

# Tennessee Dace

*Phoxinus tennesseensis*

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## Conservation Status

**Rounded Global Status:** G3 - Vulnerable

**Reasons:**

*Phoxinus tennesseensis* range is essentially confined to the Ridge and Valley province of the upper Tennessee River drainage in Tennessee, Virginia, and extreme northwestern Georgia (mainly in Tennessee). There are several dozen collection locations that have been recorded, but the status of many populations is unknown. There are several populations that have been extirpated due to siltation. Many extant populations are small and isolated. This species is probably relatively short-lived, so isolated populations are easily extirpated.

**State Status:**

Georgia (S1), Tennessee (S3), Virginia (S1).

**Endangered Species Act:**

Not listed.

**Global Long Term Trend:**

There is a moderate decline between 25 - 50%.

**Global Long Term Trend Comments:**

Several populations have been extirpated. The species may be much less abundant than formerly (Etnier and Starnes 1993).

Hamed and Alsop (2005) surveyed 11 historical and 41 potential new locations for Tennessee dace in northeast Tennessee from September 1998 to April 2001. *Phoxinus tennesseensis* was found in 5 (45%) of the historical locations and 4 (9.8%) of the new locations, suggesting that the species has declined significantly and that further surveys may yield a small number of additional previously undetected occurrences.

**Global Inventory Needs:**

Historical localities need to be resurveyed, and surveys are needed in many other small streams within range of the species. Small streams in the upper Holston River system, including tributaries of Bear and Lick creeks, should be further surveyed (Burkhead and Jenkins 1991).

**Global Protection:**

There are few to several (1-12) occurrences appropriately protected and managed.

**Global Protection Comments:**

One population (8 isolated subpopulations) is on Tennessee Department of Conservation property. Thirteen isolated populations occur on the ORNL reservation. Some occurrences are on U.S. Forest Service land (Cherokee, Jefferson). Two (probably extirpated) populations are known from Great Smoky Mountains National Park (GSMNP). This species has not been found in the park since 1960.

**Global Protection Needs:**

Land use practices resulting in siltation and reduced flow need to be reduced or eliminated. Reintroductions of the species into Great Smoky Mountains National Park and other (ORNL and USFS) protected areas would help improve the species' status.

**Degree of Threat:**

There is localized substantial threat.

**Threats:**

Extirpations have resulted from human impacts and in some cases possibly natural processes. The paucity of clean gravel spawning substrate (due to siltation) may account in part for extremely localized distribution (Starnes and Jenkins 1988). Habitat is threatened by channelization, drying of streams (perhaps related to channelization, floods, removal of riparian cover, and/or severe drought), impoundment, and siltation (Burkhead and Jenkins 1991, Jenkins and Burkhead 1994, Hamed and Alsop 2005). Tennessee dace also may be threatened by competition with the introduced mountain redbelly dace, *Phoxinus oreas* (Burkhead and Jenkins 1991).

**Other Considerations:**

Because of low diversity of streams where the species occurs, there have been few surveys of appropriate streams within the species' range.

## Distribution

**Global Range Comments:**

This species occurs in the following Tennessee counties: Anderson, Bledsoe, Blount, Bradley, Cocke, Cumberland, Greene, Hancock, Hawkins, Johnson, Knox, Marion, McMinn, Monroe, Morgan, Polk, Rhea, Roane, Sequatchie, Sevier, Sullivan, and Washington.

Its range is highly localized in small streams of the Ridge and Valley physiographic province portion of much of the upper Tennessee River drainage in Virginia and Tennessee (populations also occur in a few montane fringes of the Ridge and Valley province) (Etnier and Starnes 1993, Jenkins and Burkhead 1994). Its range also extends to extreme northwestern Georgia. In Virginia, the species is known only from headwater tributaries of the North and Middle forks of Holston River (Jenkins and Burkhead 1994). Tennessee dace is abundant in portions of the East Fork Poplar Creek system (Department of Energy Reservation), Roane County, Tennessee, which may be a stronghold for the species (Etnier and Starnes 1993). See Starnes and Jenkins (1988), Burkhead and Jenkins (1991), Etnier and Starnes (1993), and Jenkins and Burkhead (1994) for further details and spot maps.

Several records of similar *P. oreas* from the upper Tennessee drainage in Virginia probably represent introductions and may be potential sources of confusion to future distribution studies.

# National Distribution and Watershed Maps

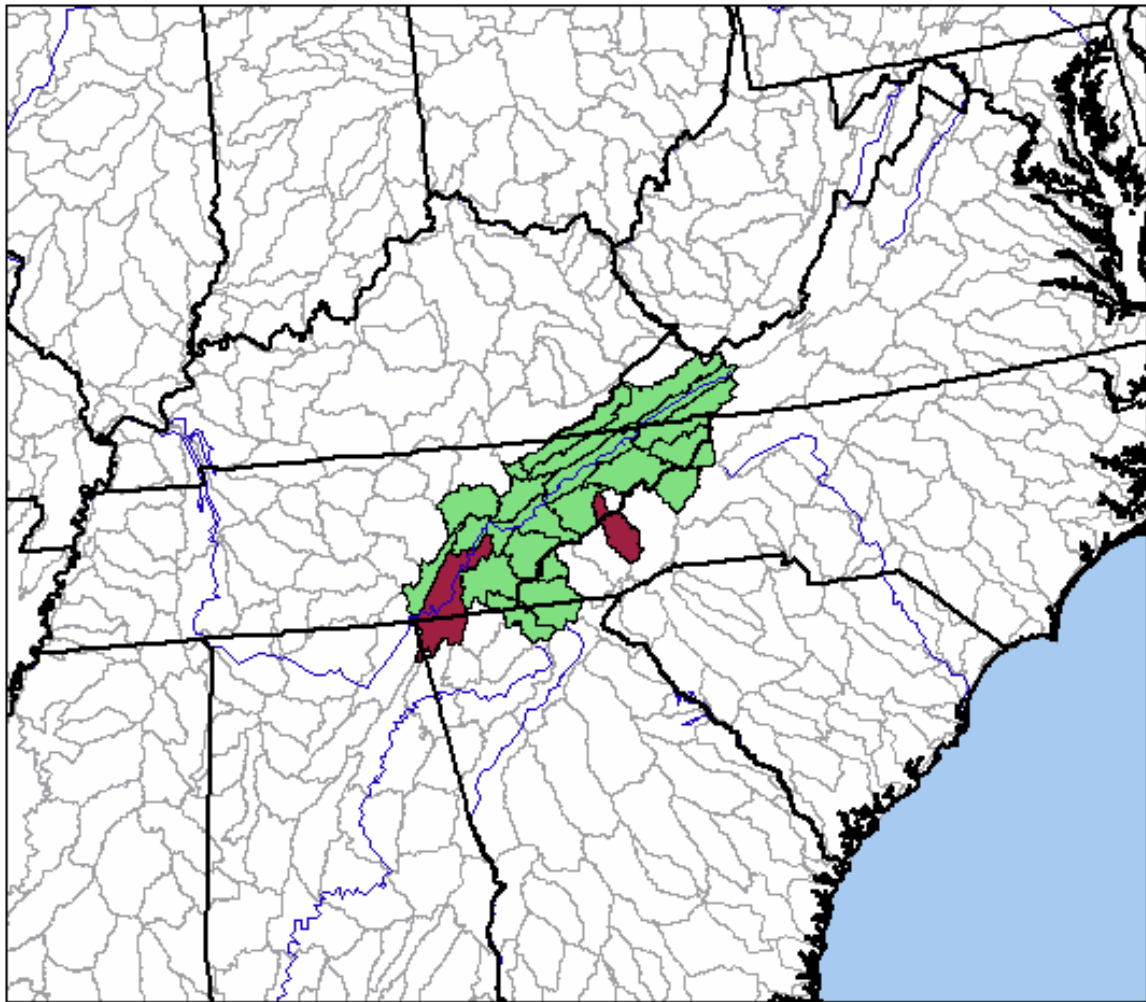








## State/Province Conservation Status

- SX: Presumed Extirpated
- SH: Possibly Extirpated
- S1: Critically Imperiled
- S2: Imperiled
- S3: Vulnerable
- S4: Apparently Secure
- S5: Secure
- Not Ranked/Under Review (SNR/SU)

## Conservation Status

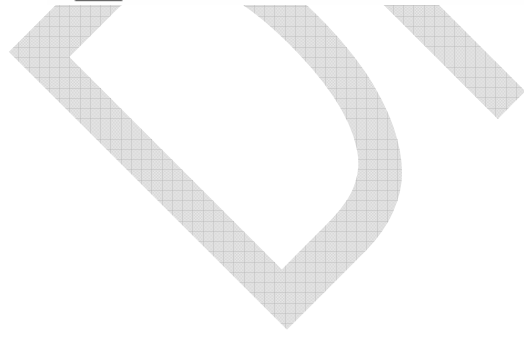
- ### Not Applicable (SNA)
- Exotic
  - Hybrid without Conservation Value



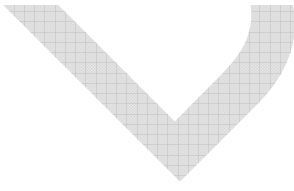
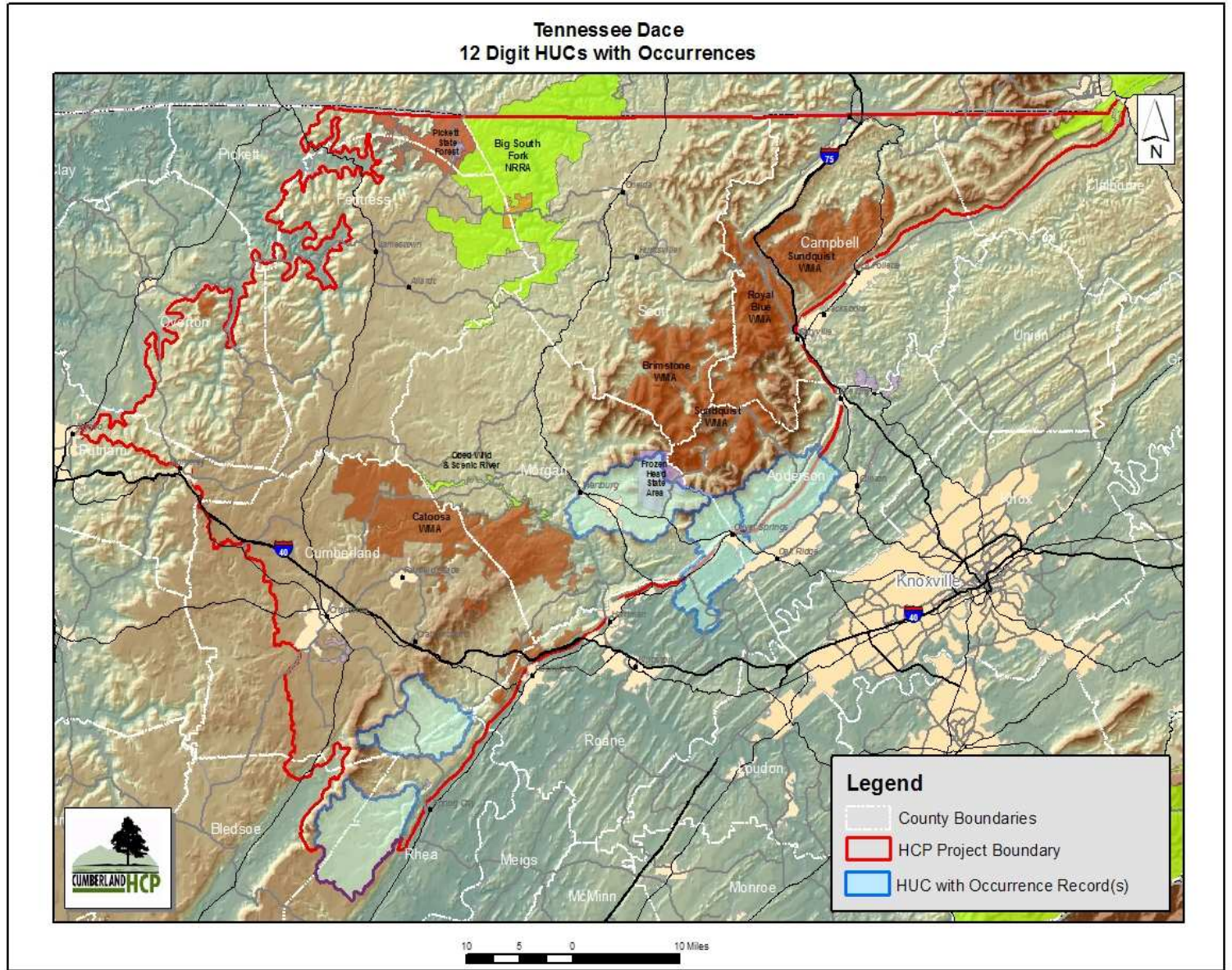
-  State Boundary
-  Major Rivers
-  USGS 8-digit HUC
-  Current Distribution
-  Historic Distribution
-  Out of Scope

*Phoxinus tennesseensis*  
Tennessee Dace

Map created June 2003



# Tennessee Distribution Map



# Key Limiting Factors from Tennessee SWAP

L1 Category	L2 Group	L3 Type	Relevant/Critical	GIS Indicator	GIS Indicator Notes	Field Indicator	Field Indicator Notes	Rationale
Hab Struc	Vegetative Structure	Vertical arrangement of vegetation	Critical	Aerial or satellite imagery (high resolution)	Aerial or satellite imagery (high resolution)	Direct measurement	Densimeter: Poor = <50%; Fair = 50 - 75%; Good = >75%	Associated with lush riparian vegetation, canopy cover greater than 70%.
Hab Chem Env Reg	Water Quality	Water chemical composition	Critical	(None)	(None)	Direct observation	Lab sampling TBD	Various contaminants can all life stages of fish.
Hab Chem Env Reg	Water Quality	Water clarity/turbidity	Critical	(None)	(None)	Direct observation/Direct measurement	Secchi disc, conductivity tests.	Species requires clear water.
Hab Chem Env Reg	Water Quality	Water pH	Critical	(None)	(None)	Direct measurement	Poor <6 or >8.5 ; Fair 6.1 to 7.5 ; Good 7.6 to 8.5	Fish are sensitive to acidity and require a medium range of PH
Hab Phys Env Reg	Hydrologic Regime	Stream flow	Critical	USGS stream gauges	USGS stream gauges	Direct observation	Stream flow defined by pool ( 0.1 to 0.3 m/s), run (0.3 to 2.0 m/s), riffle (0.5 to 2.0 m/s). Poor = run ; Fair = riffle Good = pool	Species occurs in pool habitats and spawns in riffle habitats.

## Ecology and Life History

### Technical Description:

*Phoxinus tennesseensis* is described as a 2-inch fish (dace) in the minnow family (Cyprinidae).

### Habitat Comments:

*Phoxinus tennesseensis* prefers aquatic habitat that is cool, cold, and clear. It also prefers small creeks (first-order spring-fed streams) of the Ridge and Valley limestone region. This species is most common a few hundred meters downstream of spring sources. Streams range from less than 1 meter to 2 meters in width in faster flowing reaches (Starnes and Jenkins 1988, Etnier and Starnes 1993, Jenkins and Burkhead 1994). Typically streams are of relatively moderate gradient, well shaded by riparian growth or woodlands, and remain cool year-round (seldom above about 22 C) (Starnes and Jenkins 1988). This dace inhabits sluggish pool areas with substrates of fine gravel, sand, and silt. It may congregate near cover of debris and undercut banks (Starnes and Jenkins 1988).

*Phoxinus tennesseensis* require clean gravel in riffles and runs for spawning. An aggregation of males in spawning condition was observed in shallow water (8-10 centimeters deep) over clean, fine-gravel substrate at the head of a small riffle (Starnes and Jenkins 1988). Burkhead and Jenkins (1991) reported spawning in a pasture reach in Virginia. Small breeding aggregations occupied pits being dug by stoneroller minnows (*Campostoma anomalum*) and striped shiners (*Luxilus chrysocephalus*) at the tail of pools and in runs (Burkhead and Jenkins 1991).

## Management Summary

Not yet assessed.

## Literature Cited

**NatureServe Conservation Status Factors Edition Date:** 28Jan2008.

**NatureServe Conservation Status Factors Author:** Shute, P. W., & G. Hammerson.

**Element Ecology & Life History Edition Date:** 28Jan2008.

**Element Ecology & Life History Author(s):** Hammerson, G.

**Citation for data on website including Watershed and State Distribution maps:**

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: July 3, 2008 ).

Burkhead, N. M., and R. E. Jenkins. 1991. Fishes. Pages 321-409 in K. Terwilliger (coordinator). Virginia's Endangered Species: Proceedings of a Symposium. McDonald and Woodward Publishing Company, Blacksburg, Virginia.

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