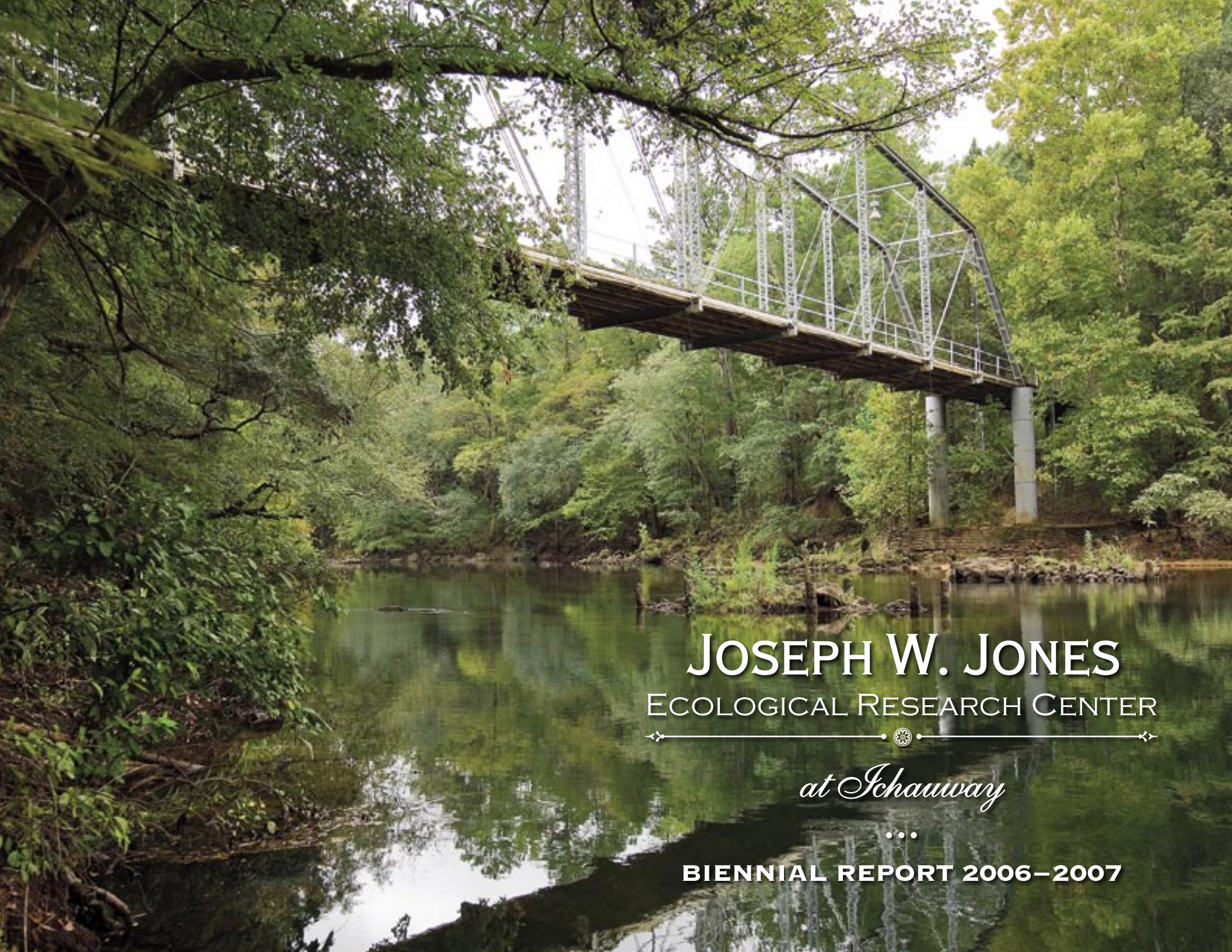

Joseph W. Jones
Ecological Research Center

at Ichauway

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BIENNIAL REPORT 2006–2007

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MISSION & VALUES

The Joseph W. Jones Ecological Research Center at Ichauway seeks to understand, to demonstrate and to promote excellence in natural resource management and conservation on the landscape of the southeastern Coastal Plain of the United States.

The Jones Center was founded on a long-standing ethic of conserving land and water resources. Ichauway is maintained as the tangible expression of this natural resource management philosophy. Central to this philosophy is the conviction that management and research inform each other and are partners in their contribution to knowledge. One of the Center's most important products is people who combine a rigorous understanding of ecological principles with proficiency in natural resource management.

To understand the natural systems of the southeastern Coastal Plain, the Center assembles information from respected practitioners and scientific literature and conducts targeted research to expand the knowledge of the field. Through a rigorous and creative research program, the Center aspires to improve management and stewardship of regional resources and also to contribute to natural resource science at the national and international levels.

To demonstrate excellence in natural resource management, the Center manages Ichauway to protect and enhance the diversity of natural communities and their component species. The practical and economic aspects of proper stewardship are fundamental considerations of our work.

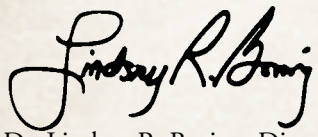
To promote excellence in natural resource management and conservation, the Center develops and conducts education and outreach programs for undergraduate and graduate students, interns and land owners and managers. The Center serves as a science-based resource for public officials, policymakers and the public.

FROM THE DIRECTOR

The Joseph W. Jones Ecological Research Center programs are focused on the unique ecological attributes and resource management of the southeastern Coastal Plain region. We are inspired and supported by the remarkable Ichauway land base with its extensive longleaf pine woodlands, high biological richness, limesink depressional wetlands, and rivers and streams dynamically connected to the Upper Floridan aquifer. Ichauway is utilized for demonstrations of natural resource management and stewardship, field-oriented short courses, visits by groups from universities and other natural resource agencies, long-term research, graduate student research and training of conservation management apprentices.

This report provides an update for the years 2006 and 2007, rather than for a single year like the 2005 annual report. This format enables us to better illustrate the growth and changes in our programs. This report provides an update on our considerable advancements in research, outreach and land management relating to our ecological forestry program with longleaf pine and the use of prescribed fire. Our aquatic and water resource scientists have continued their timely research and information transfer efforts with Georgia water policy leaders resulting in the Flint River Basin Water Development and Conservation Plan. Wildlife biologists have been very busy summarizing several years of their research with predator ecology, and in 2006 held both a Predator Ecology and Management landowner field tour and a workshop on that topic for natural resource professionals. In all the core research areas of the Center, our staff continues to define and address key conservation issues with their work and transfers this information to a wide range of constituents including natural resource professionals, policymakers, private landowners, conservation groups and university students. These topics are elaborated upon in this 2006–2007 Biennial Report.

We continued to have the generous and steady support of the Robert W. Woodruff Foundation during this period, including both the commitment of Ichauway's natural resources toward our mission and their financial support for our capital and operating expenses. We have used these resources to advance science-based conservation practices within the Coastal Plain region and to educate a new cohort of professionals to meet the challenges of stewardship of natural resources in the 21st century.



Dr. Lindsay R. Boring, Director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HIGHLIGHTS 2006–2007

- Twenty graduate students from five cooperating universities are currently conducting their research at Ichauway as part of our cooperative graduate student program. In addition, four individuals participated in the Center's conservation apprentice program in 2006–2007.

- More than 100 groups totaling approximately 1,750 natural resource professionals and university students visited the Center in 2006–2007 for educational programs including field tours, short courses, workshops and professional conferences. In addition, approximately 700 visitors from the region attended our 2007 Open House.

- The Center initiated a new long-term research project on ecological forestry and fire ecology and conducted ecological forestry workshops with participants from state agencies and conservation organizations throughout the Southeastern U.S.

- The Center led the transition of the Georgia Prescribed Fire Council from a regional organization to a statewide group for outreach and promotion of prescribed fire. The Center also worked to educate policymakers about prescribed fire through our work with the Georgia Prescribed Fire Council and on-site educational events for the U.S. Environmental Protection Agency.

- The Center continued to adapt Stoddard-Neel concepts of ecological forestry to Ichauway. Approximately 500 acres were harvested using single tree selection in 2006, with additional salvage operations for storm-damaged timber in 2007.

- The Flint River Basin Regional Water Development and Conservation Plan was finalized in 2006. The completed management plan was founded in sound science and developed with extensive stakeholder participation. Center staff served as technical advisors throughout the plan development process.

- The Center hosted two predation management field days. Seven years of research results from Center scientists, as well as regional colleagues, were summarized and presented to landowners, land managers and to USDA Wildlife Services personnel. Additionally, land management practices of Ichauway were showcased in the context of managing the predation process.

- Research staff published 29 articles in peer-reviewed journals in 2006 and 18 in 2007. Center staff also produced 10 technology transfer publications for education and outreach in 2006 and nine in 2007. There are an additional 10 "in press" publications for 2007.

PURSUING RESEARCH, EDUCATION AND CONSERVATION

The Joseph W. Jones Ecological Research Center at Ichauway is a research and conservation site of regional, national and international significance. Ichauway's 29,000 acres contain approximately 17,000 acres of rare, mature, longleaf pine woodlands, innumerable depressional wetlands, 25 miles of streams and 3,000 acres of field habitat.

Research

The research program at the Center focuses on two broad themes: the ecology, restoration and management of the longleaf pine ecosystem and water resources and aquatic ecosystems of the southeastern Coastal Plain. This dual focus of our research reflects the Center's location and the information needs of the region. Ichauway is situated in the region historically covered by longleaf pine forests. The longleaf pine ecosystem is one of the most biologically diverse systems on earth and one that is seriously threatened by human activities. The Center is also located in a hydrologically unique karst region that serves as the major recharge area for one of the most prolific and heavily used aquifers on earth, the Upper Floridan aquifer, and one that exhibits unusual interaction between surface water and groundwater resources. We balance basic research of these systems with applied work of interest to the natural resource management and conservation communities. Many of our long-term projects incorporate various components of terrestrial, aquatic and wildlife research and require an interdisciplinary approach to advance our understanding.

Our work in the longleaf pine ecosystem focuses on biodiversity and productivity of the system, integrated forest and wildlife management and ecological restoration. A common thread that links each of these areas is the critical role of prescribed fire. The Center initiated new projects on prescribed fire in both research and outreach in 2006–2007.

The lower Flint River Basin supports diverse and abundant aquatic ecosystems including streams, rivers and wetlands. The Upper Floridan aquifer supports base flows in area streams and rivers upon which a diverse community of plants and animals depend. As human populations have increased, the demands for water have diminished water availability to support streams, rivers and wetlands. Land conversion threatens to degrade water and habitat quality. Aquatics research focuses on understanding how increasing human populations affect the aquatic ecosystems of the region. Our research and education programs are designed to give policymakers and stakeholders the information they need to make informed decisions about the management and conservation of these resources.

Information generated from our research program is disseminated through peer-reviewed journal articles, technology-transfer products, popular publications and by our participation in regional, state and national scientific meetings. At the Center, our research is based on cooperation between scientists and information users. Our research seeks to address relevant natural resource management questions so that policymakers and landowners can utilize science to support the development of sound resource management plans and policies.

Conservation

The Center's conservation program is charged with the stewardship and management of the Ichauway land base. It also serves as a technical information resource for the Center and as an example of wise resource management in the region.

The integration of research and natural resource management on Ichauway presents a unique opportunity for these programs to inform one another. Information from our research programs can be scaled up to an operational level for implementation and demonstration, with these same applications providing valuable feedback and generating additional questions for scientists.

The Center's conservation program incorporates a diverse range of activities into a management model that balances multiple values in the context of a deeply-rooted land ethic. These activities include an extensive prescribed fire program, game management for species such as bobwhite quail and whitetail deer, management and monitoring of nongame and endangered species such as the red-cockaded woodpecker, conservation-based forest management and restoration of the longleaf pine ecosystem across the Ichauway landscape.

Education and Outreach

Information generated at the Center is shared with a diverse constituency including natural resource management agencies, policymakers, private landowners, conservation groups and university classes. These audiences visit the Center for field tours, short courses and workshops, while Center staff also work with them at other sites in Georgia and across the Coastal Plain of the southeastern U.S.

Our primary constituents are actively involved in making decisions that influence the management of natural resources. Our work with university-level students helps prepare the next generation of natural resource professionals. Through our outreach efforts, the Center influences conservation and management at both the state and national level.

Forty-nine students from regional research universities have completed advanced degrees through our cooperative graduate education program and 20 students are actively pursuing degrees at this time. The development of well-trained professionals through our graduate program is one of the Center's most important contributions, providing a unique legacy that continues to influence the management and conservation of natural resources through the course of these individuals' careers.

LONGLEAF PINE-WIREGRASS ECOSYSTEM

Well known for its conservation values, the longleaf pine ecosystem is gaining greater recognition for its ability to balance conservation with economic, recreational and aesthetic values. These attributes make management and restoration of longleaf an attractive option for private landowners, natural resource management agencies and conservation organizations across the Southeast. The Center continues its efforts to understand, demonstrate and promote a holistic approach to management and restoration of the longleaf ecosystem that balances these multiple values. Some of the highlights of our work over the past two years are outlined below.

- **Georgia Prescribed Fire Council**
  Center staff chaired the Georgia Prescribed Fire Council for the second time in its five-year history. The purpose of the Council is to promote the responsible use of prescribed fire and to educate the public about the importance of fire for healthy forests. The past two years were a period of significant growth for the Council, evolving from a regional effort focused on southwest Georgia to a statewide organization. The Council has served a valuable leadership role in bringing the state's prescribed fire community together as issues such as air quality, smoke management and catastrophic wildfire have become subjects for public policy debates. In recognition of its achievements, the Council received the Pulaski Award, a national award given annually by the U.S. Department of the Interior to recognize outstanding contributions to fire management and prevention of wildfire. Center staff also led efforts to found a national coalition of state fire councils.

- **Ecological Forestry Course**
  In cooperation with the Center's Scientific Advisory Committee, Center staff have developed an ecological forestry short course for natural resource professionals in the Southeast. The course is a part of the national Conservation Forestry Network and focuses on management and restoration of pine grasslands of the Coastal Plain, particularly longleaf pine. The course has attracted participants from nine Coastal Plain states extending from New Jersey to Louisiana.

- **Fire Research**
  Fire is a vital management tool for the longleaf pine ecosystem. The Center has conducted research into fire effects for many years. The newly initiated research program in fire ecology extends this baseline of management and research into three focal areas: variation in fuels, fire behavior and the ecological effects of variation in fire behavior. Understanding the variation in fuels and their consequences for fire behavior is critical for building predictive models of fire effects. Incorporating these variables into fluid dynamic models of fire behavior is also critical for predicting fire behavior and smoke management. Advancement in these models, which integrate convection and atmospheric interactions, can enhance our ability to predict the combustion process and dispersion of emissions into the atmosphere. Finally, integrating this fire science into the long-term forest ecology research projects seeks to further our understanding of the effects that fire has on carbon cycling, sustained timber yield and maintenance of biodiversity.

- **Ecological Forestry Research**
  The Center initiated a new long-term research project on ecological forestry. This project will support fire research by investigating linkages between silviculture and prescribed fire. Specific components of the project will help refine our understanding of the structure of longleaf pine forests, particularly regeneration and recruitment of smaller size classes into stands. Other aspects of the project will compare natural and human disturbances as well as restoration of the longleaf ecosystem.

- **Native Groundcover Restoration**
  Research and technological advances over the last decade have made reestablishment of longleaf pines relatively reliable. However, much less is known about restoration of the species-rich understory for which the longleaf ecosystem is renowned. Many of these plants play critical functional roles, such as the ability of grasses to carry fire and the role of legumes in cycling nutrients. The Center is addressing this information need through research, conservation and outreach programs. Researchers are developing new approaches to facilitate the establishment, cultivation and seed collection of native groundcover species, while our conservation and land management staff implement restoration at operational scales on Ichauway. Our knowledge and experience are shared with interested parties through our Native Groundcover Partnership, a diverse group of individuals, organizations and agencies interested in restoration of the longleaf ecosystem.

CONSERVATION

The qualities that make Ichauway unique and valuable are the result of a long tradition of excellence in land management. Many of the finest examples of the longleaf ecosystem on private lands are the legacy of visionary individuals such as Robert Woodruff, who assembled large properties as quail preserves in the early 20th century. Today, the Center builds upon this tradition of conservation by integrating science and land management in a dynamic setting in which each informs the other.

The Center's conservation staff includes land managers, wildlife biologists and foresters. They carry out programs in forest management, silviculture and restoration; management of game species such as bobwhite quail and whitetail deer; conservation of endangered, threatened and special concern species; and long-term habitat monitoring. Their work includes ongoing activities, such as using prescribed fire as a management tool, as well as new efforts to restore or improve forest or wildlife habitat based on sound science. Highlights of activities over the last two years include the following:

- Prescribed fire is the most essential tool for management of the longleaf pine ecosystem. The Center's conservation staff maintains an exemplary prescribed fire program that simultaneously maintains the longleaf ecosystem and minimizes wildfire danger. The long history of prescribed fire on Ichauway demonstrates its critical role in maintaining the values of longleaf forests, including conservation values, recreational opportunities and timber resources. In 2006, Center staff burned almost 14,000 acres. Because extreme drought conditions of 2007 restricted our fire activities, just over 11,000 acres were burned.

- While much of Ichauway offers some of the best remaining examples of the longleaf pine ecosystem, some areas of the property have been altered by past land use activities. The Center continues an active longleaf pine restoration program on these sites. Restoration may require one or all of the following practices: mechanical removal of undesirable hardwoods, selective herbicide application, planting longleaf seedlings and reestablishing native groundcover. Commercial crews removed approximately 700 acres of undesirable hardwoods in 2006–2007. Center conservation staff conducted similar work in smaller, more sensitive areas.

- The Ichauway forest demonstrates that conservation-based management of longleaf pine can produce economic benefits. The Center continues to adapt the Stoddard-Neel system of selection harvest to our forests. Approximately 500 acres were harvested in the northeastern portion of Ichauway in 2006. The primary goal of this harvest was stand improvement, with non-longleaf pine species and poor quality trees targeted for removal. Harvests in 2007 have been focused on salvage of downed timber from a tornado that swept through Baker County earlier this year. Salvaged timber is milled with a portable sawmill and used for building projects and repair on Ichauway.

WATER RESOURCES

One goal of the Center's programs is to contribute to a better understanding of the water resources of the Southeast as a knowledge base for Georgia's emerging efforts at regional watershed/wetland protection and water resources policy development. This knowledge will help evaluate the environmental consequences and trade-offs associated with human use of water and conservation of aquatic systems. The development and eventual utilization of this information requires a multi-targeted approach of: (1) obtaining understanding through research; (2) communicating results through education/outreach efforts targeted at regional and state natural resource managers, policymakers and educators and; (3) demonstrating conservation of exemplary ecosystems.

State policymakers and managers recognize that Georgia and the southeastern U.S. face myriad water use, water allocation and water policy issues. Unbridled population growth in the northern part of our state and an expansion of irrigated cropland in the south may soon exceed the capacity of our water supplies to meet human needs. More frequent and severe droughts also challenge our agricultural producers in southern Georgia. Statewide, we are constantly reminded of how limited our water resources have become. Competing demands for limited water supplies require the formulation of management policies based on sound science that balance the needs of humans and ensure the long-term health and sustainability of stream and aquifer systems.

The broader impacts of our work at the Center in water resource education and conservation represent an expansion into areas where we have established ourselves in a leadership role. The sustainable use and conservation of water are essential if we are to preserve the ecological amenities and services provided by healthy aquatic ecosystems. For humans, the consequences of ignoring our inherent stewardship responsibilities include increased health risks, degraded water supplies, elevated water treatment costs, decreased quality of life and limits to development and economic growth. In addition to human consequences, degradation of aquatic ecosystems will result in loss of unique regional flora and fauna, frequent drying and habitat loss, accelerated introduction of nuisance species and degraded water quality.

Center staff recognize that there are many factors to consider when developing a water management plan for Georgia. However, new initiatives and, perhaps, new management strategies will be needed to keep pace with the southeastern region's increasing demands for water, as well as to address changes in water availability that may result from global climate change.

Scientists at the Jones Center, in cooperation with members of the Center's Scientific Advisory Committee, are leading the formation of the Southeastern Environmental Flows Partnership that consists of researchers, policymakers and water managers from state and federal agencies, conservation groups and university faculty representing the southeastern region. Environmental flows are defined as the water regime of a stream, wetland or aquifer necessary to maintain the biological and ecological processes, health of aquatic ecosystems and the associated ecological goods and services required by humans. We believe that environmental flows provide great benefits for people by ensuring economic development while maintaining the health of streams and rivers. Environmental flows ensure the long-term sustainability of the many benefits that healthy stream and aquifer systems bring to society.

Research designed to provide an understanding of the consequences of human development on the water resources and aquatic systems will be critical in the evolution of conservation and management strategies for the southeastern region. Scientists at the Center, in cooperation with various state, federal and university partners, are continuing long-term studies that will evaluate threats to regional water availability, provide technical leadership to water resource policymakers and regulators and assist in the development of conservation strategies that will ensure the stewardship of water resources and aquatic systems.

Externally Funded Research 2006–2007

Hicks, D.W. Hydrological evaluation of Grand Bay and Banks Lake. The Nature Conservancy. 2006.

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