turbid
  - siltier
  - slower flowing
  - intermittent

Methods

- We sampled 55 sites using backpack electrofishing and seining during 2017-2020
- Then we compared long-term trends in occupancy and relative abundance of the Blackspotted and Blackstripe Topminnows in the KS SRS using historic and contemporary datasets
- Between species comparisons of temporal trends were made for
  - the entire SRS of KS
  - physiographic regions within the SRS

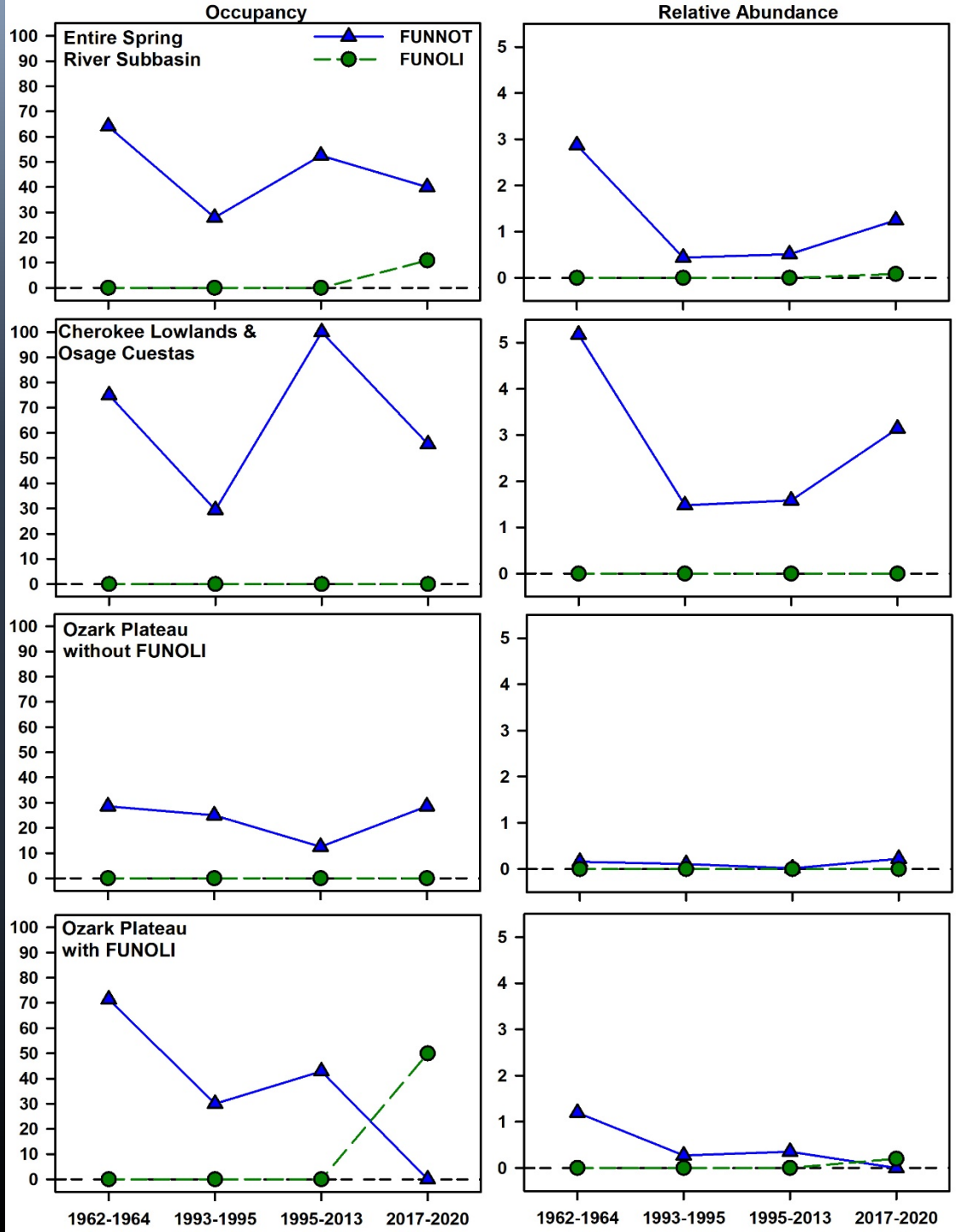


Results

- Blackstripe Topminnow
  - prevalence was relatively stable in the SRS during 1962-2020
  - It was most widespread and abundant within streams of the Cherokee Lowlands and Osage Cuestas
  - Exhibited declining trends in prevalence where Blackspotted Topminnow were present

Blackspotted Topminnow

- Only present below Empire Lake and Shoal Creek
- Contemporary distribution did not include the Cherokee Lowlands and Osage Cuestas

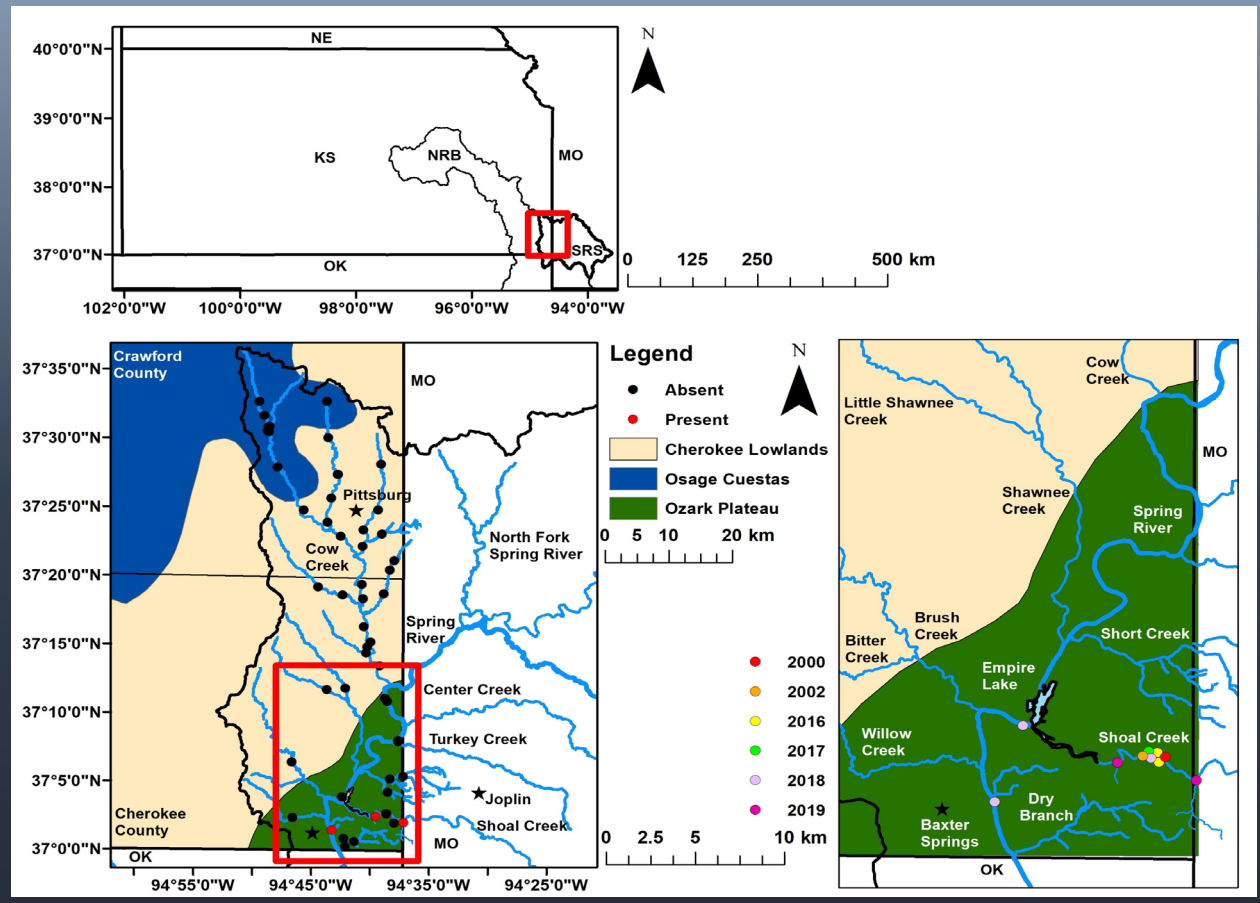


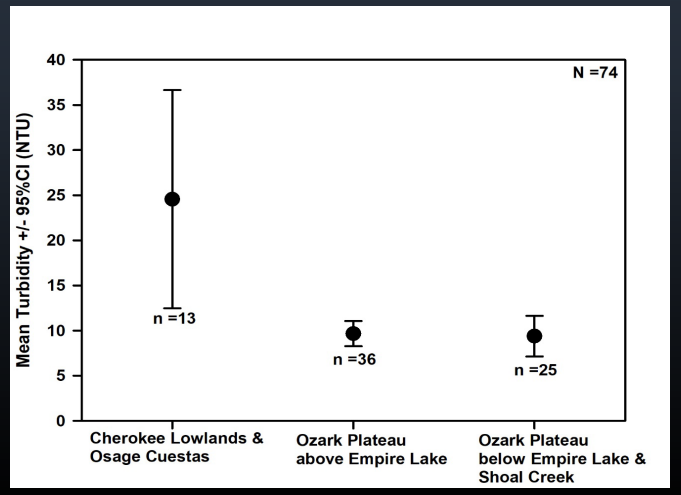
Discussion

- Our results indicate that the Blackspotted Topminnow likely displaced the Blackstripe Topminnow from the Ozark Plateau in the KS SRS where water clarity is high
- Above Empire Lake Blackspotted Topminnow were absent in the Spring River

= The ~5 km Spring River arm of Empire Lake may be functioning as a dispersal barrier

- preventing the upstream spread of Blackspotted Topminnow from Shoal Creek





Dataset	Time Period	Number of sites	Total individuals
Branson	1962-1964	39	10,501
Edds	1993-1995	43	14,104
KDWPT	1995-2013	40	34,737
PSU	2017-2020	55	25,297
Total		177	84,639

Conclusion

- Our research shows that the Blackspotted Topminnow is now an established nonnative in the SRS of KS
- Declining Blackstripe Topminnow prevalence below Empire Lake may be due to
  - negative biotic interactions
    - Competition
    - hybridization
  - Unquantified environmental variation
- Further monitoring of this species is necessary

Acknowledgements

1) We would like to thank Ryan Waters for providing access to the KDWPT SAMP data

2) We would like to thank the numerous private landowners who gave permission to sample streams on their property during the contemporary survey

3) Lastly, we thank the stream technicians for assisting with stream sampling

References

Holcroft, N. I. 2004. First record of *Fundulus olivaceus* (Atherinomorpha: Fundulidae) in Kansas. The Southwestern Naturalist 49:87-88.

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