

An Imperiled Fauna

❖ Status & Conservation Concerns

- ❖ One of the most imperiled faunas in N. America
- ❖ 83 federally listed taxa
- ❖ 25% predicted to go extinct in the next 3 decades
- ❖ Diversity loss & species declines



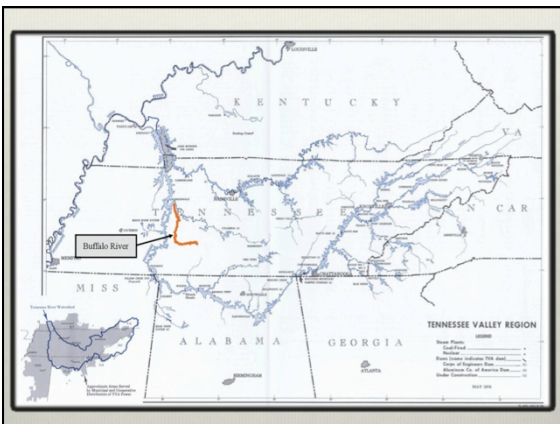
(Bogan 1993, Haag 2009, Lydeard et al. 2004, Neves et al. 1997, Parmalee and Bogan 1998, USFWS 2013)

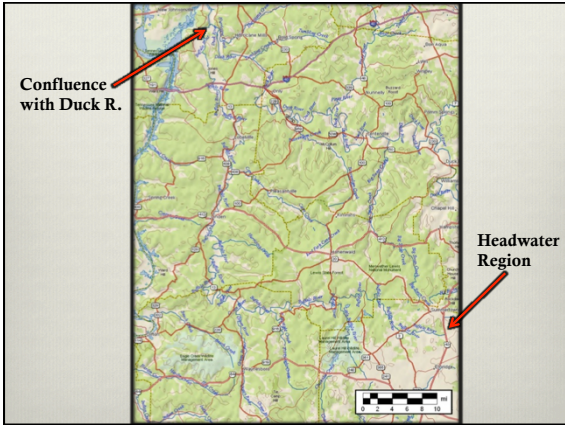
Photo: Aquatic Wildlife & Conservation Center

Buffalo River



- ❖ Located in western Middle Tennessee
- ❖ Largest tributary to the Duck River
- ❖ 125 miles (201 km) in length
 - ❖ One of Tennessee's largest remaining unimpounded rivers
- ❖ Private land ownership → over 90% of the watershed
- ❖ Parmalee and Bogan (1998): 40 species





Justification

- ❖ **Lack of existing information and baseline species data for the Buffalo River**
- ❖ **Critical habitat management (USFWS) and new species to the drainage**
- ❖ **Immediate need for translocations and reintroduction locations**
- ❖ **Future management efforts for impaired stretches of river**

(Ahlstedt 1991, Ahlstedt et al. *in press*, Isom and Yokley 1968, Ortmann 1924, Schilling and Williams 2002, Van der Schalie 1973)

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Objectives

- ❖ **Establish baseline mussel species data using both qualitative and quantitative methods for the Buffalo River**
- ❖ Compare spatial and temporal distributions of historical survey sites with current surveys
- ❖ Randomize quantitative surveys to compare species detection with qualitatively-searched sites

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Methods

Qualitative Methods:

- ❖ Timed searches for every 5 river miles
 - ❖ Survey a total of 20-25 sites in main channel
 - ❖ Additional surveys in lower reaches of major tributaries



Methods

Quantitative Methods:

- ❖ Quadrat and Transect Surveys



Photo: Modiolus Restoration Research Group



Photo: Alabama Fishes Research

McClung Museum

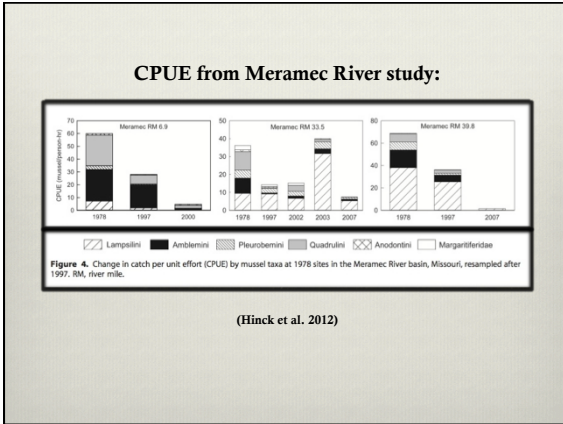
- ❖ Live individuals identified, measured, returned to substrate
- ❖ Fresh dead material retained for voucher specimens
 - ❖ Identified, cleaned, catalogued



Photo: McClung Museum of Natural History and Culture, 2012

Data Analyses

- ❖ Shannon Diversity Index (Shannon 1948)
 - ❖ Species diversity among communities
- ❖ Historical vs. Current
 - ❖ Catch per unit effort (CPUE) → Mussels detected/person hr
 - ❖ Spatial and temporal trends
 - ❖ Colonization & Extirpation proportions
 - ❖ ArcGIS software
- ❖ Species Density and Detection



Current Progress

- ❖ Preliminary surveys have identified 3 new species records for the Buffalo

Genus & species	Common name	Status
<i>Cuberlandia monodonta</i>	Spectaclecase	Endangered (USFWS)
<i>Fusconia subrotunda</i>	Longsolid	
<i>Toxolasma lividum</i>	Purple lilliput	

Photos: McClung Museum, 2013

Summary

- ❖ Global declines have placed freshwater mussels at the forefront of conservation concerns
- ❖ Current lack of knowledge regarding Buffalo River's current mussel status
- ❖ Qualitative and Quantitative approach to establishing monitoring sites and population data
- ❖ Critical habitat data and management
- ❖ Increased need for translocation and reintroduction sites

