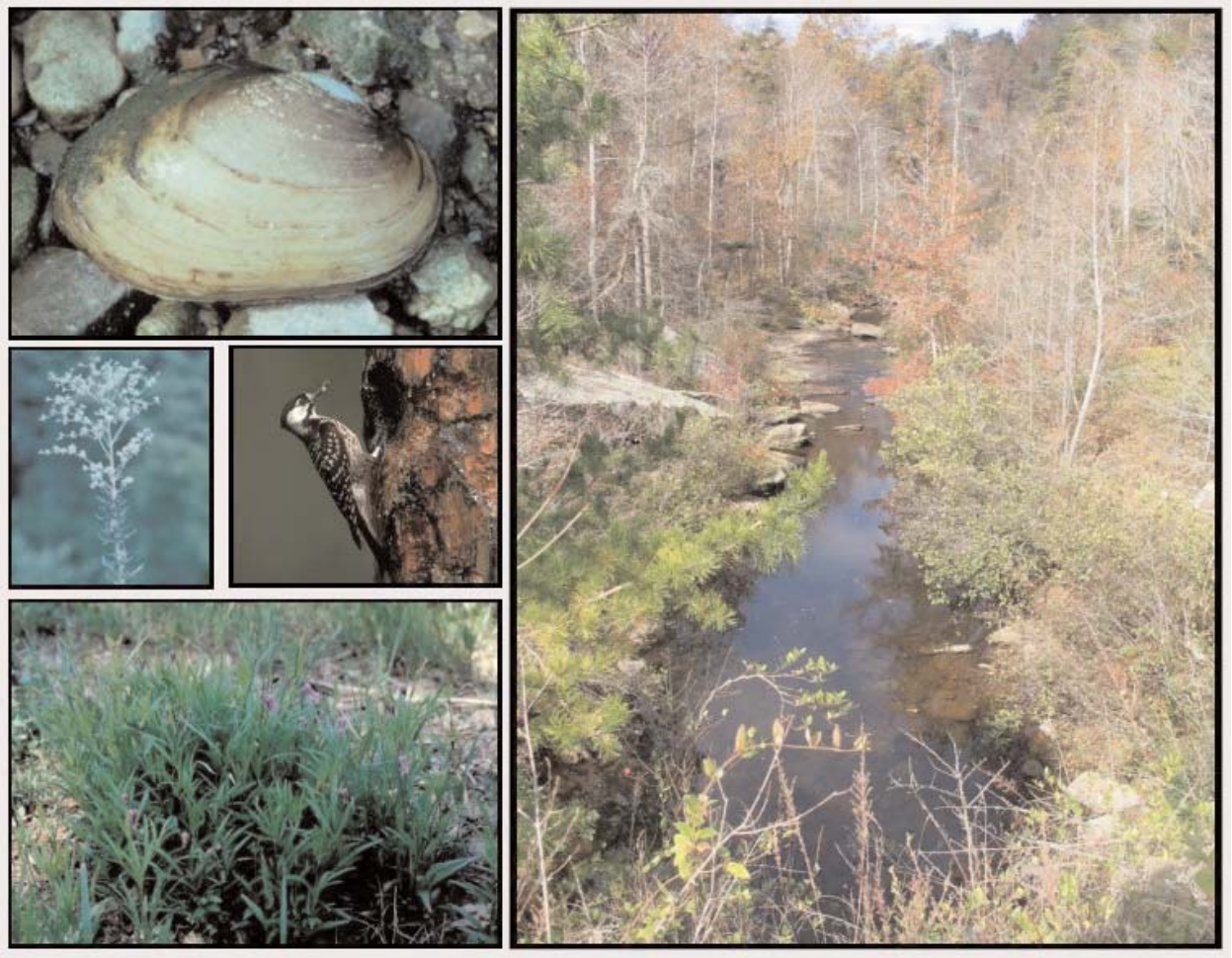
Alabama Natural Heritage Program℠

Annual Report



Fiscal Year 2004

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH
Alabama Natural Heritage Program℠

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TNC's homepage:
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Line Art & Photo Credits

All photos from the ALNHP photo archive.

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A Note From the Director

The Alabama Natural Heritage Program has had a productive and successful year. The program staff continue to conduct in-depth surveys for imperiled species in Alabama and to produce quality reports and publications on the state's diverse flora and fauna. The comprehensive database of Alabama's natural heritage continues to grow, and provides a sound foundation for conservation efforts in the state. However, there have been difficulties and setbacks within the program. Our terrestrial zoologist and Mitchell satyr butterfly expert Barry Hart resigned from the program to take a job with TVA. We wish him the best in his new position, but his expertise and dedicated service to ALNHP will be missed.

The program has also had financial difficulties during the year. The program is supported primarily by contracts and grants to perform specific projects on imperiled species, and such support has been relatively stable in recent years. However, certain aspects of the program require discretionary funds (or core funds) which are more difficult to obtain. The program needs funding to upgrade its computerized database system to the new Biotics program. Data gaps in our statewide surveys need to be addressed. Various administrative functions need additional financial support.

As a reader of this annual report, we assume that you are a friend of the heritage program. We hope to formalize this friendship by establishing a "Friends of Alabama Natural Heritage" group, and requesting your financial support. Your tax-deductible donation to ALNHP (through The Nature Conservancy) will help provide the core funding that the program so desperately needs. In return you will be recognized as a "Friend", and will be placed on our mailing list for periodic newsletters reporting ALNHP activities, annual reports, and our Inventory List of Imperiled Species. Please make your generous donation payable to **The Nature Conservancy**, and mail to:

Alabama Natural Heritage Program
The Nature Conservancy
Huntingdon College, Massey Hall
1500 East Fairview Avenue
Montgomery, Alabama 36106

You may also help support the Heritage Program by donating good quality used cars, trucks, and boats. We have a special need for good quality four-wheel drive vehicles.

Thank you for your interest in and support of the Alabama Natural Heritage Program, and our efforts to protect Alabama's rich biodiversity.

Robert W. Hastings
Director

Introduction

The mission of the Alabama Natural Heritage Program℠ (ALNHP) is to provide the best available scientific information on the biological diversity of Alabama to guide conservation action and promote sound stewardship practices. Established by The Nature Conservancy (TNC) in 1989, it is one of a network of such programs across the United States, Canada, and Latin America, collectively known as the Natural Heritage Network (NHN). The majority of these programs are cooperative ventures between state or federal government agencies and TNC, and are housed within state or federal government agencies, universities, or TNC Chapter Offices. As a member of the NHN, ALNHP is represented by its membership organization NatureServe. NatureServe works to aggregate data from individual Network Programs and is dedicated to the furtherance of the Network and the application of Heritage data to biodiversity conservation.

Natural Heritage Programs have three broad functions:

- to collect information on the status and distribution of species and natural communities,
- to manage this information in a standardized way, and
- to disseminate this information to a wide array of users.

Natural Heritage Programs use a standardized information management system to track biodiversity data including taxonomy, distribution, population trends, habitat requirements, relative abundance, quality, condition, and viability. Programs also track non-biological information including land ownership type, land-use and management, distribution of protected areas, and threats to species or their habitat.

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Alabama Natural Heritage Program℠

ALNHP is one of the few remaining Conservancy-operated Heritage programs, and serves the dual role of a science office for the Conservancy as well as the core responsibilities of a member of NatureServe and the NHN. It supports the Chapter and the Southeast Division by supplying biodiversity data, site prioritization, ecoregional and site conservation planning, ecological monitoring and burning, and land management expertise. ALNHP performs these services with support from the Alabama Chapter office as well as a number of public and private partners in conservation.

Little River Falls

Partners

The Nature Conservancy

The mission of The Nature Conservancy (TNC) is to preserve plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Based in Arlington, Virginia, TNC is the world's leading private, international conservation group, with more than 1 million members and 1,600 preserves - the largest system of private nature sanctuaries in the world. TNC has helped protect more than 11 million acres of ecologically significant habitat in the United States and more than 55 million acres in Canada, Latin America, the Caribbean, Asia and the Pacific. Through its focus on preserving biodiversity, TNC sets clear priorities and focuses its resources accordingly. Its science-based, non-confrontational approach has given it the ability to work with a broad array of partners and to develop innovative conservation strategies. The Conservancy has found that partnerships of all kinds - with landowners, corporations and governments - produce some of the most dramatic conservation results.

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

NatureServe

NatureServe is an international conservation organization whose mission is to unify, support, and represent the network of Natural Heritage Programs, Conservation Data Centers and other cooperators in the mission of collecting, interpreting and disseminating ecological information critical to the conservation of the world's biological diversity. NatureServe's four organizational goals are to:

1. help slow the loss of the world's biodiversity,
2. be a leader in the collection, management, and analysis of biodiversity data,
3. have strong staffing and funding for Network programs that will result in superior information products and services, and
4. play a central role in conservation decision-making worldwide.

NatureServe
A Network Connecting Science With Conservation

Inventory

Botany & Community Ecology

A broad scope of projects was conducted within the past year, primarily for the United States Fish and Wildlife Service (USFWS) and NatureServe. Currently five status surveys on plants classified as "Special Concern" by the USFWS are being conducted, two of which were completed and submitted in spring 2004. In addition to the several projects for the USFWS, two projects on behalf of the U. S. Forest Service are currently being implemented. A two-month project that entailed establishing permanent vegetation plots along the Natchez Trace Parkway for NatureServe was completed in September 2004.

Alabama Canebrake Pitcher-plant Surveys

Two separate projects, one on behalf of the U. S. Forest Service and the other for the U. S. Fish and Wildlife Service, are being conducted on the Alabama canebrake pitcher-plant (*Sarracenia rubra* ssp. *alabamensis*). The Forest Service project exclusively entails surveys to be conducted on the Oakmulgee Ranger District of Talladega National Forest, whereas the Fish and Wildlife project includes surveys throughout the entire range of the species.

Alabama canebrake pitcher-plant (*Sarracenia rubra* ssp. *alabamensis*)

Sandstone glade

Bankhead National Forest Glade Survey

An inventory for glades in Bankhead National Forest began in April 2003, and was continued throughout 2004. Fifteen limestone and sandstone glades have been identified, several of which contain rare plants currently tracked by ALNHP. This project will encompass one more season, with a final completion date of December 2005.

Flyr's Brickell-bush Status Survey

A status survey for the USFWS is presently underway for the Flyr's brickell-bush (*Brickellia cordifolia*) in the southernmost counties of Alabama. The entire range of this species is restricted to seven counties in Alabama and eight counties in Florida and Georgia. This survey has so far resulted in the confirmation of eight sites for *Brickellia cordifolia* in the state, only two of which are in good condition.

Georgia Rockcress

Populations of the Georgia rockcress (*Arabis georgiana*) were mapped, and areas along the banks of the Cahaba River where the plant reportedly occurs were searched, but the plant was not located. Additional searches will be made in the coming year.

Morefield's Leather-flower Status Survey

The USFWS contracted with ALNHP to conduct additional surveys in northeast Alabama and nearby Tennessee for the federally listed Morefield's leather-flower (*Clematis morefieldii*), a member of the Buttercup Family represented by no more than 12 populations worldwide. One new occurrence was found in 2004, in Madison County.

Small-flowered Meadowbeauty Status Survey

Conducted on behalf of the USFWS, a status survey on the small-flowered meadowbeauty (*Rhexia parviflora*) entails a rangewide assessment of the species that includes Alabama, Florida, and one historical location in Georgia. Surveys conducted in 2004 resulted in the discovery of eight new occurrences, seven in Florida and one in Alabama. This plant is dependent upon a fire-maintained habitat and is threatened by fire suppression.

Southern Catchfly Status Survey

A survey for southern catchfly (*Silene ovata*) on behalf of the USFWS is currently being implemented in Alabama and Mississippi. Globally rare, the species is represented by no more than five occurrences in either state, including one new population in Henry County, Alabama.

Morefield's leather-flower (*Clematis morefieldii*)

small-flowered meadowbeauty (*Rhexia parviflora*)

Significant Botanical Discoveries

- Cream-flowered tick-trefoil (*Desmodium ochroleucum*), a globally imperiled species, was discovered during a series of field surveys along the Alabama River in Autauga County, in September 2004. Prior to this discovery, only 11 extant populations were known worldwide.
- Pondberry (*Lindera melissifolia*), a federal endangered species, was discovered at two locations in Covington County, in July 2004. These observations represent the first records of *L. melissifolia* from Alabama since it was last seen in the state in 1840, from Wilcox County.
- Small-flowered meadowbeauty (*Rhexia parviflora*), previously known from only two occurrences in the state, was discovered at one site in Covington County, representing a new county record.

Terrestrial & Aquatic Zoology

Alabama Map Turtle

Alabama has the highest diversity of freshwater turtles in the contiguous United States. While many species range statewide others are restricted to the Tennessee River system in the north, the Mobile Basin draining most of the state, or rivers draining directly into the Gulf of Mexico. The most specious genus is *Graptemys*, the map turtles. Alabama is host to six map turtle species; two are endemic to the Mobile Basin and as such have the majority of their range within the borders of Alabama.

In recent years surveys have been completed on the Escambia and Barbour´s map turtles, species which are restricted to Gulf drainage rivers, and the black-knobbed sawback, one of the Mobile Basin endemics. The latest survey to be completed was for the Alabama map turtle (*Graptemys pulchra*), the other Mobile Basin endemic. The Alabama map turtle ranges throughout the Mobile Basin, being found in all the major rivers - the Coosa, Tallapoosa, Cahaba, Black Warrior, Tombigbee, and Alabama. Although it is present in the Mobile and Tensaw rivers, it is not abundant in these terminal rivers of the Mobile Basin.

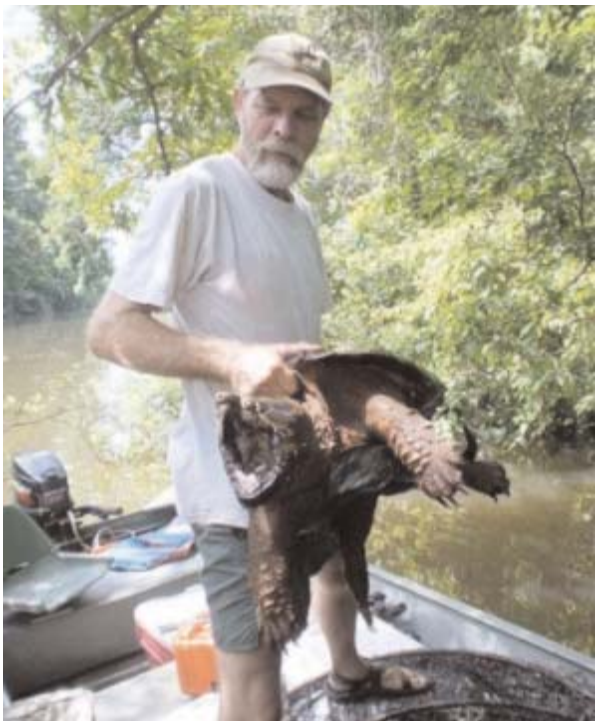
Surveys were conducted at locations throughout the range of the Alabama map turtle, and while its numbers appear stable, it was superseded in abundance by the black-knobbed sawback (*Graptemys nigrinoda nigrinoda*), except above the Fall Line. Black-knobbed sawbacks, with minor exceptions, do not occur above the Fall Line. While free-flowing rivers are the primary habitat, Alabama map turtles are also able to exist in large impoundments, such as those on the Coosa, Alabama, and Tombigbee rivers.

Alabama map turtle (Graptemys pulchra)

Habitat elements important to the Alabama map turtle include an abundance of bask sites, an abundance of gastropods and bivalves (the females are molluscivorous), and insects and other invertebrates for the males and juveniles, and suitable nest sites. The species falls under Alabama Department of Conservation´s nongame species regulations, and as such, receives state protection.

Alligator Snapping Turtle

During FY 2004 field work was begun on a two year project to examine the status of the alligator snapping turtle (*Macrochelys temminckii*) in the Mobile Basin. Based on heritage records three sites were selected for comparison. One site is on the lower Tombigbee River, one in a nearly isolated lake in the Mobile-Tensaw Delta, and the third on the lower Tallapoosa River. During the 1960´s alligator snapping turtles were heavily harvested for food and current trap results are to be used to examine if the turtles are rebounding since that harvest pressure has been lifted and they now have a protective status. Thus far trap results are limited and no conclusions can be drawn, but some of the initial findings are interesting nonetheless. The Delta lake population seems to have



Jim Godwin with an alligator snapping turtle captured during trapping. (Photo by Jeff Brayton)

larger individuals indicating that it most likely never experienced any severe harvest pressure. The two largest individuals (with weights of 41 and 48 kg) trapped thus far came from this site.

More trapping has been done on the Tallapoosa River and hence more turtles have been collected there. Of note is that this population appears to be stable and healthy as represented by individuals weighing as little as 1 kg and up to 38. This is an actively reproducing population which exists in a regulated river which undergoes daily water level fluctuations during the warm months. A dam for hydroelectric generation is located about 25 miles upstream of the study sites, and when temperatures approach or exceed the 90´s more water is released for electrical generation. Alligator snapping turtles have been able to adapt to this fluctuating regime, if in fact it does have an influence upon their biology. The lower Tallapoosa River is a site which has a nice representation of Alabama´s turtle fauna. Thus far seven species have been captured, smooth and spiny softshells (*Apalone mutica* and *Apalone spinifer*), river cooters (*Pseudemys concinna*), black-knobbed and Alabama map turtles (*Graptemys nigrinoda* and *Graptemys pulchra*), sliders (*Trachemys scripta*), and alligator snapping turtles (*Macrochelys temminckii*). More work will continue on these turtles during the remainder of 2004 and into 2005.

Black Bear Bait Stations

Historically, black bears (*Ursus americanus*) were abundant and occurred throughout Alabama. By the beginning of the 20th Century, bear populations were nearly depleted throughout the state with the exception of the extensive forested swamps of south Alabama. Over the past two decades, the majority of bear sightings in Alabama have been reported from the southwestern corner of the state, particularly from Mobile County. However, bear sightings and accounts have been reported infrequently from other portions of the state. Perhaps one of the more intriguing reports has come from portions of Bibb County, particularly within proximity of the Cahaba River. Molecular analysis of hair that was collected from the localities that produced bear sightings suggests that more than one bear is utilizing the area. In an effort to gather preliminary information concerning

black bear (*Ursus americanus*)

the presence of bears and the general locations where they are concentrated, 50 bait stations were established over a broad area in the Cahaba River watershed of northeast Bibb County. A large format map depicting the bait station locations was produced and provided to the Alabama Wildlife Federation for use in checking the stations.

Mississippi Gopher Frog

Historically, the Mississippi gopher frog (*Rana sevosa*)was found from Louisiana through Mississippi to Mobile County, Alabama. Currently, it is known from only a single population in Mississippi with other historical populations having been extirpated. This frog is a highly secretive species that spends much of its time underground. Closely coinciding with substantial rain events (primarily during late winter to early spring), adults move to ephemeral ponds and/or upland depressions to breed. Because of the concern for the plight of this species, searches were conducted within its perceived historic range in Alabama in an attempt to locate additional populations. Ponds and upland depressions that potentially could be used for breeding were identified from digital orthophotographic quarter quadrangles and USGS topographic maps. These ponds were surveyed during the breeding season for the presence of gopher frogs. No populations were discovered, and most areas did not provide suitable habitat due to current land use practices. However, additional ponds to search in the future were identified from Landsat Thematic Mapper imagery as described in the Geographic Information Systems section of this report.

Mitchell Satyr Butterfly

The discovery of the Mitchell satyr, *Neonympha mitchellii*, in Alabama has raised great interest and concern among lepidopterists and conservation biologists. Because this new population represents a considerable disjunction from the nearest known population, at least 760 km, elucidating the species' historical distribution along with habitat use and the causes of subsequent population fragmentation is of keen ecological and biogeographical interest. The recent discovery of populations from southwestern Virginia and northwestern Mississippi has helped to expedite study of the species throughout its known range. From a conservation perspective, the discovery of new populations of *N. mitchellii* is of paramount importance.

Soon after the discovery of the first colony of *N. mitchellii*, intensive searches for additional sites were pursued. Currently, all known colonies and local populations in Alabama occur within the Oakmulgee Ranger District, Talladega National Forest. The large, contiguous tract of U. S. Forest Service land that encompasses the Oakmulgee Wildlife Management Area has afforded protection of the habitats that support the species, and accordingly, the majority of the sites occur within the management area. In addition to the search for new sites, the habitats that support local populations were characterized and described. To date, 28 sites where observa-

Mitchell satyr (*Neonympha mitchellii*)

tions of the species have been recorded are described. The vast majority of all sites where the species has been located support small, localized herbaceous-shrub patches where a diverse assortment of sedges and other wetland graminoids predominate. These local patches were primarily found in association with active and maintained beaver-influenced wetland complexes. Only a few patches were found outside of beaver-created wetlands, which were either associated with low, semi-open riparian areas or saturated depressions within floodplain forests. A commonality among all localized patches was the presence of a moderate to dense cover of sedges and other herbaceous material and a structural component of woody vegetation (typically a low to moderately dense shrub-tree cover).

In addition to characterizing occupied patches, observations concerning certain life history and behavioral aspects of the species were recorded. It was determined that the species has two flight periods in Alabama occurring from late May to late June and from early August to early September. Mating and reproductive behavior have been noted on few occasions with males generally exhibiting a patrolling mate-locating strategy. Oviposition has been observed on two separate occasions but precise host plants largely remain unknown.

Currently, nothing is known concerning population size and structure or the dynamics of local populations. However, based on general counts recorded during site visits and habitat surveys, local populations appear to be quite small, especially in localized patches. Determining local population dynamics within the highly ephemeral and variable nature of beaver-influenced wetlands, is of primary importance and could possibly lead to the designing and implementation of appropriate conservation and management strategies for the species from a landscape perspective.

Based on current taxonomy of *N. mitchellii*, two subspecies have been described and are recognized, *N. m. mitchellii* and *N. m. francisci*. Both subspecies are critically imperiled and geographically confined to a restricted range; the nominate subspecies *N. m. mitchellii* occurs in a few small sites in Michigan and northern Indiana and *N. m. francisci* occurs within a 260 km² area of North Carolina. Such range restrictions coupled with small, fragmented populations and documented extirpations from former localities eventually led to the federal listing of both subspecies as endangered during the early to mid-1990s. Therefore, the discovery of new populations of either subspecies contributes to the recovery goal of that taxon.

These prospects have led to an evaluation and examination of the relationships within the *N. mitchellii* complex. A recent study provided a preliminary morphological and molecular investigation on the relationship within the complex by comparing specimens collected from a population of *N. m. mitchellii* and *N. m. francisci* to the recently discovered populations in Alabama, Mississippi, and Virginia. Although an expanded analysis is needed, information garnered from this study suggests that the recently discovered populations are more closely related to the nominate *N. m. mitchellii* than to *N. m. francisci*. If subsequent work confirms these preliminary results, then the populations in Alabama not only contribute to the recovery goal for *N. m. mitchellii* but also carry the same legal protection as the northern populations.

Paint Rock River

The Paint Rock River continues to be a site of interest for the Alabama Natural Heritage Program. A second year of mussel monitoring in the headwaters of Estill Fork, Hurricane

Searching for mussels in the Paint Rock River watershed.

Creek, and the upper most reach of the Paint Rock River was completed. Sites established in 2001-2002 were resampled in 2002-2003. A total of 23 species was collected alive with an additional five species being represented as shell only. Individuals collected, except for federally listed species, were marked with bee tags, and as of the completion of field work in 2003 a total of 481 individuals representing 20 species had been marked. Measurements were taken on all 580 individuals collected alive.

This work has provided a foundation for the streambank restoration efforts being conducted by The Nature Conservancy through their Paint Rock River Project office. Surveys for mussels are needed prior to any construction which may be done during streambank reshaping or other actions, with ALNHP conducting surveys at four sites.

One other conservation aspect which has developed during the course of the surveys and monitoring has been to supply specimens of endangered species for captive propagation. During the winter of 2004, ALNHP staff met with staff from USFWS and USGS to collect gravid female pale lilliputs (*Toxolasma cylindrellus*), one of the endangered species. Three individuals were found and transported to the Tennessee Aquarium Aquatic Research Institute hatchery facility at Cohutta Springs, GA.

During spring surveys at one of the restoration sites, a gravid female Alabama lampmussel (*Lampsilis virescens*) was discovered. Captive propagation of this species may be crucial to its survival as it is now confined solely to the upper Paint Rock River watershed. A second gravid female was found later that same day at a second locality, and a few weeks later a male was discovered. All three of these individuals were transported to the TAARI at Cohutta Springs. In July approximately 1200 larval mussels were released in Estill Fork, offspring of these two females. Of importance is that two gravid females were discovered during the same time frame because only males or very old females have been observed with intervening time spans of years between observations. Of note also was the collection of living, federally endangered, shiny pigtoes (*Fusconaia cor*) at one of the restoration localities.

Red Hills Salamander

In the past the majority of surveys for Red Hills salamanders (*Phaeognathus hubrichti*) were qualitative, that is mainly documenting the presence or absence of the species. Beginning in 1999 and continuing until 2003, quantitative Red Hills salamander monitoring was conducted at 39 sites, the majority on land owned by International Paper. These sites encompassed the range of the Red Hills salamander.

Line transects to estimate burrow density were used. Data collection was done by running a 50 or 100 m tape perpendicular to the slope and measuring the perpendicular dis-

Red Hills salamander (*Phaeognathus hubrichti*)

tance from the tape to burrows. With these measurements an estimated burrow density was calculated. In addition to the burrow data, physical measurements of the habitat were taken including slope aspect, or the direction it faced, slope angle, and slope height.

Slopes with angles of 27° or greater, north-facing, and well forested tend to be optimum for the Red Hills salamander, with salamander burrows typically being found in the middle portions of the slopes. Because of the variability of the conditions of the slopes sampled, burrow densities were found to range from 6.6 to 45.5 per 100 m^2.

Information and data collected from this study will be incorporated into an upcoming study which will continue the work in the Red Hills on the Red Hills salamander, the forested slopes, and other species found in this unique environment.

Alabama lampmussel (*Lampsilis virescens*)

Significant Zoological Discoveries

- An important discovery was made August 2004 along the Tallapoosa River where the cobblestone tiger beetle (*Cicindela marginipennis*) was observed and documented. Previously, the only known extant populations in Alabama, and also for the southeastern region, were the recently discovered Cahaba River occurrences and a series of four small islands below Jordan Dam on the Coosa River. In addition to the newly discovered Tallapoosa River occurrence, a second occurrence was found along the Cahaba River. The species has no federal statutory protection, but is considered imperiled and very rare throughout its range.

cobblestone tiger beetle (*Cicindela marginipennis*)

- The Alabama lampmussel (*Lampsilis virescens*) and pale lilliput (*Toxolasma cylendrellus*) are federal endangered freshwater mussel species that now survive only in the upper tributaries of the Paint Rock River. Gravid females from both species were collected and transported to the Tennessee Aquarium Aquatic Research Institute hatchery facility at Cohutta Springs, Georgia for captive propagation. Larval Alabama lampmussels, offspring of the females collected, were released in Estill Fork July 2004.

Applied Conservation

Biological Monitoring & Restoration Projects

Alabama Leather Flower

The Alabama leather flower (*Clematis socialis*)is a globally imperiled species (rank G1). It was first described in 1982 by Robert Kral and is currently known from only five sites in northeast Alabama and one site in northwest Georgia. The major threat to the species is loss of habitat resulting from canopy closure and competition from other plants. One of the five sites (Ellis) was extirpated in 2003-2004 by the installation of a gas pipeline followed by disking by the landowner. As the Alabama leather flower is often found in areas subject to utility right-of-way maintenance activities, there is a possibility that it may reappear at a later date at the site from the soil seedbank or rhizomes still present in the soil. Three of the sites appear to be stable. The remaining site in Alabama was recently discovered in 2002 and needs some restoration activities. The landowner was contacted this year and dialogue has been initiated to obtain permission to do some selective tree cutting on the site. Searches were conducted for new populations in seemingly favorable habitat, but none has yet been found.

Alabama leather flower (*Clematis socialis*)

Alabama leather flower (*Clematis socialis*)

Not much is known about the habitat requirements of Alabama leather flower (*Clematis socialis*). It is found in open areas subject to utility right of way maintenance activities as well as in relatively undisturbed woods. It has been observed to flower more in the open, but it seems to be just as abundant in shady locations as in sunny ones. It has also been observed that the major method of reproduction appears to be vegetative - by rhizomes. The plant is an early spring ephemeral, appearing and flowering in late April - early May before the canopy leaves have formed and begun to shade the forest floor. The seeds seem to have a low viability and germination rate.

The object of a second leather flower project was to learn more about the former land use on some of the sites in order to better understand the plant's life history and population dynamics. It would be helpful to know if the habitat has been wooded for a long time, or is in the process of re-forestation. This information, along with monitoring data, can shed light on optimum habitat requirements. This year, some historical aerial photos of the sites were studied, and the Gadsden Airport environmental analysis documents were researched for information on former land use. The Gadsden Airport site was found to have been included in Camp Sibert Military Installation property that was acquired by the City of Gadsden after WWII.

Canebrake pitcher plant (*Sarracenia rubra* spp. *alabamenis*)

Canebrake Pitcher Plant

The federally listed endangered Canebrake pitcher plant (*Sarracenia rubra* ssp. *alabamensis*) is endemic to three counties in central Alabama. Since it was first discovered in the 1950's no more than 20 populations have been documented, many of which have been adversely affected by fire suppression and the resultant re-growth of forest. The purpose of this project was to monitor six sites and perform restoration activities as needed on selected sites. Most of the populations have improved in vigor since ALNHP began monitoring and restoration activities. Restoration activities will be conducted soon for one of the recently discovered populations declining due to forest re-growth.

Coffeen Nature Preserve Management Plan

Several personnel with ALNHP assisted the Sierra Club and The Coffeen Land Trust in preparing a management plan for the Coffeen Nature Preserve at Four Mile Village in Walton County, Florida. Four Mile Village, including the Coffeen Nature Preserve, is a unique treasure, a combination of traditional single family Gulf beach homes buffered from the surrounding urban sprawl by the natural forested Preserve. But the combination of residential sites with a nature preserve also presents significant management problems. Of special concern are the contrasting needs of the Preserve for controlled burning and the needs of the property owners for fire protection. But these and other needs of the Preserve and property owners were incorporated into a management plan that can result in proper protection and maintenance of the natural biodiversity of the site, while also respecting the needs and rights of the property owners.

Green Pitcher Plant

The green pitcher plant (*Sarracenia oreophila*) is an herbaceous carnivorous plant that occurs in seepage bog habitats. It was listed as an endangered species under the Endangered Species Act of 1973 on September 21, 1979 (USFWS 1979). Extant sites of the plant occur in Alabama, Georgia, and North Carolina, with the majority of the sites (33 of the 35 extant sites) occurring in northeast Alabama. ALNHP began work on the project in 1993, and increased the scope of the project in October 1996. In 2004, 13 sites were monitored. Restoration activities,

green pitcher plant (*Sarracenia oreophila*)

consisting mainly of removing competing vegetation, were done at some of the sites. Most of the populations of green pitcher plants are stable or improving. ALNHP acted as a liaison between the USFWS and the Alabama Forestry Commission to plan prescribed burns at some of the sites. The burns are scheduled for November 2004. ALNHP also acted as a liaison between the USFWS and the landowners, and management plans were updated.

Harper's Umbrella Plant

Harper's umbrella plant (*Eriogonum longifolium* var. *harperi* - rank G4T2) is a member of the Buckwheat family that is often referred to as a biennial though it does not appear to fit the definition. Though not much is known about this plant, preliminary studies done at Redstone Arsenal in Alabama suggest that it may persist in the vegetative rosette stage for up to five years before producing seed. Harper's umbrella plant is currently known from 11 populations in four counties in northwest Alabama (Colbert, Franklin, Lawrence, and Madison - rank S1), and from five populations in three counties in Tennessee (Smith, De Kalb, and Putnam - rank S1). It has been reported from Kentucky though subsequent searches of the alleged site have failed to validate its occurrence and no voucher can be located. According to the Kentucky Natural Heritage Program the occurrence in Kentucky should be discounted until there is some better evidence for it.

Harper's umbrella plant (*Eriogonum longifolium* var. *harperi*)

One purpose of the present study was to obtain current information on the status of the plant throughout its range, as many of the sites had not been visited in a long time and some of the populations had not been located during previous visits. Another objective of this project was to begin demographic monitoring of four populations, three in Alabama and one in Tennessee, in order to learn more about the life history of the plant. All of the extant sites were visited and the Element Occurrence Records were updated. Permanent plots were established at four of the sites and the plants inventoried and each individual plant marked and mapped. These four sites will be visited again this fall to continue the demographic study.

Maxwell Air Force Base Tallowtree Elimination Demonstration Project

Two natural plant associations were identified at Maxwell Air Force Base (MAFB) in the Natural Community and Rare Plant and Animal Survey for Maxwell Air Force Base, Gunter Air force Base, and Maxwell-Gunter Lake Martin Recreation Area Final Report prepared by the Alabama Natural Heritage Program in September 2002. These were 13.5 ha (33.33 ac) of floodplain forest (*Platanus occidentalis -Fraxinus pennsylvanica - Celtis laevigata -* (*Liquidambar styraciflua*) Forest), and 0.7 ha (1.7 ac) of floodplain marsh (*Polygonum* (*hydropiperoides, punctatum*) - *Leersia* (*lenticularis, virginica*) Herbaceous Vegetation). These two communities are both

bottomland occurrences and are small and fragmented, and their floral composition has been greatly influenced by activities associated with the Air Force Base. Non-native invasive species (NNIS) had displaced native species in some of the areas.

One of the floodplain forest occurrences on MAFB served as a demonstration site for an invasive species control project. This 1.2-ha (3-ac) area once supported a diverse forest containing sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), bald cypress (*Taxodium distichum*), silver maple (*Acer saccharinum*), sweet gum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), willow oak (*Quercus phellos*), water oak (*Quercus nigra*) and many other trees. At the beginning of the project, Chinese tallowtree (*Sapium sebiferum*) comprised about 85% of the forest, dominating all strata, the overstory, understory, as well as the ground layer. The site had experienced various disturbances, including logging, and sewage pipe installation, which facilitated the tallowtree invasion.

Our mission was to demonstrate an effective method for controlling or eradicating tallowtree. The methods that we used were to mark the native trees to be left on site, cut out the Chinese tallowtrees (smaller ones were pulled up with Weed Wrenches), paint the cut stumps with herbicide, and then replant native tree species. This was an experimental approach as this had not been attempted in a wetland area before. The demonstration project served as a pilot project for invasive species control in the other natural areas of the base. The lessons learned here were used in formulating an Invasive Species Control Plan for the remaining natural areas on the Base.

Applying herbicide to tallowtree stump on MAFB.

Red-cockaded Woodpecker Safe Harbor Agreement

The red-cockaded woodpecker (Picoides borealis), or RCW, is an endangered, non-migratory bird found only in the southeastern United States. Its habitat is generally mature pine forest stands greater than 60 years old with an open, fire-maintained herbaceous ground cover. The rapid disappearance and retraction of mature, open pine woodlands from intensive timber harvest, agriculture, development, and sustained fire suppression over the past two centuries have resulted in a decline of the red-cockaded woodpecker to < 3% of its estimated abundance at the time of European settlement. Concern over this precipitous decline has led to many conservation activities aimed at recovering this species.

Unfortunately, since the enactment of the Endangered Species Act (ESA), many private landowners have felt that they should or must manage their lands in a manner to prevent endangered species from occupying their property so management for the estimated 23% of all active RCW groups which are located on private lands has proven problematic. The landowner's actions stem from fear of the legal responsibility and federally imposed restrictions on the type of management practices a landowner may pursue should an endangered species occupy a portion of their

red-cockaded woodpecker (*Picoides borealis*)

property. A concept termed Safe Harbor was introduced in 1995 in an attempt to overcome such management disincentives. A Safe Harbor Agreement (SHA) alleviates the landowners´ fears by establishing a baseline so that if they manage their property in a manner that is conducive to an endangered species, then they will not be responsible for any additional individuals that result from new colonization or population expansion beyond the baseline number that was set and determined by survey at the time that they enrolled their land in the program.

The RCW was the first species for which a SHA was drafted. The initial SHA was initiated in North Carolina, with subsequent SHAs approved and implemented in Georgia, South Carolina, Texas, and Virginia and drafted for Louisiana and Florida. In 2002, ALNHP entered into an agreement with the U.S. Fish and Wildlife Service (USFWS) to draft and finalize a SHA Plan for the RCW in Alabama. The intent of the RCW SHA is for the USFWS, the Alabama Dept. of Conservation and Natural Resources - Wildlife, Fish, and Freshwater Fisheries (ADCNR-WFF), and non-federal landowners to collaborate on implementation of conservation measures for RCWs. Through this Agreement, the Parties will seek to conserve and maintain the existing number of occupied RCW territories in Alabama and encourage the development of new RCW territories on the enrolled properties. A draft copy of the plan was completed with input from USFWS, SDCNR-WFF, and other interested parties. Additionally, ALNHP served as liaison between the permit holder (ADCNR-WFF) and prospective SHA participants communicating the plan to private and corporate landowners through activities such as public and private meetings and presentations to landowner and forestry groups.

Information Systems & Technology

Biological and Conservation Database

ALNHP maintains the Biological and Conservation Database (BCD), the most comprehensive database on the biodiversity of Alabama. BCD is supported by funding through our inventory and conservation planning projects. Although building the database has always been the primary goal of the program, securing funding to support increasing both the quantity and quality of this important program area remains a challenge. ALNHP is currently tracking 1,489 rare plants and animals (Table 1). There are 8,847 individual occurrences of these species, natural communities, and natural features documented in BCD, with the majority of the Element Occurrence Records (EOR) being for vascular plants or mussels (Fig. 1). In addition to the EORs, there currently are 464 Managed Area Basic Records and 457 Site Basic Records in BCD.

One of the important tasks each heritage program performs is the regular compilation of a Rare Species Inventory List for the state that ranks by priority each element tracked by the

Table 1. Number of Rare Elements Tracked by ALNHP.

Vertebrates	
Amphibians	25
Birds	61
Fish	153
Mammals	27
Reptiles	43
	309
Invertebrates	
Clams & Mussels	176
Snails	222
Arachnids	51
Diplopods	6
Insects	147
Crustaceans	59
	626
Plants	
Vascular Plants	499
Non Vascular Plants	20
	519
Total Elements	**1,489**

program based on the number and quality of occurrences. Updates to the Alabama Inventory List were completed June 2004, with the list published and distributed to cooperators and other interested parties and posted to the ALNHP website.

Data Requests

ALNHP responded to 12 paid data requests; 19 requests from academia, conservation non-profits, or cooperating partners; 4 internal Conservancy requests; and 4 requests from NatureServe or other Heritage Network members. Although the data for the paid data requests often are used for environmental reviews, we also received 13 requests that specifically requested an environmental review. The number of requests were similar to the past several years, with the exception being an increase in the requests for an environmental review.

Geographic Information Systems

Because the information stored in our database includes a spatial component, Geographic Information Systems (GIS) provide a powerful tool for analyzing and communicating our data. The GIS functions of data management, spatial analysis, and map production parallel and support the three broad functions of TNC and the Natural Heritage Network: information gathering, scientific analysis, and communication. EORs are periodically exported from BCD to maintain a current GIS layer representing the locations of rare, ″Endangered″, and ″Threatened″ species and natural communities.

ALNHP has continued working to build the program′s GIS capacity by acquiring software and data layers. This past year we obtained a license for ArcGIS 8.3 and additional licenses for ArcView 3.3 to load on the science staff computers through TNC′s master license agreement with ESRI. We also downloaded several additional third-party extensions for ArcView 3.3 and ArcGIS that extend the capabilities of these products. The major activity with regard to ArcGIS extensions was obtaining an evaluation version of Visual Learning Systems′ (VLS) Feature Analyst for ArcGIS as part of TNC's 6-month trial evaluation to test the usefulness of this program. This Extension adds powerful feature extraction capabilities to the software, using machine learning technology, which allows the classification of object-specific geographic features specified by the user. We are using the software to extract pond locations that potentially could support Mississippi gopher frog populations from Landsat Thematic Mapper

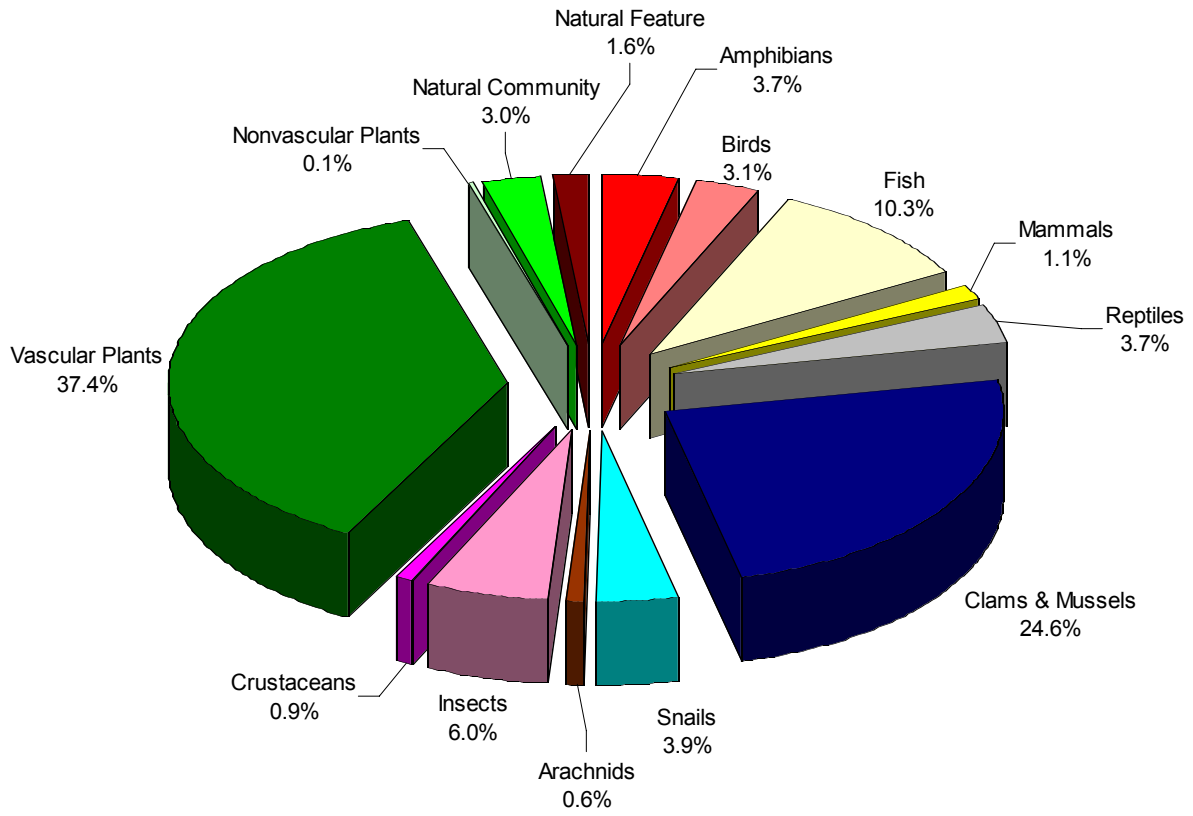


Figure 1. Percentage of total Element Occurrence Records in BCD by major taxonomic group.

(TM) and Enhanced TM Panchromatic data of Mobile and Baldwin Counties. Results from Landsat data will be compared to results from aerial photographs from Mobile County.

The largest proportion of GIS work conducted was map production to support work conducted for our partners and clients. Almost all inventory work included the production of maps depicting survey results to be included in the final report, and several of the data requests we received included map production.

One of the more promising activities regarding digital data for Alabama is our involvement as a partner in AlabamaView. In January 2004 Alabama became a member of AmericaView, a consortium promoting research, education, and outreach of remote sensing throughout the nation. The newly formed AlabamaView consortium provides a linkage among partners throughout the state involved in remote sensing activities. The goal of the AlabamaView program is to advance the availability, timely distribution, and widespread use of remote sensing data and technology through education, research, outreach and sustainable technology transfer to the public and private sectors for the benefit of the citizens of Alabama. The initial major project undertaken by the consortium is the development of a Virtual Data Portal where each Partner will share geospatial information. Datasets are currently being catalogued and a virtual data distribution system is being developed. For more information regarding Alabama and the datasets currently available through the data portal, see their webpage (www.Alabamaview.org).

Middle Coosa River, Upper Coosa River, Eightmile Creek, and Cotaco Creek Watersheds Nonpoint Source Prioritization Project

Work continued on the Middle Coosa River, Upper Coosa River, Eightmile Creek, and Cotaco Creek Watersheds Nonpoint Source Prioritization Project for the Alabama Department of Environmental Management (ADEM). This project involved the identification of "Threatened" and "Endangered" species and other sensitive areas within the watershed, and an evaluation of the threats to maintaining these species and biodiversity within these watersheds. The final report for the Middle and Upper Coosa River watersheds was completed and submitted to ADEM. In addition to analyzing EOR locations to identify those in proximity to potential hazards, large format maps were produced depicting the important ecological information resulting from the analyses. Work is continuing on the Cotaco and Eightmile Creek watersheds and will be completed in the next fiscal year.

Black Bear Sighting Database

Maintaining accounts and reports of black bears in a central databank is crucial for documenting the occurrence, examining the movement, and illustrating the distribution pattern of the species in Alabama. Additionally, the establishment of a central repository of bear sightings will help to ensure that important records and accounts are not lost over time.

During a November 2003 meeting of the Alabama Wildlife Federation (AWF) and the Alabama Black Bear Alliance (ABBA) (a consortium of state and federal agencies, conservation organizations, academia, private landowners, and forest industry that is committed to the conservation of black bears), it was recognized that a central repository or database was needed in order to track all black bear sightings. ALNHP agreed to create and maintain a database of black bear sightings in addition to establishing reporting protocol. Since that meeting, a black bear report form was developed, and an Access geodatabase was created for archiving bear sightings in a GIS-compatible database that facilitates the easy creation of bear sighting distribution maps. A map of the initial sightings entered in the database was produced and provided to AWF.

Information Technology

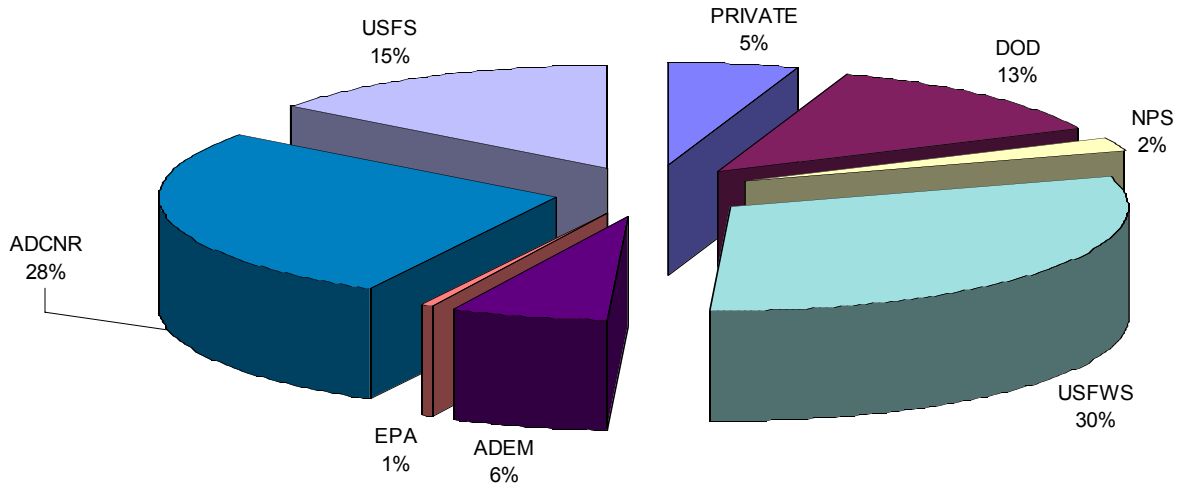
All PCs have continued to be fine tuned in-house to suit our needs, with both hardware and software upgrades implemented on all computers. The upgrades included upgrading most of the software products used on a regular basis to the current version, replacement of mice with optical mice, and upgrading USB ports to USB 2.0. In addition, USB flash memory storage devices (thumb drives) were purchased for all personnel. The major technical purchases this fiscal year were a new computer (Dell Optiplex GX270) for GIS use, Xerox Phaser 8400 color laser printer, and an InFocus XA DLP Projector for use in making presentations.

Operations

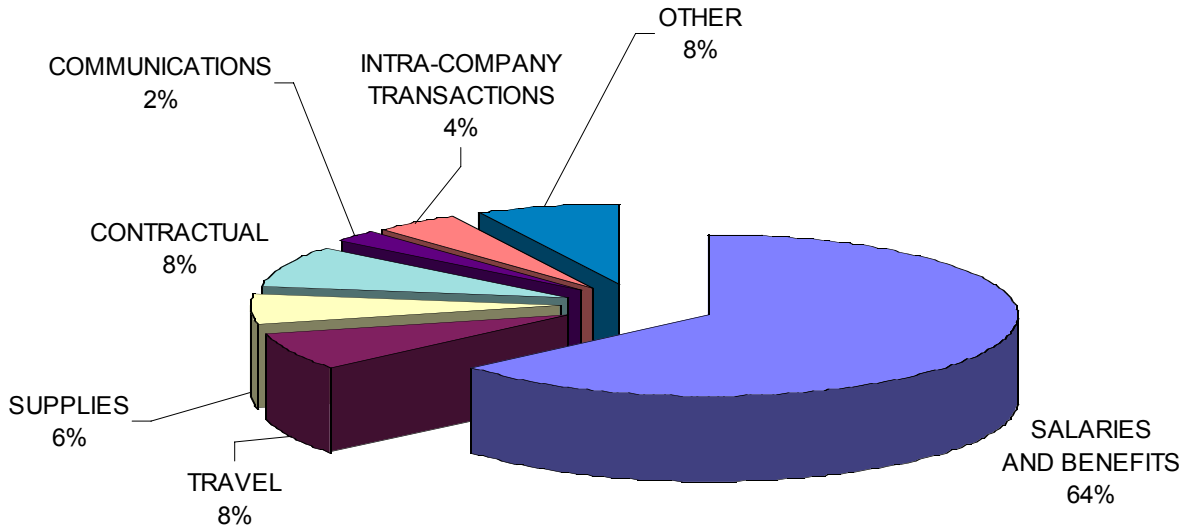
$ Finance and Grants Management

Virtually all of the work done by ALNHP is funded by contracts, primarily through state and federal agencies. During Fiscal Year 2004, almost three-fourths of our support came from the Alabama Department of Conservation and Natural Resources - Division of Wildlife and Freshwater Fisheries (28%), U.S. Fish and Wildlife Serivce (30%), and U.S. Forest Service (15%). Other support was provided by the U.S. Department of Defense (13%), Alabama Department of Environmental Management (6%), U.S.

SOURCES OF REVENUE
FY 2004



EXPENSES
FY 2004



National Park Service (2%), and U.S. Environmental Protection Agency (1%), as well as miscellaneous private sources (5%). In addition, Huntingdon College provides office space and utilities at no cost to the program. Most of the funding is spent on staff salaries (64%), with additional expenses for travel, supplies, and communications mostly related to contract projects. A critical need of the program, and a significant goal for the future, is to obtain more discretionary funding to allow more direct building of the natural heritage database, and addressing more specific data gaps in the state.

Personnel Changes

- Jan Garrett, the new Applied Conservation Ecologist, hired February 2003, completed her first year with ALNHP and TNC.
- Bonnie Jones, the new Administrative Coordinator, hired 16 November 2002 as a part-time employee, completed her first year with ALNHP and TNC as a fulltime employee.
- Barry Hart, our Terrestrial Zoologist, left the program September 3, 2004, after 5+ years with ALNHP, for a position with the Tennessee Valley Authority.

Current ALNHP Employees and Job Descriptions

Program Director

Hastings, Robert W. - Ph.D., Florida State University (1972) - Marine Biology

The Director is responsible for the overall direction and management of ALNHP, including program development and planning, fundraising, financial administration, and all personnel matters. The Director is the principal contact with other offices of TNC, government agencies, other conservation organizations, and foundations. Administrative Coordinator

Jones, Bonnie D. - BS, Auburn University (1976) - Education

The Administrative Coordinator is responsible for assisting the Program Director in all administrative and financial matters and for administrative assistance of government and privately funded grants and contracts. The Administrative Coordinator is also responsible for tracking program expenses, completing purchase orders and check requests, and filing Travel Expense Reports. In addition to financial responsibilities, this position oversees daily office operations and facilitates internal office communication.

Applied Conservation Ecologist

Garrett, Carol Janeen - Ph.D., University of Georgia (1997) - Ecology

The Applied Conservation Ecologist is responsible for implementing adaptive management techniques to promote sound land management practices through public-private partnerships. Adaptive management techniques include biological monitoring, ecological burning, land management planning, restoration and enhancement.

Aquatic Zoologist

Godwin, James C. - MS, Auburn University (1985) - Zoology

The Aquatic Zoologist is responsible for the development and oversight of the aquatic component of the program's database on the biological diversity of Alabama. The Aquatic Zoologist contributes to the management and maintenance of the database on Alabama's "Endangered", "Threatened", and rare species and communities, as well as analyzing and disseminating that information to agencies, organizations, and individuals responsible for protecting and managing those species and their habitats.

Community Ecologist/Botanist
Schotz, Alfred R. - MS, Buffalo State College, NY (1993) - Plant Ecology
The Botanist/Community Ecologist is responsible for the development and oversight of the botanical and natural community component of the program´s database on the biological diversity of Alabama. The Botanist/Community Ecologist contributes to the management and maintenance of the database on Alabama´s ″Endangered″, ″Threatened″, and rare species and communities, as well as analyzing and disseminating that information to agencies, organizations, and individuals responsible for protecting and managing those species and their habitats.

Grants Specialist (shared position with other TNC offices)
Stinson, Becky M. - BS, Auburn University-Montgomery (1977) - Business Administration
The Grants Specialist is responsible for the administrative management of all aspects of government funded projects, including review of proposals and preparation of budgets, preparation of all invoices and financial reports, and maintenance of master agreement files. Also works with project managers to ensure that the terms and conditions of agreements are met and properly documented, and directly with agency contracting officers to clarify or negotiate financial and administrative requirements.

Science Information Program Manager/GIS Specialist
Barbour, Michael S. - MS, University of New Hampshire (1993) - Wildlife Ecology
The Science Information Program Manager is responsible for the maintenance of the ALNHP Biological and Conservation Database (BCD), and is the point for the flow of information between ALNHP staff and outside users. This position is also responsible for Geographic Information Systems component of the program and for graphic layout and design of program publications. Primary focus is to graphically represent ALNHP data and to create all map products for the program. Responsibilities include the creation and maintenance of a geospatial database including the creation of new data, quality control of spatial information, and collection and maintenance of spatial data for the state, assisting in the development of ecoregional plans and site conservation plans, and integrating GIS into ALNHP projects.

Terrestrial Zoologist/Ecologist
vacant
The Zoologist/Ecologist is responsible for the development and oversight of the terrestrial zoology and natural community component of the program´s database on the biological diversity of Alabama. The Zoologist/Ecologist contributes to the management and maintenance of the database on Alabama´s ″Endangered″, ″Threatened″, and rare species and communities, as well as analyzing and disseminating that information to agencies, organizations, and individuals responsible for protecting and managing those species and their habitats.

Communications

5 Major Meetings Attended or Presentations Made

Al Schotz

November 15, 2003 - Presentation on the ″Natural Heritage Network″ for Auburn University, Bob Boyd´s Special Projects class, at ALNHP office. (Montgomery, Alabama)

November 17-19, 2003 - Participated in NatureServe Southeast Regional Heritage Conference (Callaway Gardens, Georgia)

December 9-11, 2004 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama)
January 16, 2004 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama)
March 16-18, 2004 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama)
April 29, 2004 - Presentation on Plant Ecology at AUEI-sponsored environmental education day at Black Freedmen's Farm. (Furman, Alabama)
May 2004 - Presentation highlighting ALNHP and the state's biodiversity to the Northeast Alabama Native Plant Society. (Gorham Bluff, Alabama)
June 2004 - Presentation on the plant life of Alabama to the Alex City Garden Club/Historical Society. (Alex City, Alabama)

Barry Hart

July 7, 2003 - Coordinated meeting to discuss the first draft of the Red-Cockaded Woodpecker Safe Harbor Plan. (Alabama Wildlife Federation Conference Center, Millbrook, Alabama)
November 17-19, 2003 - Participated in NatureServe Southeast Regional Heritage Conference. (Callaway Gardens, Georgia)
December 17, 2003 - Coordinated Red-cockaded Woodpecker Safe Harbor Plan Steering Committee meeting. (Montgomery, Alabama)
December 9-11, 2004 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama)
January 2004 - Discussed Safe Harbor and the Statewide Plan at the Alabama Forestry Planning Committee Winter Business Meeting. (Auburn, Alabama)
February 2004 - Discussed Safe Harbor and the Statewide Plan on a live webcast of the Alabama Forest Owners Association Capital Ideas Program.
February 28, 2004 - Presented "Endangered Species Management on Private Land" at the Alabama Forestry Association Mid-winter Meeting. (Point Clear, Alabama)
April 21, 2004 - Presentation on ALNHP and its connection and membership to the Heritage Network and NatureServe to consulting foresters. (Solon Dixon Forestry Center, Auburn University, Alabama)
April 21, 2004 - Presented RCW Safe Harbor concept and statewide plan for Alabama to consulting foresters. (Solon Dixon Forestry Center, Auburn University, Alabama)
April 2004 - Led field trip for Prattville Elementary School. (Jones Bluff, Alabama)

Jan Garrett

October 2003 - Attended Tukabatchee Council meeting. (Montgomery, Alabama)
October 2003 - Attended TNC Pre-season Fire meeting. (Roosevelt State Park, Pine Mountain, Georgia)
October 2003 - Passed the pack test to qualify as a prescribed burn team member.
October 2003 - presentation on Alabama's biodiversity and ALNHP for 2 Samford University classes. (Birmingham, Alabama)
November 17-19, 2003 - Participated in NatureServe Southeast Regional Heritage Conference. (Callaway Gardens, Georgia)

Jim Godwin

July 2003 - Attended southern Cumberland Plateau forestry meeting
November 17-19, 2003 - Participated in NatureServe Southeast Regional Heritage Conference. (Callaway Gardens, Georgia)
February 2004 - Attended 10-year plan for mussel and snail conservation in the Mobile River Basin meeting. (Scottsboro, Alabama)
February 2004 - Presented "Paint Rock River Mussel Monitoring" at the Alabama Fisheries Association Annual Meeting. (Gulf Shores, Alabama)
February 2004 - Attended Southeast Partners for Reptile and Amphibian Conservation meeting. (Ridgeland, South Carolina)
March 16-18, 2004 - Participated in TNC's Coastal Alabama Planning Workshop (Mobile, Alabama)
April 2004 - Participated in TNC's Coastal Alabama Planning Workshop. (Mobile, Alabama)
April 2004 - Attended Annual Alabama Mollusk Meeting (Auburn, Alabama)
April 2004 - Attended TNC Red Hills conservation meeting (Mobile, Alabama)
May 2004 - Attended Cahaba River National Wildlife Refuge ceremony. (West Blockton, Alabama)

Michael Barbour

August 12 & 13, 2003 - Participated in Logan Martin & Neely Henry Citizen Action Committee meetings (Middle Coosa River watershed management plan). (Gadsden & Pell City, Alabama)
September 25-29,2003 - Attended Organization of Fish & Wildlife Information Managers Annual Meeting; topic - GIS and Information Management for Conservation Planning. (Rapid City, South Dakota)

November 13, 2003 - Participated in Middle Coosa River watershed management plan Citizen Action Committee meeting. (Gadsden, Alabama)
November 15, 2003 - Presentation on ″GIS use by ALNHP″ for Auburn University, Bob Boyd´s Special Projects class, at ALNHP office. (Montgomery, Alabama)
November 16, 2003 - Attended NatureServe and National Biological Information Infrastructure Metadata Training Workshop. (Callaway Gardens, Georgia)
November 17-19, 2003 - Participated in NatureServe Southeast Regional Heritage Conference. (Callaway Gardens, Georgia)
November 19, 2003 - Presentation of ″Mapping Alabama´s Rare Species & Natural Communities″ and poster presentation of ″Alabama Natural Heritage ProgramSM: Inventorying and Mapping Alabama´s Biodiversity″ at Auburn GIS Day Symposium. (Auburn University)
November 15, 2003 - Presentation on ″GIS use by ALNHP″ for Auburn University, Bob Boyd´s Special Projects class, at ALNHP office. (Montgomery, Alabama)
February 4-6, 2004 - Attended the South East Regional User Group Conference (GIS). (Savannah, Georgia)
February 10-11, 2004 - Attended WaterQuest 2004 and Nonpoint Source Watershed Forum 2004. (Birmingham, Alabama)
February 13, 2004 - Participated in initial meeting of the AlabamaView Consortium. (Auburn University)
April 14-15, 2004 - Attended Alabama Chapter of the Wildlife Society Annual Meeting, Lakepoint Resort State Park. (Eufaula, Alabama)
May 11, 2004 - Participated in Middle Coosa River watershed management plan Citizen Action Committee meeting. (Gadsden, Alabama)
May 12, 2004 - Participated in Montgomery Groundwater Festival. (Montgomery, Alabama)
May 19-20, 2004 - Presented ″Use of GIS by the Alabama Natural Heritage ProgramSM″ at the First Geographic Information System Symposium at Troy State University. (Troy State Univeristy)
May 28-29, 2004 - Participated in AlabamaView workshop (Callaway Gardens, Georgia)
June 3,2004 - Attended 4th Annual Alabama Groundwater Conference. (Montgomery, Alabama)
June 17, 2004 - Attended ESRI ArcGIS 9 Rollout Seminar. (Birmingham, Alabama)

Robert Hastings

July 9, 2003 - Presented seminar at Auburn University-Montgomery Conservation Biology class on ALNHP and Alabama´s Aquatic Biodiversity.
September 4-5, 2003 - Attended Auburn University Environmental Institute-sponsored Alabama Water Resources Research Conference. (Orange Beach, Alabama)
October 10-12, 2003 - Attended Gulf Restoration Network Board meeting (New Orleans, Louisiana)
October 15, 2003 - Presented talks on Alabama reptiles at AUEI-sponsored environmental education day at Black Freedmen´s Farm. (Furman, Alabama)
October 17, 2003 - Presented talks on Alabama reptiles at AUEI-sponsored environmental education day at Black Freedmen´s Farm. (Furman, Alabama)
November 6, 2003 - Attended Alabama Wildlife Federation and Alabama Black Bear Alliance meeting on black bears in Alabama. (Lanark, Alabama)
November 11, 2003 - Made presentation on the work of ALNHP at Sierrra Club Montgomery Group meeting. (Montgomery, Alabama)
November 17-19, 2003 - Participated in NatureServe Southeast Regional Heritage Conference, chaired one session. (Callaway Gardens, Georgia)
December 4, 2003 - Attended Alabama Wildlife Federation editorial board meeting.
December 9-11, 2003 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama).
December 17, 2003 - Participated in meeting of Red-cockaded Woodpecker safe harbor steering committee. (Montgomery, Alabama)
January 24, 2004 - Made presentation on outdoor classroom design for Alabama Wildlife Federation teacher workshop. (Alabama 4-H Center, Columbiana, Alabama)
January 26, 2004 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama)
March 16-18, 2004 - Participated in TNC Coastal Alabama Planning Workshop. (Mobile, Alabama)
March 19-21, 2004 - Attended Gulf Restoration Network Board meeting. (New Orleans, Louisiana)
April 20, 2004 - Presented talks on Alabama reptiles at AUEI-sponsored environmental education day at Black Freedmen´s Farm. (Furman, Alabama).
April 27, 2004 - Presented talks on Alabama reptiles at AUEI-sponsored environmental education day at Black Freedmen´s Farm. (Furman, Alabama)

May 6, 2004 - Made presentation on Alabama snakes at Prattville High School. (Prattville, Alabama)
May 10, 2004 - Made presentation on Alabama snakes at Prattville High School. (Prattville, Alabama)
May 15, 2004 - Led hikes to TNC Roberta Case Pine Hills Preserve and Bibb County Glades for Sierra Club group.
May 19-21, 2004 - Attended Lake Pontchartrain research conference. (New Orleans, Louisiana)
June 21, 2004 - Attended Auburn River of Words Workshop. (Camden, Alabama)

5 Publications

Peer-Reviewed and Published Articles:

Alabama Natural Heritage Program. 2004. Alabama Inventory List: The rare, threatened, & endangered plants & animals of Alabama. Privately printed by the Alabama Natural Heritage Program℠, Montgomery, Alabama. 56 pages.

Barbour, Michael S. 2004. Identifying rare species in the Middle Coosa River watershed. ADEM Noinpoint Source Program Newsletter, 2004 Spring/Summer Edition, Page 3.

Barbour, Michael S. 2004. Use of GIS by the Alabama Natural Heritage Program℠. Proceedings of the First Annual Geographic Information System Symposium at Troy State University. Online publication available at < http://spectrum.troyst.edu/~kroblee/First Annual GIS Symposium/ > .

Garrett, Jan. 2004. Alabama: Home Sweet Home to Many Species (and too many exotics!). Alabama Wildlife 68(2):28-30 (Spring, 2004).

Godwin, James C. 2004. Tennessee Cave Salamander, *Gyrinophilus palleucus*. Pages 33-34 in R. E. Mirarchi, M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama Wildlife. Volume 3. Imperiled amphibians, reptiles, birds, and mammals. The University of Alabama Press, Tuscaloosa.

Godwin, James C. 2004. Barbour's Map Turtle, *Graptemys barbouri*. Pages 77-78 in R. E. Mirarchi, M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama Wildlife. Volume 3. Imperiled amphibians, reptiles, birds, and mammals. The University of Alabama Press, Tuscaloosa.

Godwin, James C. 2004. Eastern Indigo Snake, *Drymarchon couperi*. Pages 77-78 in R. E. Mirarchi, M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama Wildlife. Volume 3. Imperiled amphibians, reptiles, birds, and mammals. The University of Alabama Press, Tuscaloosa.

Godwin, James C. 2004. Northern Pine Snake, *Pituophis melanoleucus melanoleucus*. Pages 68-69 in R. E. Mirarchi, M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama Wildlife. Volume 3. Imperiled amphibians, reptiles, birds, and mammals. The University of Alabama Press, Tuscaloosa.

Godwin, James C. 2004. Razor-backed Musk Turtle, *Sternotherus carinatus*. Pages 79-80 in R. E. Mirarchi, M. A. Bailey, T. M. Haggerty, and T. L. Best, editors. Alabama Wildlife. Volume 3. Imperiled amphibians, reptiles, birds, and mammals. The University of Alabama Press, Tuscaloosa.

Godwin, James C. 2004. Tennessee Cave Salamander, *Gyrinophilus palleucus*. P. 153 in R. E. Mirarchi, M. A. Bailey, J. T. Garner, T. M. Haggerty, T. L. Best, M. F. Mettee, and P. E. O'Neil, editors. Alabama Wildlife. Volume 4. Conservation and management recommendations for imperiled wildlife. The University of Alabama Press, Tuscaloosa.

Godwin, James C. 2004. Barbour's Map Turtle, Graptemys barbouri. P. 171 in R. E. Mirarchi, M. A. Bailey, J. T. Garner, T. M. Haggerty, T. L. Best, M. F. Mettee, and P. E. O'Neil, editors. Alabama Wildlife. Volume 4. Conservation and management recommendations for imperiled wildlife. The University of Alabama Press, Tuscaloosa.

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