The History of Freshwater Mussels in the Duck River

Tennessee Cooperative Fishery Research Unit

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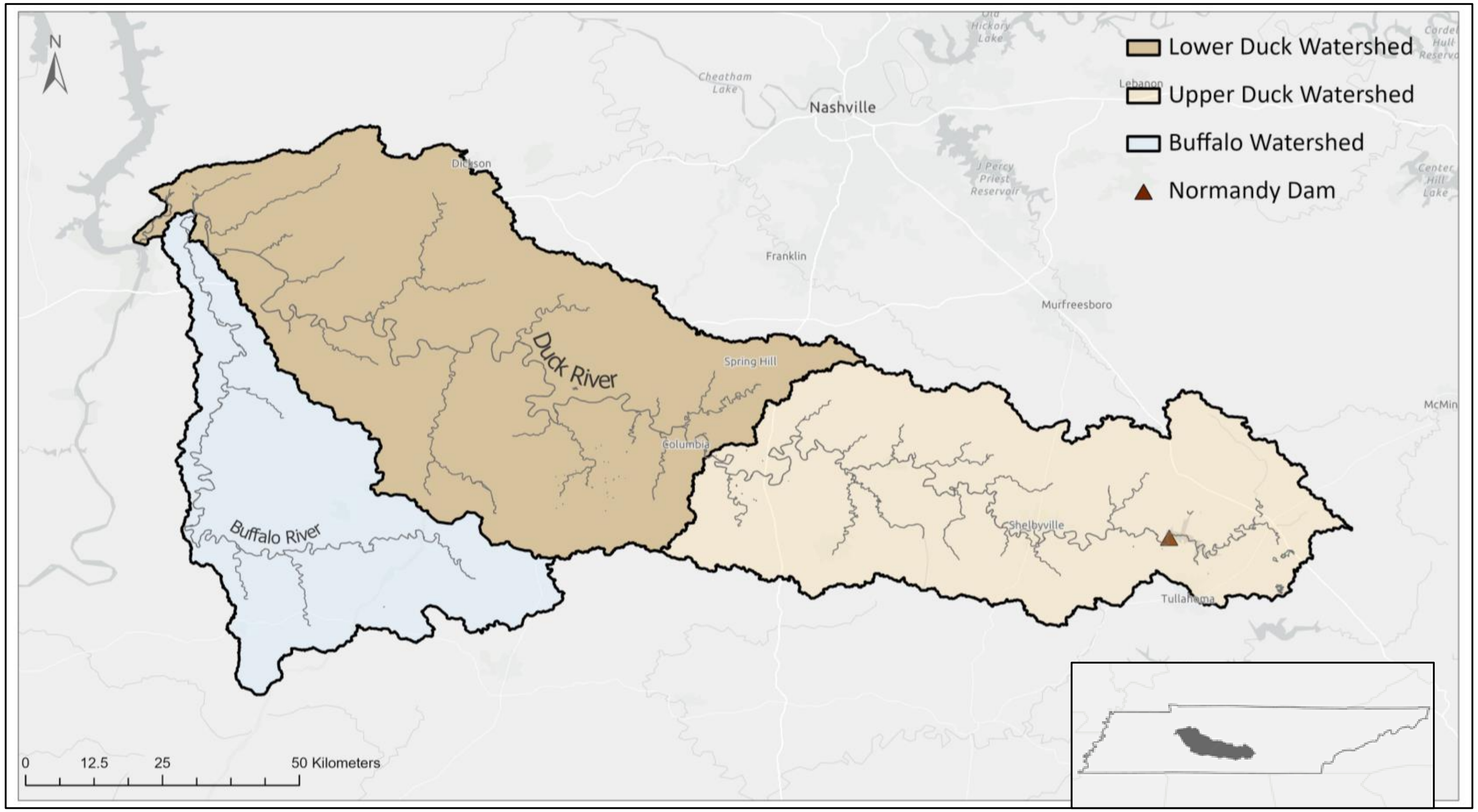
Tennessee Mussel Diversity

141 species historically | 53 federally listed | 13 petitioned

Duck River, Tennessee

150+ species of fish | 60+ extant mussels | 22+ snails



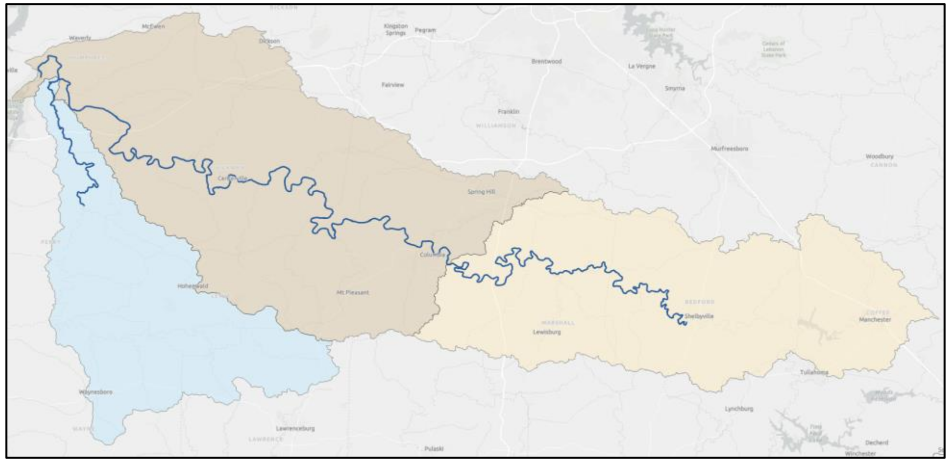
15 Listed Species

Fluted Kidneyshell

Cumberlandian Combshell

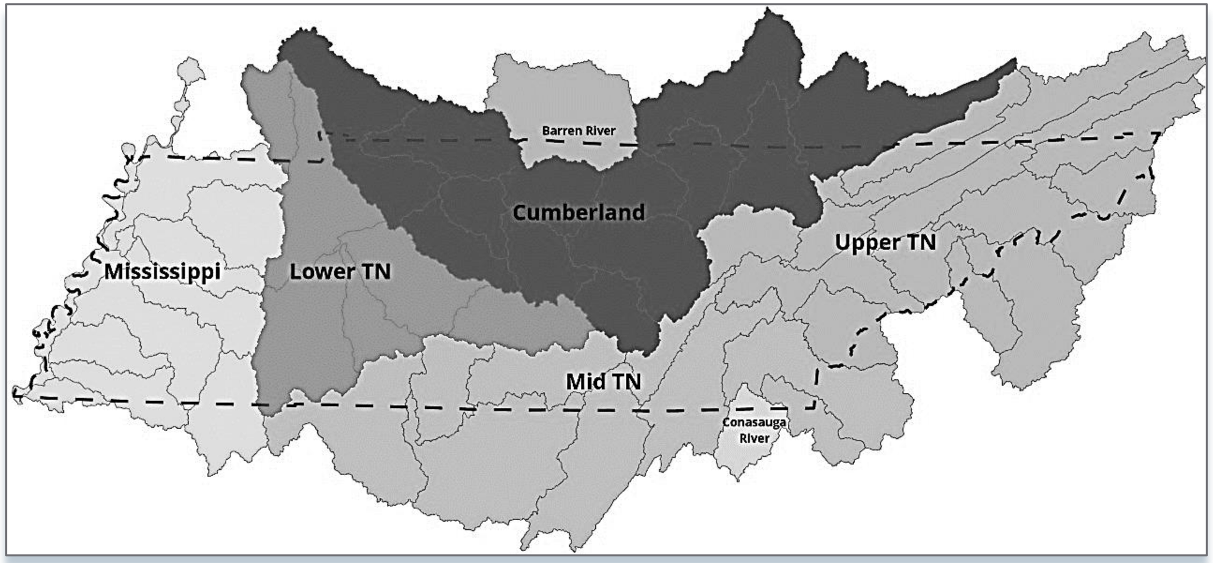
Duck River Dartersnapper

Snuffbox



Critical Habitat

Slabside Pearlymussel



Tennessee Wildlife Resources Agency

U.S. Fish & Wildlife Service
Department of the Interior

The Nature Conservancy

TVA

USGS
science for a changing world

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Division of Natural Areas
Tennessee Department of Environment and Conservation

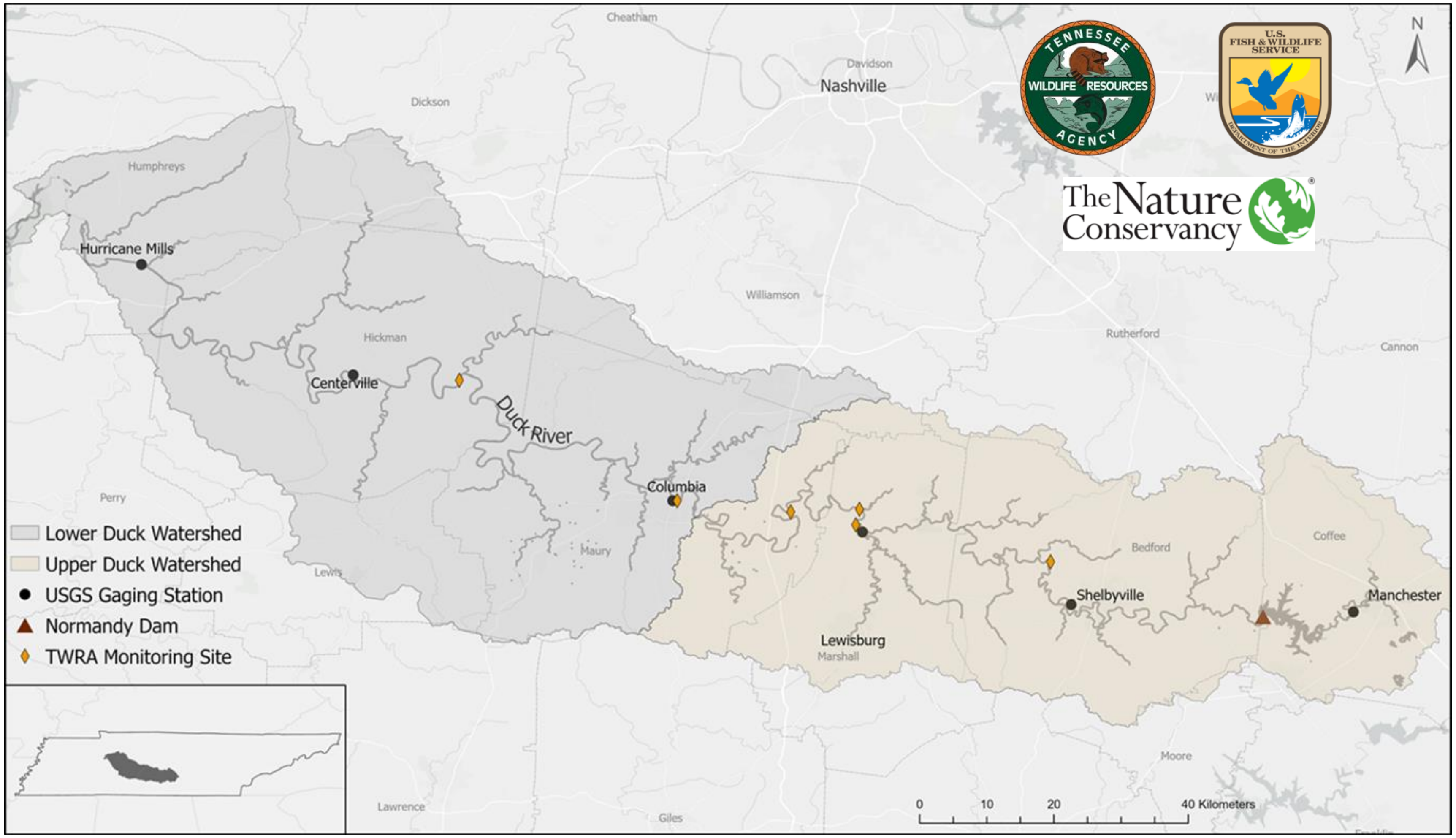
TN Department of Environment & Conservation

Forestry Wildlife Fisheries

TTU
Tennessee Cooperative Fishery Research Unit

Propagation and Reintroduction

Long-term Monitoring



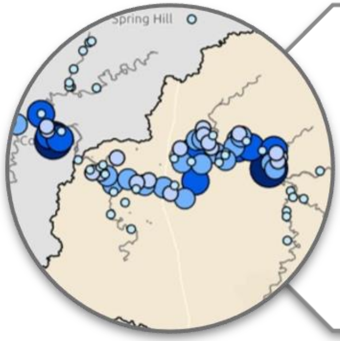
Access

7,000+ Records

- 70+ species
- 1800s-2022
- 200+ sites

Access

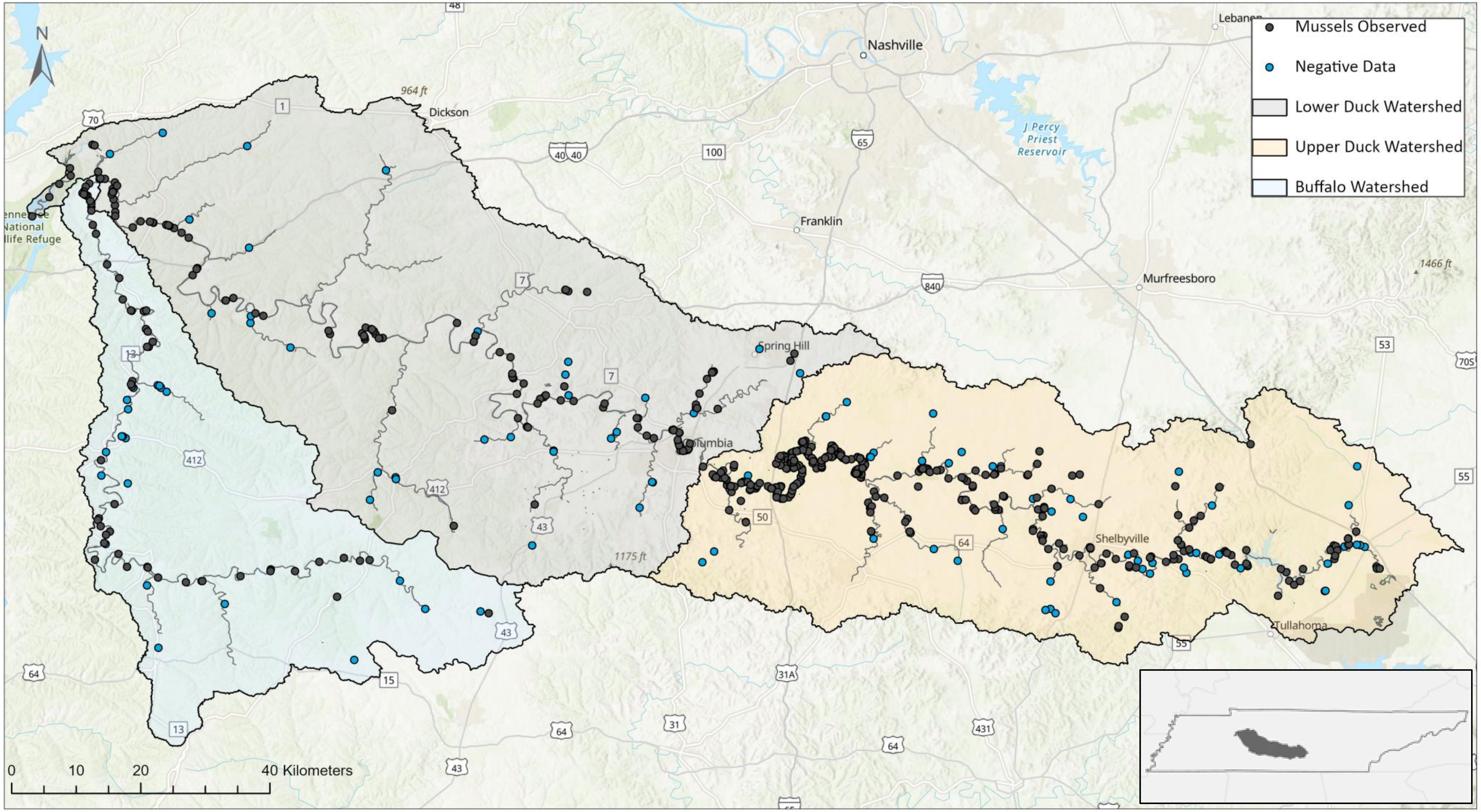
Depict accurate species distributions

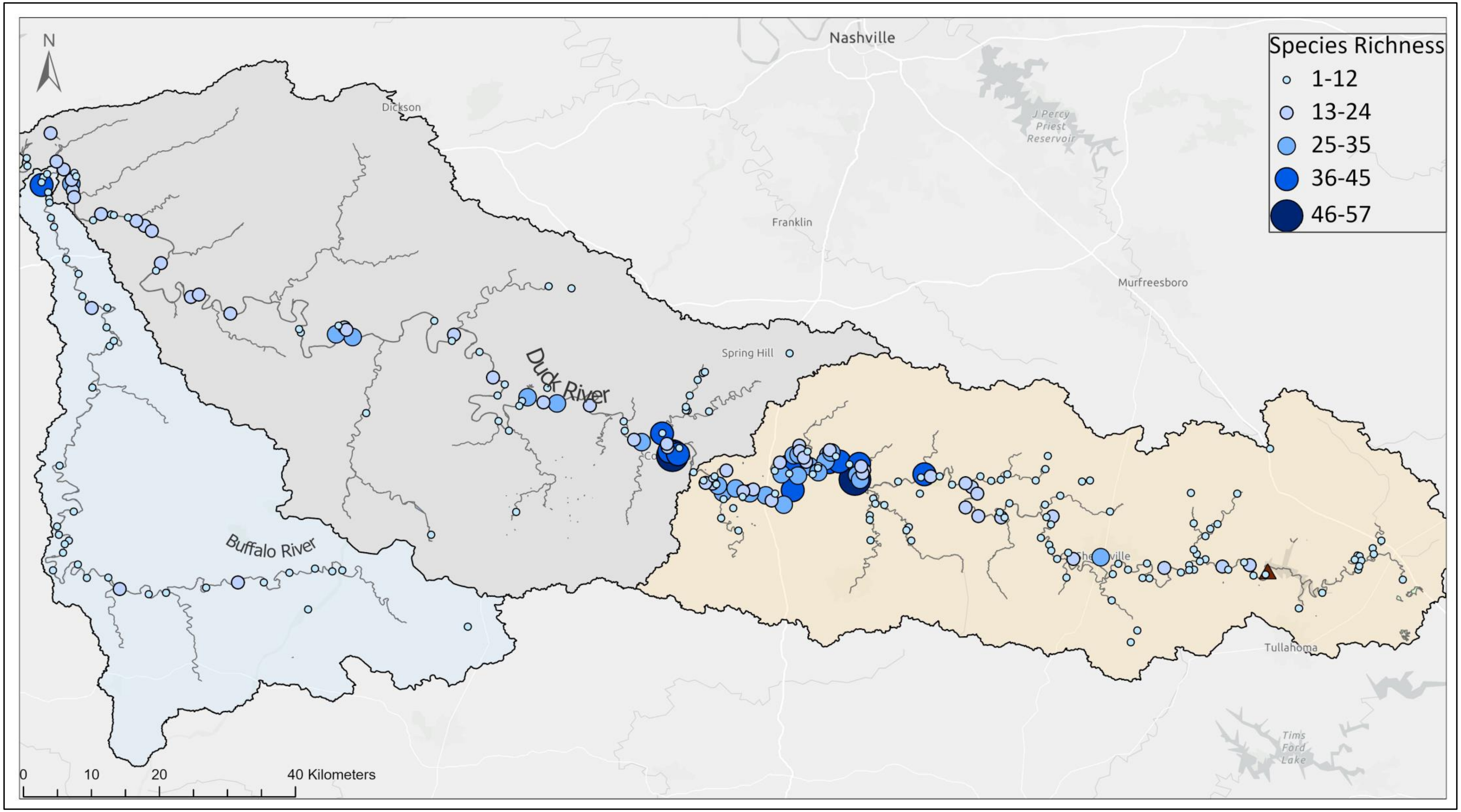


Describe long-term community and population trends

Highlight conservation priorities

Freshwater Mussel Survey Coverage in the Duck River Drainage



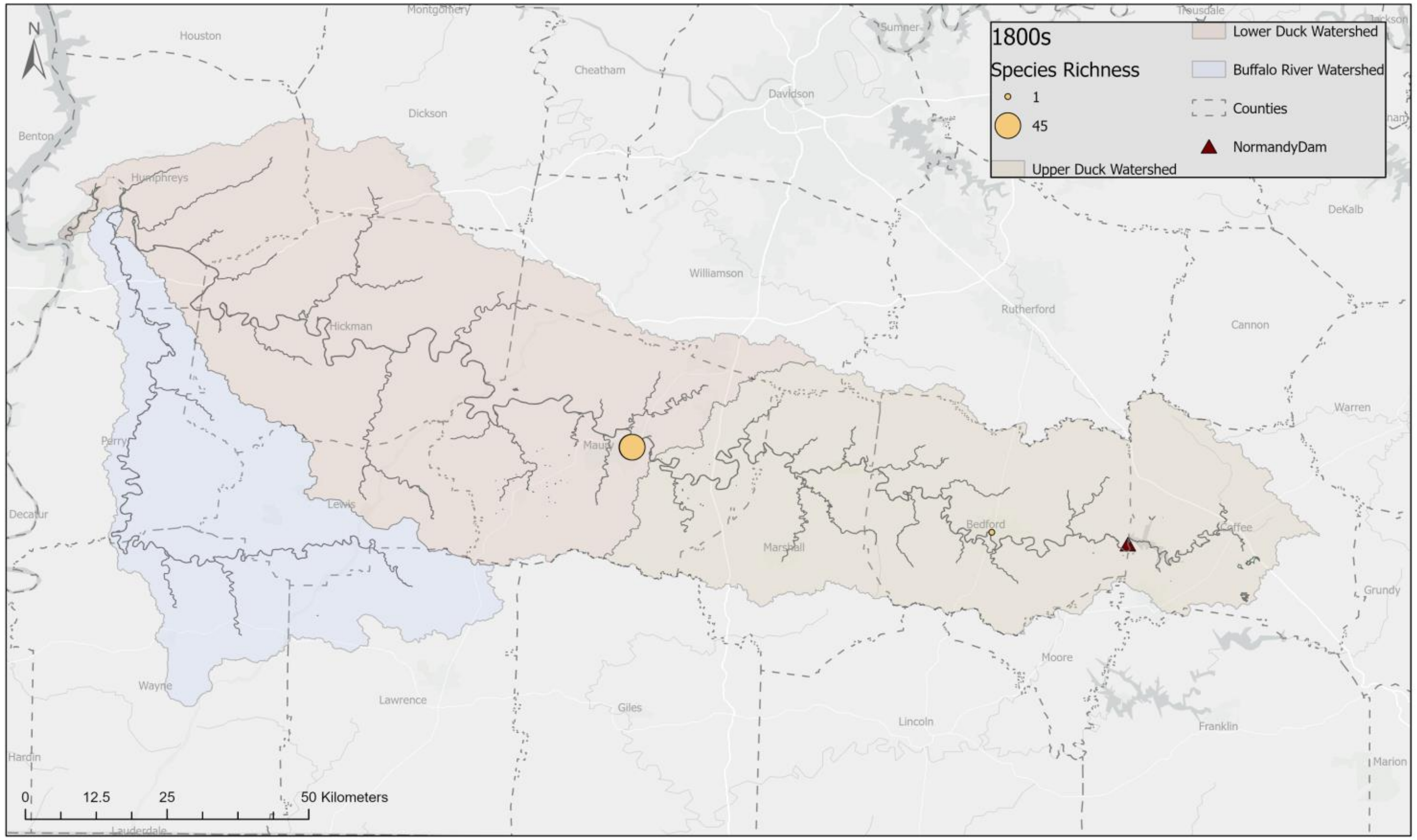


Species Richness
1-12
13-24
25-35
36-45
46-57
Nashville
Dickson
Franklin
Murfreesboro
J Percy Priest Reservoir
Spring Hill
Duck River
Buffalo River
Tullahoma
Tims Ford Lake
N
0 10 20 40 Kilometers

1800s

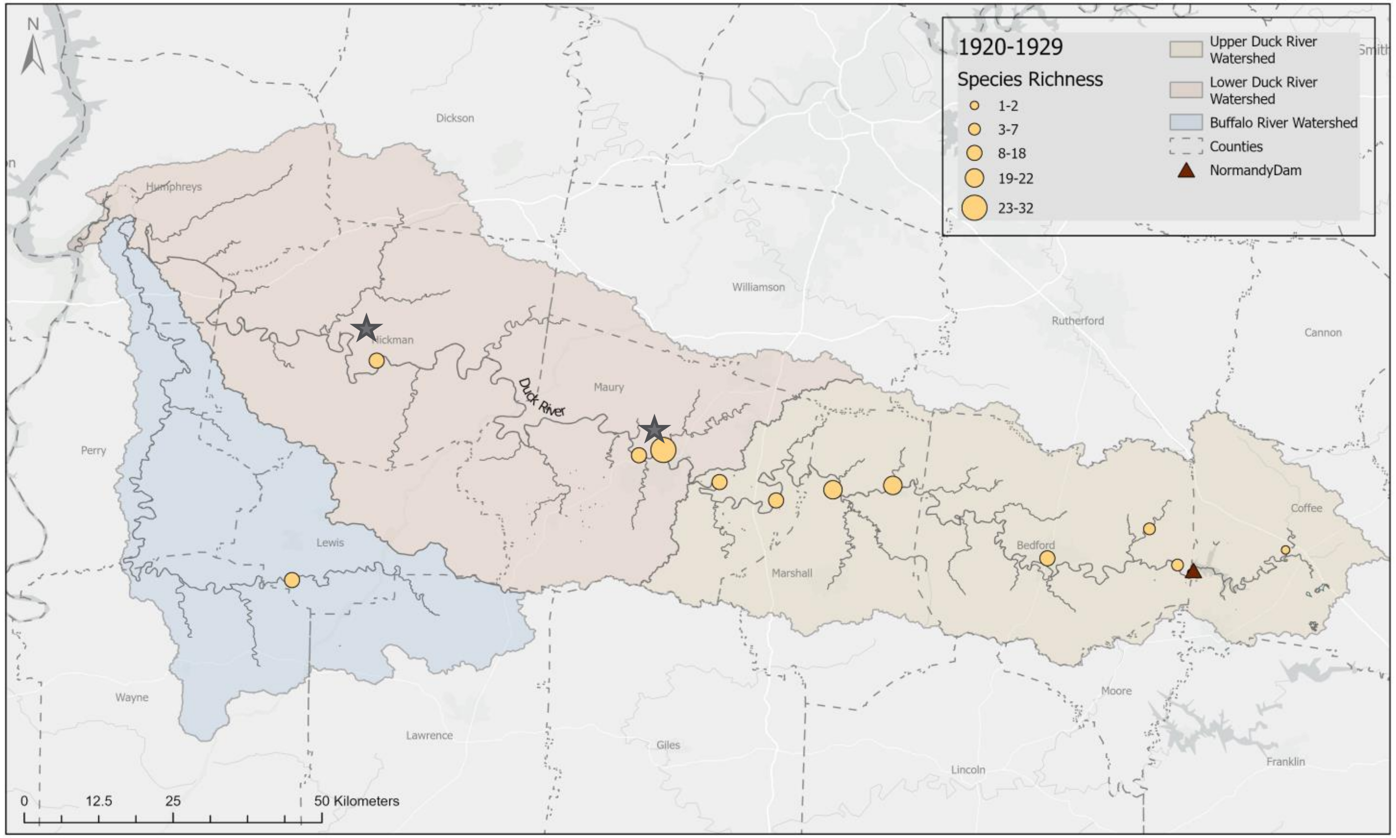
- Species richness of 45 reported at Columbia (Hinkley and Marsh 1885)
  - Large individuals

- Mill dam construction began throughout drainage (LaForest and Oliveira 1979)



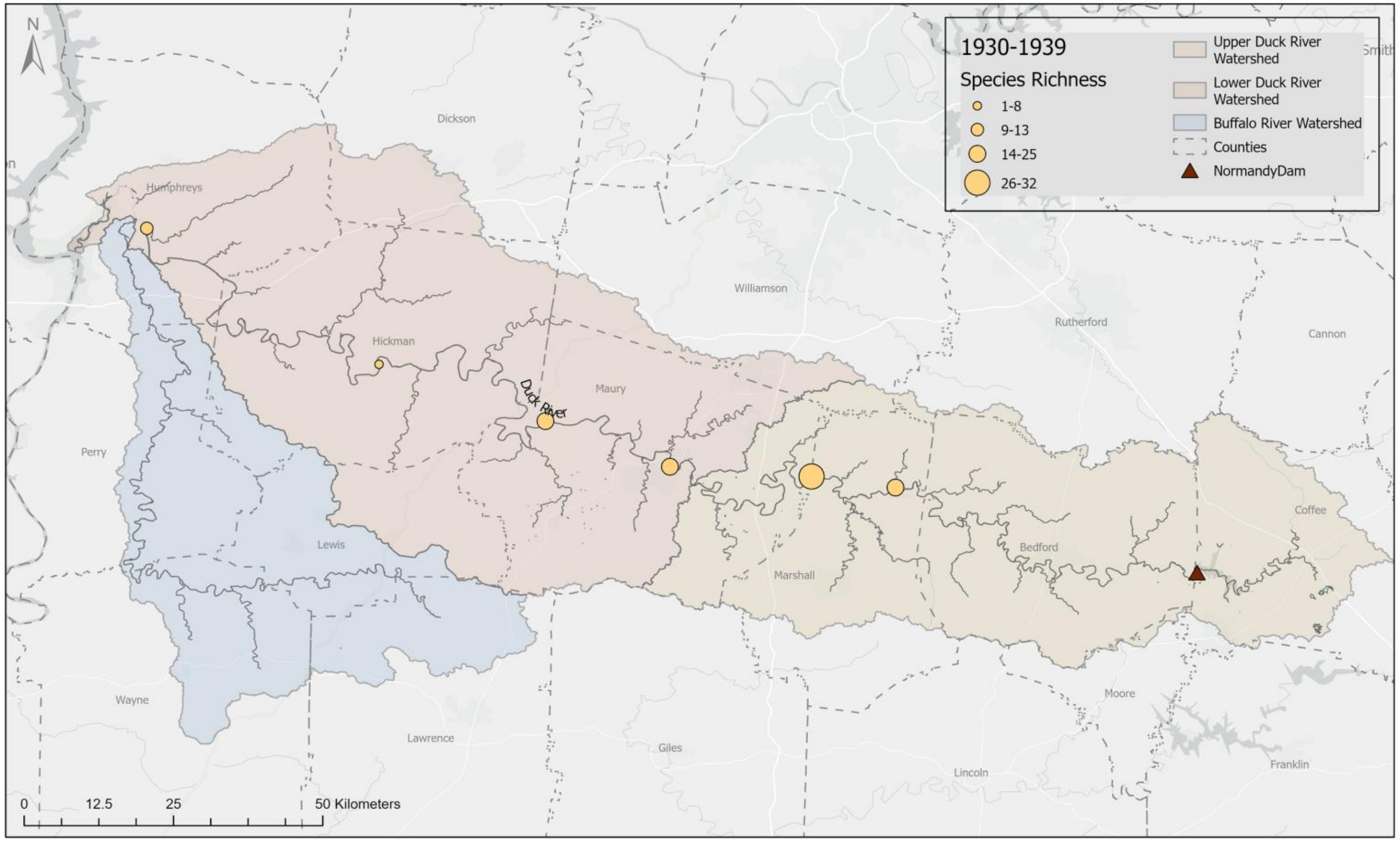
1920-1929

- 63 species found
- Highest richness at Columbia
- Species rich sites throughout drainage
- Lower levels of live individuals in Centerville attributed to **iron ore mining** between Columbia and Centerville (Ortmann 1924)



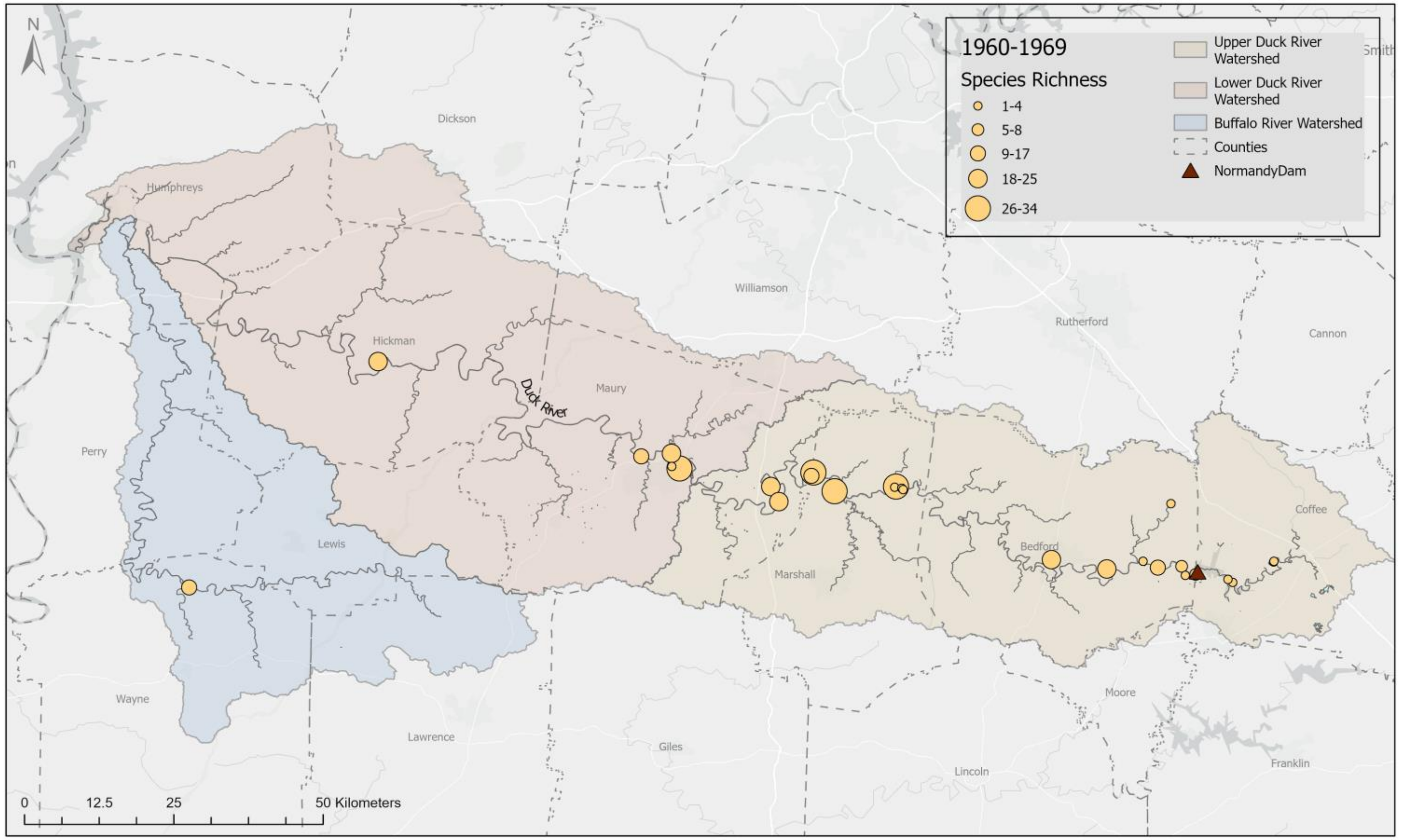
1930-1931

- River described as "paved" with mussels (Van der Schalie and Goodrich 1931)



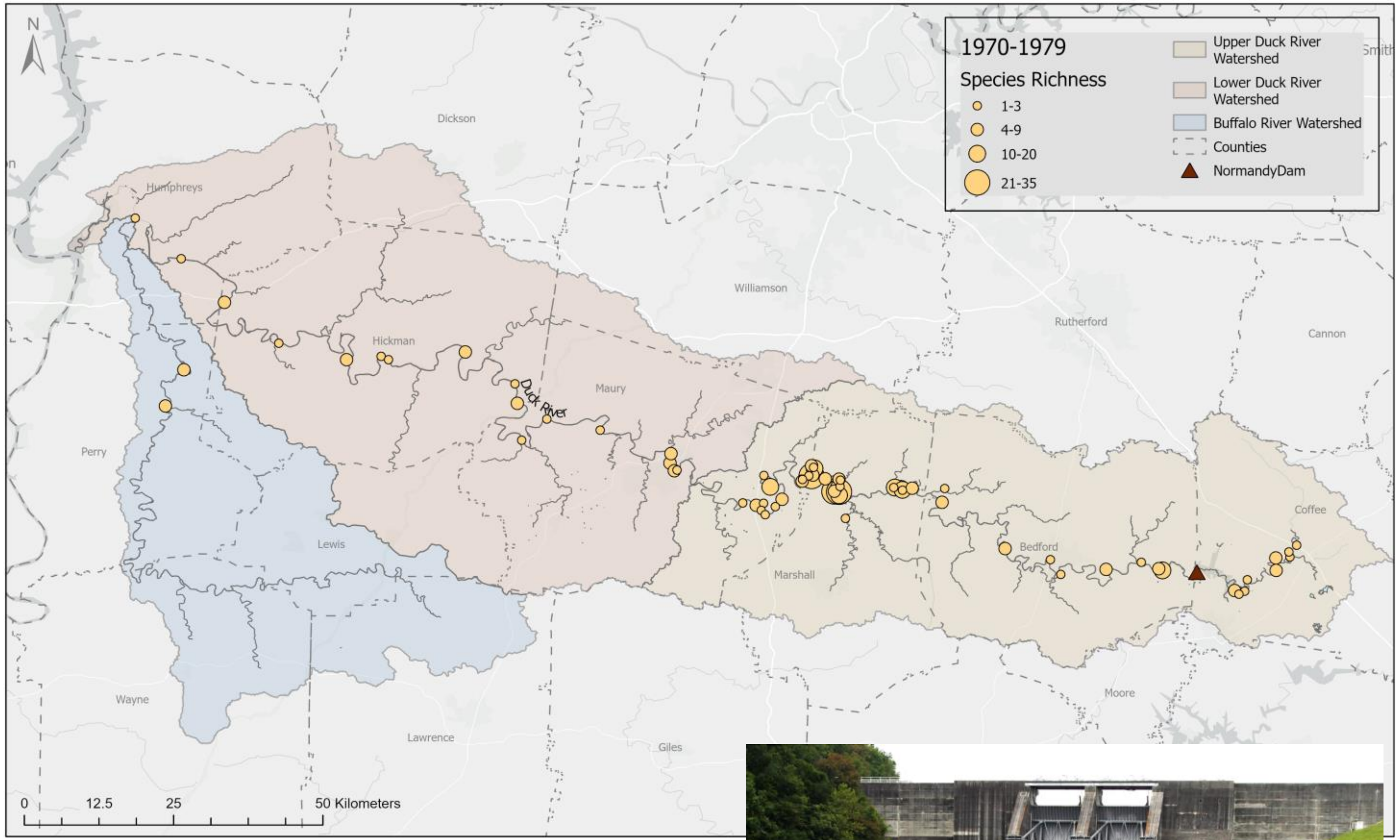
1960-1969

- 24% reduction in overall species richness since 1920s (Isom and Yokley 1968)
  - (48 vs 63 species)
- Noted that physical habitat had not been altered, but municipal sources of pollution may have contributed to declines
  - Industry, phosphate ore mining, sedimentation



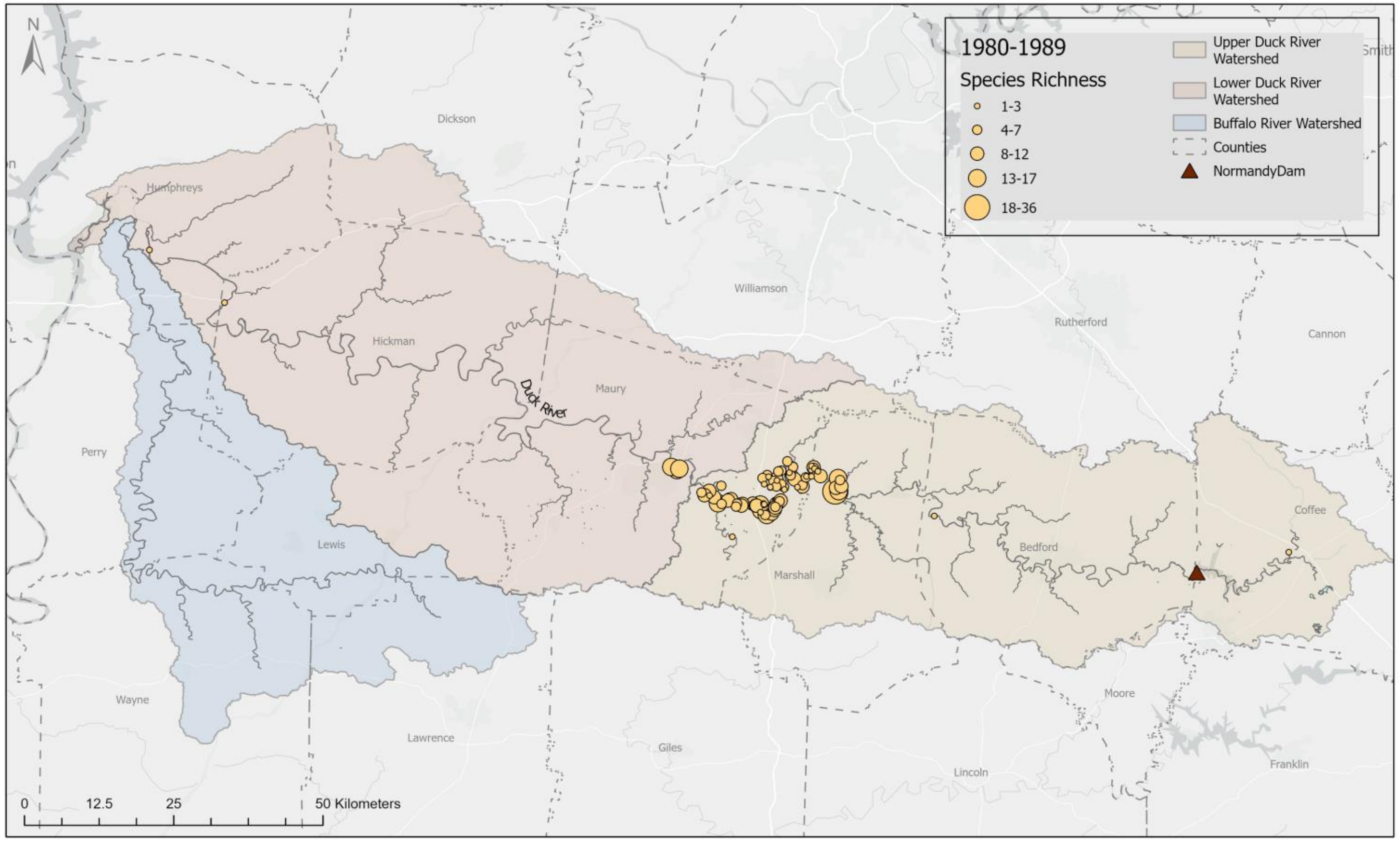
1970-1979

- Species richness and abundance declines (Van der Schalie and Goodrich 1972)
- Clean Water Act 1972
- Endangered Species Act 1973
- Normandy Dam 1976
- 1979: TVA began monitoring at 22 sites above Columbia due to Columbia Dam project



1980-1989

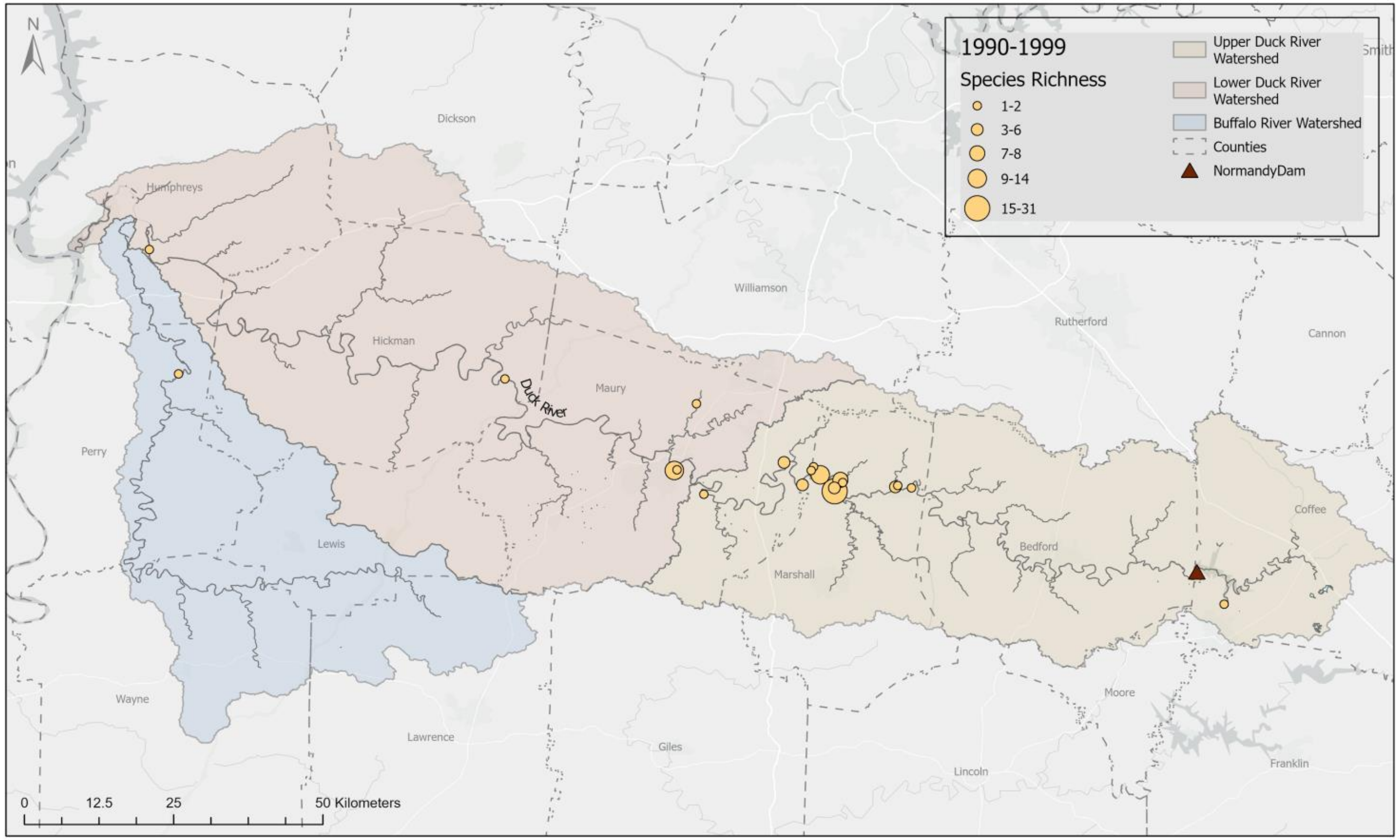
- Species richness remained stable, but mussel abundance **increased** in 1988



1990-1999

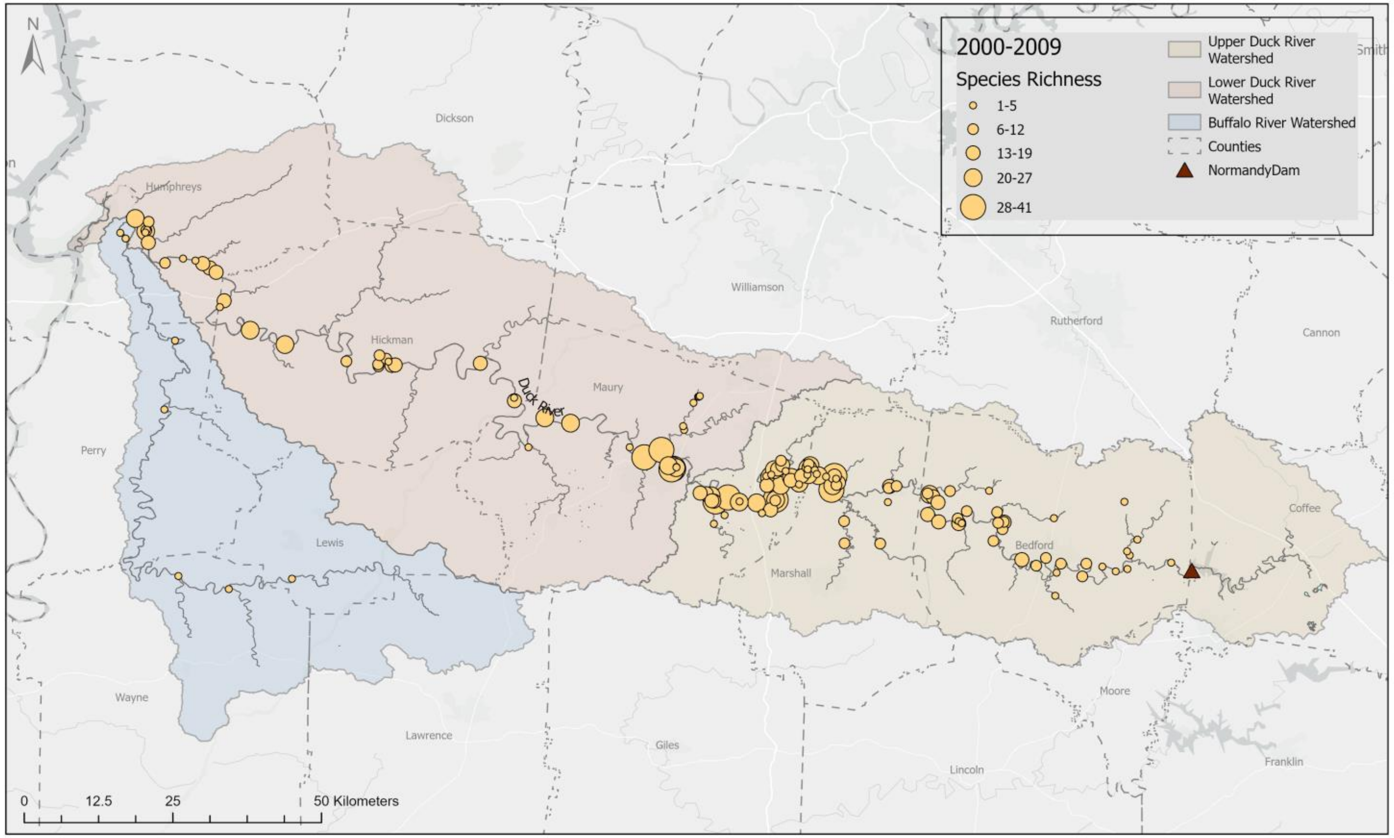
- TVA Reservoir Release Improvement Initiative

- Normandy: Discharge regulation and improved dissolved oxygen



2000-2009

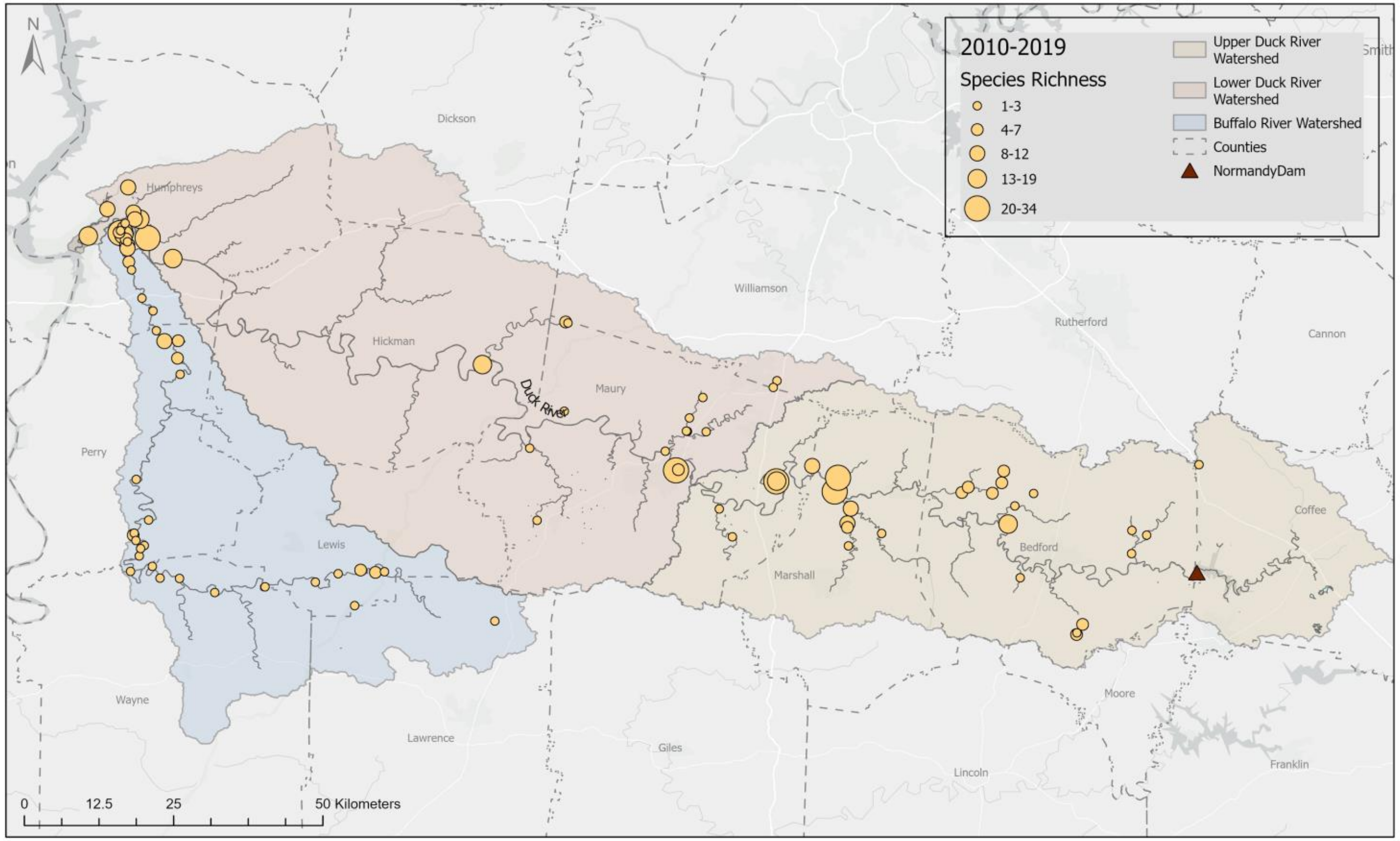
- Drainage-wide survey led by Steve Ahlstedt in 2001-2002: **54 species**
- 32 species below Centerville (Schilling and Williams 2002)
- Significant increase in species richness and mean abundance compared to 1979 and 1988
- Loss of 21 species since historical surveys began
- Reintroduction and Augmentation Plan finalized



2010-2019

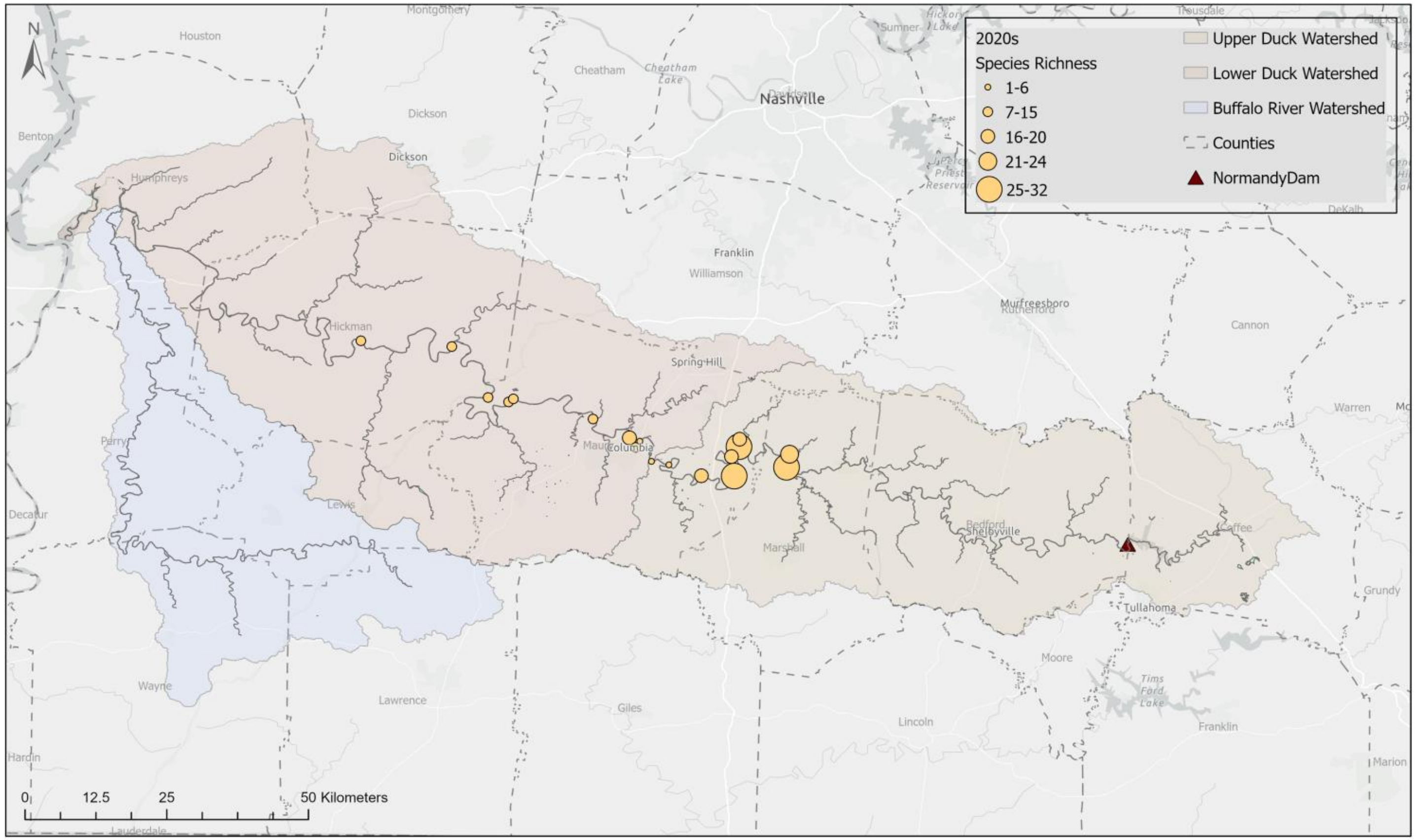
- Drainage-wide tributary surveys
  - Buffalo River (Reed) and middle and upper tributaries (Irwin)

- 2013: Reintroductions initiated for several species



2020-2023

- 5-year Monitoring
  - Evidence of reintroduction success
- 376% increase in Round Hickorynut abundance at Venable Spring
- Densities of most species stable since 2010, although some declines



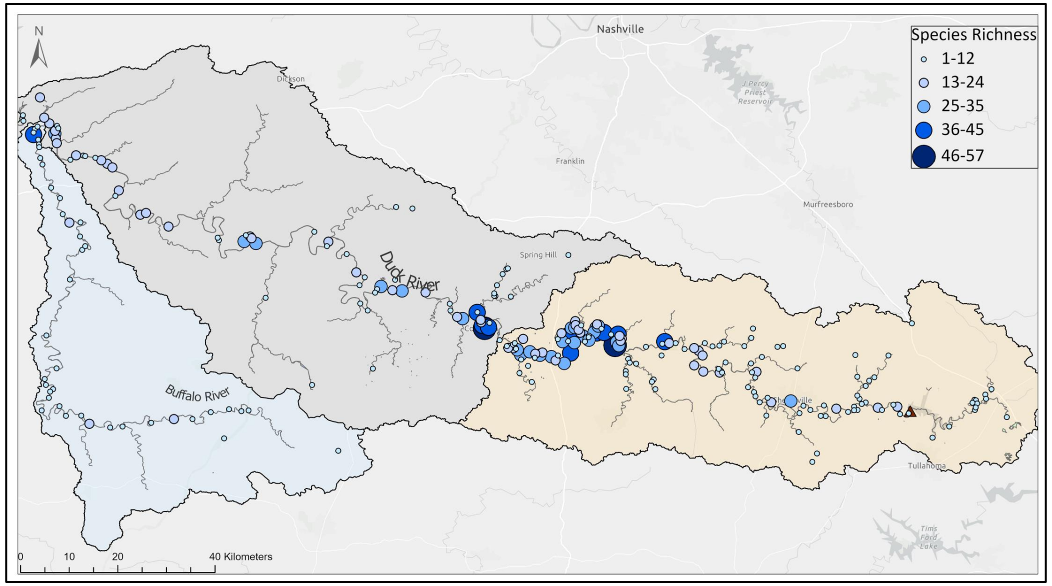
Fluted Kidneyshell

Snuffbox

Pink Mucket

Take Homes

- The Duck is a mussel hotspot, but is not without threats
  - Habitat loss/quality reduction
  - Normandy
- Recovery made possible by policy and dedicated collaboration
- Monitoring gaps exist, but they present opportunities to fill knowledge gaps
  - Assess additional reintroduction locations
- Future studies: what makes Duck mussels so healthy?



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TENNESSEE WILDLIFE RESOURCES AGENCY

TVA

DIVISION OF NATURAL AREAS TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

TN Department of Environment & Conservation

Questions

Contact for References or Questions:
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