

## **I. Introduction and Purpose**

### **A Plan to Protect Georgia's Biological Diversity**

This document represents the summary of a conservation planning effort that began officially in December of 2002, but which builds upon many years of research and data accumulation by staff of the Georgia Department of Natural Resources and other organizations (see Appendix H). In 2000 the Wildlife Resources Division, Nongame Wildlife & Natural Heritage Section produced a document entitled "Georgia's Wildlife Diversity: An Overview". This unpublished technical report provided a summary of the biological diversity of the state and described some of the problems affecting this biological diversity within each physiographic province. It also gave examples of important habitats and landscape features, provided summaries of laws and regulations pertaining to wildlife in Georgia, and described some of the essential components of wildlife conservation (e.g., monitoring, habitat management, and land protection). This report incorporates some of the background material presented in "Georgia's Wildlife Diversity" and other assessments by the Georgia DNR, as well as more recent analyses of wildlife diversity patterns and threats by DNR and other cooperating agencies and organizations.

Funding for the current planning effort came from the State Wildlife Grant program administered by the U.S. Fish & Wildlife Service; matching nonfederal funds came from the Nongame Wildlife Conservation Fund administered by the Wildlife Resources Division (WRD).

The goal of this effort was to develop a conservation strategy based upon the best currently available data on the distribution and abundance of wildlife species in the state, particularly rare and declining species. The strategy assesses the extent and condition of habitats required by these species, as well as existing and potential problems and conservation opportunities for these habitats. Further, this strategy addresses research and survey needs, habitat restoration needs, and monitoring needs. It also includes an evaluation of existing policies and programs for wildlife conservation in Georgia. Existing and potential partnerships are outlined, and priorities for implementing specific conservation actions are provided.

Coordination with other agencies and organizations that manage land or administer wildlife conservation programs in Georgia was a key component of this effort. The planning team included Georgia DNR staff as well as representatives of private and public conservation organizations and land managing entities in Georgia. A Steering Committee composed of representatives of various agencies, organizations, and land managing groups provided general oversight for the project. Technical teams were formed to address specific components of the conservation strategy; these teams included Wildlife Resources Division staff as well as representatives of other agencies and organizations. Input from the Steering Committee, representatives of other conservation organizations, consulting biologists and academic researchers was used in the development of the conservation strategy

The goal of this planning effort is to provide an informational and strategic framework that will support the conservation of Georgia's biological diversity. While it builds on the work of previous planning efforts, it attempts to define a set of prioritized conservation strategies that may be applied locally and statewide to achieve the goal of maintaining Georgia's diversity of native species and natural habitats.

The purpose of this document is to outline objectives and partnerships for wildlife conservation in Georgia. It is a broadly focused strategy that indicates areas in which resources should be concentrated and emphasis placed to facilitate the conservation of Georgia's animals, plants, and natural communities. Where data are currently lacking to provide a clear picture of conservation objectives, research priorities to provide needed data are indicated. Where the data are sufficient to provide direction for species and habitat protection, restoration, or management, these recommendations are stated.

This document is not intended to be a blueprint for local land use ordinances or a statewide land use plan. It is not intended as an evaluation or indictment of land use practices by any segment of society. We acknowledge that nearly every activity by humans on the Georgia landscape has positive or negative impacts on wildlife populations and their habitats. The purpose of developing this strategy is to provide information that may help minimize negative impacts and maximize positive impacts. Finally, the emphasis of this document is not on development of new regulations, but on more effective implementation of existing regulations and development of new cooperative relationships to protect and maintain habitats for native wildlife species.

### **Essential Elements of a Comprehensive Wildlife Conservation Strategy**

In enacting the authorizing legislation for the State Wildlife Grants program, Congress provided guidance on the essential elements that comprise a Comprehensive Wildlife Conservation Strategy (CWCS). These elements are as follows:

- (1) Information on the distribution and abundance of species of wildlife, including low and declining populations as the State fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the State's wildlife; and,
- (2) Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in (1); and,
- (3) Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats; and,
- (4) Descriptions of conservation actions proposed to conserve the identified species and habitats and priorities for implementing such actions; and,

(5) Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions; and,

(6) Descriptions of procedures to review the strategy at intervals not to exceed ten years; and,

(7) Plans for coordinating the development, implementation, review, and revision of the plan with Federal, State, and local agencies and Indian tribes that manage significant land and water areas within the State or administer programs that significantly affect the conservation of identified species and habitats; and

(8) Broad public participation in the development and implementation of the conservation strategy.

### **Species of Greatest Conservation Need**

Congress further directed that the strategies must identify and be focused on “species in greatest need of conservation,” yet address the “full array of wildlife” and wildlife-related issues. No definition of “species of greatest conservation need” was provided in the authorizing legislation; instead, the task of defining and identifying these species was left to each state wildlife agency working in collaboration with its conservation partners. The purpose of focusing on species of greatest conservation need is to ensure that those most imperiled species are adequately addressed in the conservation strategy.

The directive to emphasize species of greatest conservation need is not meant to imply that these species are of greater intrinsic value than other species. The ultimate goal of a comprehensive wildlife conservation strategy is to protect and maintain the full complement of species native to a state or region. While many species of wildlife (particularly generalists, species adapted to a wide range of conditions and habitats) are able to maintain viable populations in spite of significant land use changes, other species (particularly those species adapted to a narrow range of habitat conditions) are becoming increasingly imperiled due to loss or degradation of natural habitats, direct mortality from human activities, and other factors. It is intuitively logical that in developing a set of conservation strategies to maintain the whole of Georgia’s natural heritage, one should prioritize conservation actions based upon an objective assessment of need.

Species that are globally imperiled and clearly threatened with extinction are an obvious choice for conservation action. However, there are many other species that are experiencing significant population declines in Georgia. The directive to address the “full array of wildlife” requires that the agency consider these species as well, to ensure that the conservation strategy meets the dual objectives of “keeping common species common” as well as preventing or minimizing further extirpations or extinctions of the more imperiled species.

The approach taken in this planning effort has been to define species of greatest conservation need based on a number of factors, including global and state rarity rankings, population and habitat trends, range of occurrence, number of protected populations, and importance of Georgia efforts to the global conservation of the species. Some species that are not globally imperiled but are considered indicators of habitat quality over a large area or region were included as well. Finally, rare or uncommon species for which additional research is needed in order to develop specific conservation strategies were included, since one of the required elements of the planning process is identification of high-priority research and survey needs. The term used in this document for this more inclusive group is “high priority species”. A discussion of the procedures used in selecting these species can be found in the “Approach and Methods” section.

### **Scales of Biological Diversity**

In general terms, diversity means variety or heterogeneity within some defined group or area. Biological diversity can be expressed at several scales of concern, from subcellular to global. For example, genetic diversity refers to the variety of genes or genotypes within a species, population, or subpopulation. This diversity is often measured or indicated by laboratory research methods such as electrophoresis. Individual populations within a species may exhibit high or low levels of genetic diversity. The amount of genetic diversity within a population is a reflection of various biological and physical environmental factors operating over time on the genetic resources of that population (e.g., spontaneous mutations, interbreeding, isolation, habitat variability). The level of genetic diversity within a population is often reflected in variability in form or function (e.g., body structure, metabolism, blood type, leaf shape, hair color or disease resistance) and may have important implications for the capability of that population to sustain itself through time.

Another type of biological diversity is expressed in terms of the number of species in a given habitat. This has been referred to as “alpha diversity” by some researchers. The simplest type of alpha diversity is known as “species richness”, and is based on presence/absence data. Species richness is simply the number of species observed within a given habitat. Other measures of within-habitat diversity are based on formulae that take into account the relative abundance of different species within the habitat. These diversity indices require counts of individuals within species, and are often used for purposes of comparison across habitat types within certain taxonomic groups.

A great deal of ecological research has been devoted to investigation of the patterns of species richness, and development of theories to explain why some habitats support great numbers of species, while other support relatively few. Some of the factors that are important in determining alpha diversity include successional stage of the habitat, structural complexity in the habitat, climatic stability, nutrient availability, degree of isolation from other similar habitats, variability of natural disturbance patterns, competition, predation and parasitism. As with most things in nature, it is difficult to detect the relative importance of these various factors for a given habitat.

A third type of diversity, known as “beta diversity”, refers to the amount of biological diversity across habitats within a given region or landscape. Beta diversity is a reflection of the variety of habitats within the landscape, which in turn is indicative of the heterogeneity of topography, soils, climate, geology, disturbance patterns, etc. in the region. Regions with more complex environmental gradients typically have greater beta diversity, even though the alpha diversity values for each habitat may be relatively low.

In this document, we are mostly concerned with beta diversity, that is, the diversity of wildlife species across the entire Georgia landscape. However, reference is made at various points to habitats that are particularly rich in species (“alpha diversity”). It is important to keep in mind that the diversity of life forms represented in a particular habitat depends on many factors. Nevertheless, conservation planners agree that the best approach to maintaining biological diversity over a broad region is maintenance of the full suite of natural communities on which native species depend.

### **Wildlife Diversity Databases**

Our knowledge of species diversity patterns in Georgia and elsewhere is based on a long history of field studies and taxonomic research. Occurrence data for species are derived from a variety of sources, including natural history museums, herbaria, published scientific literature, and reports prepared by field researchers. In each state, natural heritage programs compile and analyze data on species and natural communities to develop a picture of biological diversity. An international network of natural heritage programs known as NatureServe provides a standardized data framework for assessing the global distribution of these species and natural communities.

The Nongame Wildlife & Natural Heritage Section (NWNHS) of WRD develops and maintains information on animal and plant species and the natural communities they comprise within the state of Georgia. The NWNHS staff maintains manual and digital files on approximately 600 plant species and 400 animal species, including 223 state-protected species. The section's databases currently include over 11,500 documented occurrences of rare species and significant natural communities in Georgia. The NWNHS staff also maintains digital landcover databases as well as a GIS database of conservation lands.

Database management programs developed and maintained by NatureServe are used within WRD and throughout the United States by natural heritage programs to manage diversity data and to generate detailed, site-specific information. Significant natural communities and plant and animal species of special concern are termed “elements of biodiversity”, and one of the central data features of WRD biodiversity databases is the element occurrence record. These records contain information on occurrences of rare species or natural communities at particular sites, including location, size, and condition of the population or community and date of observation.

Rarity ranks are used to characterize elements and to facilitate conservation planning. These ranks are assigned after reviewing pertinent status information at the state level and globally. Rarity ranks are based on a scale of 1 to 5; the higher the number, the more

secure that species is thought to be at the state (or global) level. Therefore, an S1 species is considered very rare or imperiled in the state, while an S5 species is considered common and secure. A species with a rarity rank of G5 S1 is globally secure but occurs in very small numbers in the state. Thus it is not of global conservation concern, but may be considered a priority for conservation within the state, depending on other factors. This ranking system helps to assure that conservation efforts are directed to those species needing the most help in order to maintain biological diversity in a state or region. More detailed information on global rarity ranks and state rarity ranks can be found at the following website: <http://www.natureserve.org/explorer/ranking.htm>.