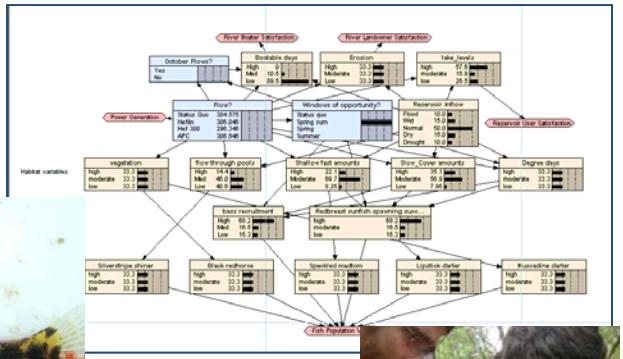
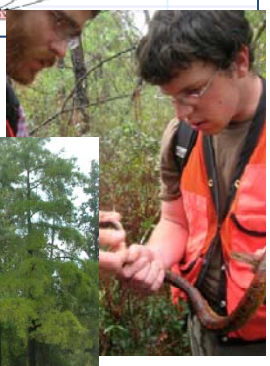
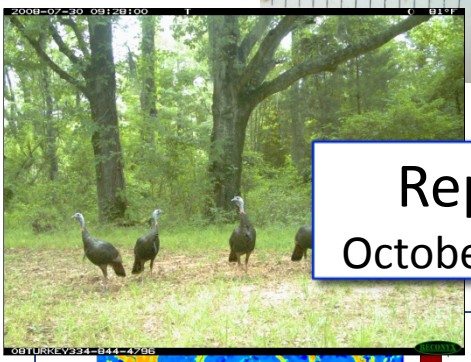
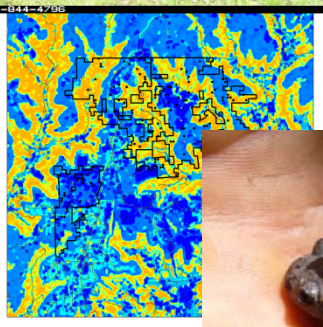


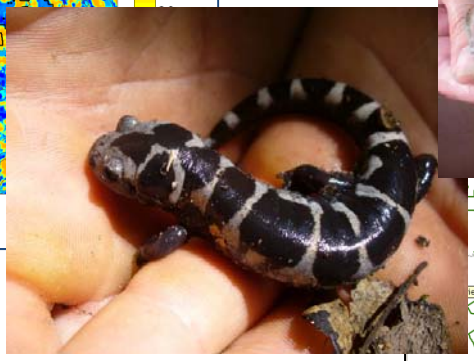




Report of Activities

October 2008-September 2009





alabama cooperative fish and wildlife research unit

original graphic artby: Griffin Shreves III

Alabama Cooperative Fish and Wildlife Research Unit

Report of Activities
October 2008 – September 2009

Cooperating Agencies
U.S. Geological Survey
Alabama Department of Conservation and Natural Resources, Wildlife and Freshwater Fisheries Division
Auburn University
Wildlife Management Institute
U.S. Fish and Wildlife Service

Alabama Cooperative Fish and Wildlife Research Unit
Auburn University
3301 School of Forestry and Wildlife Sciences
Auburn, Alabama 36849-5418
www.ag.auburn.edu/alcfwru

Table of Contents

Coordinating Committee

M.N.(Corky) Pugh, Director,
Wildlife and Freshwater Fisheries
Alabama Dept of Conservation and
Natural Resources
64 North Union Street
Montgomery, AL 36130

Richard Guthrie, Dean
School of Agriculture and Director,
Alabama Agricultural Experiment Station
107 Comer Hall
Auburn University, Alabama

Jim Fleming, Supervisor
Cooperative Research Units
U.S. Geological Survey
12201 Sunrise Valley Drive
Reston,Virginia 20192

Donald F.McKenzie
Southeast Field Representative
2396 Cocklebur Road
Ward, Arkansas72176

Robert Ford
Regional Research Coordinator
FWS Migratory Bird Field Office
Memphis, Tennessee 38152

Unit Staff

James B. Grand, Unit Leader-Wildlife

Elise R. Irwin,
Assistant Unit Leader–Fisheries

Judy Christian, Unit Secretary

Graduate Students

Rob Allgood, M.S. (Grand)
Philip Damm, M.S. (Grand)
Alan Hitch, Ph.D. (Grand)
Carrie Johnson, M.S. (Grand)
John Knight, M.S. (Irwin)
Eva Kristofik, M.S. (Grand)
Ben Martin, M.S. (Irwin)*
Allison Moody, Ph.D. (Grand)
Molly Moore, M.S. (Irwin)
Taconya Piper, Ph.D. (Irwin)

*Graduated

Research Associates

Kevin Kleiner
Kathryn Kennedy

Research Assistants

Amy Silvano

Research Assistants (Temporary)

Paige Aplin
Jesse Boulerice
Mike Gaglin
Jeff Holder
Ryan Kennedy
Ben Martin
Phillip Massey
Scott Mitchell
Jimmy Stiles
Sierra Stiles
Erika Taketa
Jennifer Trusty

Marcus Collado
Dona Hesterman
Karen Tenaglia
Clayton Faidley
Chelsey Faller
Lindsay Gedacht
Jennifer Eells
Emily Pollom
Tyler Mosley

Student Workers

Elliot Broder
Walter Cheatum
William Grand
Goda McDowell
Mary Rogers

Unit Affiliated and Co-advised Graduate Students

Jesse Boulerice
Tyson Crouch
Emily Hartfield
Daniel Holt
Patricia Spears
Jimmy Stiles
Sierra Stiles
Michelle Tacconelli
Kevin White

*Graduated

Auburn University Collaborating Faculty

Agricultural Economics and Rural Sociology
- Diane Hite

Biological Sciences
- Troy Best
- Michael Gangloff
- Craig Guyer
- Geoff Hill
- Mary Mendonca

Fisheries and Allied Aquaculture
- Carol Johnston

Forestry and Wildlife Sciences
- Jim Armstrong
- Stephen Ditchkoff
- Gary Hepp
- John Kush
- Ed Loewenstein
- Mark MacKenzie
- Ralph Meldahl
- Mark Smith
- Todd Steury

Mathematics and Statistics
- Randall Holmes

Federal Agency Cooperators

U.S. Fish and Wildlife Service
- Dean Demarest
- Laurie Fenwood
- Bob Ford
- Bill Gates
- Patrick Harper
- Jeff Powell

U.S. Geological Survey
- Jaime Collazo
- Dirk Derksen
- Tom Fondell
- Mary Freeman
- Kevin Gergeley
- Alexa McKerrow
- James D. Nichols

Ken Odum
James Peterson
Jim Williams

USDA, Forest Service
Deyna Kuntzsch
Mark Garner
Dan Logan
Dagmar Thurmond

Department of Defense
Pete Swiderek
Steve Laine
Mark Thornton

Department of Energy
Marshall Adams

State Agency Cooperators

Alabama Department of Conservation and Natural Resources
Frank Allen
Rob Andress
Forrest Bailey
Steve Barnett
Kevin Baswell
Dan Catchings
Gene Carver
Stan Cook
Ron Eakes
Jeff Garner
Keith Gauldin
Bill Gray
Greg Lein
Jo Lewis
Jim McHugh
Ray Metzler
Gary Moody
Nick Nichols
Drew Nix
Chris Nix
Adam Pritchett
Fred Pringle
Steve Rider
Jim Schrenkel
Chuck Sharp
Nick Sharp
Eric Soehren
Bruce Todd

Florida Game and Fresh Water Fish Commission
Andy Strickland

Georgia Department of Natural Resources
Don Harrison

Other University Cooperators

University of Georgia
Byron Freeman
Liz Kramer
Carrie Strait

North Carolina State University
Todd Earnhardt
Matt Rubino
Steve Williams

Oklahoma State University
Stan Fox
Paul Shipman

Non-Governmental Cooperators

Alabama Power Company
Matthew Bowden
Willard Bowers
Angie Segars Anderegg

The Nature Conservancy
Paul Freeman

Conservation Services Southeast
Mark Bailey

Program Direction Statement

The Cooperative Fish and Wildlife Research Unit program facilitates cooperation among the U.S. Geological Survey, Biological Resources Division; universities; state fish and wildlife agencies; and private organizations in programs of research and education related to fish and wildlife resource management. The objectives of the program are: 1) to conduct research on fish and wildlife ecology and to investigate the production, utilization, management, protection, and restoration of populations of fish and wildlife; 2) to provide technical and professional education and continuing education primarily on the graduate and professional level in the fields of fish and wildlife management, teaching, research, demonstration and administration; and 3) to make facts, methods, and new findings discovered through research available to scientists, landowners, sportsmen, outdoor recreationists, conservationists, extension workers, teachers, and local, state and federal agencies. The Unit shall also continue to work closely with the U.S. Fish and Wildlife Service to be informed of, and where requested, assist with the development of that agency's initiatives ecosystem management system. The operations of the Alabama Unit are governed by a Coordinating Committee operating under a formal cooperative agreement signed by the U.S. Geological Survey, Biological Resources Division; Auburn University; the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries; U.S. Fish and Wildlife Service, and the Wildlife Management Institute.

The Alabama Unit has identified four areas in which to concentrate its research efforts: 1) determining the effects of forest management techniques on wildlife species, 2) investigating the ecology and management of stream corridors, 3) investigating the status, life history and habitat requirements, and of endangered or threatened species to obtain information necessary for the development of comprehensive recovery plans, and 4) investigating the ecology and management of fish and wildlife species on landscape scales. The Unit will not be restricted to these areas of investigation; however, it will work towards the development of comprehensive research programs in each.

Effects of Forest Management on Wildlife Populations

Approximately 70% of non-urban land in Alabama is forested, much of it managed intensively for the production of forest products. Wildlife populations can be valuable components of forestlands. However, in some forests wildlife may be quite scarce. The abundance of wildlife in woodlands depends upon available food and cover resources that are in turn determined by forest management practices. Timber management can have major impacts on wildlife populations, and information is required to enable adequate evaluation of these impacts and to permit provision for support of wildlife species in the timber program. Many questions need to be answered relative to the relationships between wildlife species or groups and timber management practices. The response of wildlife to such factors as rotation schedule, species composition of forests, burning and thinning schedules, snag retention or removal, and size of clear cuts, needs to be determined. Area sensitive species need to be identified and their area requirements determined. Response of wildlife species to reforestation efforts requires evaluation. Wildlife is of high economic and aesthetic value and represents an important component of our forest ecosystem. It is important that we obtain the necessary information to ensure the retention of wildlife populations as forest management intensifies.

Ecology and Management of Stream Corridors

A typical southeastern stream corridor is a wetland complex composed of flowing-water aquatic habitats, adjacent riparian habitats, and periodically flooded bottomland habitats. Also, any particular stream corridor is just a segment of a drainage system with a sequence of corridor zones associated with streams from headwaters to large rivers. Stream corridors are important sources of renewable resources such as commercial and recreational fisheries, aquatic-oriented wildlife, and terrestrial wildlife utilizing productive bottomland areas. In addition, stream corridors are highly valued recreation and aesthetic areas due to high biological productivity and landscape diversity.

Stream corridors have always been, and continue to be, the focus of many forms of economic and land developments that exert some effect on these systems. Impacts to stream and river systems basically stem from two general factors, altered hydrologic conditions (i.e., water quality and quantity) and physical alterations of streams and associated lands (e.g., agricultural plots, backwater draining, navigation improvements). Both land and water changes tend to influence the integrity of instream, riparian, and bottomland communities since all these habitats are dependent on water/land relationships. The natural flowing-water processes of erosion and deposition impose a dynamic character to instream, riparian, and bottomland habitats and their associated fish and wildlife communities. Human modifications to stream corridors tend to intensify this dynamic character and frequently require continual human intervention to maintain artificial stream corridor conditions.

The most pressing areas of research involving stream corridors concern the interactions between fish and wildlife communities and the physical and chemical processes of flowing waters. The Unit intends to develop research that integrates fish and wildlife resource characteristics and functions with the hydrologic processes that influence stream corridor habitats. Specific areas for development include: renewable resource management, conservation of species, preservation of communities, impact assessment and prediction of effects, and mitigation and restoration.

Endangered Species

One hundred sixteen* species or subspecies that occur in Alabama have been declared endangered or threatened by the federal government (Threatened and Endangered Species System, USFWS); included are **98** animals and **18** plants. Information on the status, habitat requirements, and life history of these taxa is required to permit identification and declaration of critical habitat and to enable the formulation of management practices providing for their protection and, where possible, eventual recovery. Three hundred three species appear on the list of species of greatest conservation need in Alabama. Addressing the needs of these species now may prevent the need for listing them as threatened or endangered in the future. Research needs vary greatly by taxon; however, the Unit is capable of enlisting a diversity of expertise in addressing identified needs. Research in this area will be developed primarily in response to specific requests for assistance by cooperating agencies.

Landscape Ecology

Traditionally, research in wildlife and fisheries has focused on population or community dynamics on relatively small or undefined spatial scales, with the size of a study area defined by protocols for collecting data or by management units such as forest stands or

agricultural fields. Recent work in the field of landscape ecology strongly suggests that many ecological processes of interest to wildlife and fisheries researchers and managers occur on a variety of spatial scales, ranging from local (e.g., stand-scale) to regional (e.g., landscape-scale) dynamics. Landscape processes often are an emergent ecological property that cannot be directly extrapolated from observations collected on small scales. Inferences from small-scale or aspatial studies could be misleading in addressing the large scale ecological effects of increasing urbanization, changes in land use, and habitat fragmentation evident on modern landscapes.

Recent advances in technology are making spatially explicit data covering large areas widely available at relatively low cost. These data and the tools required to access and interpret them are rapidly becoming essential and affordable to wildlife and fisheries biologists. The Unit will develop research that quantifies and evaluates large-scale, landscape processes for wild populations and the ecological communities that sustain them. The Unit will also be involved in other landscape approaches, including the development and application of spatially explicit, individual-based behavioral models and the use of landscape characteristics to predict the distribution of wild populations.

*Text in bold represents a revision.

EFFECTS OF FOREST MANAGEMENT ON WILDLIFE POPULATIONS

Mapping the distribution of longleaf ecosystems for herpetofauna conservation

Funding Source: U.S. Fish and Wildlife Service

Principal Investigator: James B. Grand

Co-principal Investigator: Mark MacKenzie (Auburn University)

Research Assistant: Kevin Kleiner

Duration: August 2007 – August 2010

Over the last two centuries, the longleaf pine ecosystem has been dramatically altered by logging, replanting with other pine species, and fire suppression. Current estimates, suggest that longleaf occupies 5% of its pre-European settlement extent. This reduction in habitat has affected numerous birds, reptiles, and amphibians. The best known example of this is the red-cockaded woodpecker (*Picoides borealis)*, a federally endangered species that inhabits old growth longleaf pine woodlands. The gopher tortoise (*Gopherus polyphemus*) and the black pine snake (*Pituophis melanoleucus lodingi*) are also longleaf ecosystem inhabitants of increasing concern. Successful management of these animals requires knowledge of the current distribution of the longleaf pine ecosystem.

Currently, the course scale spatial distribution of longleaf pine can be obtained from the USDA Forest Service's Forest Inventory and Analysis Program (FIA, Prasad and Iverson 2003). Additionally in 2005, John Hogland, a graduate student at Auburn University working with the Alabama Gap Analysis Project, created a fine-grain probability distribution of longleaf pine ecosystems (Hogland 2005). Currently, this is the only large extent, fine grain map of the current distribution of the longleaf pine ecosystem. This goal of this project is to evaluate the accuracy of the Hogland's Map and if necessary explore new approaches to for large-scale mapping of longleaf pine using remotely sensed data. Recently, the objectives of this project were modified to assess the use of IKONOS and SPOT imagery as a tool for mapping longleaf pine systems and estimate the relationship between gopher tortoise burrow density and the probability of stand type on the DeSoto National Forest.

Status – An assessment of Hogland's model has been completed and a more accurate model is required for herpetofauna conservation. IKONOS and SPOT imagery were acquired for the study areas. Stand maps based on textural analysis were created to provide an appropriate sampling framework. Field work to collect information on stand characteristics and use by Gopher Tortoises is ongoing.

Balancing game and non-game management objectives on the J.D. Martin Skyline Wildlife Management Area **(new)**

Funding Source: Cooperative Research Units and Alabama Department of Conservation and Natural Resources

Principal Investigator: James B. Grand

Co-investigators: Elise R. Irwin , Frank Allen (ADCNR, Wildlife Section) , Andrew Nix (ADCNR, Wildlife Section), Jim Schrenkel (ADCNR, Wildlife Section), Eric Soehren (ADCNR Heritage Section), Nick Sharp (Lands Division).

Research Associate: Amy L. Silvano

Duration: June 2009 – August 2010

J.D. Martin Skyline Wildlife Management Area (Skyline) occupies approximately 163 km^2 in Jackson County, Alabama and was the study site for a recently completed investigation of terrestrial vertebrate biodiversity. This project will use structured decision making tools to develop management recommendations for Skyline that provide an optimal balance between management for game and non-game wildlife, recreational uses, "Natural areas," and serve as a model for developing similar recommendations for other lands managed by Alabama Department of Conservation and Natural Resources. Three fundamental objectives were identified by a the team of investigators based on the mandates of the land owners and managing agencies. These objectives include maintaining or restoring ecosystem function, maximizing the quality and quantity of habitat for hunted species, and maximizing outdoor recreation opportunities. Sub-objectives identified within the fundamental objectives include maximizing use by priority species identified in the Alabama's comprehensive state wildlife conservation strategy, maximizing early successional habitat, conserving and restoring natural areas, and conserving and restoring aquatic systems, maximizing hunting and non-hunting recreational opportunities. Management alternatives that include uneven-aged forest management, creation and maintenance of early successional habitats, and trail establishment are under consideration.

Status – The investigators attended a week-long workshop on structured decision making and rapid prototyping at the USFWS National Conservation Training Center at Shepherdstown, West Virginia in August 2009. At the workshop, the team received instruction and coaching while developing the essential elements for structuring and analyzing the problem. Several prototype Bayesian belief and decision networks have been developed. We are currently analyzing field and expert-opinion data to develop probabilistic models for the effects of the management alternatives on the criteria that will be used to evaluate their effectiveness at meeting the fundamental objectives for Skyline. The team is scheduled to meet again in March to evaluate the behavior of the models.

Ecological assessment of habitats occupied by breeding birds at Redstone Arsenal, Alabama

Funding Source: Department of Defense

Principal Investigator: Troy Best (Auburn University)

Graduate Students: Lisa A. McWilliams, Charles A. Kilgore, Brian L. Ortman

Undergraduate Students: Rebecca Roper, Francisco Cartaya

Duration: April 2007 – December 2010

The state of Alabama has one of the richest faunal biodiversities in the United States (Mirarchi 2004). There are 420 species of birds comprising the official American Ornithological Society state list (Mirarchi 2004). This is almost half the total species recognized for the continental United States by the American Birding Association.

Redstone Arsenal encompasses a variety of habitats within its 38,248 secured acres. It contains extensive wetland areas associated with the Tennessee River, several local springs, woodlands, and fields. The varied habitats attract a large percentage (~290 species) of Alabama's avifauna either as residents, migrants, or rare visitors (Porter 2001). The area's variable water levels of ponds, sinks, and cypress swamps, much of which is maintained by the Wheeler National Wildlife Refuge, attract many winter waterfowl, herons, egrets, and shorebirds (Porter 2001). The Redstone Arsenal area also attracts many raptors and passerines of both woodland and field species.

Twenty-eight species of birds are of special concern in Alabama. Many species of these birds of special concern may occur in the Redstone Arsenal area of the Tennessee Valley region. Alabama provides critical breeding, wintering, or migratory habitats necessary for the overall success of these species.

Considering the need for information on avian diversity and ecological associations in the region, an assessment of species present, distribution, breeding activity, habitats occupied, etc., is highly desirable. These data would be useful in developing management plans for the Redstone Arsenal, and would provide baseline data for comparisons and future research. This study will be a significant contribution to overall assessment of presence, distribution, breeding activities, and habitat associations of avian species of special concern in Alabama.

Status – Preliminary data on occurrence of birds at Redstone Arsenal were gathered during 2006 and 2007. These data formed the basis for a preliminary report submitted to Redstone Arsenal in September 2007. During January-August 2008 and January-July 2009, field work was conducted at Redstone Arsenal to assess species present, distribution on the facility, breeding activity, and habitats occupied. During January-September 2010, remaining field work will be completed. The final report will be submitted by 31 December 2010.

ECOLOGY AND MANAGEMENT OF STREAM CORRIDORS

Relations between occupancy rates, fish health and water quality parameters for fishes inhabiting Wheeler NWR (completed)

Funding Source: U.S. Geological Survey, U.S. Fish and Wildlife Service

Principal Investigator: Elise Irwin

Research Associate: Kathryn Kennedy

Duration: August 2007 – December 2008

Wheeler National Wildlife Refuge (WNWR) located in North Alabama adjacent to Wheeler Reservoir on the Tennessee River encompasses 35,000 acres, and includes several satellite Refuges. During recent Biological Review of WNWR, recommendations were made to complete an assessment of occupancy rates and overall fish health in relation to water quality for nongame fishes on refuge lands. In addition to Wheeler Reservoir, streams that drain to the reservoir are located on refuge lands and current information is lacking regarding fish populations and aquatic species health in these systems. It is hypothesized that water quality is compromised in several water bodies on the Refuge, therefore warranting a quantitative assessment of how water quality parameters may be affecting both fish occupancy rates and overall fish health. The main objective of this study was to estimate species occupancy rates and health status of non-game fishes within the tributaries of Wheeler NWR, and to compare these data to current patterns of land use.

Status - Seven watersheds were surveyed and twenty-seven species of fish from eight families were captured and identified. Estimates of detection and occupancy for species and disease (of bluegill) were calculated using maximum likelihood methods and modeled as a function of measured covariates using the logit link function. Competing models of detection and occupancy were compared using Akaike's information criterion (AIC). For most species, detection was a function of habitat variables. Species occupancy varied across species and across watersheds, and disease occupancy was high across watersheds. Wheeler Reservoir was likely the most influential driver of species composition and distribution likely because of replacement of lotic stream habitat with lentic reservoir habitat. Pasture land cover appeared to be an influencing variable in describing variation in occupancy for many fish species. Proportion of pasture land cover also demonstrated a positive effect on disease occupancy among fish collected and a negative effect on bluegill growth. Bluegill growth also exhibited a negative response to row crop land cover, and occupancy of parasites among all fish showed a potential positive relation to row crop land cover. Several species of fish collected in the Refuge demonstrated potentially negative responses to urban land cover; most of these species were either absent or had few encounters despite appropriate habitat in two watersheds. The greatest difference between these watersheds and others with similar habitat was the greater potential for urban, residential, and industrial chemical contamination. Estimates of species occupancy and detection will be valuable pieces of information for managers tasked to maintain viable fish populations. Estimates of occupancy may be used as baseline values for assessment of system response to management actions. In this way, estimates are specific, empirical, and measurable objectives for management. It follows that estimates of occupancy and detection are invaluable for incorporating species and disease response into adaptive management and structured decision making.

ENDANGERED/DECLINING POPULATIONS

Integrated analysis of spring pygmy sunfish habitat in Limestone and Madison Counties, Alabama

Funding Source: U.S. Geological Survey

Principal Investigator: Elise Irwin

Research Associate: Kathryn Mickett Kennedy

Student: TBA

Duration: August 2008 – September 2010

Alabama is experiencing rapid growth in many parts of the state; one of the fastest growing is the Huntsville/Madison County region. Human population growth and associated changes in land use in the region will increase and impose potential stress on natural resources such as water quality and quantity and biodiversity. The region has multiple species of conservation need and FWS is in the process of considering the listing of at least one additional species, spring pygmy sunfish Elassoma alabamae identified as imperiled.

Evaluation of effects of landscape change on natural ecosystems is needed. Often water resources (quality and quantity) equate to common currency in systems where multiple competing uses for water have been identified. In the case of the Huntsville, Alabama area, consumption of groundwater and surface water for human uses is needed; however, several issues related to imperiled aquatic species (fish and snails) have also been identified by State and Federal agencies. Understanding water sources and effects of increased use on water quality and quantity for multiple competing objectives will require development of models to 1) define linkages among abiotic and biotic components of ecosystems; 2) identify key uncertainties regarding ecosystem function; and 3) quantify effects of management on state variables (see influence diagram; Figure 1). The goal of this project is to integrate the expertise in USGS Water and Biology to assist FWS with evaluating the effects of ground water and surface water on the persistence of spring pygmy sunfish habitat. Ultimately, the project will provide FWS with a product that could be incorporated into or become a recovery plan or Habitat Conservation Plan for the species of concern.

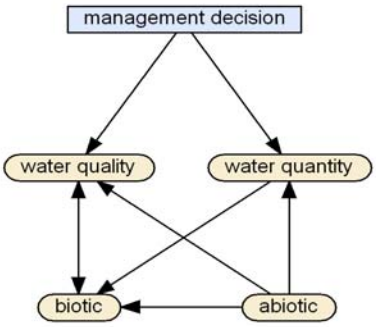


Figure 1. Influence diagram illustrating the relations among management, water quality and quantity and biotic and abiotic components of an ecosystem.

Status – Identification of key ecosystem components, uncertainties, links, and stakeholder values is underway. Meetings with experts in the fields of ecology, water resource management, and groundwater geochemistry have been scheduled. These meetings will provide the necessary expert opinion and sources for empirical data to inform a structured decision model for management of spring pygmy sunfish.

Assessment of habitats in areas historically used by Ivory-billed Woodpeckers in southern and western Alabama and the Florida panhandle (completed)

Funding Source: US Fish and Wildlife Service

Principal Investigator: Geoffrey Hill

Graduate Students: Brian Rolek

Research Technicians: Elizabeth Wright, Gordon Gover

Duration: August 2006 – August 2009

The recent re-discovery of Ivory-billed Woodpeckers (IBWO) in Arkansas has spawned interest in surveys of suitable habitat within the former range of the species. In the mid- to late-1860s IBWO were shot along the Tombigbee River in Marengo County and the Warrior River west of Greensboro in Alabama. In 1907, one was reported killed in the Conecuh swamps north of Troy. Numerous birds were collected in river-swamps of the Florida panhandle during that time period. Large tracts of bottomland hardwoods and river-swamps still exist in the Tombigbee, Mobile, Tensaw, Black Warrior, Conecuh/ Escambia, Pea/Choctawhatchee, Appalachicola/Chipola, Rivers in Alabama and panhandle Florida.

The objective of this project is to conduct field searches for IBWO in areas of suitable habitat, and characterize the habitats associated with all potential IBWO observations and sign.

Status – Since we initiated a search for Ivory-billed Woodpeckers in Northwest Florida in 2005,we have gathered substantial evidence that Ivory-billed Woodpeckers persist in the forests along the Choctawhatchee River south of Interstate 10. Between May 2005 and January 2008 we documented 25 sightings by competent observers, recorded over 400 sounds consistent with the *kent* calls and double-knocks of Ivory-billed Woodpeckers, and detected numerous large cavities in trees. In the latest funding period, however, there were no credible detections of ivorybills by any members of our search team or by birdwatchers who visited the area. The 2009 search focused on setting automated cameras that were activated by seismic sensors and conducting counts at pre-determined stations scattered throughout the swamp forest. At this point we know far too little about the foraging behavior of Ivory-billed Woodpeckers in this part of Florida to recommend any sort of detailed forest management such as girdling trees as has been done in Arkansas. We do feel confident in stating that these are shy birds that require large tracts of forest for survival. Our recommendations for management of the forested areas where we have found evidence for the existence of Ivory-billed Woodpeckers are: 1) Minimize disturbance on lands owned by the Northwest Florida Water Management District. 2) Exclude use of off-road vehicles from NWFWMD lands except on designated roadways. Hunting and fishing should be permitted because there is no evidence that these activities disturb Ivory-billed Woodpeckers and restricting such activities would alienate the many local people who enjoy such recreation. 3) Acquire areas of forest wetland not already owned by NWFWMD and land adjacent to forested wetlands. Acquire corridor creeks that could facilitate dispersal to adjacent bottomlands.

Population status and host plant population status of the Gulf Coast solitary bee, Hesperapis oraria

Funding Source: U. S. Fish and Wildlife Service

Principal Investigator: George Folkerts (Auburn University)

Research Assistant: Katie Glynn

Duration: March 2006 – March 2009

Hesperapis oraria was described in 1996 (Cane et al. 1996) from specimens ranging from Horn Island off the coast in Jackson County, Mississippi, eastward to St. Andrews State Park in Bay County, Florida. This species is the only representative of its genus east of the Mississippi River and thus represents a unique geographical disjunct from other species which inhabit the western U.S. and Mexico. As far as is known the species is restricted to coastal dune habitats and sandy barrier islands. Coastal Plain honeycomb head (*Balduina angustifolia)* is thought to be the sole pollen host for this species (Cane et al. 1996). Although the host plant ranges farther inland and occurs in coastal Georgia and throughout the Florida peninsula, no specimens of the bee have been taken in most areas of the host plant range. Thus, it is possible that the species is restricted to the area from which it is presently known. Nests of this species have not been reported in the literature and were not found during previous survey work. Thus, the conservation significance of many life history parameters of the species cannot be assessed. Since the last survey for this species was completed in 1995, Cane (1997) reported that ten populations, located during 1993-1994, survived the effects of Hurricane Opal (October 1995) which impacted essentially the entire known range of the species to some extent. Since that time, tropical storms or hurricanes have impacted portions of the known range of *Hesperapis oraria.* An additional factor that may have affected populations of *H. oraria* relates to the accelerated coastal development that has occurred throughout its range since the bee was discovered. In areas such as the Fort Morgan peninsula in Baldwin County, Alabama, development has markedly changed habitats in the last decade. Cane (1997) reported that a site from which the species was known at Romar Beach, Baldwin County, Alabama, had been destroyed by building construction.

Status – This project was not completed due to the untimely passing of Dr. Folkerts.

Reproductive biology of the federally threatened Price's Potato Bean(new)

Funding Source: U.S. Department of Defense (Redstone Arsenal, AL)

Principal Investigators: Robert Boyd (Auburn University)

Graduate Students: Kyle Paris (M.S.)

Duration: August 2009 – May 2012

Apios priceana (Price's Potato-Bean) is described in the Recovery Plan (USFWS 1993) as a vine that grows up to 15 feet in length from a large underground stem (tuber). It is often found in open woods and along the edges of streams in areas underlain by limestone rock. Flowers of this species appear in large clusters and individual flowers are relatively large and showy (about 2 cm long). The species was first collected in 1896 and is known from only a few populations. NatureServe Explorer reports only 25 populations, often with fewer than 50 individuals, and some of these are known or believed to be extirpated. The restricted range, small population sizes, and reports of declining population sizes caused this species to be listed as Federally Threatened by the US Fish and Wildlife Service on February 5, 1990.

Little is known of the natural history of this species of *Apios*. The Recovery Plan for *Apios priceana* (USFWS 1993) contains a long list of natural history information needs for this species. Natural history studies can provide information regarding the general life history situation for a species, and form the basis of a general scientific understanding of a species' ecological relationships. This type of information can be helpful for managers seeking to understand the basic biology of a threatened species, and we propose to generate this type of information for Price's Potato-Bean. We will use the DOD's Redstone Arsenal population as the focal population for generating this information.

Status – This project was funded only recently and is just getting underway. One graduate student will be working on this project during the coming year (M.S. student Kyle Paris) and an initial visit to the field site has been made.

LANDSCAPE ECOLOGY

Adaptive management and monitoring for restoration and faunal recolonization of shoal habitats

Funding source: Alabama Power Company, Alabama Division of Wildlife and Freshwater Fisheries

Principal Investigator: Elise Irwin

Research Associate (s): Kathryn Mickett Kennedy

Student (s): Taconya Piper (Ph.D.), Ben Martin (M.S.), Molly Martin (M.S.)

Duration: October 2006 – September 2010

High imperilment rates of fishes and mussels in the state of Alabama are related to impoundment and regulation of riverine flows. Specifically, the inundation and disruption of natural flow regimes of shoal habitats in medium sized rivers was hypothesized to be the primary cause for imperilment of 53% of fishes in Southeastern Rivers. In Alabama, loss of functional shoal has likely affected 64% of fish species of greatest conservation need (GCN). Restoration and protection of functional shoal habitat in the remaining unimpounded (i.e., free flowing) fragments of rivers of the State is a critical element of conservation of aquatic species. However, effects of specific flow regimes (i.e., magnitude, duration and timing and their combinations) on shoal habitats and ultimately on biotic processes are not well known. Therefore, we propose to evaluate effects of experimental flow regimes on shoal dependent aquatic fauna in the Piedmont region of Tallapoosa River. Specific objectives are to: 1) Compare fish and invertebrate assemblages and population structure between flow-managed and naturally flowing river reaches (including all GNC species); 2) Assess habitat stability (i.e., shoals) and persistence for GCN species and other species of concern; and 3) Determine applicability of flow management and habitat restoration for other river systems.

Status - Analysis of a long-term (1981-1991) historical data set collected throughout the Tallapoosa basin after dam construction suggested populations of shoal-dwelling fish species have been either stable or in possible recovery since dam construction. Monitoring of faunal response to flow management changes at Harris Dam has been conducted in both spring and fall of 2005-2009. Results from 2005 indicated group (regulated vs. unregulated) and/or distance from the dam were important factors in explaining the variance in occupancy for several species, including black redhorse, lipstick darter, and muscadine darter. In preliminary analysis of the 2005-2008 data, these species showed greater fluctuations in population parameters in unregulated sites compared to regulated sites. This is possibly due to the regional drought conditions experienced in the region from 2006-2008. Over the four years of data, black redhorse population parameters were again a function of group (regulated vs. unregulated) and/or distance from the dam, suggesting a strong influence of the dam on this species. Population parameters for lipstick and muscadine darters were more a function of habitat characters, suggesting a lesser influence of the dam. In addition to population analysis, spawning windows for fishes are being evaluated for GCN species from both assessment of reproductive condition of adults and collection and aging of juveniles. Data from 2005-2009 continue to be processed and analyzed. We are currently preparing a final report for the first phase of the study which will continue this fiscal year.

Inventory and conservation planning for species of greatest conservation need on Alabama DCNR lands

Funding Source: Alabama Division Wildlife and Freshwater Fisheries, Auburn University

Principal Investigator: James B. Grand

Co-principal investigators: Mike Gangloff, Craig Guyer, Elise Irwin, Carol Johnston, Mark MacKenzie, Ed Loewenstein, Todd Steury

Project Coordinator: Amy Silvano

Graduate Students: Rob Allgood, Jesse Boulerice, Emily Hartfield, Daniel Holt, Carrie Johnson, Eva Kristofik, Patricia Spears, Jimmy Stiles, Sierra Stiles, Michelle Tacconelli, Kevin White

Duration: October 2006 – December 2011

During this five-year project the Alabama Cooperative Fish and Wildlife Research Unit will coordinate the development of multi-species Inventory and Conservation Plans (ICPs) for selected lands managed by the Alabama Department of Conservation and Natural Resources. The project will potentially include lands in six ecological regions, and could affect 303 species of greatest conservation need (GCN), of which 118 are listed as threatened or endangered. During the first year, a steering committee will be established, lands and species for inclusion in the plan will be identified, information needs assessment will begin, and an outreach plan will be developed. Subsequent years will be used to gather information and develop decision support tools, conduct outreach programs, and develop the ICPs. The overall goal is to provide a science-based plan for the conservation of GCN species and the habitats they depend on as they occur or could occur on ADCNR managed lands. Additional goals are to establish a protocol and a baseline for monitoring GCN species, to provide a basis for the development of new ICPs, to provide guidance for the improvement of populations of GCN species, to improve upon our understanding of the issues affecting the conservation of GCN species, and to foster relationships among public and private stakeholders.

Status –This is the second year of high priority field research and we conducted surveys on 6 study areas in central Alabama—Coosa WMA , Cheaha State Park, Oak Mountain State Park, Wind Creek State Park, Coldwater Mountain Tract, and Sipsey Sullivan Tract. At each study area we used standardized protocols to sample bird, mammal, reptile, amphibian, fish, mussel, and crayfish populations and their associated habitats. The surveys were based on a probabilistic sampling design that will allow us to estimate distribution, abundance, and habitat relationships for many of the species that are detected. Habitat information collected on the surveys is being used to develop simulation models for management of two forest types. The habitat relationship and forest management models will be used to evaluate species responses to potential management actions using structured decision making approaches.

Climate change in the Southeast U.S. and its impact on bird habitat

Funding Source: U.S. Geological Survey

Principal Investigator: James B. Grand

Research Associates: Kevin Kleiner, Tyler Kreps

Duration: September 2008 – September 2010

Many fish and wildlife agencies are preparing to respond to projected changes in climate local, regional, and global scales. Numerous climate models were developed under the Intergovernmental Panel on Climate Change (IPCC) that predict changes in temperature and rainfall patterns throughout much of North America. These changes are expected to cause substantial alteration to habitat conditions and thus species distributions. Current models, run at a continental scale, have been inconsistent with regard to predicting temperature trends and trends in storm duration and intensity over the Southeastern U.S. Understanding the impact of potential changes in climate on wildlife habitat adds yet another dimension of uncertainty when agencies attempt formulate management plans based on historical trends of population abundance. Terrestrial landscapes are expected to change yielding altered forest and terrestrial ecotypes, to the extent that species distributions and migratory patterns for birds and other species may dramatically change. However, this change may be obfuscated by land use change in many areas. Still, state fish and wildlife agencies will need information on potential changes to wildlife habitat for long-range planning efforts. Unfortunately, climate change predictions from the current suite of Global Circulation Models (GCM) have not been scaled appropriately for state or local level planning. This project seeks to develop historical land use and land cover data (LULC) at decadal intervals from the late-1970's through 2006 and examine change in relation to observed climate and land use. These data will complement ongoing projects at North Carolina State University (NSCU) to examine changes in bird distribution over the same time period. Data from both projects will be used in conjunction with climate change predictions based on Regional Circulation Models (RCM) that are in development at Texas Tech University to examine the potential changes in bird distribution in the southeastern U.S

Status – Remote-sensing data for mapping the historical LULC have been acquired. The uniform land cover legend for has been determined for the historic classification. A protocol for mapping land cover change has been developed and data collection is underway.

Decision Support Models for Multi-species Bird Conservation

Funding Source: North Carolina State University

Principal Investigator: James B. Grand

Graduate Student: Allison Moody

Duration: January 2008 – December 2010

Populations of many game and non-game bird species in the eastern US are declining relatively rapidly. With limited funding for bird conservation, there is an urgent need to make informed decisions because in many areas lands suitable for bird conservation are increasingly limited. Moreover, programs to conserve and manage those lands are competing with land uses that drive the cost effectiveness of conservation programs even higher. To further improve conservation design and make the best use of limited conservation funds for bird populations, planning efforts need to be spatially explicit, large-scale, based on physiographic not political boundaries, and they need to consider the relative conservation potential of the landscape as well as the relative need for conservation of each bird species. We are developing a framework for the biological planning and conservation design elements of strategic habitat conservation that will ensure the sustainability of bird populations in the South Atlantic Migratory Bird Initiative (SAMBI) area. The framework will be based on identified assumptions that can be evaluated and updated through monitoring and applied research. This framework will be applied based on projections of land use and land cover and emergent projections of animal distribution that incorporate both urbanization and predicted climate change developed by cooperators at the North Carolina Cooperative Fish and Wildlife Research Unit (NC CFWRU) at NCSU. The products are expected to identify strategically important areas for bird conservation efforts through partnerships forged by the Atlantic Coast Joint Venture (ACJV).

Status – In conjunction with researchers at NC CFWRU and ACJV staff, during FY2008, we hosted four workshops within the SAMBI area to inform land managers and ACJV partners of this effort and to solicit their input on the review of animal distribution models, selection of focal species, and conservation design objectives through a structured decision making exercise. A report is in preparation that describes how information provided by workshop participants was used to develop lists of focal species using two approaches. Projections of land cover change in the Charleston, SC and Camp Le Jeune, NC areas were used in a preliminary examination of the effects of climate change and urban growth on conservation priorities for longleaf pine birds for the ACJV technical team.

Optimal Conservation Strategies to Cope with Climate Change (new)

Funding Source: U.S. Geological Survey, Southeast Climate Assessment

Principal Investigator: James B. Grand

Postdoctoral Fellow: Vacant

Graduate students: Vacant (2)

Duration: September 2009 – August 2013

Natural resource managers in the southeastern United States face unprecedented pressure to develop effective and efficient conservation strategies. Climate change and other anthropogenic stressors further complicate the challenges associated with maintaining populations of trust species and the habitats they require. Additionally, opportunistic, reactive strategies frequently have not been effective for stabilizing or bolstering already declining populations of many terrestrial and aquatic species. Thus, we propose to employ a strategic, integrated approach to ensure the health and resilience of those species that allows adaptation to changing climate and other anthropogenic activities. We will use the principles of Adaptive Management (AM) and Strategic Habitat Conservation (SHC) to address the potential impacts of climate change on terrestrial and aquatic wildlife populations in the southeastern United States at regional scales. AM provides an ideal framework for the establishment and attainment of conservation objectives in the face of many sources of uncertainty, while SHC is specifically designed to address issues associated with establishing and maintaining target wildlife populations. Although it can be argued that SHC is only applicable at landscape scales, the iterative nature of both processes is essentially parallel. To be successful either approach requires explicit involvement and commitment of stakeholders in planning, design, decision making, monitoring, and research.

In Phase I of the project we will hold a series of workshops for the fish and wildlife conservation community to: 1) Identify focal species for planning conservation actions within each ecoregion, 2) Assess the state of populations of focal species based on the best available information, 3) Determine population objectives and habitat objectives for focal species that will ensure their persistence, and 4) Identify and quantify the effects of management and policy alternatives for the conservation of focal species. In Phase II, we will 1) Select habitat relationship models for predicting population responses by focal species to climate change and conservation actions, 2) Determine optimal conservation strategies based on the identified management and policy alternatives that are most likely to sustain populations of focal species, and 3) Identify key elements for monitoring that will reduce uncertainty regarding the effect of climate change on terrestrial and aquatic populations and their habitats and measure progress towards population and habitat objectives.

Status – We are currently coordinating with U.S. Fish and Wildlife Service staff on timing and participation in Phase I workshops to be held during 2010. A selection committee is interviewing applicants for the Postdoctoral Fellow. Graduate student applications are in review.

OTHER PROJECTS

Using time-lapse cameras to estimate abundance and structure of Eastern wild turkeys (Meleagris gallopavo) in Alabama

Funding Source: Alabama Division Wildlife and Freshwater Fisheries, Alabama Wild Turkey Federation, Auburn University

Principal Investigator: James B. Grand

Graduate Research Assistant: Phil Damm

Duration: August 2007 – December 2009

The increased harvest of Eastern Wild Turkey populations in recent years has led to questions regarding the sustainability of this harvest. We propose a statistically rigorous population survey using time-lapse cameras and bait to estimate age and sex ratios, abundance, and annual poult production to assess harvest sustainability in the state of Alabama. Hypotheses of density in relation to habitat characteristics at the landscape level have been developed *a priori* from the literature to determine the sources of variability that cause unequal distribution of wild turkeys at an ecoregional scale. The objectives of the study are to 1) estimate the abundance (through estimates of density and incorporation of models of detectability) of turkeys using repeated time lapse camera surveys in a nine county area in southwest Alabama; 2) estimate annual production (poults per hen) and age and sex structure of the population; and 3) determine sources of heterogeneity in habitat that cause bias in estimates of turkey density and detectability. An important assumption to this survey is that each trapping occasion (photograph) is independent. If turkeys become faithful to bait sites that would not normally use those sites, then density estimates could be overestimated. To explore the possible bias, we intend to conduct a short term telemetry study to determine the effects of bait on density of use of space by turkeys. Upon completion, this proposal will provide land managers with critical information required to maintain current population levels of wild turkeys through sustainable harvest.

Status - During the summer of 2008, the camera survey was conducted in District V of the ADCNR Division of Wildlife which consists of nine counties. Division of Wildlife personnel conducted surveys in Mobile, Baldwin, Monroe and Clarke counties. Auburn University personnel conducted surveys in Conecuh, Choctaw, Washington and Wilcox counties. One hundred and one plots were surveyed, and 178,951 images were captured. All images have been reviewed and the number animals by species, as well as the sex and age of all turkeys were recorded. Data analysis and reporting are in progress.

PRODUCTIVITY

Publications

Hanson, L. B., J. B. Grand, et al. (2008). "Change-in-ratio density estimator for feral pigs is less biased than closed mark-recapture estimates." Wildlife Research 35(7): 695-699.

Hanson, L. B., M. S. Mitchell, et al. (2009). "Effect of experimental manipulation on survival and recruitment of feral pigs." Wildlife Research 36(3): 185-191.

Hayer, C. A and E.R. Irwin. 2008. Influence of Gravel Mining and Other Factors on Detection Probabilities of Coastal Plain Fishes in the Mobile River Basin, Alabama. Transactions of the American Fisheries Society 137:1606-1620.

Irwin, E. R., K. D. M. Kennedy, M. C. Freeman, J. Peterson and B. J. Freeman. 2009. Using Aquatic GAP models to prioritize conservation efforts: a framework. GAP Bulletin 16:53-60.

Schamber, J. L., P. L. Flint, et al. (2009). "Population Dynamics of Long-tailed Ducks Breeding on the Yukon-Kuskokwim Delta, Alaska." Arctic 62(2): 190-200.

Publications Pending

Irwin, E. R. and J. Hornsby. In press. Measuring change associated with hydrologic alteration: the Tallapoosa River fish assemblage in 1951 and 1996. Fisheries Management and Ecology xx:xxx-xxx.

Irwin, E. R. In press. Coarse woody debris provides productive fish habitat in streams. Page xx in Managing Forests on Private Lands in Alabama and the Southeast. Alabama Forestry Commission and Alabama Forestry Foundation, Montgomery, Alabama.

Irwin, E. R., K. D. M. Kennedy, M. C. Freeman and J. Peterson. In press. Adaptive management of a regulated river: a template for stakeholder involvement and structured decision making. Ecology and Society xx:xx-xxx.

Jolley, D. B., S. S. Ditchkoff, B. D. Sparklin, L. B. Hanson, M. S. Mitchell, and J. B. Grand. In press. An estimate of herpetofauna depredation by a population of wild pigs. Journal of Mammalogy .

Mitchell, M.S., Pacifici, L.B., Grand, J.B., Powell, R.A. 2009.Contributions of vital rates to growth of a protected population of black bears. Ursus 2:###-###

Sakaris, P. C. and E. R. Irwin. In press. Tuning stochastic matrix models with hydrologic data to predict the population dynamics of a riverine fish. Ecological Applications xx:xxx-xxx.

Sharp, N. W., M. S. Mitchell, and J. B. Grand. In press. Sources, sinks, and spatial ecology of cotton mice in longleaf pine stands undergoing restoration. Journal of Mammalogy.

Reports

Hitch, A.T., Grand, J.B., Allen, S.L., and Sharp, N.W. 2008. Habitat use and distributions of birds, small mammals and herpetofauna on the J.D. Martin Skyline Wildlife Management Area, Jackson County, Alabama. Final Report to Alabama Department of Conservation and Natural Resources

Kennedy, K.D.M. and E. R. Irwin. 2009. Patterns of fish and disease occupancy in Wheeler National Wildlife Refuge, Alabama. Final Report to U.S. Fish and Wildlife Service.

Silvano, A.L, Kleiner, K.J., Grand, J.B. MacKenzie, M.D., Mitchell, M.D., and Irwin, E.R. The Alabama Gap Analysis Project: Final Report to USGS National Gap Program. Submitted: September 15, 2009.

Presentations

Grand, J.B, Kleiner, K.J. A decision support tool for longleaf pine restoration using Southeast Regional GAP data and methodology developed by the East Gulf Coastal Plain Joint Venture. Longleaf Alliance Regional Meeting 29-30 October 2009, Sandestin, FL

Grand, J.B. Integrating ecological principles in conservation design. USFWS R4 Biologists's Conference Callaway Gardens, GA 23-25 February 2009 - Invited Speaker

Irwin, E. R. and K. D. M. Kennedy. January 2009. Stakeholder involvement: a primary need for successful adaptive management. Adaptive management and structured decision making: helping stakeholders make smart decisions about complicated systems symposium. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana. Invited Speaker.

Kennedy, K. D. M. and E. R. Irwin. January 2009. The Next Step: Evaluating and Applying Adaptive Management Monitoring Data for the Tallapoosa River below R.L. Harris Dam. Adaptive management and structured decision making: helping stakeholders make smart decisions about complicated systems symposium. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana. Invited Speaker.

Irwin, E. R., A. M. Ferrara, K. D. M. Kennedy, P. C. Sakaris, and R. Campbell. January 2009. Alligator gar conservation in the southeast United States: development of a decision tool for evaluating effects of management on population viability. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana. Invited Speaker.

Irwin, E. R. February 2009. Using Bayesian Belief Networks as Decision Support Tools for Conservation Planning. USFWS R4 Biologist's Conference. Confronting 21st Century Challenges: Strategic Habitat Conservation. Callaway Gardens, Pine Mountain, Georgia.

Irwin, E. R. March 2009. Human Dimensions, Stakeholder Involvement and Objective Setting, Adaptive Management Conference Series, Athens, Georgia. Invited Speaker.

Martin, B. M. and E. R. Irwin. January 2009. Modeling redbreast sunfish nest survival in the regulated Tallapoosa River, Alabama: defining functional responses to discharge and temperature. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana.

Martin, M. M. and E. R. Irwin. January 2009. Population parameters of crayfishes in regulated and unregulated reaches of the Tallapoosa River basin. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana. Poster.

Piper Goar, T. D. and E. R. Irwin. January 2009. Effects of fluctuating hydrological regime and water temperature on juvenile channel catfish growth and survival. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana. Poster.

Range-wide decision support tool open pine ecosystem conservation. NFWF Power of Flight Meeting Gulfport MS 15-17 April 2009 – Invited Speaker

Decision support tool open pine ecosystem –project update. East Gulf Coastal Plain Management Board Meeting, Holly Springs, MS 25-29 May 2009 - Invited speaker.

Wild Turkey Production Study in Alabama. 35th Annual Southeast Directors' Wild Turkey Committee Meeting Decatur, AL 9-10 Jun 2009 – Invited speaker

Developing a range-wide decision support tool and tracking database for Open Pine restoration, Lower Mississippi Valley/West Gulf Coastal Plain/Ouachitas Landbird Working Group Meeting, Minden LA 9-10 September, 2009 - Invited Speaker

Moody, A.T., Grand, J.B. Incorporating expert opinion in decision support models for birds in the eastern United States, US regional association of the international association for landscape ecology symposium, Snowbird, UT 12-16 April 2009

Hitch, A.T., Grand, J.B. Sources of variation in detection probability for birds in habitat relationship models in the Cumberland Plateau, AL. American Ornithologists Union Meeting, Philadelphia, PA 12-15 August 2009

Johnson, C.B., Grand, J.B. The Effects of Wildlife Openings on Bird Communities in the East Gulf Coastal Plain. American Ornithologists Union Meeting, Philadelphia, PA 12-15 August 2009

Moody, A.T., Grand, J.B., Collazo, J.A., Designing landscapes for sustainable bird populations in the southeastern United States American Ornithologists Union Meeting, Philadelphia, PA 12-15 August 2009

Williams, S.G., Grand, J.B., Collazo, J.A, Nichols, J.D., Royle, J.A., Sauer, J.R. Global Climate, Landscape Change and Range Dynamics of Landbirds in Eastern North America. Waterbirds Society Meeting, Texas, Nov 2008

Johnson, C.B., Grand, J.B. The Effects of Wildlife Openings on Bird Communities in the East Gulf Coastal Plain

Damm, P.E., Grand, J.B. Using time-lapse cameras to estimate abundance and structure of Eastern wild turkeys (*Meleagris gallopavo sylvesteris*) in Alabama. Southeastern Natural Resources Graduate Student Symposium, Starkville, MS

Graduate Theses and Dissertations

Martin, B. M. 2008. Nest survival, nesting behavior, and bioenergetics of redbreast sunfish on the Tallapoosa River, Alabama. Masters' Thesis. Auburn University.

Awards

Best Poster Award. Southern Division American Fisheries Society.

Martin, M. M. and E. R. Irwin. January 2009. Population parameters of crayfishes in regulated and unregulated reaches of the Tallapoosa River basin. Spring Meeting of the Southern Division of the American Fisheries Society, New Orleans, Louisiana. Poster.

Outreach/Technical Assistance

Dr. Grand

Designing sustainable landscapes – GA 6 Nov 08

Workshop for longleaf remote sensors Auburn, AL November 8, 2009

Structured Decision Making presentation and discussions USFWS, ES office in Panama City, FL 13-14 May 2009

Developing a range-wide decision support tool and tracking database for Longleaf Pine restoration, Auburn, AL 13-14 July 2009

Developing a range-wide decision support tool and tracking database for Longleaf Pine restoration, Auburn, AL 13-14 July 2009

Skyline final report – Montgomery, AL 21 Nov 2009

ICP Project Steering Committee Meeting Auburn, AL 15 January 2009

ICP Project presentation at Auburn Fisheries review Auburn Alabama, 6 February 2009

Selection of focal species and modeling habitat priorities for SAMBI area - meeting with Atlantic Coast JV Coordinators – 15-16 June, Raleigh NC

Effects of climate change on bird habitat in the Southeastern U.S., Southeastern Association of Fish and Wildlife Agencies Directors' Meeting, Corpus Christi, TX

USFWS – selection committee for East Gulf Coastal Plain Joint Venture Coordinator October 2008

USFWS Atlanta – Climate Change workshop 30 January 2009

PVA analysis for Steller's Eider for USFWS R7 ES

Structured Decision Making Workshop – Balancing game and non-game wildlife objectives on the Skyline Wildlife Management Area, Shepherdstown, WV 10-14 August & several pre- and post-workshop teleconferences

Structured Decision making presentation/workshop for Eider Recovery Team 16-20 February 2009

Dr. Irwin

Alligator Gar Management presentation. January 15, 2009, Alligator Gar Technical Committee, Southern Division, American Fisheries Society.

Adaptive management presentation at Fisheries Review meeting February 6, 2009.

Met with The Nature Conservancy regarding instream flows in the Southeast. March 23, 2009

Harris Dam project update, ADCNR and APC. March 30, 2009. Prattville, Alabama

Met with The Nature Conservancy and other colleagues regarding a research agenda instream flows in the Southeast. April 14, 2009

Army Corps of Engineers Water Control Manual Update meeting. April 14, 2009. Discussed Harris Dam project and relevance to Carters Dam.

Harris Dam Stakeholders meeting. May 26, 2009. Alexander City, Alabama.

Structured Decision Making Workshop – Balancing game and non-game wildlife objectives on the Skyline Wildlife Management Area, Shepherdstown, WV 10-14 August & several pre- and post-workshop teleconferences

International Activities

Dr. Irwin

Submitted NSF proposal in the PIRE program (Partnerships for International Research and Education: 3 selected for submission from AU). Linking nutrients, natural resources and floodplain ecosystem dynamics: landscape ecology of the Caño Negro National Wildlife Refuge, Costa Rica. Collaborators were from AU Outreach, Education, School of Forestry and Wildlife Sciences, Civil Engineering and Fisheries. A private industry (Spectir) and three other Universities were involved: Internacional Universidad Nacional of Costa Rica, Nichols State (LA), and University of Arkansas, Pine Bluff.

Teaching

Dr. Grand

Courses

- WILD 7950 Analysis of Wildlife Populations (7 students; 3 hrs)

Directed Studies

- Intro to GIS (1 student; 3 hrs)
- Occupancy Analysis (1 student; 2 hrs)
- Use of focal species for coservation planning (1 student; 2 hrs)

alabama
cooperative
fish and wildlife
research unit

original graphic artby: Collin Shreves III