

Alabama Natural Heritage ProgramSM

Annual Report



Fiscal Year 2003



Staff Directory & Resources

2003 Staff Directory

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Affiliated Websites:
NatureServe's biodiversity site:
<http://www.natureserve.org>

TNC's homepage:
<http://www.nature.org>



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A Note from the Director

I joined the Alabama Natural Heritage Program as Director in January, 2002, after a long career in academia as a scientist and environmental educator. The transition has been easy and satisfying. I have found the Program to be staffed by competent and dedicated scientists, who are committed to preserving biodiversity in Alabama and the Southeast. Alabama is well-known for its incredible biodiversity, the diversity of its natural landscapes and ecological regions, and its natural beauty. From the mountains of the northeast to the pure white sands and clear waters of the Gulf coast, Alabama offers diverse natural areas for a variety of outdoor activities and recreational opportunities. The state of Alabama leads the nation in the number of species of freshwater fish, turtles, mussels, snails, crayfish, and caddisflies. Other groups are also quite diverse. Recent studies of biodiversity patterns in the United States have ranked Alabama fifth among the states in total biodiversity, behind California, Texas, Arizona, and New Mexico, all of which are significantly larger. But Alabama also ranks high in the number of species that have become extinct (second only to Hawaii), or are at risk of extinction (fourth behind Hawaii, California, and Nevada). All Alabamians should be proud of our natural areas, but also must be committed to protecting them. The Alabama Natural Heritage Program has been a leader in that effort. By maintaining and building the state's most comprehensive database of species distribution and abundance, the Program has provided state and federal agencies, corporations, environmental groups, and the public with the information needed to preserve and protect Alabama's natural areas and biodiversity. Alabama can depend upon that leadership in the future.

Robert W. Hastings
Director
Alabama Natural Heritage Program SM

Introduction

The mission of the Alabama Natural Heritage Program SM (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.

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.

The last annual report published by ALNHP was the Fiscal Year 2000 Annual Report. Therefore, in addition to reporting accomplishments from fiscal year 2003, this report includes some information for fiscal years 2001 and 2002.

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.

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.

Inventory

Botany & Community Ecology

Several projects were conducted within the past year, primarily for the United States Fish and Wildlife Service (USFWS). Currently five status surveys on plants classified as “Special Concern” by the USFWS are being conducted, two of which were completed and submitted in September 2003. In addition to the several projects for the USFWS, two projects on behalf of the U. S. Forest Service are currently being implemented. A report outlining management recommendations on selected parcels within Talladega National Forest was completed and submitted to the Forest Service in January 2003.

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.



Bankhead National Forest Glade Survey

An inventory for glades in Bankhead National Forest began in April 2003. Seven limestone and sandstone glades have been identified, many of which contain rare plants currently tracked by ALNHP. This project will encompass two more seasons, with a final completion date of December 2005.

Choctaw National Wildlife Refuge Natural Community and Rare Plant Survey

Natural communities have been described and mapped for Choctaw National Wildlife Refuge. A detailed narrative describing the refuge’s plant associations and rare plants, along with a GIS data layer for final map products, will be completed by July 2003.

Cream-flowered Tick-trefoil Status Survey

A status survey for the U. S. Fish and Wildlife Service is currently being conducted on the cream-flowered tick-trefoil (*Desmodium ochroleucum*) in Alabama, Florida, and Mississippi. This globally imperiled species is currently known from only 11 occurrences worldwide, six of which are in Alabama.

Flyr’s Brickell-bush Status Survey

A status survey for the U. S. Fish and Wildlife Service 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 six counties in Alabama and eight counties in Florida and Georgia. This survey has so far resulted in the confirmation of six sites for *Brickellia cordifolia* in the state, only one of which is in good condition.

Many-flowered Grass Pink Status Survey

A range-wide status survey for the U.S. Fish and Wildlife Service is being conducted on the many-flowered grass pink (*Calopogon multiflorus*). It is currently known from approximately 22 sites, most of which are in the state of Florida. This plant is dependent upon a fire-maintained habitat and is threatened by fire suppression. The final report will be completed and submitted by March 2004.

Morefield's Leather-flower Status Survey



The U. S. Fish and Wildlife Service contracted with ALNHP to conduct additional surveys in northeast Alabama and nearby Tennessee for Morefield's leather-flower (*Clematis morefieldii*), represented by no more than 10 populations. Four new occurrences have been discovered since the beginning of the project, including a new record for Jackson County. A regional biologist from southeastern Tennessee recently found the species in that state.

Wild Coco Status Survey

A status survey on the wild coco orchid (*Pteroglossaspis ecristata*) was completed and submitted to the U. S. Fish and Wildlife Service in June 2003. The project included a portion of the species' range (Alabama, Florida, Louisiana, and Mississippi) where baseline surveys were conducted to assess rarity, current distribution, and threats. Sixty occurrences have been documented from the project area, 50 of which are in Florida.



Significant Botanical Discoveries

- ◆ Price's potato bean (*Apios priceana*), a federal threatened species, was documented at five new sites, primarily from Jackson and Madison counties
- ◆ Morefield's leather flower (*Clematis morefieldii*), a federal endangered species, had four new occurrences documented, including a new record for Jackson County.



Price's potato bean

- ◆ American beakgrain (*Diarrhena americana*), previously known from only two occurrences in the state, was discovered at two additional sites during surveys conducted in Jackson and Madison counties.
- ◆ Creeping morning-glory (*Evolvulus sericeus*), was documented in Dallas County, the first record of this species in Alabama.
- ◆ Finger dragon-head (*Physostegia digitalis*), a member of the mint family, was documented in Choctaw County in 2002, the first record of this species in Alabama.
- ◆ Crestless eulophia (*Pteroglossaspis ecristata*), a globally imperiled species previously considered extirpated from the state, was discovered in a state conservation area in Baldwin County during September 2002.
- ◆ Small-flowered meadowbeauty (*Rhexia parviflora*), a globally imperiled species previously recorded from only one site in Alabama was documented at a second site in Escambia County July 2002.

Terrestrial & Aquatic Zoology

Alabama Redbelly Turtle Nest Predation On Gravine Island

The federal endangered Alabama redbelly turtle (*Pseudemys alabamensis*) occurs only in the lower Mobile Bay drainage, and nearby Mississippi. One well known nesting site for this and other turtles is Gravine Island in the Tensaw River. A nest predation study was conducted at this site in 2002. Crows, raccoons, and armadillos were major predators on turtle nests on this island, and destroyed at least 70% of nests laid.

Appalachian Cottontail Survey

During the winter and spring of 2001, surveys were conducted for the Appalachian cottontail (*Sylvilagus obscurus*) in the mountainous and hilly terrain of the Shoal Creek and Talladega Ranger Districts of the Talladega National Forest and the Bankhead National Forest. Prior to this survey, only five individuals of this species had ever been confirmed within Alabama from specimens collected by naturalists and mammalogists. A population of Appalachian cottontails was successfully located in the Bankhead National Forest. However, much remains unknown concerning the cottontail's distribution and demography in Alabama.

Flatwoods Salamander Survey

Surveys for flatwoods salamanders (*Ambystoma cingulatum*) were conducted across south Alabama in 2001 to 2003. Drought conditions prevailed during this time period, except for the later part of 2002 and early 2003, but these rains were too sporadic and insufficient to fill the ponds which support larvae. Flatwoods salamanders have not been seen in Alabama in over 20 years, and none were found during this survey.

Mitchell's Satyr Survey

On 23 June 2000, Dr. Jeffrey Glassberg, author of several butterfly field guides and President of the North American Butterfly Association made an astounding discovery of a rare butterfly, the Mitchell's satyr (*Neonympha mitchellii* ssp.), in the Oakmulgee Ranger District, Talladega National Forest. Following Glassberg's discovery, intensive inventories and habitat surveys for garnering additional information on this satyr ensued. Surveys for locating and studying local colonies of the Mitchell's satyr were conducted during 2002 and 2003 in the Oakmulgee Ranger District, Talladega National Forest of central Alabama. Several colonies have since been discovered, and efforts are currently underway to genetically examine the relationship of Alabama's population to other populations of the Mitchell's satyr species complex. Currently, there are two critically "Endangered" subspecies of this complex, the nominate Mitchell's satyr (*Neonympha mitchellii mitchellii*) from Michigan and Indiana and the St. Francis satyr (*Neonympha mitchellii francisci*) from North Carolina.



Monitoring Freshwater Mussels in the Paint Rock River

Monitoring of freshwater mussels in the Paint Rock River began in 2002, and has continued in 2003. Over 300 individuals of 22 species have been collected, measured, and marked in Estill Fork, Hurricane Creek, and the upper Paint Rock River, establishing baseline data for detecting future trends in the mussel fauna.

Rare Turtle Surveys



Barbour's map turtle

Surveys to assess the status of Barbour's map turtle (*Graptemys barbouri*) and the Alabama map turtle (*Graptemys pulchra*) were completed in 2002 and 2003. For the Barbour's map turtle surveys were focused in the Choctawhatchee River system in southeastern Alabama. Barbour's map turtles were documented in the Choctawhatchee River above Geneva, downstream to the state line, and also in the Pea River.

Alabama map turtle surveys have been conducted in the Tallapoosa, Coosa, Alabama, Cahaba, Black Warrior, Tombigbee, and Tensaw rivers. Throughout its distribution this species has been one of the more abundant turtles observed.

Red Hills Salamander Survey

On a positive salamander note, data collection has proceeded very well on Red Hills salamanders (*Phaeognathus hubrichti*). Data has been gathered using line transects to estimate burrow densities on sites throughout the range of this endemic and fossorial species. At this time ALNHP has collected the most complete body of quantitative data on densities of this species.



Snake Surveys



black pine snake

Surveys were conducted across the Lower Coastal Plain of South Alabama for the eastern indigo snake (*Drymarchon couperi*), black pine snake (*Pituophis melanoleucus lodingi*), and southern hognose snake (*Heterodon simus*) during the 2002 and 2003 field seasons. Despite repeated surveys in areas that historically supported the “Threatened” eastern indigo

snake and the southern hognose snake, no confirmed or documented captures of these two extremely rare snakes have been made. However, anecdotal information on indigo snake sightings is occasionally received, but no recent information on southern hognose snake sightings has been obtained. The status of the black pine snake is a little more promising. Several documented observations and captures of black pine snakes over the past few years by herpetologists and volunteers have been received, including the capture of a 5-foot individual by ALNHP staff this spring in western Mobile County.



Significant Zoological Discoveries

- ◆ During field work in Estill Fork in 2003, a live female Alabama lampmussel (*Lampsilis virescens*) was discovered. This represents the first observation of a live individual of this species since 1998, when two individuals, both males, were seen. Alabama lampmussels are now found only in the upper tributaries of the Paint Rock River.
- ◆ Along with the Alabama lampmussel, the pale lilliput (*Toxolasma cylindrellus*) is the second freshwater mussel species that now survives only in the upper tributaries of the Paint Rock River. In early summer 2003, a gravid female pale lilliput was collected and transported to the Tennessee Aquarium Research Institute at Cohutta Springs, Georgia for captive propagation. Glochidia were harvested from the female and appropriate fish hosts were infected.

- ◆ During the 2002 Barbour's map turtle survey in the Choctawhatchee River system, a second species of broad-headed map turtle was discovered. The Escambia map turtle (*Graptemys ernsti*) was collected from the Pea River, the major western tributary of the Choctawhatchee River system. This represents a significant range extension for this species, which was previously considered to be endemic to the Conecuh-Escambia river system.
- ◆ An important discovery was made on 29 June 2001 along the cobble and gravel shoreline of the Cahaba River where the cobblestone tiger beetle (*Cicindela marginipennis*) was observed and documented. The species had never been reported from the Cahaba, plus this find is only the third reported occurrence for the entire southeastern United States. The other two known localities include a series of four small islands below Jordan Dam on the Coosa River and an extirpated occurrence on the Tombigbee River near Columbus, Mississippi. Currently, the Coosa and the newly discovered Cahaba River occurrences represent the only known extant populations for the species in Alabama and, more broadly, for the southeastern region. Concern over the disappearance of populations caused by damming and dredging activities, coupled with highly localized occurrences, led to the species' listing as a Category C2 Candidate for the List of Endangered and Threatened Wildlife in 1989. Currently, the species has no federal recognition under the Endangered Species Act and has been removed as a candidate for protection. The cobblestone tiger beetle has a global rank of G2G3, and by this definition, the species is considered imperiled and very rare throughout its range.



Applied Conservation

Biological Monitoring Projects

Alabama Canebrake Pitcher Plant

The Alabama canebrake pitcher plant (*Sarracenia rubra* spp. *alabamensis*) is a federally listed threatened plant that is endemic to Alabama. Ten sites were monitored and management recommendations were made for each site. Vegetation management was done at some sites to maintain the open, sunny conditions needed by the plant.

Alabama Leather-flower Monitoring

The federal endangered Alabama leather-flower (*Clematis socialis*) occurs only in 8 sites: 2 in GA and the other 6 in AL. Most of these sites are on private land. The Alabama populations are monitored each year. Little is currently known about the optimum habitat preferences for this plant, but it is believed to prefer full or filtered sunlight.



Various restoration techniques such as burning, mowing, and selective overstory removal are being tried.

Conecuh National Forest

Vegetation sampling was done in the Conecuh National Forest, as part of a collaborative effort with the Gulf Coastal Plain Ecosystem Partnership to monitor restoration of the understory component as efforts are made to restore the native longleaf pine communities.

Green Pitcher Plant Monitoring



The green pitcher plant (*Sarracenia oreophila*) is a federally listed endangered plant. Thirty-three of the 35 known sites occur in Alabama. Most of these sites are on private land. ALNHP works cooperatively with the U.S. Fish and Wildlife Service to monitor the populations and perform needed restoration work. The green pitcher plant thrives in open areas. Many of the sites where it occurs are in the process of succeeding to forest. The sites require burning, mowing, and/or selective tree removal to maintain an open, sunny condition. ALNHP works with the landowner to optimally manage his/her green pitcher plant site.

Sweet Pinesap

Research was done on the sweet pinesap (*Monotropis odorata*) to provide the Forest Service with information and management recommendations. Reported locations of the plant were searched on the Bankhead National Forest, but sweet pinesap was not found.

Ecoregional & Conservation Planning

Upper East Gulf Coastal Plain

ALNHP staff contributed to efforts to complete TNC's Upper East Gulf Coastal Plain ecoregional plan. Efforts in 2002-2003 were devoted to finalizing the site portfolio, updating information on plant and animal targets, and preparing additional Element Occurrence Records for the UEGCP ecoregion. Additional time was also devoted to addressing viability issues of proposed conservation sites, as identified through the ecoregional planning process, within the Interior Low Plateau and Cumberlands and Southern Ridge and Valley ecoregions.

Information Systems & Technology

Biological and Conservation Database (BCD)

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. Building the database was further hindered by the absence of a full time Data Manager for most of fiscal year 2002.

ALNHP is currently tracking 1,520 rare plants, animals, and natural communities (Table 1). There are 8,774 individual occurrences of these species, natural communities, and natural features documented in BCD, with the majority of EORs 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.

Perhaps the most significant development related to the database software was NatureServe's completion of the latest generation of the biodiversity management software, Biotics 4 (formerly known as Heritage Data Management System during the development process). This software combines Geographic Information Systems (GIS) and powerful relational database technologies to organize, map, and analyze heritage data, and provides better tools for mapping and analyzing Element Occurrence data that is the core of the heritage programs. Since the completion of the software, ALNHP has been developing a database and software conversion plan and searching for funding sources for the conversion process. The goal is to have the software conversion completed during the first half of 2004.

Table 1. Number of Rare Elements Tracked by ALNHP.

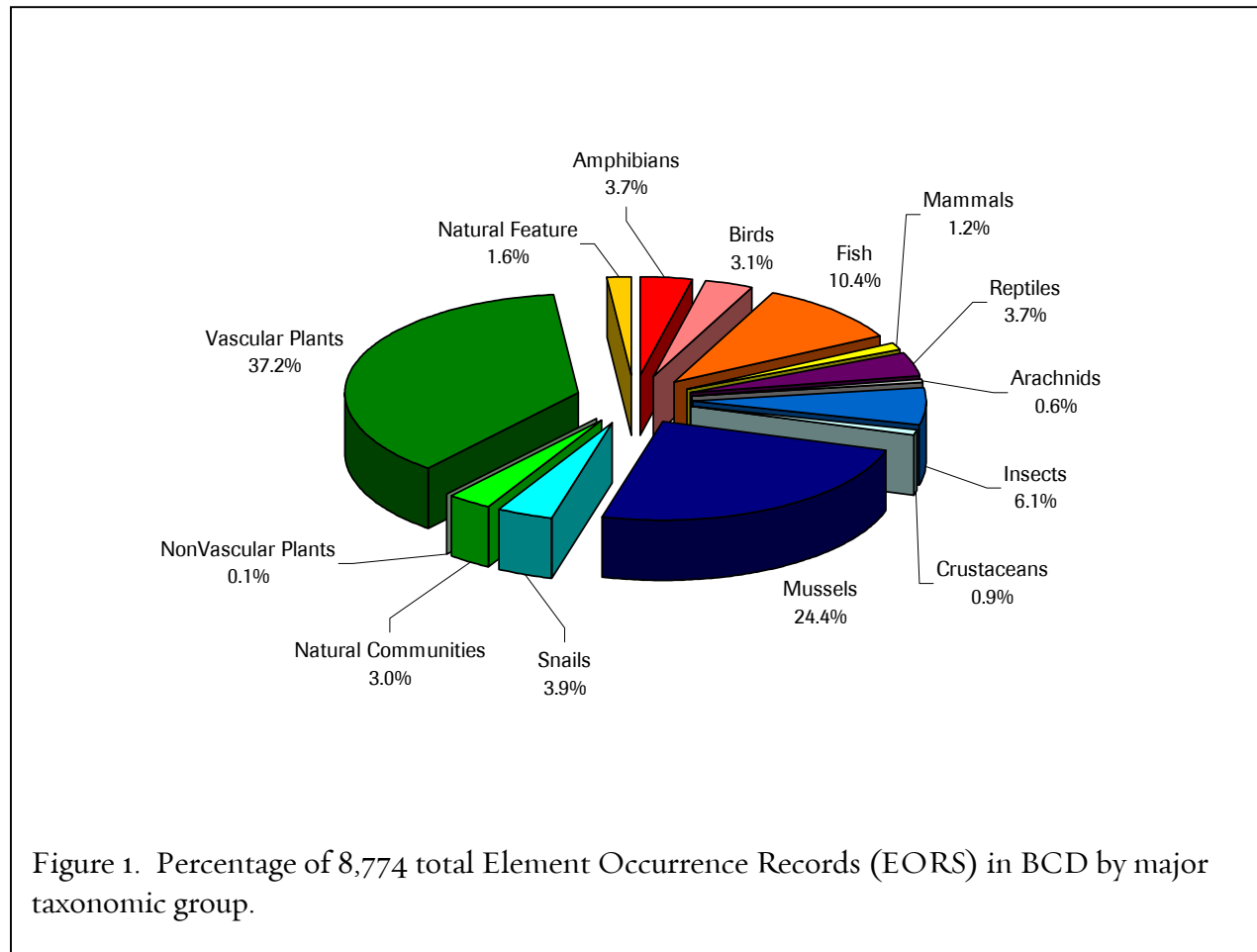
Vertebrates	
Amphibians	25
Birds	59
Fish	154
Mammals	27
Reptiles	<u>43</u>
	308
Invertebrates	
Clams & Mussels	178
Snails	203
Arachnids	48
Diplopods	6
Insects	135
Crustaceans	<u>56</u>
	626
Plants	
Vascular Plants	501
Non Vascular Plants	<u>20</u>
	521
Natural Communities	65
Total Elements	<u>1,520</u>

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 program based on the number and quality of occurrences. Updates to the Alabama Inventory List were completed June 2003, with the list published and distributed to cooperators and other interested parties. In addition, the updated list was posted to the ALNHP website.

Data Requests

ALNHP responded to 12 paid data requests; 34 requests from academia, conservation nonprofits, or cooperating partners; 2 internal Conservancy requests; and 3 requests from NatureServe or other Heritage Network members. This marks a decrease from previous years for paid data requests but an increase from academia and cooperating partners.

ALNHP has been working with several major timber companies in Alabama to sign or extend data sharing agreements to help the companies meet new certification standards adopted by the Sustainable Forestry Initiative (SFI), the forest certification standard followed by nearly all



major timber companies. Under these standards, the companies have committed to identify and protect the most imperiled plants, animals, and ecosystems found on their properties. ALNHP has completed agreements with International Paper and Weyerhaeuser, and is in the process of completing an agreement with Temple Inland Forest. We also completed a data sharing agreement with the Alabama Gap Analysis Program to provide species information in support of their efforts.

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 community locations in the state. GIS data requests have represented an increasing proportion of the data requests we receive as clients become aware of our GIS

capabilities. Once the program implements Biotics, GIS will be more efficiently integrated with the conservation database.

ALNHP has continued working to build the program's GIS capacity by acquiring software and data layers. The main GIS software used is ArcView 3.x (Environmental Systems Research Institute, Redlands, California). This software was upgraded to ArcView 3.3 when the update was released. Several years ago, ESRI revamped the ArcInfo side of their software suite and released ArcGIS 8.0. ALNHP has received a copy of ArcGIS 8.3 under TNC's master license agreement with ESRI, and is waiting on the hardware key and license file to implement the software. We also have received the ArcView 3.x 3D Analyst 1.0 Extension and an additional license for ArcView 3.3 and the Spatial Analyst 2.0 Extension under the master license agreement. Additional ArcView 3.3 third-party extensions have been purchased or downloaded to increase the program's GIS capabilities (see the Hardware and Software box for a listing). Other GIS software purchased included Global Mapper and GPS-related software.

Perhaps the most noteworthy data acquisition of the past year is the upgrade of MapTech Terrain Navigator Professional to version 6.0 for Alabama. Terrain Navigator is commercial software providing digital copies of USGS topographic maps. The most important improvement incorporated into Version 6 is online access to digital orthophotographic quarter quadrangles (DOQQ). A DOQQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map, with each DOQQ corresponding to a quarter section of a USGS 7.5' topographic quadrangle. ALNHP now has complete coverage of the state for both digital topographic quads and DOQQs. In addition to purchasing Terrain Navigator for Alabama, ALNHP took advantage of the deep discount offered at the release of the new software version to purchase coverage for the surrounding states: Florida, Georgia, Tennessee, Mississippi, and Louisiana. Other data layers and GIS products ALNHP has acquired over the past few years include: EPA's Better Assessment Science Integrating point and Nonpoint Sources (BASINS) 3.0, Southern Appalachian Man and the Biosphere's Southern Appalachian Assessment GIS Data Base, Topologically Integrated Geographic Encoding and Referencing system (TIGER) line files (roads, streams, etc.), National Hydrologic Dataset, USGS National Land Cover Data, digital elevation model (DEM) for Alabama, county boundaries, Hydrologic Unit Codes (HUC) or watersheds, topographic quad index, TNC ecoregions, GSA's digital geologic map of Alabama, Digital Environmental Atlas of Georgia, and ESRI data and maps.

Contracts

The *Paint Rock River Nonpoint Source Prioritization Project* was completed for the Alabama Department of Environmental Management (ADEM) March 2003. 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 the watershed. 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 has started on a similar contract with ADEM for the Middle Coosa River, Upper Coosa River, Eightmile Creek, and Cotaco Creek watersheds, with the majority of the work within the Middle Coosa River watershed completed.

Maps

Map production is important to communicating our conservation mission. The largest proportion of GIS work conducted is probably 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. Additionally, one data request was for map production that did not include our data.

Global Positioning System (GPS)

The use of Global Positioning System (GPS) units during field work greatly facilitates the collection of relatively accurate locational information. ALNHP has purchased additional GPS units so that all field staff have access to a unit. In September 2002, we purchased 2 additional recreation-grade units (Garmin GPS Map 76S) and 1 professional differential-capable unit [Corvalis Microtechnology (CMT) MC-GPS V], and differential beacon receiver package. In January 2003, we received an additional CMT MC-GPS unit from the lot of 100 donated to TNC by CMT.

Information Technology

In November 2002, ALNHP's office internet connection was upgraded from a dial-up connection to a 256k Integrated T-1 line maintained by ITC Deltacom. The T-1 was established for both phone and data lines providing an extra discount on the phone service and an additional phone line. At that time, the domain name previously established as an email-alias was used to establish a web site and email service hosted by Deltacom. A web site for the program (www.alnhp.org) was developed and made available November 2002. In preparation for using the T-1 for internet access, a local area network (LAN) was established for ALNHP's office computers to facilitate file sharing among staff and to provide access to the color laser printer for all staff computers, as well as providing internet access.

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 memory capacity for all ALNHP computers was increased to a minimum capacity of 256 MB RAM. The Applied Conservation Ecologist computer was replaced with a Gateway E-1800 purchased through TNC's easy PC program when the computer in use failed. In addition, three notebook computers were purchased, one Gateway this year and two Dell Inspirons the previous fiscal year, with plans to

purchase two more in the coming months. Most of the software products used on a regular basis were upgraded to the current version.

Our phone system's hard drive failed November 2002, necessitating a replacement of the phone system. The phone system was changed from the analog equipment in use from The Phone Store, to a NEC digital phone system from New South Communications.

Operations

Finance and Grants Management

Virtually all of the work currently done by ALNHP is funded by contracts, primarily through state and federal agencies. During Fiscal Year 2003, almost three-fourths of our support came from the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (30%), U. S. Fish and Wildlife Service (26%), and U. S. Forest Service (15%). Other support was provided by Alabama Department of Environmental Management (7%), U. S. Department of Defense (5%), and U. S. National Park Service (4%), as well as miscellaneous private sources (13%). In addition, Huntingdon College provides office space and utilities at no cost to the program. Most of the funding is spent on staff salaries (72%), 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 specific data gaps in the state.

Currently, and since its inception, the Alabama Natural Heritage Program is administered through The Nature Conservancy. Negotiations have been underway during the past year to transfer the program administratively to another institution (possibly the Auburn University Environmental Institute). Those negotiations should be completed by the end of the current fiscal year.

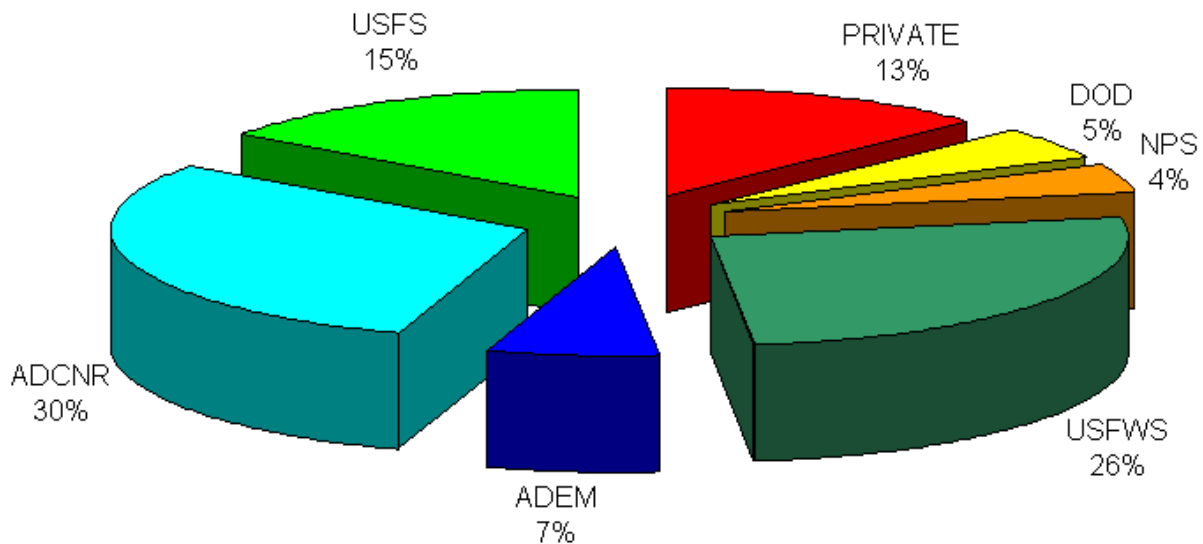
Personnel

- Robert W. Hastings, the new Director hired during fiscal year 2002, completed his first year with ALNHP and TNC.
- Michael S. Barbour, the new Science Information Program Manager hired April 2002, completed his first year with ALNHP and TNC.
- Carlen Emanuel, the program's Applied Conservation Ecologist, left the program November 2002 when she transferred to TNC's Ohio Field Office as their Forest Ecologist.
- Jan Garrett, the new Applied Conservation Ecologist, started February 2003.
- Bonnie Jones, the new Administrative Coordinator, started part-time 16 November 2002 and changed to flex-time 1 April 2003.

Income Summary

Government Grants and Contracts			\$347,494
	Ala. Dept. of Conservation and Natural Resources	\$119,281	
	Ala. Dept. of Environmental Management	\$27,430	
	Department of Defense	\$19,536	
	National Park Service	\$16,653	
	U. S. Forest Service	\$59,587	
	U. S. Fish and Wildlife Service	\$105,007	
Other Income and Support			\$51,150
	Private Contracts	\$31,814	
	Donated Goods and Services	\$12,854	
	Data Base User Fees	\$4,695	
	Other Income	\$1,209	
	Intra-Company Transfer	\$578	
Total Income			\$398,644

**Sources of Revenue
FY 2003**



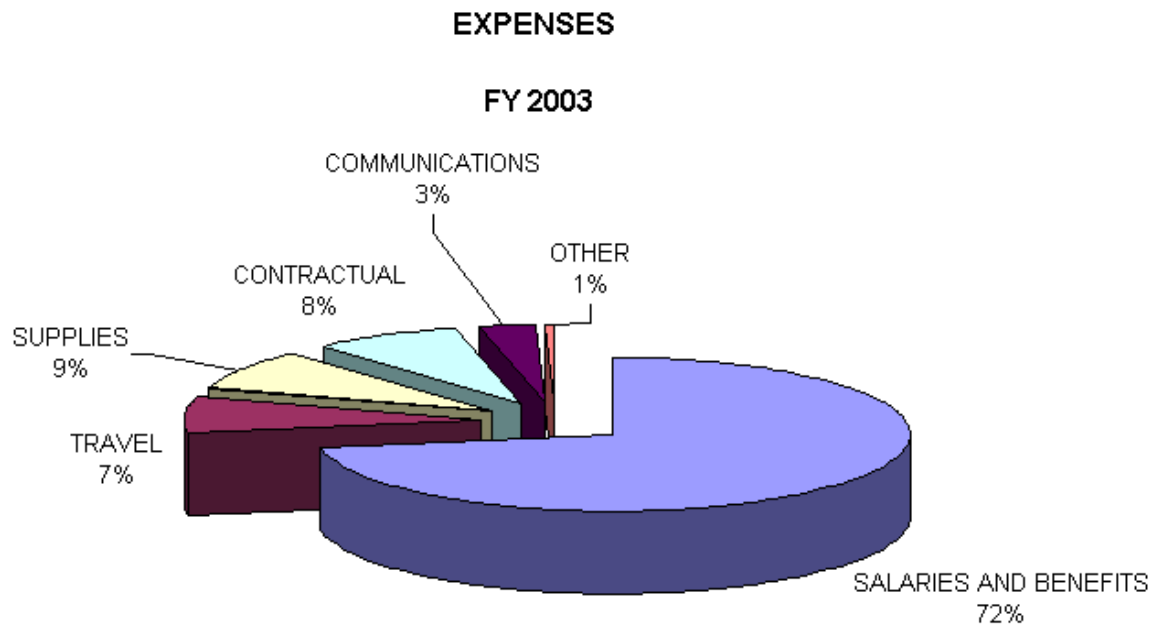
Government Grants and Contracts

Ala. Dept. of Conservation and Natural Resources		\$119,281
Eastern Indigo Year 3	\$11,974	
Cave Shrimp	\$902	
Eastern Indigo, Year 2	\$6,428	
Reassessment of Red Hill Salamander	\$11,567	
Rare Turtles Survey - Year 3	\$12,377	
Red-Bellied Turtle	\$12,770	
Paint Rock River Mussels	\$11,431	
Multi State Flatwoods Salamander	\$23,203	
Monitoring Rare Mussels Paint Rock River	\$14,362	
Rare Turtle Survey Year 4	\$7,297	
Reassessment RHS Year 2	\$6,970	
Ala. Dept. of Environmental Management		\$27,430
Paint Rock River	\$7,706	
Identification of T&E Species	\$19,724	
Department of Defense		\$19,536
Indigo Snake Survey	\$2,819	
Maxwell GAFB	\$16,717	
National Park Service		\$16,653
Russell Cave & Little River Canyon	\$16,653	
U. S. Forest Service		\$59,587
Mitchell's satyr	\$14,296	
Talladega 3500 acres	\$7,000	
Talladega 1200 acres	\$2,500	
Conecuh National Forest Pilot	\$13,189	
Sweet Pinesap	\$1,557	
Butterfly Pilot - Shoal Creek	\$1,494	
Flattened Musk Turtle	\$13,986	
Survey-AL Canebrake Oakmulgee	\$2,669	
Survey-Glades Bankhead National Forest	\$2,896	
U. S. Fish and Wildlife Service		\$105,007
Status Survey Mitchell's Satyr	\$7,970	
Choctaw National Wildlife Refuge	\$7,562	
<i>Rhexia parviflora</i>	\$832	
<i>Agalinis georgiana</i>	\$4,444	
<i>Silene ovata</i>	\$1,922	
<i>Lilium iridollae</i>	\$702	
<i>Calopogon multiflorus</i>	\$6,649	
<i>Eriogonum</i> survey/monitoring	\$27	
<i>Eulophia</i> Multi-State Survey	\$454	
Many-Flowered Grass Pink Survey	\$3,105	
Canebrake monitoring, inventory	\$2,900	
<i>Desmodium ochroleucum</i>	\$3,758	
<i>Clematis socialis</i> Monitoring II	\$3,895	
Eufaula NWR	\$214	
<i>Brickellia cordifolia</i>	\$4,290	
<i>Clematis morefieldii</i>	\$6,319	
<i>Ruellia noctiflora</i>	\$4,301	
Red Cockaded Woodpecker Safe Harbor Plan	\$14,324	
<i>Arabis georgiana harper</i>	\$2,386	
<i>Sarracenia oreophila</i> Management II	\$28,953	

Total**\$347,494**

Expenses Summary

Personnel and Fringe Benefits	\$313,727
Director	
Administrative Coordinator	
Applied Conservation Ecologist	
Aquatic Zoologist	
Community Ecologist/Botanist	
Science Information Program Manager	
Zoologist/Ecologist	
Travel	\$31,769
Supplies	\$37,913
Contractual	\$34,973
Communications	\$12,455
Other Expenses	\$2,907
TOTAL EXPENSES	\$433,744
SURPLUS (DEFICIT)	-\$35,100



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.

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.

Terrestrial Zoologist/Ecologist

Hart, Barry D. - MS, University of Tennessee (2002) – Ecology and Evolutionary Biology

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 maintains and manages 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 maintains and manages 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.

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.

Science Information Program Manager/GIS Specialist

Barbour, Michael – 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 will be 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.

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.

Grants Specialist (shared position with other TNC offices)

Stinson, Becky M. - BS, Auburn University-Montgomery (1977) - Business Admin.

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.

Communications

Major Meetings Attended or Presentations Made

Al Schotz

July 18, 2002 - Presentation of "Alabama Orchids" to Bibb County Wildflower Society

August 27, 2002 - Presentation on the "Longleaf Pine Ecosystem" to the Escambia Historical Society (Brewton, Alabama)

October 2, 2002 - Presentation on Alabama's Biodiversity to the Bibb County High School (Centreville, Alabama)

- October 5, 2002 - Attended planning meeting of the Botanical Society of America (Mobile, Alabama)
- November 9, 2002 - Presentation on the "Natural Heritage Network" for Auburn University, Bob Boyd's Special Projects class, at ALNHP office (Montgomery, Alabama)
- January 10, 2003 - Presentation to Audubon Society (Jackson, Mississippi)
- February 2003 - Program for the Selma Garden Club
- March 29, 2003 - Presentation on "Alabama Diversity" to the Alabama Academy of Science (Jacksonville State University, Jacksonville, Alabama)
- April 27, 2003 - Program on Pitcher-Plant Habitats of Alabama and the Southeast" to the Alabama Wildflower Society
- May 10, 2003 - Presentation on "Alabama's Biodiversity" at Turtle Point Environmental Center (Flomaton, Alabama)
- June 9-10, 2003 - Attended TNC Cumberlands and Southern Ridge and Valley/Interior Low Plateau ecoregional meeting (Nashville, Tennessee)
- June 17, 2003 - Presentation to International Paper on natural communities of the Black Belt
- July 25-27, 2003 - Attended annual meeting of the Botanical Society of America – lead two field trips (Mobile, Alabama)

Barry Hart

- July 23-24, 2002 – Served on the Mammal Committee at the 2nd Alabama Non-game Species Conference (Auburn, Alabama) (contributed species account on marsh rabbit and Appalachian cottontail)
- September 18, 2002 – Facilitated a meeting for incorporating birds as conservation targets in the Upper East Gulf Coastal Plain (Plymouth Bluff Conference Center, Columbus, Mississippi)
- January 27-31, 2003 – Attended the 4th Symposium on the Red-Cockaded Woodpecker (Savannah, Georgia)
- July 7, 2003 – Facilitated a meeting for the discussion and implementation of the Statewide Red-Cockaded Woodpecker Safe Harbor Agreement (Alabama Wildlife Federation offices, Millbrook, Alabama)
- August 26, 2003 – Presented a talk on the occurrence, habitat preference, and life history of the Mitchell's satyr based on field work conducted on the Oakmulgee Ranger District, Talladega National Forest (Oakmulgee Ranger District work center, Brent, Alabama).

Jan Garrett

- April 2003 – Attended Basic Wildland Firefighter's Training presented by the Alabama Wildland Fire Academy (Alabaster, Alabama)
- April 28 - May 2 2003 – Attended Core Heritage Methodology Training (Arlington, Virginia)

Jim Godwin

- February 2002 – Alabama Fisheries Association Annual Meeting, presentation on *Graptemys nigrinoda* (Gulf Shores, Alabama)
- February 2002 – Alabama Mollusk Meeting (Spanish Fort, Alabama)
- April 2002 – Alabama Cave Survey Meeting (Grant, Alabama)
- July 23-24, 2002 – 2nd Alabama Non-game Species Conference (Auburn, Alabama)
- August 13-14, 2002 – Mobile River Basin Coalition 2002 Aquatic Recovery Workshop (Montgomery, Alabama)
- December 4-5, 2002 – Tennessee Mollusk Meeting, and the Regional Karst Biodiversity Study (Knoxville, Tennessee)
- February 2003 – Alabama Fisheries Association Annual Meeting with a presentation on *Graptemys barbouri* (Auburn, Alabama)
- March 16-19 2003 – Freshwater Mollusk Conservation Society 3rd Biennial Symposium (Durham, North Carolina)
- April 2003 – Alabama Mollusk Meeting (Spanish Fort, Alabama)

Michael Barbour

- April 22-26, 2002 – Attended Core Heritage Methodology Training (Arlington, Virginia)
- June 6-7, 2002 – Participated in Middle Coosa River Watershed Citizen Action Committees Workshop (Ashville, Alabama)
- July 23-24, 2002 – Attended 2nd Alabama Non-game Species Conference (Auburn University)
- August 13-14, 2002 – Attended Mobile River Basin Coalition 2002 Aquatic Recovery Workshop (Montgomery)
- October 24-25, 2002 – Participated in ADEM Nonpoint Source Education for Municipal and Elected Officials (NEMO) Training Workshop (Spanish Fort, Alabama)
- November 1-5, 2002 – Participated in Organization of Fish & Wildlife Information Managers Annual Meeting and National Fish & National Wildlife Data Summit (Baltimore, Maryland)
- November 9, 2002 - Presentation on "GIS use by ALNHP" for Auburn University, Bob Boyd's Special Projects class, at ALNHP office (Montgomery, Alabama)
- November 20, 2002 – Attended Auburn University GIS Day Symposium (Auburn, Alabama)
- February 4-5 2003 – Attended WaterQuest 2003 and Nonpoint Source Watershed Forum 2003 (Birmingham, Alabama)
- May 21-22, 2003 – Attended Alabama Chapter of The Wildlife Society's Annual Meeting (Goose Pond Colony, Scottsboro, Alabama)
- June 7, 2003 – Attended Alabama Water Watch 10th Annual Meeting (Auburn University Fisheries Pavilion, Auburn, Alabama)

Robert Hastings

- April 22-26, 2002 – Attended Core Heritage Methodology Training (Arlington, Virginia)

- May 1, 2002 – Presented seminar on ALNHP to Huntingdon College environmental biology class
- May 15-18, 2002 – Attended Environmental Law Institute conference to receive National Wetlands Award in Education (Washington, DC)
- May 22, 2002 – Presented talk on ALNHP at Montgomery Optimist Club meeting
- July 23-24, 2002 – Participated in 2nd Alabama Non-game Species Conference (Auburn, Alabama) (contributed species account on gulf sturgeon)
- September 4-6, 2002 – Presented paper on Alabama aquatic biodiversity at Auburn Environmental Institute Water Resources conference (Orange Beach, Alabama)
- October 18-20, 2002 – Attended Gulf Restoration Network board meeting (New Orleans, Louisiana)
- March 13, 2003 – Presented seminar at Auburn University Environmental Institute on Alabama's Aquatic Biodiversity (Auburn, Alabama)
- April 5-10, 2003 – Attended NatureServe Leadership Conference (Ellicott City, Maryland.)
- April 22-23, 2003 – Attended Comprehensive Wildlife Conservation Plan Workshop (Atlanta, Georgia)
- May 13, 2003 – Presented slide show and demonstration of Alabama snakes at Prattville High School (for three different classes) (Prattville, Alabama)
- June 10, 2003 – Presented slide show and demonstration of Alabama snakes at Montgomery Sierra Club meeting (Montgomery, Alabama)

Publications

Because an annual report has not been published since FY2000, all publications from 2000 to end of FY2003 are listed. A complete list of all ALNHP publications and reports is available upon request (Hastings, Robert W. 2003. Publications and reports of the Alabama Natural Heritage Program. Unpublished report, Alabama Natural Heritage Program, Montgomery, AL. 19 pp.).

Peer-Reviewed and Published Articles:

- Carroll, A., E. L. Blankenship, M. A. Bailey, and C. Guyer. 2000. An estimate of maximum local population density of Red Hills salamanders (*Phaeognathus hubrichti*). *Amphibia-Reptilia* 21:260-263.
- Counts, Tom, Jarel Hilton, and Bob McCollum. 2001. Wildlife habitat management: A comprehensive year-around approach. *Alabama Wildlife*, Spring 2001: 17-23.
- Emanuel, Carlen M., and Joe Braswell. 2002. Coastal Plains Chapter Restoration Project Feature: "From titi to wet pine savanna". *Newsletter of Coastal Plain Chapter of Society for Ecological Restoration* 2(1): 3,5.

- Emanuel, Carlen M. And Joe Braswell. 2002. Transco - Davenport 1 Mitigation Restoration: "From titi to wet-pine savanna". In proceedings of the 29th Annual Conference on Ecosystems and Restoration, Tampa, FL In progress.
- Godwin, James C. 2001. Threatened and Endangered Species: Creatures of the Dark. Alabama's Treasured Forests, Alabama Forestry Commission, Summer 2001:17.
- Godwin, Jim 2001. Alabama's Freshwater Turtles. Alabama Wildlife, Summer 2001:22-25.
- Hart, Barry D. 2000. Threatened and endangered species: eastern indigo snake. Alabama's Treasured Forests, Alabama Forestry Commission, Fall 2000: 13.
- Hart, Barry D. 2000. Alabama's Appalachian cottontail. Alabama Wildlife, Alabama Wildlife Federation, Winter 2000-2001: 8-9.
- Hart, Barry D. 2002. Threatened and Endangered species: Mitchell's satyr in Alabama. Alabama's Treasured Forests, Alabama Forestry Commission, Winter 2002: 26 & 31.
- Hart, Barry D. 2003. The Safe Harbor Program and the Red-Cockaded Woodpecker. Alabama Wildlife, Summer 2003: 18-19.
- Schotz, Alfred R. 2001. Threatened and Endangered Species: Mohr's Barbara button. Alabama's Treasured Forests, Alabama Forestry Commission, Spring 2001: 8.
- Schotz, Alfred R. 2001. Threatened and Endangered Species: Eggert's sunflower. Alabama's Treasured Forests, Alabama Forestry Commission, Fall 2001: 25.
- Schotz, A. R. 2003. Threatened & Endangered Species: Giant Orchid. Alabama's Treasured Forests, Alabama Forestry Commission. Vol. 22, No. 1.
- Schotz, Alfred R. 2003. Biological Diversity in the Longleaf Pine Ecosystem. Alabama's Treasured Forests, Alabama Forestry Commission, Winter, 2003: 28-29.

UNPUBLISHED PROJECT REPORTS:

- Alabama Natural Heritage Program. 2000. Draft Study and Management Recommendations to Promote Recovery of the Red Hills Salamander (*Phaeognathus hubrichti*): Haines Island Park, McDuffie Landing, and Bell's Landing Park, Monroe County, Alabama. Task 1 Report: Inventory of Red Hills Salamander Habitat. Unpublished report submitted to U. S. Army Corps of Engineers, Mobile District and U. S. Fish and Wildlife Service, Jackson Field Office and Daphne Field Office (Agreement No. 1448-40181-97-G-044). 35 pp.

Alabama Natural Heritage Program. 2000. The Weeks Bay Watershed non-point source prioritization project & site conservation plan. Unpublished report submitted to Alabama Department of Environmental Management. 56 pp. + 7 Appendices (xxxiii pp.).

Alabama Natural Heritage Program. 2000. Annual Report: Fiscal Year 2000. Privately printed by the Alabama Natural Heritage Program, Montgomery, Alabama. 24 pp.

Alabama Natural Heritage Program. 2001. Alabama Inventory List: The rare, threatened, & endangered plants, animals & natural communities. Privately printed by the Alabama Natural Heritage Program, Montgomery, Alabama. 43 pp. + Appendices (i-x pp.).

Alabama Natural Heritage Program. 2001. The Northern Gulf Partnership. Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries (Agreement No. 99C-CNR-103). 14 pp. + 3 Appendices (155 pp.) + Illustrations.

Alabama Natural Heritage Program. 2001. Northern Gulf Coastal Partnership: Grand Bay Savanna. Unpublished report submitted to The Nature Conservancy, Alabama Chapter, Mobile Office. 52 pp. + 6 Appendices (80 pp.) + Illustrations.

Alabama Natural Heritage Program. 2002. Natural Community and Rare Plant and Animal Survey of Maxwell Air Force Base, Gunter Air Force Base, and Maxwell-Gunter Lake Martin Recreation Area. Unpublished report submitted to Environmental Materials Consultants, Inc. 112 pp.

Alabama Natural Heritage Program. 2003. Alabama Inventory List: The rare, threatened, & endangered plants, animals & natural communities. Privately printed by the Alabama Natural Heritage Program, Montgomery, Alabama. 60 pp.

- Bailey, Mark A., Barry Hart, Alfred Schotz, Michael Roedel, Michael Barbour, Debbie R. Folkerts, George W. Folkerts, and Craig Guyer. 2003. Tennessee-Tombigbee Waterway Wildlife Mitigation Project: Draft Study and Management Recommendations to Promote Recovery of the Red Hills Salamander (*Phaeognathus hubrichti*): Haines Island Park, McDuffie Landing, and Bell's Landing Park, Monroe County, Alabama. Unpublished report submitted to U. S. Army Corps of Engineers, Mobile District and U. S. Fish and Wildlife Service, Jackson Field Office and Daphne Field Office (Agreement No. 1448-40181-97-G-044). iii + 32 pp. + 5 Appendices.
- Task 1 Report: Inventory of Red Hills Salamander Habitat and American Burying Beetle Survey (Contributing Authors - Bailey, Mark A., Barry Hart, Alfred Schotz, Michael Roedel, Michael Barbour). pp. 1-32, A1-2, B1-8, C1-3.
- Task 2 Report: Effects of armadillo (*Dasypus novemcinctus*) foraging on litter arthropods at six Red Hills Salamander (*Phaeognathus hubrichti*) sites in the Western Red Hills of Alabama (Authors: Debbie R. Folkerts and George W. Folkerts; 31 December 2001). Appendix D, pp. D1-21.
- Task 3 Report: Population biology of the Red Hills Salamander at Haines Island Park (Author: Craig Guyer; 2000). Appendix E, pp. E1-22
- Ballentine, Barbara, Barry D. Hart, Geoffrey Hill, and Michael Roedel. 2000. Point counts at Horseshoe Bend National Military Park, Alabama. Unpublished report submitted to National Park Service, Horseshoe Bend National Military Park (Contract No. 1443CA509098021). 17 pp. + 2 Appendices (42 pp.)
- Barbour, Michael S. 2003. Paint Rock River Watershed Nonpoint Source Pollution (CWAP Cooperative Agreement C0059425). Unpublished report submitted to Alabama Department of Environmental Management, Montgomery, Alabama. 184 pp.
- Barbour, Michael S. 2003. Middle Coosa River, Upper Coosa River, Eight Mile Creek, and Cotaco Creek nonpoint source prioritization project (CWAP Cooperative Agreement C20596062). Unpublished status report submitted to Alabama Department of Environmental Management, Montgomery, Alabama. 82 pp.
- Emanuel, Carlen M. 2000. Monitoring report for ginseng, *Panax quinquefolius*. Unpublished report submitted to Environmental Management Office, U.S. Army Missile Command, Redstone Arsenal, Alabama. 9 pp. + Appendix.
- Emanuel, Carlen M. 2000. Monitoring Report for Alabama canebrake pitcher plant, *Sarracenia rubra* ssp. *alabamensis*. Unpublished contract report. Alabama Natural Heritage Program, Montgomery, AL.
- Emanuel, Carlen M. 2000. Monitoring Report for Morefield's leather-flower, *Clematis morefieldii*. Unpublished contract report submitted to U. S. Department of the Interior, Fish and Wildlife Service, Jackson, Mississippi. 8 pp.

- Emanuel, Carlen. M. 2000. Monitoring Report for Alabama leather-flower, *Clematis socialis*. Unpublished contract report. Alabama Natural Heritage Program, Montgomery, AL.
- Emanuel, Carlen M. 2002. Restoration management of the green pitcher plant, *Sarracenia oreophila* (Kearney) Wherry, in Alabama: Report for 1996-2002. Unpublished contract report submitted to U. S. Fish and Wildlife Service. 67 pp.
- Emanuel, Carlen M., and Joe Braswell. 2002. Transco-Davenport 1 Mitigation Restoration Report: From titi to wet pine savanna. Unpublished report submitted to Williams Gas Pipeline Company, Transco, Houston, Texas. 71 pp.
- Godwin, James C. 2000. Survey for the flatwoods salamander (*Ambystoma cingulatum*) in the Vicinity of Station 82, 1999 and 2000: Years 1 & 2. Unpublished report submitted to Transco (Transcontinental Gas Pipeline Corporation), Houston, Texas. 9 pp.
- Godwin, James C. 2000. Reassessment of the status of the Red Hills salamander (*Phaeognathus hubrichti*) using line transect methodology to estimate burrow densities: Year 1. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 12 pp.
- Godwin, James C. 2000. Reassessment of the historical and search for new localities of the Tennessee Cave Salamander (*Gyrinophilus palleucus*) in Alabama. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 15 pp.
- Godwin, James C. 2000. Escambia Map Turtle (*Graptemys ernsti*) Status Survey. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 13 pp.
- Godwin, James C. 2000. Walls of Jericho/Hurricane Creek Inventory. Unpublished report submitted to Mead Corporation, Stevenson, Alabama. 12 pp.
- Godwin, James C. 2001. Black-knobbed Sawback (*Graptemys nigrinoda*) Status Survey. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 15 pp.
- Godwin, James C. 2002. Survey for New Localities of the Tusculumbia Cave Shrimp. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 6 pp.
- Godwin, James C. 2002. Monitoring of Federally Listed and Rare Mussels in the Paint Rock River. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 80 pp.

- Godwin, James C. 2002. Reassessment of the Status of the Red Hills Salamander (*Phaeognathus hubrichti*) Using Line Transect Methodology to Estimate Burrow Densities. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 17 pp.
- Godwin, James C. 2002. Flatwoods Salamander (*Ambystoma cingulatum*) Survey, 2002. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 5 pp.
- Godwin, James C. 2002. Turtle nest success on Gravine Island with emphasis on the Alabama Red-bellied Turtle (*Pseudemys alabamensis*) and Delta Map Turtle (*Graptemys nigrinoda delticola*). Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 17 pp.
- Godwin, James C. 2002. Distribution and Status of Barbour's Map Turtle (*Graptemys barbouri*) in the Choctawhatchee River System, Alabama. Unpublished report submitted to the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 21 pp.
- Hart, Barry D. 2000. Status survey of the eastern indigo snake (*Drymarchon corais couperi* Holbrook), black pine snake (*Pituophis melanoleucus lodingi* Blanchard), and southern hognose snake (*Heterodon simus* Linnaeus) in Alabama. Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 49 pp.
- Hart, Barry D. 2000. TVA Lake Guntersville: Phase I Report. Description of selected Lands Planning Parcels on Guntersville Reservoir. Unpublished report submitted to TVA Regional Natural Heritage Project (Contract No. 00RE3-258048). 21 pp. + appendices.
- Hart, Barry D. 2001. Survey for the Appalachian cottontail (*Sylvilagus obscurus*) in Alabama. Unpublished report submitted to Alabama Dept. of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries, Project Number 72, E-1-11. 23 pp.
- Hart, Barry D. 2002. An evaluation of five aquatic sampling methods useable in an Appalachian mountain stream, Great Smoky Mountains National Park, Sevier County, Tennessee. Unpublished M. S. thesis, University of Tennessee, Knoxville, TN. 203 pp.
- Hart, Barry D. 2002. Status survey of the eastern indigo snake (*Drymarchon couperi* Holbrook), black pine snake (*Pituophis melanoleucus lodingi* Blanchard), and southern hognose snake (*Heterodon simus* Linnaeus) in Alabama. Unpublished report submitted to Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries. 49 pp.

- Hart, Barry D. 2003. A survey for the Mitchell's satyr (*Neonympha mitchellii* French) in the National Forests of Alabama (Phase I Report 2002). Unpublished report submitted to U.S. Fish and Wildlife Service, Daphne, AL. 54 pp.
- Hart, Barry D., and B. McCollum. 2001. Other species of special concern. pp. 27-35. *In* Bon Secour National Wildlife Refuge Biological Review: First Draft. U. S. Fish and Wildlife Service, Bon Secour National Wildlife Refuge, Gulf Shores, Alabama. 65 pp.
- Hart, Barry D., and Alfred R. Schotz. 2002. The Mobile-Tensaw Delta: A community inventory and classification and summary of significant natural areas and biological elements. Report prepared for Dr. Edward O. Wilson, University Professor Emeritus and Honorary Curator in Entomology, Harvard University, Cambridge, MA. 66 p. + Illustrations.
- Hastings, Robert W. 2002. A history of the Alabama Natural Heritage Program. Unpublished report, Alabama Natural Heritage Program, Montgomery, AL. 12 pp.
- Hastings, Robert W. 2003. Publications and reports of the Alabama Natural Heritage Program. Unpublished report, Alabama Natural Heritage Program, Montgomery, AL. 19 pp.
- Hilton, Jarel L. 2000. Calcareous glades and barrens in Northwestern Alabama: Update. Unpublished report submitted to U. S. Fish and Wildlife Service. 17 pp. + Appendix (25 pp.).
- Hilton, Jarel L., and Robert D. Sutter. 2001. Effects of grazing on a threatened mustard (*Lesquerella lyrata* Rollins). Unpublished report. 8 pp. + Appendix.
- Schotz, Alfred R. 2000. Rare Plant Survey of Walls of Jericho, Jackson County, Alabama. Unpublished report submitted to the Mead Corporation. 9 pp. + Appendix (21 pp.).
- Schotz, Alfred R. 2000. Status Survey on *Cuscuta harperi* in Alabama. Unpublished report submitted to U. S. Fish and Wildlife Service.
- Schotz, Alfred R. 2000. Reassessment of *Schwalbea americana*, American chaffseed, in Alabama. Unpublished report submitted to U. S. Fish and Wildlife Service. 7 pp.
- Schotz, Alfred R. 2000. Status Survey Report on *Rudbeckia auriculata* in Alabama. Unpublished report submitted to U. S. Fish and Wildlife Service.
- Schotz, Alfred R. 2001. Re-evaluation of *Helianthus eggertii*, Eggert's Sunflower, in Alabama. Unpublished report submitted to U. S. Fish and Wildlife Service. 8 pp. + 2 Appendices.
- Schotz, Alfred R. 2001. Status Survey on *Helianthus verticillatus* in Alabama. Unpublished report submitted to U. S. Fish and Wildlife Service. 9 pp. + 2 Appendices.

- Schotz, Alfred R. 2002. Re-evaluation of *Sarracenia rubra* ssp. *wherryi* in Alabama. Unpublished report submitted to U. S. Fish and Wildlife Service. 2 pp. + 2 Appendices.
- Schotz, Alfred R. 2002. Eufaula National Wildlife Refuge Natural Community and Rare Plant Survey. Unpublished report submitted to U. S. Fish and Wildlife Service, Eufaula National Wildlife Refuge.
- Schotz, Alfred R. 2003. Status survey report on *Pteroglossaspis ecristata*, Wild Coco, in Alabama, Florida, Louisiana, and Mississippi. Unpublished report submitted to U. S. Fish and Wildlife Service. 11 pp. + 5 Appendices.
- Schotz, Alfred R. 2003. Choctaw National Wildlife Refuge Natural Community and Rare Plant Survey. Unpublished report submitted to U. S. Fish and Wildlife Service, Choctaw National Wildlife Refuge. iv + 24 pp. + 4 Appendices.
- Schotz, Alfred R., and Carlen Emanuel. 2003. An assessment of 4,700 acres of selected proposed management areas in the Talladega Ranger District. Unpublished report submitted to U. S. Department of Agriculture, Forest Service, Heflin, Alabama, by the Alabama Natural Heritage Program, Montgomery, Alabama. 11 pp. + 2 Appendices.
- Schotz, Alfred R., and Michael D. Roedel. 2001. Natural community assessment and rare plant survey of Moss Rock, Jefferson County, Alabama. Unpublished report submitted to the City of Hoover, Alabama. 27 pp. + Photographs.