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SICKLEFIN REDHORSE CONSERVATION ACTIVITIES
ENVIRONMENTAL ASSESSMENT
Georgia / North Carolina

Prepared by:
TENNESSEE VALLEY AUTHORITY

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Proposed Action

The sicklefin redbreast (*Moxostoma sp.*) is a medium-sized fish species found only in the Hiwassee River and the Little Tennessee River systems in the far eastern corner of the Tennessee Valley (see Figure 1). Although the sicklefin redbreast is now known to have been collected in 1937, and has been known to the Eastern Band of Cherokee Indians for millennia, it was not recognized as a potentially distinct species until 1992, following examination of two specimens collected from the Little Tennessee River. Detailed physical, behavioral, and genetic studies concluded that the sicklefin redbreast is, in fact, a distinct species.

In May 2005, driven by concern over impacts from migration barriers, water quality, non-native fish, and other factors, the U.S. Fish and Wildlife Service (USFWS) declared the sicklefin redbreast a candidate for the federal endangered species list. This meant it warranted being on the list; however, going through the process to place it on the list was superseded by higher priority listing work. In April 2010, the USFWS was petitioned under provisions of Section 4 of the Endangered Species Act (ESA) to place the sicklefin redbreast on the federal endangered species list. The petition is currently under review by USFWS.

The Tennessee Valley Authority (TVA) proposes to enter into a Candidate Conservation Agreement (CAA) with the USFWS, North Carolina Wildlife Resources Commission (NCWRC), Duke Energy Carolinas, LLC (Duke Energy), Eastern Band of Cherokee Indians (EBCI), and Georgia Department of Natural Resources (GADNR) in order to formalize an effort to promote the recovery of the sicklefin redbreast and preclude their listing under the Endangered Species Act. The execution and implementation of this CCA is intended to lead to the conservation of this sensitive fish species in its range, which presently includes the Hiwassee and Little Tennessee River basins in North Carolina and Georgia, including all of their tributaries and associated uplands.

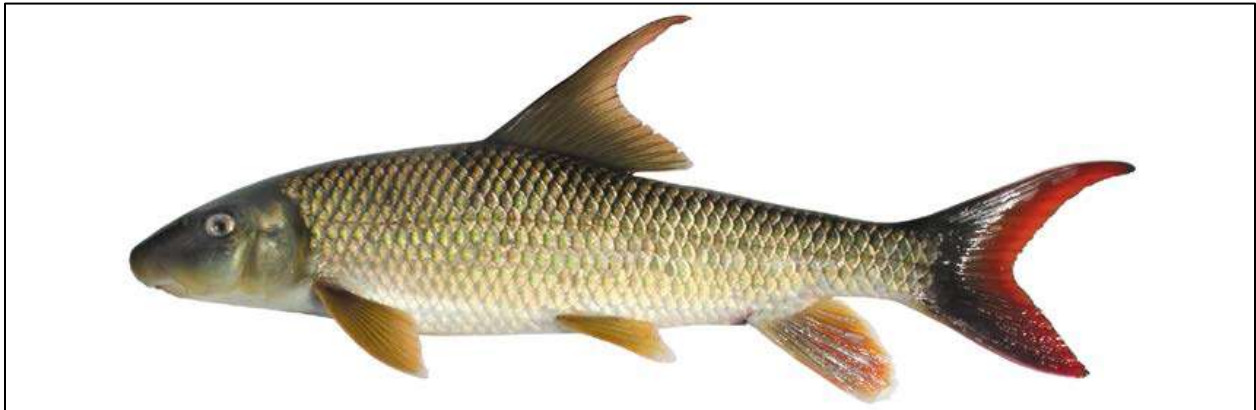


Figure 1. Sicklefin redbreast (photo by S. J. Fraley, 2008)

Purpose and Need for Action

By addressing sicklefin redbreast conservation across its range, TVA and cooperators hope to conserve sicklefin redbreast populations and expand the current range of the species, develop and implement management strategies that maintain or enhance sicklefin redbreast populations, and monitor the response of the species to conservation and management activities. The

proactive and collaborative management effort is also intended to promote existing individual sicklefin redhorse conservation efforts and to share knowledge and information among cooperators and other organizations. This allows for an organized approach to the implementing of conservation actions and the reporting of conservation efforts, including integrated efforts for hatchery support, rearing, and stocking of the sicklefin redhorse; population assessment and monitoring; habitat management activities; and conservation based research.

The proposal also supports and is consistent with TVA’s mission of environmental stewardship and the objectives for species conservation in the TVA Natural Resources Plan (2011).

Alternatives

No Action Alternative – Maintain current ad-hoc activities

If TVA does not elect to participate in the CCA, USFWS, NCWRC, Duke Energy, EBCI, and GADNR would continue independent (but informally coordinated) efforts concerning management of this species, or the other parties may proceed with an agreement without TVA’s participation. Without an agreement, annual funding of these activities and annual work plans for each entity would be at the sole discretion of each participating entity. TVA would not make a 10-year commitment to provide a certain amount of funding, nor commit to conducting in-kind activities furthering the conservation of this species. TVA would continue to partner with these parties on some activities as funding and staff resources are available.

Proposed Action Alternative – Formal sicklefin redhorse CCA with the identified parties

TVA proposes to enter into CCA for the sicklefin redhorse (*Moxostoma sp.*) with the USFWS, NCWRC, Duke Energy, EBCI, and GADNR. The CCA has been developed as a cooperative effort among tribal, state, federal, nongovernmental, and private organizations to establish a formal agreement to cooperate on actions that conserve, manage, and improve sicklefin redhorse populations range-wide with the goal of working to preclude the need to list the species under the ESA. Potential cooperating organizations include Conservation Fisheries, Inc. and Warm Springs National Fish Hatchery.

Under the CCA, TVA would conduct conservation activities in the affected watersheds. These activities would be in-kind contributions of resources for the term of the CCA. TVA would also provide funding (with two separate payments) to support conservation actions directed by the USFWS.

In-Kind Contributions: In-kind contributions of staff time and resources would be committed for the following conservation measures:

Annual Conservation Measures	TVA Contribution	Cooperating Agencies
Provide assistance (personnel) and equipment to annual sicklefin redhorse broodstock sampling and collection in the Little Tennessee, Oconaluftee, Tuckasegee, and Hiwassee Rivers.	\$10,000	<ul style="list-style-type: none"> • USFWS • NCWRC
Stock fry/fingerling sicklefin redhorse.	\$5,000	<ul style="list-style-type: none"> • USFWS • NCWRC
Total Annual In-kind Funding	\$15,000	

These “in-kind contributions” would consist of fisheries survey work within streams and rivers as part of TVA’s routine River and Reservoir Monitoring Program¹, the capture of sicklefin redhorse broodstock, and assistance in stocking of fry and/or fingerling sicklefin redhorse as directed by the committee governing implementation of this CCA. TVA’s contributions would include TVA personnel and use of TVA equipment and boats. Because it is assumed that this species will not be listed as threatened or endangered under the ESA, all of TVA’s in-kind monitoring activities would be conducted under TVA’s existing authority, and with appropriate authorization (collection permits) from the States of Georgia and North Carolina.

Financial Contributions: TVA would also contribute \$200,000 in two separate payments to support hatchery operations and other species management activities. The two payments would support the efforts of the USFWS and other cooperators. The initial payment of \$110,000 would be provided within the first year of the 10-year term of this CCA. TVA would provide an additional \$90,000 contribution for hatchery operations and other species management activities prior to the end of the fifth year of the 10-year term of this CCA; this additional funding would be made by TVA as either a one-time payment or in installments.

As part of the CCA, TVA would also participate as a member of the Working Group which would assist USFWS in deciding appropriate conservation actions over the term of this 10-year agreement. While TVA would participate as a member of this group, all final decisions on specific actions would be at the discretion of USFWS. TVA does not anticipate any future decisions on its part which would require additional review under the National Environmental Policy Act or the ESA.

Affected Environment and Environmental Impacts

Geographic Setting

This CCA is intended to benefit the sicklefin redhorse throughout its range, which presently includes the Hiwassee and Little Tennessee River basins in North Carolina and Georgia, including all of their tributaries and associated uplands. See Appendix A. Past and recent collection records of the sicklefin redhorse, together with what is known about the habitat utilization of the species, indicate that the sicklefin redhorse once inhabited the majority, if not all, of the rivers and large creeks in the Blue Ridge portion of the Hiwassee and Little Tennessee River systems in North Carolina, Tennessee, and Georgia (Jenkins 1999, pp. 20-26). Only those river segments in North Carolina (Cherokee, Clay, Graham, Jackson, Macon, and Swain counties) and Georgia (Towns, Union, and Rabun counties) would be included in the agreement. No activities would occur in the State of Tennessee due to a lack of current, extant populations of this species in Tennessee portions of the Hiwassee River and Little Tennessee River drainages.

Resources Evaluated

Proposed activities would be very limited in scope and would include:

¹ TVA has contributed to sicklefin redhorse conservation efforts and the informal working group, specifically through the implementation of the TVA River and Stream Monitoring Index of Biotic Integrity and the Reservoir Fisheries Assemblage Index programs. Additionally, the aquatic monitoring team at the TVA has participated in sicklefin Redhorse gamete collection for captive propagation since the program began, through in kind efforts outside their routine monitoring.

- TVA activities centered around the in-kind services to be performed by TVA staff and contractors; assistance and equipment provided to annual sicklefin redhorse bloodstock sampling and collection in the Little Tennessee, Oconaluftee, Tuckasegee, and Hiwassee Rivers; and routine monitoring of biological communities in those rivers; and
- Activities funded by TVA and Duke Energy contributions and administered by USFWS, which could include such activities as monitoring of sicklefin redhorse populations, research on life-history parameters, hatchery production of sicklefin redhorse, and population augmentation and reintroduction efforts.

When reviewing these TVA proposed actions, TVA specialists considered potential effects related to air quality, land use, socioeconomics, solid and hazardous waste, surface and ground water, transportation, visual resources, terrestrial wildlife (including threatened and endangered species), recreation, floodplains, aquatic botany, prime farmland, wetlands, and cultural resources. TVA determined that there would be no potential effects to these resources from the actions and, thus, these resources do not require further evaluation. Potential effects to aquatic communities were identified as the only relevant environmental issue and are reviewed below.

Aquatic Communities (including Threatened and Endangered Species and federally Designated Critical Habitats)

Affected Environment: Due to the extensive geographic scope addressed in this CCA (river segments in six North Carolina counties and three Georgia counties), a large number of state- and federally listed species are found in the counties considered under this CCA (see Appendix B). These species include two federally listed or candidate fish --- the sicklefin redhorse (Candidate) and spotfin chub (Threatened) --- and two federally listed mussel species --- the Appalachian elktoe (Endangered) and little-wing pearl mussel (Endangered). One additional mussel species --- the Cumberland bean (Endangered) --- is historically reported from North Carolina but is no longer believed to occur in affected watersheds. Additionally, a large number of state-listed aquatic species are known from areas covered by the CCA. See Appendix B.

Designated Critical Habitat (DCH) for spotfin chub is present in the Little Tennessee River in Swain and Macon counties, North Carolina. DCH for Appalachian elktoe is present in several drainages in Graham, Jackson, Macon, and Swain counties.

Environmental Impacts:

Under the No Action Alternative, TVA would not participate in the CCA and parties would continue independent (but informally coordinated) efforts concerning management of this species, or the other parties may proceed with an agreement without TVA's participation. Because the efforts would be less coordinated and/or marginally reduced in scope, it is expected that fewer benefits to the fish species would result and recovery and conservations may be less successful. Without TVA's financial contributions to fish hatchery operations, fewer sicklefin redhorse would be produced at the hatchery and available for introduction into the watersheds. Fewer impacts to aquatic communities would occur.

Under TVA's Proposed Action, TVA would conduct in-kind activities and would provide funding for USFWS-directed activities. As described below, no significant direct, indirect, or cumulative effects to these species are expected to occur as a result of these activities.

In-Kind TVA Activities:

Under the Proposed Action Alternative, all sicklefin redhorse in-kind activities (sampling, collection and monitoring) proposed to be conducted by TVA are routine and minor. Typically, sampling, collection and monitoring activities entail personnel periodically visiting streams and rivers at select locations and using equipment within the stream bed to capture fish. Disturbance of other aquatic species from sicklefin redhorse collection activities would result in short-term, localized effects as a result of the use of electrofishing, seining or use of other permitted collection techniques. Minor habitat disturbance and disturbance of behavioral patterns of aquatic species would occur during collection. Following completion of individual survey efforts, behavior patterns of aquatic species would quickly return to pre-disturbance conditions.

Implementation of these activities is anticipated to have beneficial direct, indirect, and cumulative effects to the sicklefin redhorse, as these activities would promote the recovery of the sicklefin redhorse in its range. Because sicklefin redhorse is a native fish which was previously part of the fish communities in these drainages, re-introductions or population augmentation activities are not anticipated to result in measurable effects on aquatic species and their habitats (including rare, threatened or endangered species such as the DCH of spotfin chub or Appalachian elktoe) due to competition or other ecological displacement.

Sampling, collection and monitoring actions are currently covered under TVA's federal ESA Section 10 collection permit. This permit allows minor and discountable incidental effects to the federally listed spotfin chub, Appalachian elktoe, little-wing pearl mussel, and Cumberland bean (if encountered). TVA also holds state permits in North Carolina which allow for the incidental or deliberate collection of all state-listed aquatic species shown in Appendix B.

All in-kind activities conducted by TVA would be conducted in accordance with TVA protocols for preventing the spread of exotic or invasive species. This includes inspection and cleaning of all equipment used during fish collection to ensure that exotic or invasive species are not introduced into waters covered by this CCA.

TVA Financial Contributions of USFWS-Directed Activities:

TVA would also provide funds to support activities conducted as part of the USFWS-led Working Group, including monitoring of sicklefin redhorse populations, research on life-history parameters, hatchery production of sicklefin redhorse, and population augmentation and reintroduction efforts. The activities funded by TVA would be conducted under the authorities of USFWS, EBCI, NCWRC, and/or GADNR or their agents. These activities would occur in alignment with a formal USFWS *Propagation and Reintroduction Plan* that would be developed to guide conservation of sicklefin redhorse.

Conservation actions funded by TVA would be substantially the same as those in-kind actions conducted by TVA described above. Therefore, direct, indirect and cumulative impacts resulting from conservation activities funded by TVA to other species, including state- and federally-listed aquatic species, are anticipated to be minor, temporary, and discountable. All activities would be conditioned to ensure that there is no adverse modification of Designated Critical Habitats for spotfin chub or Appalachian elktoe.

As with the TVA in-kind actions, implementation of these activities is anticipated to have beneficial direct, indirect, and cumulative effects to the sicklefin redhorse, as these activities would promote the recovery of the sicklefin redhorse in its range.

All activities authorized by USFWS would likewise employ protocols to ensure that they do not contribute to the spread of exotic or invasive species. The *Propagation and Reintroduction Plan* would include measures which ensure that all transplanted or introduced individuals are screened for disease or parasites before being placed into waterways covered by this CCA.

Agencies and Persons Consulted

USFWS published information regarding the CCA and its purposes in local and regional newspapers, and on their website. State and National legislative offices were also contacted during this outreach effort. No other state, federal, or local approvals are required for this decision.

It is the intent and expectation of the CCA that the execution and implementation of this CCA would lead to conservation of the sicklefin redhorse in its range. If, subsequent to the effective date of this CCA, the Secretary of the Interior should determine, pursuant to Section 4(a) of the ESA (16 U.S.C. §1533(a)), that the sicklefin redhorse is threatened or endangered, TVA and the CCA parties would be encouraged to participate in recovery planning for the sicklefin redhorse. Further, in the event that the sicklefin redhorse is determined to be endangered or threatened under Section 4(a), the CCA would serve as a basis for providing conservation credit for any federal actions reviewed under Section 7 of the ESA.

TVA Preparers

The following individuals were involved in the preparation of this document:

- John T. Baxter – Aquatic Ecology
- Freddie Bennett – Water Resource Representative
- Kemmy J. Garrett – Heritage Reviewer, Watershed Specialist
- Matthew Higdon – NEPA compliance
- Shannon O'Quinn – Water Resources
- Edward W. Wells III – Cultural Resources
- Doug White – Environmental Support, NEPA compliance

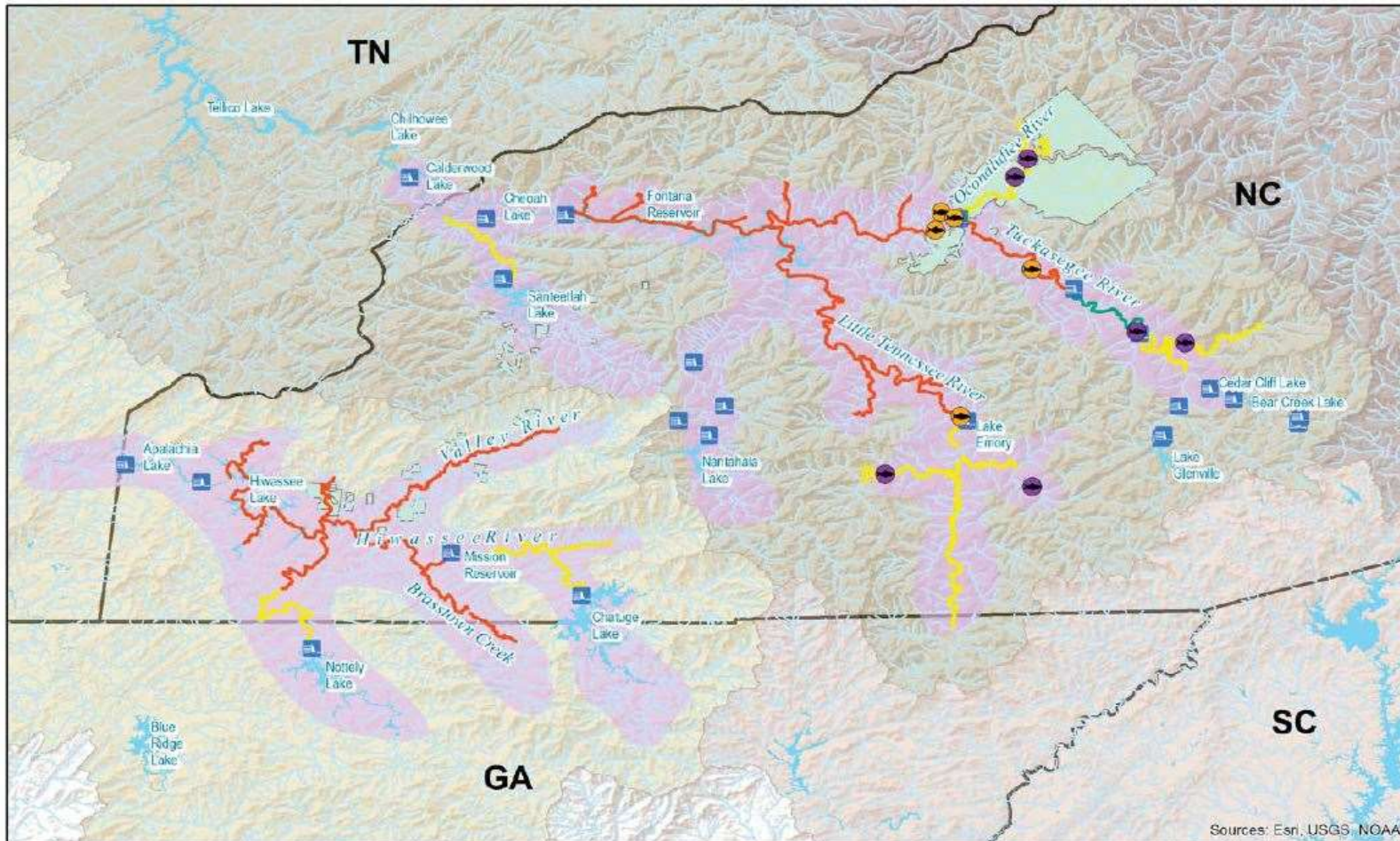
References

Jenkins, R. E. 1999. Sicklefin Redhorse (*Moxostoma* sp.), undescribed species of sucker (*Pisces, Catostomidae*) in the upper Tennessee River drainage, North Carolina and Georgia description, aspects of biology, habitat, distribution, and population status. Unpublished report to the U.S. Fish and Wildlife Service, Asheville Field Office, Asheville, North Carolina, and the North Carolina Wildlife Resources Commission, Raleigh, North Carolina. 34 pp., Tables 1 7, and Figures 1 15.

**Appendix A:
Sicklefin Redhorse Distribution Map**

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APPENDIX A: Sicklefın Redhorse Distribution Map

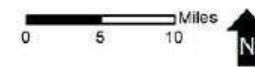


Sicklefin Redhorse Distribution

- Brood Stock Collection Site
- Fry Stocking Site
- Expansion After Dillsboro Dam Removal
- Potential Range Expansion
- Extant Range
- Historic Range
- Dams
- Eastern Band of Cherokee
- State Boundary

Hydrologic Basin

- French Broad-Holston
- Middle Tennessee-Hiwassee
- Savannah
- Upper Tennessee



Sources: Esri, USGS, NOAA

Produced by Ecological Services
Asheville, North Carolina
Basemap: ESRI World Terrain
Map Date: 12/10/2015

Appendix B:

State- and Federally Listed Species Known From the CCA Coverage Area in Georgia and North Carolina

Appendix B. State- and Federally Listed Species Known From the CCA Coverage Area in Georgia and North Carolina.

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
Ambystoma talpoideum	Mole Salamander	CHEROKEE	NC	S2S3	Special Concern	
Ambystoma talpoideum	Mole Salamander	MACON	NC	S2S3	Special Concern	
Cryptobranchus alleganiensis	Hellbender	RABUN	GA	S2	Rare	
Cryptobranchus alleganiensis	Hellbender	TOWNS	GA	S2	Rare	
Cryptobranchus alleganiensis	Hellbender	UNION	GA	S2	Rare	
Cryptobranchus alleganiensis	Hellbender	CHEROKEE	NC	S3	Special Concern	
Cryptobranchus alleganiensis	Hellbender	CLAY	NC	S3	Special Concern	
Cryptobranchus alleganiensis	Hellbender	GRAHAM	NC	S3	Special Concern	
Cryptobranchus alleganiensis	Hellbender	JACKSON	NC	S3	Special Concern	
Cryptobranchus alleganiensis	Hellbender	MACON	NC	S3	Special Concern	
Cryptobranchus alleganiensis	Hellbender	SWAIN	NC	S3	Special Concern	
Aneides aeneus	Green Salamander	RABUN	GA	S3	Rare	
Aneides aeneus	Green Salamander	JACKSON	NC	S2S3	Endangered	
Aneides aeneus	Green Salamander	MACON	NC	S2S3	Endangered	
Aneides aeneus	Green Salamander	TRANSYLVANIA	NC	S2S3	Endangered	
Desmognathus aeneus	Seepage Salamander	CHEROKEE	NC	S3	Watch List	
Desmognathus aeneus	Seepage Salamander	GRAHAM	NC	S3	Watch List	
Desmognathus aeneus	Seepage Salamander	MACON	NC	S3	Watch List	
Desmognathus wrighti	Southern Pigmy Salamander	SWAIN	NC	S2S3	Rare	
Desmognathus wrighti	Southern Pigmy Salamander	SEVIER	TN	S2S3	In Need of Management	
Desmognathus santeetlah	Santeetlah Dusky Salamander	JACKSON	NC	S3S4	Watch List	
Eurycea junaluska	Junaluska Salamander	GRAHAM	NC	S1S2	Threatened	
Hemidactylium scutatum	Four-toed Salamander	CHEROKEE	NC	S3	Special Concern	
Hemidactylium scutatum	Four-toed Salamander	GRAHAM	NC	S3	Special Concern	
Hemidactylium scutatum	Four-toed Salamander	MACON	NC	S3	Special Concern	
Plethodon aureolus	Tellico Salamander	CHEROKEE	NC	S2?	Rare	
Plethodon aureolus	Tellico Salamander	GRAHAM	NC	S2?	Rare	
Pseudacris brachyphona	Mountain Chorus Frog	CHEROKEE	NC	S2	Special Concern	

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
<i>Haliaeetus leucocephalus</i>	Bald Eagle	CHEROKEE	NC	S3B,S3N	Threatened	
<i>Haliaeetus leucocephalus</i>	Bald Eagle	GRAHAM	NC	S3B,S3N	Threatened	
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SWAIN	NC	S3B,S3N	Threatened	Delisted
<i>Haliaeetus leucocephalus</i>	Bald Eagle	SWAIN	NC	S3B,S3N	Threatened	
<i>Falco peregrinus</i>	Peregrine Falcon	JACKSON	NC	S1B,S2N	Endangered	
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	HAYWOOD	NC	S2B	Rare	
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	JACKSON	NC	S2B	Rare	
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	CHEROKEE	NC	S2B,S2N	Threatened	
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	GRAHAM	NC	S2B,S2N	Threatened	
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	HAYWOOD	NC	S2B,S2N	Threatened	
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	JACKSON	NC	S2B,S2N	Threatened	
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	MACON	NC	S2B,S2N	Threatened	
<i>Aegolius acadicus</i>	Northern Saw-whet Owl	SWAIN	NC	S2B,S2N	Threatened	
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	CLAY	NC	S2S3B,S5N	Rare	
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	GRAHAM	NC	S2S3B,S5N	Rare	
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	JACKSON	NC	S2S3B,S5N	Rare	
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	MACON	NC	S2S3B,S5N	Rare	
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	BLOUNT	TN	S1B,S4N	In Need of Management	
<i>Contopus cooperi</i>	Olive-sided Flycatcher	MACON	NC	SNA	Watch List	
<i>Empidonax alnorum</i>	Alder Flycatcher	JACKSON	NC	S2B	Rare	
<i>Poecile atricapilla</i>	Black-capped Chickadee	HAYWOOD	NC	S3	Special Concern	
<i>Poecile atricapilla</i>	Black-capped Chickadee	JACKSON	NC	S3	Special Concern	
<i>Certhia americana</i>	Brown Creeper	JACKSON	NC	S3B,S5N	Special Concern	
<i>Thryomanes bewickii altus</i>	Appalachian Bewick's Wren	JACKSON	NC	SXB	Endangered	
<i>Thryomanes bewickii altus</i>	Appalachian Bewick's Wren	MACON	NC	SXB	Endangered	
<i>Vireo gilvus</i>	Warbling Vireo	MACON	NC	S2B	Rare	
<i>Vermivora pinus</i>	Blue Winged Warbler	CHEROKEE	NC	S2B	Rare	
<i>Vermivora pinus</i>	Blue Winged Warbler	GRAHAM	NC	S2B	Rare	
<i>Vermivora pinus</i>	Blue Winged Warbler	MACON	NC	S2B	Rare	
<i>Setophaga magnolia</i>	Magnolia Warbler	GRAHAM	NC	S2B	Rare	
<i>Setophaga cerulea</i>	Cerulean Warbler	CLAY	NC	S2B	Special Concern	
<i>Setophaga cerulea</i>	Cerulean Warbler	GRAHAM	NC	S2B	Special Concern	

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
<i>Setophaga cerulea</i>	Cerulean Warbler	MACON	NC	S2B	Special Concern	
<i>Loxia curvirostra</i>	Red Crossbill	JACKSON	NC	S3B,S3N	Special Concern	
<i>Clinostomus funduloides</i> ssp. 1	Smoky Dace	JACKSON	NC	S2	Special Concern	
<i>Clinostomus funduloides</i> ssp. 1	Smoky Dace	MACON	NC	S2	Special Concern	
<i>Clinostomus funduloides</i> ssp. 1	Smoky Dace	SWAIN	NC	S2	Special Concern	
<i>Notropis hypsilepis</i>	Highscale Shiner	RABUN	GA	S3	Rare	
<i>Notropis lutipinnis</i>	Yellowfin Shiner	JACKSON	NC	S2	Special Concern	
<i>Notropis lutipinnis</i>	Yellowfin Shiner	MACON	NC	S2	Special Concern	
<i>Notropis photogenis</i>	Silver Shiner	TOWNS	GA	S1	Endangered	
<i>Phenacobius crassilabrum</i>	Fatlips Minnow	RABUN	GA	S2	Endangered	
<i>Erimonax monachus</i>	Spotfin Chub	MACON	NC	S1	Threatened	Threatened
<i>Erimonax monachus</i>	Spotfin Chub	SWAIN	NC	S1	Threatened	Threatened
<i>Erimystax insignis</i>	Blotched Chub	UNION	GA	S2	Endangered	
<i>Erimystax insignis</i>	Blotched Chub	CHEROKEE	NC	S2	Rare	
<i>Luxilus chrysocephalus</i>	Striped Shiner	MACON	NC	S1	Special Concern	
<i>Moxostoma carinatum</i>	River Redhorse	TOWNS	GA	S3	Rare	
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	TOWNS	GA	S1	Endangered	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	CHEROKEE	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	CHEROKEE	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	CLAY	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	CLAY	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	GRAHAM	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	JACKSON	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	MACON	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	MACON	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	SWAIN	NC	S2	Threatened	Candidate
<i>Moxostoma</i> sp. 2	Sicklefin Redhorse	SWAIN	NC	S2	Threatened	Candidate
<i>Noturus flavus</i>	Stonecat	SWAIN	NC	S1	Endangered	
<i>Etheostoma gutselli</i>	Tuckasegee Darter	MONROE	TN	S1	Endangered	
<i>Etheostoma inscriptum</i>	Turquoise Darter	JACKSON	NC	S1	Threatened	
<i>Etheostoma inscriptum</i>	Turquoise Darter	MACON	NC	S1	Threatened	
<i>Etheostoma vulneratum</i>	Wounded Darter	GRAHAM	NC	S2	Special Concern	
<i>Etheostoma vulneratum</i>	Wounded Darter	JACKSON	NC	S2	Special Concern	

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
Etheostoma vulneratum	Wounded Darter	MACON	NC	S2	Special Concern	
Etheostoma vulneratum	Wounded Darter	SWAIN	NC	S2	Special Concern	
Percina squamata	Olive Darter	CHEROKEE	NC	S2	Special Concern	
Percina squamata	Olive Darter	JACKSON	NC	S2	Special Concern	
Percina squamata	Olive Darter	MACON	NC	S2	Special Concern	
Percina squamata	Olive Darter	SWAIN	NC	S2	Special Concern	
Sorex cinereus	Common Shrew	SEVIER	TN	S4	In Need of Management	
Sorex palustris punctulatus	Southern Water Shrew	CLAY	NC	S3	Special Concern	
Sorex palustris punctulatus	Southern Water Shrew	JACKSON	NC	S3	Special Concern	
Sorex palustris punctulatus	Southern Water Shrew	MACON	NC	S3	Special Concern	
Sorex palustris punctulatus	Southern Water Shrew	SWAIN	NC	S3	Special Concern	
Sorex fumeus	Smoky Shrew	SEVIER	TN	S4	In Need of Management	
Sorex hoyi winnemana	Southern Pygmy Shrew	CHEROKEE	NC	S3	No Status	
Sorex hoyi winnemana	Southern Pygmy Shrew	CLAY	NC	S3	No Status	
Sorex hoyi winnemana	Southern Pygmy Shrew	GRAHAM	NC	S3	No Status	
Sorex hoyi winnemana	Southern Pygmy Shrew	JACKSON	NC	S3	No Status	
Sorex hoyi winnemana	Southern Pygmy Shrew	MACON	NC	S3	No Status	
Parascalops breweri	Hairy-tailed Mole	TOWNS	GA	S1	No Status	
Myotis sodalis	Indiana Bat	CHEROKEE	NC	S1S2	Endangered	Endangered
Myotis sodalis	Indiana Bat	JACKSON	NC	S1S2	Endangered	Endangered
Myotis sodalis	Indiana Bat	SWAIN	NC	S1S2	Endangered	Endangered
Myotis sodalis	Indiana Bat	BLOUNT	TN	S1	Endangered	Endangered
Myotis leibii	eastern small-footed bat	TOWNS	GA	S2	No Status	
Myotis leibii	eastern small-footed bat	UNION	GA	S2	No Status	
Myotis leibii	eastern small-footed bat	GRAHAM	NC	S2	Special Concern	
Myotis leibii	eastern small-footed bat	SWAIN	NC	S2	Special Concern	
Myotis septentrionalis	Northern Long-eared Bat	CHEROKEE	NC	S2	Rare	Threatened
Myotis septentrionalis	Northern Long-eared Bat	GRAHAM	NC	S2	Rare	Threatened
Myotis septentrionalis	Northern Long-eared Bat	MACON	NC	S2	Rare	Threatened
Myotis septentrionalis	Northern Long-eared Bat	SWAIN	NC	S2	Rare	Threatened
Lasiurus cinereus	Hoary Bat	MACON	NC	S3S4	Watch List	

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	FANNIN	GA	S3	Rare	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	RABUN	GA	S3	Rare	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	TOWNS	GA	S3	Rare	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	UNION	GA	S3	Rare	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	CHEROKEE	NC	S3	Threatened	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	GRAHAM	NC	S3	Threatened	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	MACON	NC	S3	Threatened	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	SWAIN	NC	S3	Threatened	
<i>Corynorhinus rafinesquii</i>	Rafinesque's Big-eared bat	BLOUNT	TN	S3	In Need of Management	
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	TOWNS	GA	S1S2	Rare	
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	UNION	GA	S1S2	Rare	
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	CLAY	NC	S3	Rare	
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	GRAHAM	NC	S3	Rare	
<i>Sylvilagus obscurus</i>	Appalachian Cottontail	MACON	NC	S3	Rare	
<i>Glaucomys sabrinus coloratus</i>	Carolina Northern Flying Squirrel	HAYWOOD	NC	S2	Endangered	Endangered
<i>Glaucomys sabrinus coloratus</i>	Carolina Northern Flying Squirrel	JACKSON	NC	S2	Endangered	Endangered
<i>Glaucomys sabrinus coloratus</i>	Carolina Northern Flying Squirrel	SWAIN	NC	S2	Endangered	Endangered
<i>Neotoma floridana haematoreia</i>	Southern Appalachian Woodrat	UNION	GA	S3	No Status	
<i>Neotoma floridana haematoreia</i>	Southern Appalachian Woodrat	JACKSON	NC	S3S4	Watch List	
<i>Neotoma floridana haematoreia</i>	Southern Appalachian Woodrat	MACON	NC	S3S4	Watch List	
<i>Neotoma floridana haematoreia</i>	Southern Appalachian Woodrat	SWAIN	NC	S3S4	Watch List	
<i>Microtus chrotorrhinus carolinensis</i>	Southern Rock Vole	MACON	NC	S3	Special Concern	
<i>Microtus chrotorrhinus carolinensis</i>	Southern Rock Vole	SWAIN	NC	S3	Special Concern	
<i>Synaptomys cooperi</i>	Southern Bog Lemming	SEVIER	TN	S4	In Need of Management	

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
<i>Mustela nivalis</i>	Least Weasel	UNION	GA	S1	No Status	
<i>Spilogale putorius</i>	Eastern Spotted Skunk	JACKSON	NC	S2	Rare	
<i>Spilogale putorius</i>	Eastern Spotted Skunk	MACON	NC	S2	Rare	
<i>Puma concolor cougar</i>	Eastern Cougar	SWAIN	NC	SX	Watch List	Endangered
<i>Glyptemys muhlenbergii</i>	Bog Turtle	RABUN	GA	S2	Endangered	Threatened (SA)
<i>Glyptemys muhlenbergii</i>	Bog Turtle	TOWNS	GA	S2	Endangered	Threatened (SA)
<i>Glyptemys muhlenbergii</i>	Bog Turtle	UNION	GA	S2	Endangered	Threatened (SA)
<i>Glyptemys muhlenbergii</i>	Bog Turtle	CHEROKEE	NC	S2	Threatened	Threatened (SA)
<i>Glyptemys muhlenbergii</i>	Bog Turtle	CLAY	NC	S2	Threatened	Threatened (SA)
<i>Glyptemys muhlenbergii</i>	Bog Turtle	GRAHAM	NC	S2	Threatened	Threatened (SA)
<i>Glyptemys muhlenbergii</i>	Bog Turtle	MACON	NC	S2	Threatened	Threatened (SA)
<i>Sternotherus minor</i>	Stripeneck Musk Turtle	CHEROKEE	NC	S1	Special Concern	
<i>Pituophis melanoleucus melanoleucus</i>	Northern Pine Snake	CHEROKEE	NC	S2	Special Concern	
<i>Pituophis melanoleucus melanoleucus</i>	Northern Pine Snake	SWAIN	NC	S2	Special Concern	
<i>Crotalus horridus</i>	Timber Rattlesnake	GRAHAM	NC	S3	Special Concern	
<i>Crotalus horridus</i>	Timber Rattlesnake	JACKSON	NC	S3	Special Concern	
<i>Crotalus horridus</i>	Timber Rattlesnake	MACON	NC	S3	Special Concern	
<i>Crotalus horridus</i>	Timber Rattlesnake	SWAIN	NC	S3	Special Concern	
<i>Skistodiaptomus carolinensis</i>	Yancey Sideswimmer	MACON	NC	SH	Special Concern	
<i>Cambarus reburus</i>	French Broad Crayfish	JACKSON	NC	S2	Rare	
<i>Cambarus georgiae</i>	Little Tennessee Crayfish	JACKSON	NC	S2	Special Concern	
<i>Cambarus georgiae</i>	Little Tennessee Crayfish	MACON	NC	S2	Special Concern	
<i>Cambarus hiwasseensis</i>	Hiwassee Crayfish	CHEROKEE	NC	S3S4	Watch List	
<i>Cambarus hiwasseensis</i>	Hiwassee Crayfish	CLAY	NC	S3S4	Watch List	
<i>Cambarus parrishi</i>	Parrish Crayfish	CHEROKEE	NC	S1	Special Concern	
<i>Cambarus parrishi</i>	Parrish Crayfish	CLAY	NC	S1	Special Concern	

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Dactylocythere prinsi	Whitewater Crayfish Ostracod	JACKSON	NC	S1	Watch List	
Trechus balsamensis	A Carabid Beetle	JACKSON	NC	SU	Watch List	
Trechus novaculosus	A Carabid Beetle	SWAIN	NC	SU	Watch List	
Trechus rosenbergi	A Carabid Beetle	JACKSON	NC	SU	Watch List	
Trechus subtilis	A Carabid Beetle	JACKSON	NC	SU	Watch List	
Eulonchus marialiciae	Mary Alice's Small-headed Fly	HAYWOOD	NC	S3?	Watch List	
Eulonchus marialiciae	Mary Alice's Small-headed Fly	JACKSON	NC	S3?	Watch List	
Eulonchus marialiciae	Mary Alice's Small-headed Fly	MACON	NC	S3?	Watch List	
Eulonchus marialiciae	Mary Alice's Small-headed Fly	SWAIN	NC	S3?	Watch List	
Autochton cellus	Golden-banded Skipper	GRAHAM	NC	S2	Rare	
Autochton cellus	Golden-banded Skipper	MACON	NC	S2	Rare	
Euchloe olympia	Olympia Marble	SWAIN	NC	S1	Rare	
Satyrium edwardsii	Edwards' Hairstreak	MACON	NC	S2	Rare	
Eroria laeta	Early Hairstreak	CLAY	NC	S2S3	Rare	
Eroria laeta	Early Hairstreak	JACKSON	NC	S2S3	Rare	
Eroria laeta	Early Hairstreak	MACON	NC	S2S3	Rare	
Celastrina ebenina	Dusky Azure	GRAHAM	NC	S2	Rare	
Celastrina ebenina	Dusky Azure	MACON	NC	S2	Rare	
Celastrina ebenina	Dusky Azure	SWAIN	NC	S2	Rare	
Euphydryas phaeton	Baltimore	JACKSON	NC	S2	Rare	
Euphydryas phaeton	Baltimore	MACON	NC	S2	Rare	
Polygonia faunus smythi	Smyth's Green Coma	GRAHAM	NC	S1S2	Rare	
Polygonia faunus smythi	Smyth's Green Coma	MACON	NC	S1S2	Rare	
Macromia margarita	Margaret's River Cruiser	MACON	NC	S2?	Rare	
Vaejovis carolinianus	Carolina Scorpion	CHEROKEE	NC	S2?	Watch List	
Microhexura montivaga	Spruce-fir Moss Spider	SWAIN	NC	S1	Rare	Endangered
Nesticus cooperi	Lost Nantahala Cave Spider	MACON	NC	S1	Rare	
Nesticus cooperi	Lost Nantahala Cave Spider	SWAIN	NC	S1	Rare	
Alasmidonta raveneliana	Appalachian Elktoe	GRAHAM	NC	S1	Endangered	Endangered

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<i>Alasmidonta raveneliana</i>	Appalachian Elktoe	JACKSON	NC	S1	Endangered	Endangered
<i>Alasmidonta raveneliana</i>	Appalachian Elktoe	MACON	NC	S1	Endangered	Endangered
<i>Alasmidonta raveneliana</i>	Appalachian Elktoe	SWAIN	NC	S1	Endangered	Endangered
<i>Alasmidonta varicosa</i>	Brook Floater	MACON	NC	S2	Endangered	
<i>Alasmidonta viridis</i>	Slippershell Mussel	MACON	NC	S1	Endangered	
<i>Alasmidonta viridis</i>	Slippershell Mussel	SWAIN	NC	S1	Endangered	
<i>Elliptio dilatata</i>	Spike	CHEROKEE	NC	S2	Special Concern	
<i>Elliptio dilatata</i>	Spike	MACON	NC	S2	Special Concern	
<i>Elliptio dilatata</i>	Spike	SWAIN	NC	S2	Special Concern	
<i>Fusconaia barnesiana</i>	Tennessee Pigtoe	CHEROKEE	NC	S1	Endangered	
<i>Fusconaia barnesiana</i>	Tennessee Pigtoe	MACON	NC	S1	Endangered	
<i>Fusconaia subrotunda</i>	Longsolid	CLAY	NC	S1	Rare	
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	CHEROKEE	NC	S2	Special Concern	
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	CLAY	NC	S2	Special Concern	
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	JACKSON	NC	S2	Special Concern	
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	MACON	NC	S2	Special Concern	
<i>Lampsilis fasciola</i>	Wavy-rayed Lampmussel	SWAIN	NC	S2	Special Concern	
<i>Lasmigona holstonia</i>	Tennessee Heelsplitter	MACON	NC	S1	Endangered	
<i>Pegias fabula</i>	Little-wing Pearlymussel	SWAIN	NC	S1	Endangered	Endangered
<i>Pleurobema oviforme</i>	Tennessee Clubshell	CHEROKEE	NC	S1	Endangered	
<i>Villosa iris</i>	Rainbow	CHEROKEE	NC	S2	Special Concern	
<i>Villosa iris</i>	Rainbow	JACKSON	NC	S2	Special Concern	
<i>Villosa iris</i>	Rainbow	MACON	NC	S2	Special Concern	
<i>Villosa iris</i>	Rainbow	SWAIN	NC	S2	Special Concern	
<i>Villosa trabalis</i>	Cumberland Bean	CHEROKEE	NC	SH	Rare	Endangered
<i>Villosa vanuxemensis</i>	Mountain Creekshell	CHEROKEE	NC	S1?	Threatened	
<i>Helicodiscus bonamicus</i>	Spiral Coil	GRAHAM	NC	S1	Special Concern	
<i>Glyphyalinia junaluskana</i>	Dark Glyph	CHEROKEE	NC	S2	Special Concern	
<i>Paravitrea umbilicaris</i>	Open Supercoil	GRAHAM	NC	S2	Special Concern	
<i>Paravitrea lacteodens</i>	Ramp Cove Supercoil	GRAHAM	NC	SH	Special Concern	
<i>Patera clarki nantahala</i>	Noonday Globe	SWAIN	NC	S1	Threatened	Threatened
<i>Mesodon orestes</i>	Engraved Covert	JACKSON	NC	S1	Threatened	
<i>Elimia interrupta</i>	Knotty Elimia	CHEROKEE	NC	SNA	Endangered	

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<i>Aneura sharpii</i>	Liverwort	MACON	NC	S1	Rare	
<i>Bazzania nudicaulis</i>	Liverwort	SWAIN	NC	S2	Rare	
<i>Cephaloziella spinicaulis</i>	Liverwort	MACON	NC	S1	Rare	
<i>Drepanolejeunea appalachiana</i>	a liverwort	JACKSON	NC	S1	Special Concern	
<i>Drepanolejeunea appalachiana</i>	a liverwort	MACON	NC	S1	Special Concern	
<i>Leptoscyphus cuneifolius</i>	Liverwort	SWAIN	NC	S2	Rare	
<i>Lophocolea muricata</i>	Liverwort	JACKSON	NC	S1	Special Concern	
<i>Lophocolea muricata</i>	Liverwort	MACON	NC	S1	Special Concern	
<i>Lophocolea appalachiana</i>	Liverwort	JACKSON	NC	S1	Special Concern	
<i>Lophocolea appalachiana</i>	Liverwort	MACON	NC	S1	Special Concern	
<i>Plagiochila exigua</i>	Liverwort	SWAIN	NC	S2	Rare	
<i>Sphenolobopsis pearsonii</i>	Liverwort	SWAIN	NC	S2	Rare	
<i>Brachymerium andersonii</i>	Anderson's Brachymerium	MACON	NC	SH	Rare	
<i>Brachymerium systylium</i>	Mexican Brachymerium	MACON	NC	S1	Rare	
<i>Bryocrumia vivicolor</i>	Gorge Moss	JACKSON	NC	SH	Rare	
<i>Entodon compressus</i>	Flattened Entodon	MACON	NC	S1	Rare	
<i>Leptodontium viticulosoides</i> var. <i>sulphureum</i>	Grandfather Mountain Leptodontium	SWAIN	NC	S1	Rare	
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	RABUN	GA	S1	Endangered	Endangered
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	GRAHAM	NC	S3	Endangered	Endangered
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	HAYWOOD	NC	S3	Endangered	Endangered
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	JACKSON	NC	S3	Endangered	Endangered
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	MACON	NC	S3	Endangered	Endangered
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	SWAIN	NC	S3	Endangered	Endangered
<i>Gymnoderma lineare</i>	Rock Gnome Lichen	TRANSYLVANIA	NC	S3	Endangered	Endangered
<i>Hydrothyria venosa</i>	Aquatic Lichen	CHEROKEE	NC	S3	Watch List	
<i>Hydrothyria venosa</i>	Aquatic Lichen	GRAHAM	NC	S3	Watch List	
<i>Hydrothyria venosa</i>	Aquatic Lichen	JACKSON	NC	S3	Watch List	
<i>Hydrothyria venosa</i>	Aquatic Lichen	MACON	NC	S3	Watch List	
<i>Hydrothyria venosa</i>	Aquatic Lichen	SWAIN	NC	S3	Watch List	
<i>Packera millefolium</i>	Blue Ridge Ragwort	RABUN	GA	S1	Threatened	
<i>Rugelia nudicaulis</i>	Rugel's Ragwort	SWAIN	NC	S3	Rare	
<i>Rugelia nudicaulis</i>	Rugel's Ragwort	SEVIER	TN	S2	Endangered	

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<i>Eurybia mirabilis</i>	Dwarf Aster	MACON	NC	S3	Rare	
<i>Berberis canadensis</i>	American barberry	SWAIN	NC	S2	Special Concern	
<i>Arabis patens</i>	Spreading Rockcress	SWAIN	NC	S1	Rare	
<i>Cardamine clematitis</i>	mountain bittercress	GRAHAM	NC	S2S3	Rare	
<i>Cardamine clematitis</i>	mountain bittercress	JACKSON	NC	S2S3	Rare	
<i>Cardamine clematitis</i>	mountain bittercress	SWAIN	NC	S2S3	Rare	
<i>Helianthemum bicknellii</i>	Plains Frostweed	MACON	NC	S1	Special Concern	
<i>Helianthemum bicknellii</i>	Plains Frostweed	SWAIN	NC	S1	Special Concern	
<i>Hypericum graveolens</i>	Mountain St. John's-wort	SWAIN	NC	S2S3	Watch List	
<i>Hypericum graveolens</i>	Mountain St. John's-wort	SEVIER	TN	S3	Endangered	
<i>Shortia galacifolia</i>	Oconee-bells	RABUN	GA	S1	Endangered	
<i>Shortia galacifolia</i> var. <i>galacifolia</i>	Southern Shortia	MACON	NC	S2	Special Concern	
<i>Shortia galacifolia</i> var. <i>galacifolia</i>	Southern Shortia	SWAIN	NC	S2	Special Concern	
<i>Euphorbia purpurea</i>	Glade Spurge	GRAHAM	NC	S3	Rare	
<i>Euphorbia purpurea</i>	Glade Spurge	JACKSON	NC	S3	Rare	
<i>Euphorbia purpurea</i>	Glade Spurge	MACON	NC	S3	Rare	
<i>Euphorbia purpurea</i>	Glade Spurge	SWAIN	NC	S3	Rare	
<i>Corydalis micrantha</i>	Slender Corydalis	JACKSON	NC	S1	Threatened	
<i>Frasera caroliniensis</i>	American Columbo	CLAY	NC	S2S3	Rare	
<i>Gentianopsis crinita</i>	Fringed Gentian	UNION	GA	S1	Threatened	
<i>Stachys clingmanii</i>	Stachys	SWAIN	NC	S2?	Watch List	
<i>Stachys clingmanii</i>	Stachys	SEVIER	TN	S1S2	Threatened	
<i>Synandra hispidula</i>	Guyandotte Beauty	SWAIN	NC	S1	Endangered	
<i>Lysimachia fraseri</i>	Fraser Loosestrife	RABUN	GA	S2	Rare	
<i>Lysimachia fraseri</i>	Fraser Loosestrife	MACON	NC	S3	Endangered	
<i>Lysimachia terrestris</i>	Swamp Loosestrife	TOWNS	GA	S1	Special Concern	
<i>Trientalis borealis</i>	Northern Starflower	TOWNS	GA	S1S2	Endangered	
<i>Trientalis borealis</i>	Northern Starflower	UNION	GA	S1S2	Endangered	
<i>Hydrastis canadensis</i>	Goldenseal	RABUN	GA	S2	Endangered	
<i>Hydrastis canadensis</i>	Goldenseal	TOWNS	GA	S2	Endangered	
<i>Hydrastis canadensis</i>	Goldenseal	UNION	GA	S2	Endangered	

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<i>Hydrastis canadensis</i>	Goldenseal	JACKSON	NC	S3	Rare	
<i>Hydrastis canadensis</i>	Goldenseal	MACON	NC	S3	Rare	
<i>Hydrastis canadensis</i>	Goldenseal	SWAIN	NC	S3	Rare	
<i>Amelanchier sanguinea</i>	Roundleaf Serviceberry	JACKSON	NC	S3	Watch List	
<i>Filipendula rubra</i>	Queen-of-the-prairie	MACON	NC	S1	Endangered	
<i>Geum radiatum</i>	Spreading Avens	SWAIN	NC	S2	Endangered	Endangered
<i>Sanguisorba canadensis</i>	Canada Burnet	RABUN	GA	S1	Threatened	
<i>Spiraea virginiana</i>	Virginia Spiraea	GRAHAM	NC	S2	Threatened	Threatened
<i>Spiraea virginiana</i>	Virginia Spiraea	MACON	NC	S2	Threatened	Threatened
<i>Potentilla tridentata</i>	Three-toothed Cinquefoil	UNION	GA	S1	Endangered	
<i>Buckleya distichophylla</i>	piratebush	MACON	NC	S2	Threatened	
<i>Sarracenia oreophila</i>	Green Pitcher Plant	TOWNS	GA	S1	Endangered	Endangered
<i>Sarracenia oreophila</i>	Green Pitcher Plant	CLAY	NC	S1	Endangered	Endangered
<i>Sarracenia purpurea</i> var. <i>montana</i>	Mountain Purple Pitcherplant	RABUN	GA	S1	Endangered	
<i>Saxifraga caroliniana</i>	Carolina saxifrage	SWAIN	NC	S3	Rare	
<i>Lindernia saxicola</i>	False Pimpernel	RABUN	GA	SH	Special Concern	
<i>Stewartia ovata</i>	Mountain Camellia	CHEROKEE	NC	S2	Rare	
<i>Abies fraseri</i>	Fraser Fir	SWAIN	NC	S2	Watch List	
<i>Carex biltmoreana</i>	Biltmore Sedge	TOWNS	GA	S1	Threatened	
<i>Carex hitchcockiana</i>	Sedge	JACKSON	NC	S1	Special Concern	
<i>Carex hitchcockiana</i>	Sedge	MACON	NC	S1	Special Concern	
<i>Carex leptonervia</i>	Sedge	GRAHAM	NC	S3	Watch List	
<i>Carex leptonervia</i>	Sedge	JACKSON	NC	S3	Watch List	
<i>Carex leptonervia</i>	Sedge	MACON	NC	S3	Watch List	
<i>Carex leptonervia</i>	Sedge	SWAIN	NC	S3	Watch List	
<i>Carex misera</i>	Sedge	RABUN	GA	S1	Threatened	
<i>Carex misera</i>	Sedge	SWAIN	NC	S3	Watch List	
<i>Carex misera</i>	Sedge	SEVIER	TN	S2	Threatened	
<i>Carex projecta</i>	Sedge	CHEROKEE	NC	S1	Rare	
<i>Carex purpurifera</i>	Sedge	RABUN	GA	S2	Special Concern	
<i>Carex purpurifera</i>	Sedge	UNION	GA	S2	Special Concern	
<i>Carex purpurifera</i>	Sedge	CHEROKEE	NC	S3	Special Concern	

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
<i>Carex purpurifera</i>	Sedge	GRAHAM	NC	S3	Special Concern	
<i>Carex purpurifera</i>	Sedge	MACON	NC	S3	Special Concern	
<i>Carex ruthii</i>	Sedge	SEVIER	TN	S2	Threatened	
<i>Carex manhartii</i>	Manhart Sedge	RABUN	GA	S2S3	Special Concern	
<i>Carex manhartii</i>	Manhart Sedge	TOWNS	GA	S2S3	Special Concern	
<i>Carex manhartii</i>	Manhart Sedge	UNION	GA	S2S3	Special Concern	
<i>Carex radfordii</i>	Radford's Sedge	JACKSON	NC	S1	Threatened	
<i>Cymophyllus fraserianus</i>	Fraser's Sedge	RABUN	GA	S1	Threatened	
<i>Trichophorum cespitosum</i>	Tufted Clubrush	JACKSON	NC	S2S3	Rare	
<i>Helonias bullata</i>	Swamp-pink	RABUN	GA	S1	Threatened	Threatened
<i>Helonias bullata</i>	Swamp-pink	JACKSON	NC	S2	Threatened	Threatened
<i>Trillium persistens</i>	Persistent Trillium	RABUN	GA	S1	Endangered	Endangered
<i>Xerophyllum asphodeloides</i>	Eastern Turkeybeard	RABUN	GA	S1	Rare	
<i>Coeloglossum viride</i> var. <i>virescens</i>	American Frog Orchid	JACKSON	NC	S1	Endangered	
<i>Cypripedium acaule</i>	Pink Lady-slipper	RABUN	GA	S4	No Status	
<i>Cypripedium acaule</i>	Pink Lady-slipper	TOWNS	GA	S4	No Status	
<i>Cypripedium acaule</i>	Pink Lady-slipper	UNION	GA	S4	No Status	
<i>Cypripedium parviflorum</i>	Small Yellow Lady's-slipper	RABUN	GA	S3	Rare	
<i>Cypripedium parviflorum</i>	Small Yellow Lady's-slipper	TOWNS	GA	S3	Rare	
<i>Cypripedium parviflorum</i>	Small Yellow Lady's-slipper	UNION	GA	S3	Rare	
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper	LUMPKIN	GA	S3	No Status	
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper	RABUN	GA	S3	No Status	
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper	TOWNS	GA	S3	No Status	
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper	UNION	GA	S3	No Status	
<i>Isotria medeoloides</i>	Small Whorled Pogonia	RABUN	GA	S2	Threatened	Threatened
<i>Isotria medeoloides</i>	Small Whorled Pogonia	TOWNS	GA	S2	Threatened	Threatened
<i>Isotria medeoloides</i>	Small Whorled Pogonia	UNION	GA	S2	Threatened	Threatened
<i>Isotria medeoloides</i>	Small Whorled Pogonia	CLAY	NC	S1	Threatened	Threatened
<i>Isotria medeoloides</i>	Small Whorled Pogonia	JACKSON	NC	S1	Threatened	Threatened

SCIENTIFIC NAME	COMMON NAME	COUNTY	STATE	STATE RANK*	STATE STATUS	FEDERAL STATUS
<i>Isotria medeoloides</i>	Small Whorled Pogonia	MACON	NC	S1	Threatened	Threatened
<i>Platanthera integrilabia</i>	White Fringeless Orchid	RABUN	GA	S1S2	Threatened	Proposed
<i>Deschampsia cespitosa</i> ssp. <i>glauca</i>	Tufted Hairgrass	CLAY	NC	S1	Threatened	
<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	Slender Wheatgrass	CLAY	NC	S1	Threatened	
<i>Glyceria nubigena</i>	Smoky Mountain Manna-grass	GRAHAM	NC	S2	Rare	
<i>Glyceria nubigena</i>	Smoky Mountain Manna-grass	SWAIN	NC	S2	Rare	
<i>Muhlenbergia glomerata</i>	Muhly	CLAY	NC	S1	Special Concern	
<i>Sporobolus heterolepis</i>	Northern Dropseed	CLAY	NC	S1	Threatened	
<i>Sporobolus heterolepis</i>	Northern Dropseed	JACKSON	NC	S1	Threatened	
<i>Grammitis nimbata</i>	Dwarf Polypody	MACON	NC	S1	Threatened	
<i>Hymenophyllum tayloriae</i>	Gorge Filmy Fern	JACKSON	NC	S1S2	Rare	
<i>Hymenophyllum tayloriae</i>	Gorge Filmy Fern	MACON	NC	S1S2	Rare	
<i>Hymenophyllum tayloriae</i>	Gorge Filmy Fern	TRANSYLVANIA	NC	S1S2	Rare	
<i>Trichomanes boschianum</i>	Appalachian Bristle Fern	MACON	NC	S1	Endangered	
<i>Trichomanes petersii</i>	Dwarf Filmy-fern	GRAHAM	NC	S2	Rare	
<i>Huperzia porophila</i>	Rock Clubmoss	JACKSON	NC	S2	Rare	
<i>Huperzia porophila</i>	Rock Clubmoss	MACON	NC	S2	Rare	
<i>Huperzia appalachiana</i>	Appalachian Fir-clubmoss	JACKSON	NC	S3	Watch List	
<i>Huperzia appalachiana</i>	Appalachian Fir-clubmoss	MACON	NC	S3	Watch List	
<i>Botrychium oneidense</i>	Blunt-lobe Grapefern	JACKSON	NC	S2	Rare	
<i>Botrychium simplex</i> var. <i>simplex</i>	Little Grape-fern	HAYWOOD	NC	S2	Rare	
<i>Botrychium simplex</i> var. <i>simplex</i>	Little Grape-fern	JACKSON	NC	S2	Rare	
<i>Phegopteris connectilis</i>	Northern Beechfern	SWAIN	NC	S2	Endangered	

*Notes on State Ranks:

B - Rank of breeding population in state; used for migratory species only, and as qualifier of ranks described below (e.g., S1B through S5B).

N - Rank of non-breeding population in state; use for migratory species only, and as qualifier of ranks (e.g., S1N through S5N).

S1 – Extremely rare and critically imperiled in the state with five or fewer occurrences

S2 – Very rare and imperiled within the state, 6 to 20 occurrences, some factor(s) making it vulnerable to extinction.

S3 – Rare or uncommon in the state, from 21 to 100 occurrences.

S4 – Widespread, abundant, and apparently secure within the state, but with cause for long-term concern.

S5 - Common, widespread, and abundant in the state; essentially ineradicable under present conditions. .

SH - Occurred in state historically, with some expectation that it may be rediscovered; presence may not have been verified in the past 20 years.

SNA - Rank is not applicable because the element is not a suitable target for conservation (e.g., not native, interspecific hybrid without value, outside its usual range and not regularly found in state, never confidently documented as present in state).

S#S# - A numeric range rank (e.g., S1S2) indicating uncertainty about the exact status of the element.

SU - Currently cannot be assigned a rank in state due to lack of information and substantially conflicting information about status or trends. More information needed.

SX - Believed to be extirpated in state and has not been located despite intensive searches of historical sites and other appropriate habitat.

? - Indicates an inexact or uncertain numeric rank.

