



# FRESHWATER MOLLUSK INVENTORY OF THE DUCK RIVER BASIN TENNESSEE A PRELIMINARY REPORT

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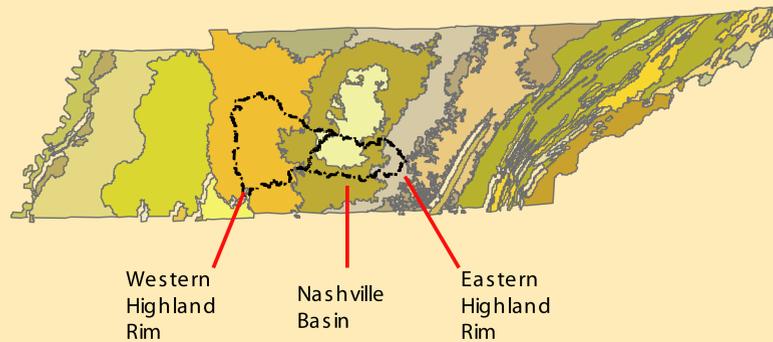
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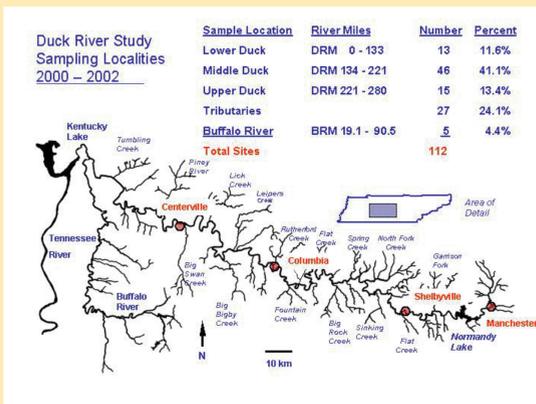
## INTRODUCTION

The Duck River Basin located in south-central Tennessee is recognized as one of the most biologically diverse basins in North America. This treasured resource boasts over 140 species of fish, 50 mussels, and 25 snails, many of which are endemic. Originating on the Eastern Highland Rim, the Duck River traverses some 260 miles across three different physiographic regions before joining the Tennessee River. The greatest potential threats to the Duck River Basin's rich diversity are changing land-use patterns, industrial and wastewater discharges, increasing water demands, and streamflow alteration from Normandy Reservoir.

### Physiographic Provinces of Tennessee



Between 2001 and 2002, mollusks were inventoried at 112 sites throughout the basin to document changes in species richness, distribution, and densities that have occurred since the early 1900s. To examine changes in historical species richness and distributions, a database of over 2,500 museum records was assembled. While 74 species historically occurred in the basin, 55 taxa remain, including 3 federally listed species (*Epiobrama capsaeformis*, *Lemiox rimosus*, and *Quadrula intermedia*).



## RESULTS and DISCUSSION

### Historic Surveys

Historic collections were examined from the ANSP, FLMNH, MCZ, MFM, OSUM, UMMZ, and USNM, revealing a cumulative total of 74 mussel species documented from the Duck River Basin, of which, 55 remain.

- 1891 - Brian Shermick & Richard E. Call
- 1923 - A.E. Ortmann
- 1931 - Calvin Goodrich and Henry van der Schalie
- 1965 - Billy Isom and Paul Yokely
- 1970 - David Stansberry and Carol Stein
- 1978 & 1988 - Steve Ahlstedt and J. Jenkinson (TVA)

Ahlstedt and others, 2001



### Current Conditions

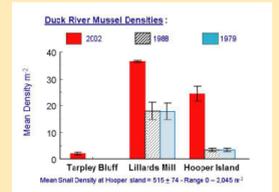
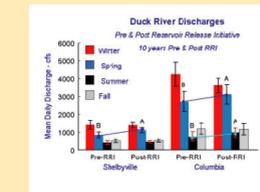
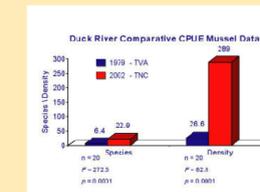
Mussel densities and species richness examined as Catch Per Unit Effort (CPUE) or quadrat sampling; indicate significant increases in mussel diversity and density since 1979. Mean mussel densities at Lillard's Mill increased from 17.8 m<sup>2</sup> in 1979 to 36.6 m<sup>2</sup> (n=20) in 2002. Generally, mussel species richness increased down-river (maximum 33 species per site), with a mean diversity of 17.6 species per site in the lower drainage. Mussel species richness was not significantly different (p=0.76) across 12 sites sampled in 1922, 1965, and 2002.

For gastropods, 25 species were documented during the study, 4 being new species records for the drainage. Gastropod species richness was greatest in the middle reach of the basin with a mean of 6.84 species sampled per site. Habitat utilization patterns and density data for freshwater gastropods in the mainstem river are under evaluation.

### What's the Difference?

There are 2 likely factors behind the improvements:

- 1) Changes in water quality below Shelbyville sewage treatment plant.
- 2) Minimum flow restoration from Normandy Dam resulting from Tennessee Valley Authority (TVA) Reservoir Release Initiative.



## CONCLUSIONS

- Freshwater mussel resources have rebounded significantly
  - CPUE densities have increased more than 10 X and species richness 3 X since 1979
  - Quadrat densities have quadrupled since 1979
- Discharge and water-quality modifications at Normandy Reservoir are likely the difference in improvements in the mollusk fauna.

- Most diverse river in the Mississippi / Tennessee River Basin

Freshwater Mussels	52
Freshwater Snails	24
Fishes	147
Zooplankton	45
Plankton - periphyton	87
Tubellarians - Hirudinea	32
Isopods - Decapods	15
Insects	>225
Herpeto-fauna	15

Total Species Richness >642



The apparent long-term stability for mollusk species richness and abundance in the Duck River basin make it an outstanding national resource.