

## 2.4 THREATENED, ENDANGERED, AND SPECIAL CONCERN AQUATIC SPECIES

### Introduction

Threatened and endangered species are those that have been officially listed by the U.S. Fish and Wildlife Service (FWS) under the Endangered Species Act (ESA) of 1973. Under this law, the term “species” includes species, subspecies, other smaller taxonomic units (stocks, varieties), and certain populations; that convention will be followed in this document. Additional species may be of special concern because of their limited distributions, but the legal listing process has not been completed. This section concerns distribution of threatened, endangered, and special concern species (TE&SC), defined broadly as those species listed as threatened (T), endangered (E), proposed endangered or threatened (PE, PT), category 1 (C1), or formerly known as category 2 (C2) (a designation since eliminated by the FWS), or ranked as G1, G2, or G3 (or a variant) by the state heritage programs and The Nature Conservancy (see glossary).

### Key Findings

- . • The state heritage program lists include 190 aquatic and semiaquatic TE&SC species in the SAA area; of these, 62 are fish and 57 are molluscs.
- . • The state heritage program lists include 34 endangered, 10 threatened, 4 proposed endangered, and 63 former (C2) aquatic and semiaquatic species, as determined by the FWS; an additional 79 species are ranked as G1, G2, or G3 by The Nature Conservancy.
- . • Of the 34 endangered species on the state heritage program lists, 26 are molluscs and 7 are fish.
- . • The 10 counties with the greatest number of aquatic TE&SC species on the state heritage program lists are in three areas: the Clinch and Powell river drainages of Virginia and Tennessee; the area around Knoxville and Oak Ridge, TN; and Monroe County, Tennessee. This overall pattern largely reflects patterns for fish and molluscs.
- According to the FWS, 46 threatened and endangered aquatic species are known to occur and 7 others possibly occur in SAA area counties. The nine counties known by FWS to have the greatest number of threatened and endangered aquatic species include the same six counties in the Clinch and Powell river drainages of Virginia and Tennessee that were identified in the heritage program data set as harboring the most TE&SC species and two counties in Georgia, which are primarily in the Conasauga River drainage.

**Table 2.4.1** Threatened, endangered, and special concern (TE&SC) species used in section 2.4 of this report. These species are either federally listed as endangered (E), threatened (T), proposed endangered (PE), category 1 (1) candidate, or former category 2 (2) candidate or globally ranked as G1, G2, G3, or a variant (see glossary for descriptions of global ranks) by The Nature Conservancy. All species were in the heritage programs database and occur within the Southern Appalachian Assessment (SAA) area boundary.

Scientific Name	Common Name	Global Rank	Federal Rank
Fish			
<i>Acipenser fulvescens</i>	Lake sturgeon	G3	2
<i>Ambloplites cavifrons</i>	Roanoke bass	G3	
<i>Ammocrypta clara</i>	Western sand darter	G3G4	
<i>Clinostomus funduloides</i> ssp 1	Little Tennessee River rosyside dace	G5T2	
<i>Cottus baileyi</i>	Black sculpin	G2	
<i>Cottus pygmaeus</i>	Pygmy sculpin	G1	T
<i>Cycleptus elongatus</i>	Blue sucker	G3	2
<i>Cyprinella caerulea</i>	Blue shiner	G2	T
<i>Cyprinella callitaenia</i>	Bluestripe shiner	G2	2
<i>Cyprinella monacha</i>	Spotfin chub	G2	T
<i>Cyprinella zanema</i> pop 1	Santee chub -piedmont population	G3?T3	
<i>Erimystax cahni</i>	Slender chub	G2	T
<i>Erimystax insignis</i>	Blotched chub	G3G4	
<i>Etheostoma acuticeps</i>	Sharphead darter	G3	
<i>Etheostoma cinereum</i>	Ashy darter	G2G3	2
<i>Etheostoma ditrema</i>	Coldwater darter	G2	2
<i>Etheostoma kanawhae</i>	Kanawha darter	G2	
<i>Etheostoma maculatum</i>	Spotted darter	G2	2
<i>Etheostoma nigrum susanae</i>	Cumberland Johnny darter	G5T1	2
<i>Etheostoma podostemone</i>	Riverweed darter	G3	
<i>Etheostoma sagitta</i>	Arrow darter	G3G4	
<i>Etheostoma scotti</i>	Cherokee darter	G?	T
<i>Etheostoma</i> sp 3	Duskytail darter	G1	E
<i>Etheostoma tallapoosae</i>	Tallapoosa snubnose darter	G2?Q	
<i>Etheostoma tippecanoe</i>	Tippecanoe darter	G3	
<i>Etheostoma trisella</i>	Trispot darter	G2	2
<i>Etheostoma vulneratum</i>	Wounded darter	G3	
<i>Hemitremia flammea</i>	Flame chub	G4	2
<i>Hypentelium roanokense</i>	Roanoke hog sucker	G3	
<i>Ichthyomyzon bdellium</i>	Ohio lamprey	G3G4	
<i>Luxilus zonistius</i>	Bandfin shiner	G3	
<i>Moxostoma ariommum</i>	Bigeye jumprock	G2	
<i>Moxostoma lachneri</i>	Greater jumprock	G3?	
<i>Moxostoma robustum</i>	Robust redhorse	G3G4	2
<i>Notropis ariommus</i>	Popeye shiner	G3	
<i>Notropis hypsilepis</i>	Highscale shiner	G3	2
<i>Notropis lineapunctatus</i>	Lined chub	G3	
<i>Notropis semperasper</i>	Roughhead shiner	G3	2
<i>Notropis</i> sp 3	Palezone shiner (S. Fk. Cumberland)	G2	E
<i>Noturus baileyi</i>	Smoky madtom	G1	E

<i>Noturus flavipinnis</i>	Yellowfin madtom	G2	T
<i>Noturus gilberti</i>	Orangefin madtom	G2	2
<i>Noturus munitus</i>	Frecklebelly madtom	G3	
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<i>Percina rex</i>	Roanoke logperch	G2	E
<i>Percina squamata</i>	Olive darter	G3	2
<i>Percina tanasi</i>	Snail darter	G2	T
<i>Phenacobius crassilabrum</i>	Fatlips minnow	G3	
<i>Phenacobius teretulus</i>	Kanawha minnow	G3	2
<i>Phoxinus cumberlandensis</i>	Blackside dace	G2	T
<i>Phoxinus tennesseensis</i>	Tennessee dace	G2G3	
<i>Polyodon spathula</i>	Paddlefish	G4	
<i>Thoburnia hamiltoni</i>	Rustyside sucker	G2	2
<i>Typhlichthys subterraneus</i>	Southern cavefish	G3	
Molluscs			
<i>Alasmidonta marginata</i>	Elktoe	G5	2
<i>Alasmidonta raveneliana</i>	Appalachian elktoe	G1	E
<i>Alasmidonta varicosa</i>	Brook floater	G3	2
<i>Athearnia anthonyi</i>	Anthony's river snail	G1T1	E
<i>Conradilla caelata</i>	Birdwing pearlymussel	G1	E
<i>Cumberlandia monodonta</i>	Spectacle case	G2G3	2
<i>Cyprogenia stegaria</i>	Fanshell	G1	E
<i>Dromus dromas</i>	Dromedary pearlymussel	G1	E
<i>Elimia bellula</i>	Walnut elimia	G?	2
<i>Elimia crenatella</i>	Lacey elimia	G?	2
<i>Elliptio lanceolata</i>	Yellow lance	G3	2
<i>Epioblasma brevidens</i>	Cumberlandian combshell	G2	PE
<i>Epioblasma capsaeformis</i>	Oyster mussel	G2	PE
<i>Epioblasma florentina florentina</i>	Yellow-blossom	G1TX	E
<i>Epioblasma torulosa</i>			
<i>gubernaculum</i>	Green-blossom pearlymussel	G2TX	E
<i>Epioblasma torulosa torulosa</i>	Tubercled blossom	G2TX	E
<i>Epioblasma triquetra</i>	Snuffbox	G3	2
<i>Epioblasma turgidula</i>	Turgid-blossom	GH	E
<i>Epioblasma walkeri</i>	Tan riffleshell	G1T1	E
<i>Fusconaia barnesiana</i>	Tennessee pigtoe	G2G3	
<i>Fusconaia cor</i>	Shiny pigtoe	G1	E
<i>Fusconaia cuneolus</i>	Fine-rayed pigtoe	G1	E
<i>Fusconaia masoni</i>	Atlantic pigtoe	G2	2
<i>Hemistena lata</i>	Cracking pearlymussel	G1	E
<i>Holsingeria unthinksensis</i>	An aquatic cavesnail	G1	
<i>Io fluvialis</i>	Spiny riversnail	G2	2
<i>Lampsilis abrupta</i>	Pink mucket	G2	E
<i>Lampsilis cariosa</i>	Yellow lampmussel	G4	2
<i>Lampsilis virescens</i>	Alabama lamp mussel	G1	E
<i>Lasmigona holstonia</i>	Tennessee heelsplitter	G2G3	2
<i>Lasmigona subviridis</i>	Green floater	G3	2
<i>Leptoxis praerosa</i>	Onyx rocksnail	G1G3	2
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<i>Leptoxis taeniata</i>	Painted rocksnail	G?	2
<i>Lexingtonia dolabelloides</i>	Slabside pearlymussel	G2G3	2
<i>Lithasia geniculata</i>	Ornate rocksnail	G1G3	2
<i>Lithasia verrucosa</i>	Varicose rocksnail	G?	2

<i>Pegias fabula</i>	Little-wing pearlymussel	G1	E
<i>Plethobasus cicatricosus</i>	White wartyback	G1	E
<i>Plethobasus cooperianus</i>	Orange-foot pimpleback	G1	E
<i>Plethobasus cyphus</i>	Sheepnose	G3	
<i>Pleurobema collina</i>	James spiny mussel	G1	E
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<i>Pleurobema cordatum</i>	Ohio River pigtoe	G3	
<i>Pleurobema oviforme</i>	Tennessee clubshell	G2G3	2
<i>Pleurobema plenum</i>	Rough pigtoe	G1	E
<i>Pleurobema rubrum</i>	Pyramid pigtoe	G2G3	
<i>Pleurocera showalteri</i>	Upland hornsnail	G?	2
<i>Pyrgulopsis ogmoraphe</i>	Royal snail	G1G3	E
<i>Quadrula cylindrica strigillata</i>	Rough rabbitsfoot	G4T2T3	PE
<i>Quadrula intermedia</i>	Cumberland monkeyface	G1	E
<i>Quadrula sparsa</i>	Appalachian monkeyface	G1	E
<i>Toxolasma cylindrellus</i>	Pale lilliput	G1	E
<i>Toxolasma lividus</i>	Purple lilliput	G1G2	2
<i>Tulotoma magnifica</i>	Tulotoma livebearing snail	G2?	E
<i>Villosa fabalis</i>	Rayed bean	G2	2
<i>Villosa nebulosa</i>	Alabama rainbow	G3	
<i>Villosa perpurpurea</i>	Purple bean	G1 PE	
<i>Villosa trabalis</i>	Cumberland bean	G2	E
Herptiles (Amphibians and Reptiles)			
<i>Aneides aeneus</i>	Green salamander	G4	2
<i>Clemmys muhlenbergii</i>	Bog turtle	G3	12
<i>Cryptobranchus alleganiensis</i>	Hellbender	G4	2
<i>Desmognathus santeetlah</i>	Santeetlah dusky salamander	G3Q	
<i>Eurycea junaluska</i>	Junaluska salamander	G2Q	2
<i>Gyrinophilus palleucus</i>	Tennessee cave salamander	G2	2
Insects			
<i>Aeshna mutata</i>	Spring blue damer	G3G4	
<i>Arrhopalites clarus</i>	A cave springtail	G1?	
<i>Calopteryx amata</i>	Superb jewelwing	G3G4	
<i>Ceraclea alabamiae</i>	Caddisfly	G1	
<i>Cheumatopsyche helma</i>	Helma's cheumatopsyche caddisfly	G1G3	2
<i>Gomphus consanguis</i>	Cherokee clubtail	G2G3	2
<i>Gomphus quadricolor</i>	Rapids clubtail	G3G4	
<i>Gomphus ventricosus</i>	Skillet clubtail	G3	
<i>Gomphus viridifrons</i>	Green-faced clubtail	G3	
<i>Hydraena maureenae</i>	Maurens hydraenan minutemoss beetle	G1G3	2
<i>Hydroptila cheaha</i>	Caddisfly	G1	
<i>Hydroptila chocoalocco</i>	Caddisfly	G1	
<i>Hydroptila micropotamis</i>	Caddisfly	G1	
<i>Hydroptila patriciae</i>	Caddisfly	G1	
<i>Hydroptila setigera</i>	Caddisfly	G1	
<i>Macromia margarita</i>	Margaret's river cruiser	G2G3	2
<i>Ophiogomphus aspersus</i>	Brook snaketail	G3G4	
<i>Ophiogomphus howei</i>	Pygmy or midget snaketail	G3	2
<i>Ophiogomphus incurvatus</i>			

<i>Polycentropus carlsoni</i>	Carlson's polycentropus caddisfly	G1G3	2
<i>Pseudosinella hirsuta</i>	A cave springtail	G1	
<i>Stenelmis gammoni</i>	Gammon's stenelmis riffle beetle	G1G3	2
<i>Stylurus amnicola</i>	Riverine clubtail	G3G4	
<i>Stylurus laurae</i>	Laura's clubtail	G3G4	
<i>Stylurus scudderi</i>	Zebra clubtail	G3	
<i>Antrolana lira</i>	Madison Cave isopod	G1	T
<i>Caecidotea carolinensis</i>	Bennett's Mill Cave water slater	G?	2
<i>Caecidotea henroti</i>	Henrot's cave isopod	G2	
<i>Caecidotea holsingeri</i>	Greenbriar Valley cave isopod	G3	
<i>Caecidotea incurva</i>	Incurved cave isopod	G2	
<i>Caecidotea pricei</i>	Price's cave isopod	G3	
<i>Caecidotea richardsonae</i>	Tennessee Valley cave isopod	G3G5	
<i>Caecidotea sinuncus</i>	An isopod	G1	2
<i>Caecidotea vandeli</i>	Vandel's cave isopod	G2	
<i>Cambarus chasmodactylus</i>	New River riffle crayfish	G3G4	
<i>Cambarus crinipes</i>	Bouchard's crayfish	G3?	
<i>Cambarus extraneus</i>	Chickamauga crayfish	G3	2
<i>Cambarus obeyensis</i>	Obey crayfish	G3?	2
<i>Cambarus reburrus</i>	French Broad crayfish	G2G3	2
<i>Lirceus culveri</i>	Rye Cove isopod	G1	2
<i>Lirceus usdagalun</i>	Lee County cave isopod	G1	E
<i>Macrocotyla hoffmasteri</i>	Hoffmaster's cave flatworm	G3	
<i>Sphalloplana chandleri</i>	Chandler's planarian	G1	
<i>Sphalloplana consimilis</i>	Powell Valley planarian	G1G2	
<i>Sphalloplana virginiana</i>	Rockbridge County cave planarian	G1	2
<i>Stygobromus abditus</i>	James cave amphipod	G1	
<i>Stygobromus baroodyi</i>	Rockbridge County cave amphipod	G2	
<i>Stygobromus biggersi</i>	Bigger's cave amphipod	G1G2	2
<i>Stygobromus carolinensis</i>	Yancey sideswimmer	G?	2
<i>Stygobromus conradi</i>	Burnsville Cove cave amphipod	G1G2	2
<i>Stygobromus cumberlandus</i>	Cumberland cave amphipod	G2	
<i>Stygobromus ephemerus</i>	Ephemeral cave amphipod	G1	
<i>Stygobromus estesi</i>	Craig County cave amphipod	G1	
<i>Stygobromus gracilipes</i>	Shenandoah Valley cave amphipod	G2	
<i>Stygobromus hoffmani</i>	Alleghany County cave amphipod	G1	2
<i>Stygobromus interitus</i>	New Castle Murder Hole amphipod	G1	
<i>Stygobromus leensis</i>	Lee County cave amphipod	G1	
<i>Stygobromus morrisoni</i>	Morrison's cave amphipod	G2	2
<i>Stygobromus mundus</i>	Bath County cave amphipod	G1G2	2
<i>Stygobromus pseudospinosus</i>	Luray Caverns amphipod	G1	
<i>Stygobromus sp 7</i>	Sherando spinosoid amphipod	G2	
<i>Stygobromus spinosus</i>	Blue Ridge Mountain amphipod	G2	
<i>Stygobromus stegerorum</i>	Madison Cave amphipod	G1	
<i>Stylodrilus beattiei</i>	A cave lumbricolid worm	G1G2	

## Likely Future Trends

Certain future trends are obvious. But, with the analysis of the current situation, trends that reflect the process of species imperilment, per se, must be separated from trends that represent the human process of identifying imperiled species.

Both the FWS and heritage program lists will tend to grow longer over time – new species are identified more rapidly than other species are removed from lists. Between 1979 and 1989, none of the 251 North American fish species identified by the American Fisheries Society as threatened, endangered, or of special concern was removed from their list because recovery was successful, 16 were removed because of better information, and 10 became extinct (Williams and others 1989). In that same time, 139 new species were added (Williams and others 1989). In the Southeast, the number of imperiled fish species recognized by the FWS has risen from 3 in 1974 to 84 in 1994 (Walsh and others 1995). All states in the SAA area have a backlog of species recognized by fisheries professionals as threatened or endangered, but which are not federally listed (Warren and Burr 1994). These historical trends will probably continue. If the Endangered Species Act is not reauthorized, of course new species will not be listed by the FWS (there is already a moratorium on listing new species after March 1995, and the C2 list was eliminated in July 1995). But, species will be no less endangered by not being federally listed, and they will still be of concern to heritage programs and others.

Will more species in the SAA area become endangered over time? Probably. Extinctions and endangerment, have always occurred, although not at the current rate (Wilson 1988), and they will probably continue. But, to speculate further on the future trend of endangerment patterns requires complex considerations of biological, cultural, economic, and political concerns well beyond the scope of the analysis we conducted.