VALUING ECOSYSTEM SERVICES

in the

RED HILLS REGION

of Southwest Georgia & North Florida

A Publication of Tall Timbers Research Station & Land Conservancy

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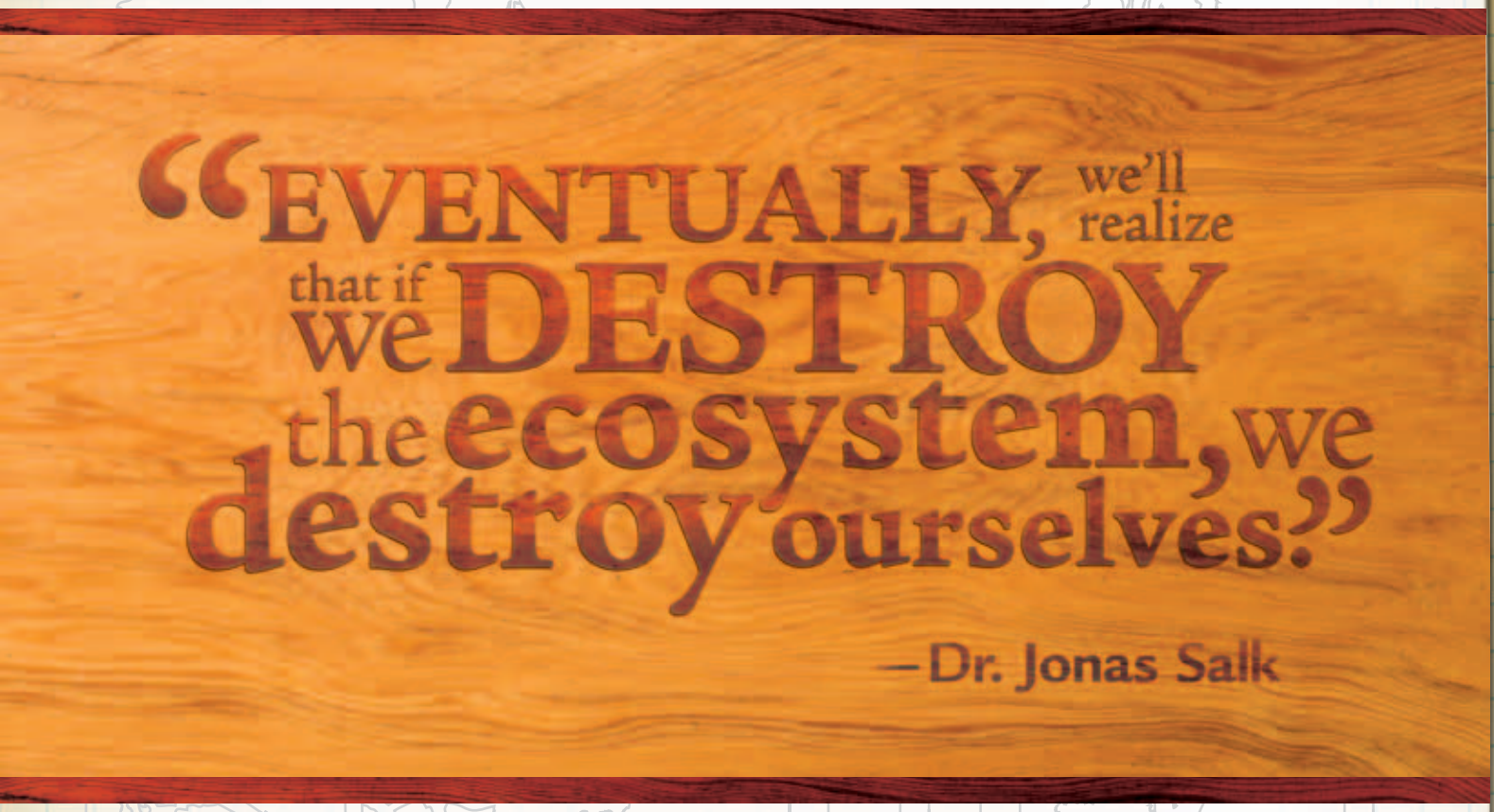
"EVENTUALLY, we'll realize that if we DESTROY the ecosystem, we destroy ourselves."
—Dr. Jonas Salk

It is no secret that the environment provides us many valuable products, including food, fuel, building materials, and minerals. Far less understood is the value of certain indispensable **ecosystem services** in our lives. These services are natural processes we take for granted that support our lives on earth: water purification, drinking water recharge, flood control, climate regulation, carbon storage, soil conservation, pollination, and wildlife habitat conservation, even natural beauty.

We think of these vital services as free and limitless. They don't have price tags and aren't traded on any stock exchanges. But because we don't recognize them as having any monetary value, they often are disregarded when decisions are made that affect our forests, wetlands, and other natural areas. The result is serious and costly impacts. For example, the loss of marsh and wetlands in Louisiana resulting from the construction of hundreds of dams and diversions along the Mississippi River over several decades magnified flooding and damage from Hurricane Katrina in coastal areas and the city of New Orleans.[1]

Because development decisions largely depend on cost and benefit analyses, it is critical that the economic value of these services provided by nature be incorporated into the decision making process. Fortunately, this is already beginning to happen. In 1997, New York City saved $6 billion in capital costs and hundreds of millions of dollars annually since then by protecting water-filtering forests in the Catskill and Delaware watersheds rather than building a massive water treatment facility.[2] Similarly, a number of cities across the United States, including Austin, Charlotte, Raleigh, San Antonio, and Seattle, are using forest conservation as a viable, low-cost alternative for protecting water supplies and ensuring drinking water quality for their growing metropolitan areas.

Such recognition of the economic value of nature's services has led to a number of efforts around the U.S., including this first-ever project in the Red Hills region of North Florida and Southwest Georgia. To begin, it is necessary to assign dollar values to the beneficial natural processes our region provides.

Ecosystem services are the things that nature provides that directly benefit people. These services include water purification, drinking water recharge, flood control, carbon storage, soil conservation, pollination, wildlife habitat conservation, even natural beauty.

Two of the most valuable ecosystem services in the Red Hills region are water supply protection and groundwater recharge.

Determining the Value of Ecosystem Services in the Red Hills Region

From 2009 to 2011, the University of Georgia's Warnell School of Forestry and Natural Resources undertook the challenge of valuing a wide range of critical ecosystem services provided by private forests in the greater Red Hills region. Nestled between the Ochlockonee and Aucilla Rivers, the Cody Escarpment just south of the state capital of Tallahassee, Florida, and the historic main street community of Thomasville, Georgia to the north, this magnificent area has retained many of the natural features that are vanishing from the landscape of the South. The region's rolling hills encompass a mosaic of pinewoods, hardwood forests, grassy plains, sinkhole lakes, and wetlands. Rich in plants and animals, it is home to more than 60 rare and threatened species. The forested lands of the greater Red Hills also nurture the Floridan Aquifer, a vast underground reservoir that provides clean drinking water to millions of residents of Florida, Georgia, and Alabama.

We are fortunate that the forests and other natural areas of the Red Hills have endured and even thrived when so many others have vanished. The single most important reason is that the region is home to more than 80 quail hunting properties, some larger than 14,000 acres, many established in the late 1800s and early 1900s. Of the more than 445,000 forested acres in the greater Red Hills (referred to hereafter simply as the Red Hills), more than 300,000 acres are held as largely contiguous quail hunting lands. As of January 2012, more than 164,000 acres of these hunting lands in the Red Hills were permanently protected through conservation easements and other measures. Red Hills private landowners' devotion to the practices of selective timber harvesting and prescribed burning has resulted in a bounty of interconnected natural areas providing irreplaceable ecosystem services that benefit the broader public.

Study Process

The research team used geographic information system technology to identify characteristics of forested areas in the Red Hills that affect economic values. These characteristics included forest type, riparian status, groundwater recharge rates, wildlife diversity, and scenic visibility. Researchers adapted detailed value estimates from previous studies to the Red Hills and conducted original research to determine local residents' willingness to pay for changes in environmental quality. They then estimated per acre dollar values based on forest characteristics and these combined valuations.

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Study Results

The results of the study underscore the well-known ecological importance of the Red Hills by demonstrating the tremendous **economic value of the ecosystem services** that are directly benefiting all residents of the region. Economists estimated the total economic value of the ecosystem services provided by the private forest lands of the Red Hills at **$1.136 billion per year**. The estimated average value of ecosystem services **per acre** ranges from **$600 to more than $11,900 annually**, depending upon the forest characteristics on site. As shown below, two of the most valuable ecosystem services in the Red Hills are water supply protection and groundwater recharge.

Ecosystem Service	$/Acre/Year	Total Value (Rounded)
Water Supply Protection	$0–$8,200*	$615 million
Groundwater recharge	$200–$600	$229 million
Gas and climate regulation	$30–$380*	$17 million
Pollination	$0–$180*	$60 million
Habitat conservation	$0–$250*	$52 million
Aesthetic value	$200–$2,600*	$163 million
		Total $1.136 billion/year

*Depending upon forest characteristics on site

Water Supply Protection: Red Hills forests and wetlands perform many vital roles. They are essential for slowing storm water runoff and allowing time for absorption to prevent flooding. Forests and wetlands also filter pollutants such as sediments, fertilizers, pesticides, herbicides, and heavy metals, preventing these contaminants from fouling drinking water supplies and thus decreasing water treatment costs. They perform these services across more than 1,000 square miles. The estimated dollar value of filtering and cleansing water and providing flood protection throughout the region is more than $615 million annually. This includes values ranging from $4,600/acre annually for rural forested wetlands to $8,200/acre annually for forested wetlands in urban and suburban areas, which have a higher value given their relative scarcity and their important role in flood protection and pollution abatement.

Groundwater Recharge: Ensuring an adequate supply of drinking water has become a critical issue for Florida, Georgia, and Alabama. The vast forests and wetlands of the Red Hills perform a crucial role in continually replenishing the Floridan Aquifer, the source of drinking water for millions of residents of these fast-growing states. In fact, more than 76 percent of Red Hills forest lands are classified as having high annual aquifer recharge, with rates exceeding 10 inches/year. Southern Thomas County and southeastern Grady County, with annual rates approaching 20 inches, are among the areas of highest recharge in the Floridan Aquifer. The total annual economic value associated with groundwater recharge in the Red Hills is more than $229 million. This ranges from more than $200/acre yearly for low recharge areas of between 1 to 10 inches/year to $600/acre yearly for areas of high aquifer recharge.

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Gas (CO_2) and Climate Regulation: Forests are essential for their role in absorbing carbon dioxide, producing oxygen, removing harmful pollutants from the air, and regulating our climate.[3] Red Hills private forest lands cover hundreds of thousands of acres and provide these vital natural services to the public at no cost. The annual value of this natural process applied to the Red Hills is $17 million or between $30/acre for rural forest land, which includes 97 percent of the region, and $380/acre for forests in urbanized portions of the region. The much higher value for forests in urban environments reflects the larger scale of human health issues and the relative scarcity of these lands.

Pollination: Red Hills forests provide vital habitat for bees, butterflies, and moths. These pollinators are essential for the successful reproduction of approximately 1,000 plants, including agricultural commodities grown in the Red Hills for food, fibers, and medicines. The annual dollar value of forest habitat for pollinators is $60 million with per acre values as high as an estimated $180 for non-wetland forests. The importance of this aspect of forest habitat cannot be overstated, as the value of Florida crops pollinated by bees alone is $3.3 billion.[4]

...protecting habitat to ensure species diversity is increasingly important.

Habitat Conservation: Given population growth, habitat fragmentation and loss, and cuts to state land conservation programs in Florida and Georgia, protecting habitat to ensure species diversity is increasingly important. The Red Hills is home to an amazing diversity of plants and animals. For example, 170 of the 290 species of amphibians and reptiles in the Southeast are found within southern pine forest systems like the Red Hills. And just one of these, the gopher tortoise, digs burrows used by more than 365 species.[5] Based on economic assessments conducted elsewhere and then tailored to the Red Hills, the estimated annual value of wildlife habitat is $52 million and is as high as $250/acre for evergreen forests with relatively high diversity.

Aesthetic Value: Americans place great importance on open space, regardless of whether it is a forest or grassy plain, in a rural or urban environment, publicly owned or privately held. In fact, one survey of 174 small businesses found that quality of life was one of the highest rated factors for small companies considering relocation, and the most important quality of life consideration was the presence of parks, recreation, or open space.[6]

The cherished evergreen forests, rolling fields, and lush wetlands of the Red Hills offer scenic views that have economic as well as aesthetic value. As one example, properties near such green space routinely command higher values. Based upon extensive survey research, landowners report they would be willing to pay between $200 and $2,600/acre annually depending upon forest characteristics and location, to protect the scenic Red Hills landscape. Higher estimated values are associated with the presence of water features, such as rivers, streams, and ponds, with residents reporting they would be willing to pay more than $42 million annually to protect key water resources.

Payments for Ecosystem Services (PES)

Because ecosystems provide irreplaceable natural services that save countless taxpayer dollars, it makes sense to incentivize landowners to protect these ecosystems. Payments for ecosystem services (PES) afford landowners a small financial incentive to continue protecting forests and other natural areas that provide ecosystem services that benefit the public.

The largest provider of ecosystem service payments in the United States is the federal government. Federal programs, such as the Conservation Reserve Program, Environmental Quality Incentive Program, and Wildlife Habitat Incentive Program, provided approximately $2 billion in PES in 2011 to reward conservation activities that reduced erosion, protected water quality, and provided wildlife habitat. Economists from the U.S. Department of Agriculture estimated the economic benefits from the Conservation Reserve Program alone ranged from $9.5 billion to $19.5 billion.[7] And because agricultural and forest lands constitute such a large portion of total land use (70 percent of land area in the lower 48 states), they must be a key target in any strategy to reverse the loss of ecosystem services.[8]

Innovative partnerships are emerging to compensate land owners for protecting forests and agricultural lands that provide ecosystem services that benefit the public. Now the South Florida Water Management District, in conjunction with state and federal agencies, has initiated the Northern Everglades PES Program. Eligible cattle ranchers in the Northern Everglades have been invited to propose projects that would provide water storage or nutrient removal over a ten-year contract period. The estimated payment total over the life of the project is $43 million. Project partners believe this effort will reduce pollutants entering Lake Okeechobee and south Florida estuaries, control flooding, and prevent further degradation of water quality.[9]

This is one of several leading-edge PES projects. For example, an Oregon utility in the Tualatin River watershed pays landowners to plant shade trees near river banks to offset the impact of heated discharges from a wastewater plant[10]; a Santa Fe Municipal Watershed Restoration Project proposes to fund forest management and restoration activities to protect the city's watershed from a catastrophic wildfire[11]; and Perrier Vittel S.A., the international purveyor of bottled water, pays landowners near its source waters to use less intensive dairy farm practices.

Finally, though not direct payments for ecosystem services, federal tax incentives promote the use of conservation easements. These and state programs such as Georgia's Conservation Use Assessment, which significantly reduce property valuation for farm and forest lands, are financial inducements that bolster the protection of ecosystem services that benefit the public.

Forests are essential for their role in absorbing carbon dioxide, producing oxygen, removing harmful pollutants from the air, and regulating our climate.

Conclusions and Recommendations

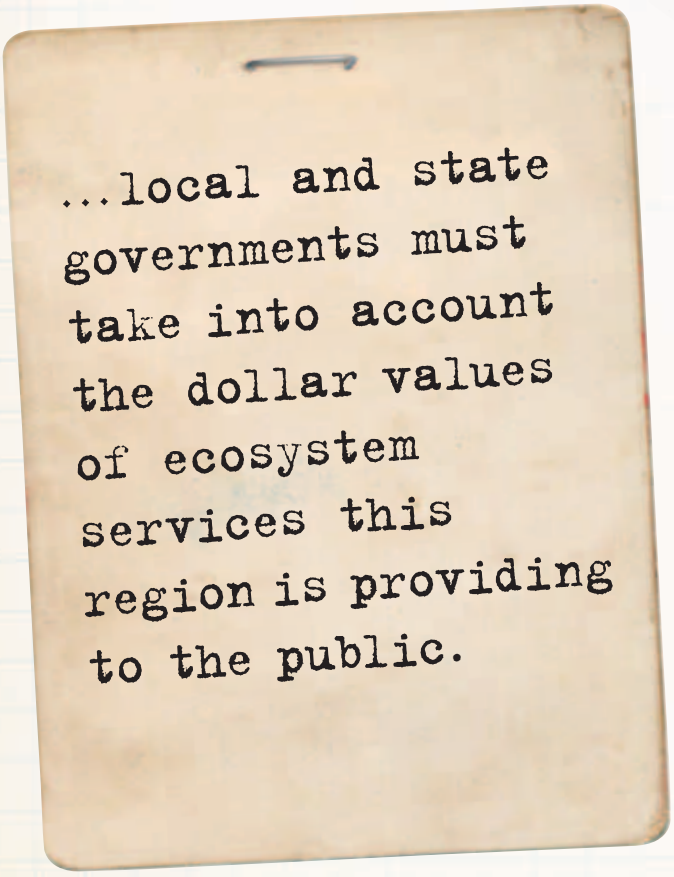
- Forest lands in the Red Hills provide an estimated **$1.136 billion annually** in vital ecosystem services that are critical for the regional economy, the environment, and our quality of life. It is vital to protect the lands that provide these valuable services.

- When prioritizing conservation opportunities and making decisions regarding project and program funding in the Red Hills, local and state governments must take into account the dollar values of ecosystem services this region is providing to the public.

- Given the vital and often irreplaceable ecosystem services provided to the public by forests and other landscapes, local, state and federal governments must take them into account when considering land use, transportation, and utility projects and proposals that could adversely affect these natural systems.

- Forest landowners may be able to take advantage of federal PES programs as well as a small but growing number of innovative private sector and public-private partnerships that are emerging to incentivize the protection of forests providing ecosystem services.

- In addition to existing PES options, Red Hills landowners should be on the cutting edge of future opportunities, such as the possibility that Red Hills forests could serve as compensated mitigation sites for gopher tortoises and other declining species.



- Finally, this study is the first step in informing landowners, business leaders, and government officials about the critical importance the Red Hills region plays in providing valuable ecosystem services that benefit taxpayers. Future research is needed to fill data gaps, broaden the interdisciplinary approach to ecosystem service studies, and increase public awareness of the role the Red Hills plays in protecting these important natural services.

For Additional Information

For additional information about this project, contact:

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The mission of Tall Timbers is to foster exemplary land stewardship through research, conservation, and education in the Red Hills region of north Florida and southwest Georgia.

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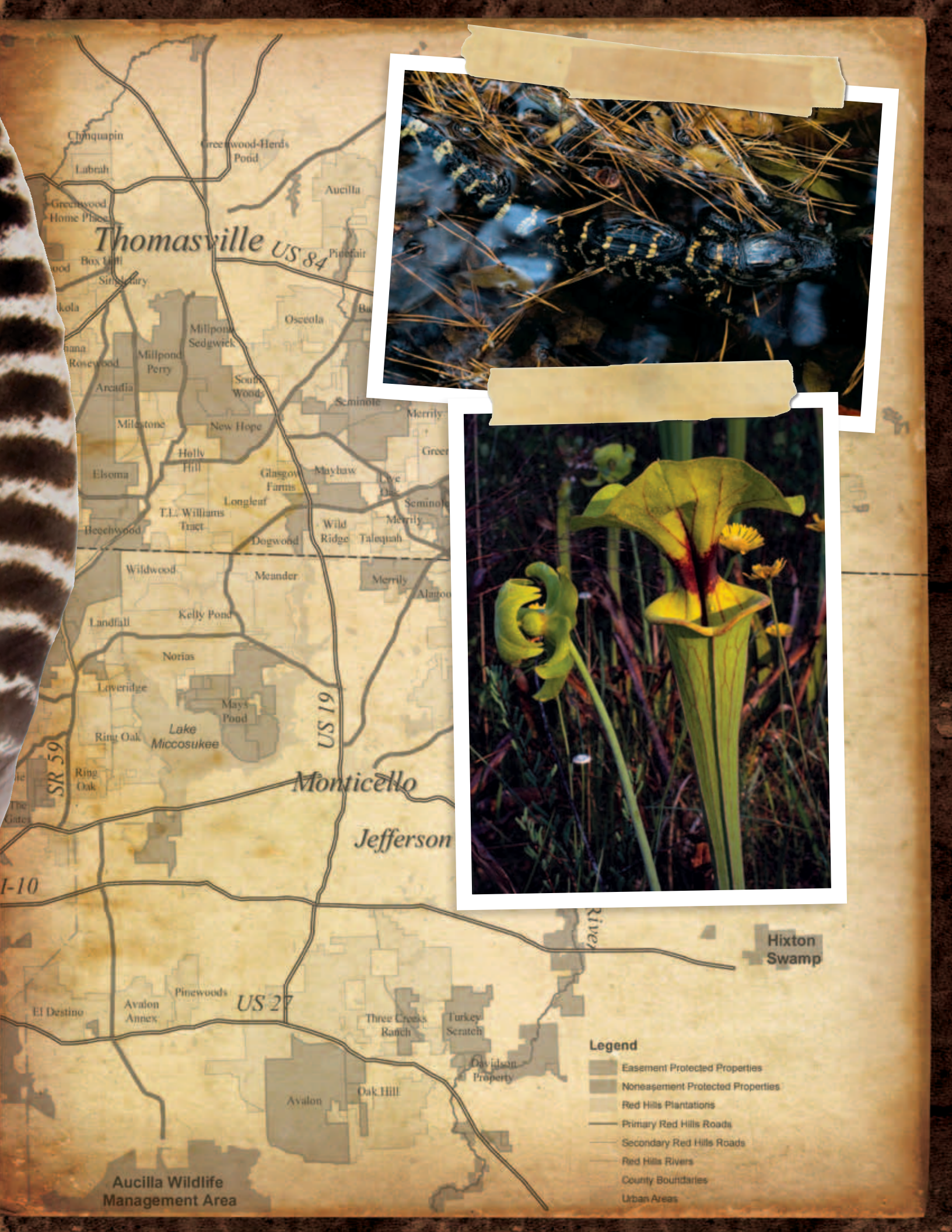
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