

## **SUMMARY REPORT FOR REGION IV**

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TWRA Region IV is represented by the 21 counties found in the easternmost part of the state. This Administrative Region is a highly variable landscape which includes portions of four terrestrial ecoregions with eight terrestrial subcoregions. From east to west the Southern Blue Ridge (SBR) has two subcoregions, the Unaka Mountains in the northeast with portions of Johnson, Carter, Sullivan, Unicoi, Washington, Greene and Coker Counties and the Unicoi Mountains with portions of Jefferson, Sevier, Blount and Monroe Counties. The Ridge and Valley (RV) ecoregion has 4 subcoregions: the Bristol Valley, Holston Valley, Rolling Limestone Hills and the Sandstone Hills. The Cumberland Plateau and Mountains (CPM) has two subcoregions lying within Region IV: the Black Mountains and Cumberland Mountains of which almost all of Campbell and a substantial portion of Claiborne Counties and a smaller portion of Anderson County is included. The major portion of the CPM and a smaller portion of the RV are shared with TWRA Administrative Region III.

The SBR extends from north Georgia to Pennsylvania with Tennessee lying near the southwest of this province. Tennessee's portion of this province is often called collectively the Unaka Mountains. Elevations in this region range from about 305 m (958 ft) to 2,024 m (6,356 ft). The Unaka Mountains include several mountain ranges, those being, from north to south, the Iron, Holston, Stone, Unaka, Bald, Great Smoky and Unicoi Mountains. There are several distinct mountains along the western edge of the SBR, generally of lower elevations than those along the North Carolina border. From north to south these are: English, Chilhowee, Starr, and Bean Mountains.

The SBR is part of the oldest land mass in eastern North America which has not been affected by marine submersion or continental glaciation. Because of this the SBR supports one of the most biologically diverse temperate forests in the world. There are at least 3,000 species of plants, including over 150 species of trees. Terrestrial habitats range from warm sheltered valleys to mountain peaks over 6000 feet high. These habitats support wildlife species of both boreal and tropical origins. The SBR is recognized globally for its salamander diversity and endemism.

The water that falls on and flows from these mountains form streams and rivers that support an array of aquatic life. Shute, Biggins and Butler (1997) report that these are the most biologically rich waters in the world, containing 90 percent of all mussel and crayfish species, 75 percent of aquatic snail species and about 50 percent of all freshwater fishes in the continental U.S. The major Rivers that drain the SBR are the French Broad, Nolichucky, Pigeon, Little Tennessee, Little River, Hiwassee, Little Pigeon, Tellico and Watauga.

Immediately west of the SBR is the Ridge and Valley Province (RV), which extends from the coastal plain of Alabama to the St. Lawrence Valley. The Tennessee portion is often popularly known as the Great Valley. The RV consists of high parallel ridges and narrow valleys, oriented from northeast to southwest. The ridges are higher at

the northern end, with Clinch Mountain and Bays Mountain reaching heights of 800 m (2500 ft) and 945 m (2967 ft), respectively. The valley floors slope gently towards the southwest, from an average elevation of about 300 m (942 ft) in the north to about 230 m (722 ft) in the south. The Holston, Clinch and Powell Rivers drain into the Tennessee River Basin. The Nature Conservancy in the book **Presious Heritage: The Status of Biodiversty of the United States**, states that the “Clinch River surpasses all other watersheds in the country with 48 imperiled and vulnerable fish and mussel species, including 21 that are federally listed as endangered or threatened.” A very small portion of the RV in extreme southeastern Tennessee in Bradley and Polk Counties is drained by the Conasauga River system, tributary to the Coosa River. It supports a diverse fish fauna composed of many endemics.

Forests in the northern portion of the RV are primarily dominated by oak-hickory-pine types, with some northern hardwoods on the higher ridges. Forest types in the southern portion of the RV are oak-hickory-pine and other mixed forest types.

The CPM in Tennessee stretches from the Kentucky border and ends at the Tennessee border with Alabama and Georgia. The CPM is an area of rugged terrain, with elevations ranging from about 350 m (1,100 ft) along some of the streams to 1,075 m (3,376 ft) on Cross Mountain. The CPM are drained by the headwaters from both the Tennessee and Ohio River Basins. Coal deposits are found in the majority of the CPM. The primary forest types are oak and mixed mesophytic forest. The CPM and RV ecoregions are considered to be a global center for cave invertebrates and has one of the largest concentrations of caves and cave species in the United States (Culver et al. 1999). An array of vertebrate species such as woodrats, salamanders and bats are cave obligates or inhabit caves on a seasonal basis and play a critical role in nutrient cycling. Most of these species are rare. The CPM is also an important global center for breeding Cerulean Warblers and Golden-winged Warblers, both of which are GCN species and are neotropical migrants.

Threats and key conservation issues facing East Tennessee are numerous and vary in magnitude. Development and sprawl within the SBR and RV is growing at an unprecedented rate. Roads, home development and urbanization in combination are causing wildlife habitats to be fragmented and eliminated. Corridors that many wildlife species use for migration/travel are severely impeded by these activities. Aquatic species have suffered a great deal in the RV and SBR due to the construction of dams and industrial and agricultural pollution. Paper effluents to the Pigeon River have virtually eliminated its fish fauna, and only through aggressive research and restoration can this trend be reversed. The Clinch and Powell systems continue to receive siltation from strip mines in Virginia and both are seriously impacted by these practices. Mercury and polychlorinated biphenyls (PCBs) are serious pollutants that have contaminated several ecosystems, such as Holston River, Cherokee, Ft. Loudon, Tellico, Watts Bar and Nickajack Reservoirs. Many of our mussel species are in great peril. The larger river fish fauna of the RV are now extremely fragmented and several species are known to have disappeared. Exotic species are having a negative impact on plant communities in the SBR, examples are the balsam wooly adelgid and hemlock wooly adelgid. Diseases, such as dogwood anthracnose, beech blight, and other factors such as acid deposition is not only affecting plants and wildlife habitat, including soils, but is reaching alarming levels in wetlands and streams.

Six main outcome statements address the conservation needs of the SBR, CPM and RV.

Clarify the conservation status of species of greatest conservation need.  
Enhance/restore populations of GCN species to sustainable levels.  
Conserve/restore the ecological integrity of native upland forests.  
Conserve/Restore the ecological integrity of high elevation forests.  
Conserve/restore the ecological integrity of woodlands/grasslands.  
Build constituencies for wildlife conservation.

The following strategies will be used to obtain these outcomes.

Rapid assessments as well as long-term monitoring and research programs will be implemented to clarify the status of priority species.  
Key limiting factors that threaten the viability of priority species will be addressed to enhance/restore species of greatest conservation need to sustainable levels.  
Areas with potential for species conservation/restoration will be evaluated and prioritized.  
Some conservation efforts that are in place will be expanded to expand/restore the ecological integrity of natural ecosystems such as native grasslands and woodlands.  
Public information programs will be developed to highlight biodiversity significance of Tennessee wildlife.

Eighteen projects were identified to start addressing the conservation needs of the SBR, CPM and RV:

Surveys and inventories will be conducted in specified habitats to clarify the conservation status of target species and to fill inventory data gaps. Those include, Grassland/Upland forest/High elevation forest/High elevation wetland/Cave and Aquatic Salamander Surveys. Salamanders of particular interest include: Black Mountain, four-toed, Junaluska, hellbender and shovelnose. Other herpetofauna (reptiles and amphibians), and micro-mustelids will also be species of interest. Herpetofaunal and Small Mammal Inventories on selected Wildlife Management Areas, State Natural Areas and State Parks will fill data gaps about priority species on TWRA and other state managed lands.

To clarify the conservation status of aquatic species of greatest conservation need, the TWRA stream crews will conduct stream surveys in the Upper Cumberland Drainage, Powell River, and Clinch River systems. Species of particular interest include all crayfish, silverjaw minnow, and the Cumberland Johnny darter. A taxonomic key will be developed for identifying the crayfish of Tennessee. Genetic analysis will be used for problematic species.

To enhance/restore some of our rare species to sustainable levels, Wildlife habitat Improvement Projects will provide artificial nesting/roosting structures for target species such as Barn Owl, Saw Whet Owl, red squirrel, Northern flying squirrel, and numerous bat species where this habitat need is a key limiting factor. These projects will include the installation and monitoring of nesting/roosting structures throughout the SBR and RV. Jefferson County High School has constructed 40 artificial nest boxes. Twenty of those have been installed and are currently being monitored. Sixty more boxes will be completed and installed within the next 2 years.

Cave and karst habitats are important to numerous cave obligates and troglobites. Caves and cave conservation areas in Hawkins, Sullivan, Hancock, Greene, Hancock, Claiborne, Campbell, Union, Grainger, Knox, Blount, Cocke, Washington and Unicoi Counties will be investigated. In addition, data loggers will be installed in Oaks cave at Chuck Swan Wildlife Management area to determine temperature variations and disturbances in the Gray bat roosting area.

On private and state owned lands in the CPM & RV, Appalachian Cottontail, spotted skunk and least weasel surveys will be conducted to determine distribution and status of these species. Also in the RV, Tiger salamander larvae will be relocated from Henderson Island Wildlife Management Area to restore the largest terrestrial Tennessee salamander to other suitable habitats within their historic range in Regions 3 and 4.

Blue sucker populations will be restored by propagation and transplanting them to suitable areas within their historic range. This project will require outside sources to propagate this species and will be dependant on available funds. Restoration of mollusks by transplantation will also be conducted. GCN mussel and snail species from the Powell and upper Clinch rivers will be moved to locations within their historic range statewide. The restoration of the Lake Sturgeon has been ongoing for 3 years with hundreds of small sturgeon being released in the main stem of the Tennessee River, the Holston and the French Broad.

To conserve/restore the ecological integrity of native upland forests, the status and integrity of upland forests adjacent to watersheds where GCN species occur will be determined. Particular areas of interest include the Clinch, Nolichucky and Powell River watersheds in the RV. In the SBR, Red Spruce will be restored to historical ranges and in areas where hemlocks are being decimated by the hemlock wooly adelged, an exotic insect pest that is causing deforestation of both eastern and Carolina hemlocks throughout the range. This project will allow TWRA to partner with the USDA Forest Service, the US Fish and Wildlife Service, North Carolina Wildlife Resources Commission, and private non-governmental organizations, such as private plant propagation facilities, nurseries, etc.

To conserve/restore the ecological integrity of high elevation forests, high elevation wetlands will be mapped for future inventory. There is a tremendous data gap in our knowledge of where many of these "small scale" wetlands are located, and many GCN species are tied to these habitats.

Genetic studies will be conducted on lesser-known GCN species, such as, the Yonahlossee and shovelnose salamanders. Herpetologists are finding that many salamanders in the Southern Appalachians are cryptic sibling species. This means that morphologically, some salamanders appear to be the same, but further research shows that there are major differences in genetics, behavior and niche breadth and width.

To conserve/restore the ecological integrity of woodlands/grasslands, Region IV will assist in the native grass conversion of Hampton Creek Cove State Natural area. This area contains multiple GCN species to include woodland and meadow jumping mice, red backed vole, golden-winged warbler, golden mouse, star-nosed mole, hairy-tailed mole, and Soricids all of which are early-mid successional grassland obligates. This project will forge partnerships with Southern Appalachian Highlands Conservancy (SAHC), TDEC Division of Natural Areas, Natural Resources Conservation Service (NRCS), the USDA Forest Service, the Tennessee Valley Authority Natural Heritage Division and TWRA Lands Management Northeast Tennessee Unit.

Building constituencies for wildlife conservation will be accomplished by producing informative multimedia for public viewing. In addition, a wildlife mobile education facility will be constructed to highlight GCN species in Region IV. Both of these projects will help the public better understand GCN species conservation and their roles as landowners.

At the present time TWRA staff is conducting inventory and surveys of both terrestrial and aquatic species on public and private lands. TWRA assists private landowners, by providing technical assistance to restore native grasslands and native forests, important habitats that will provide food, shelter and space for many species of nongame wildlife. Many of the projects listed above are ongoing or will be implemented by July 2007. Funding and staff capacity are the only limiting factors that would stifle these projects. Region IV is confident that the overall goal of the State Wildlife Action Plan, addressing the conservation needs of GCN species in this region, will be met. As designed, these projects will also meet the goals and objectives of TWRA's Strategic Plan 2006-2012.

There is no doubt, as conservationists, we are faced with a daunting task, but with the help of staff, funding, (budget approval by the Tennessee Wildlife Resources Commission) and grants from the USFWS we can accomplish all we set out to do.

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