

Wetlands are a unique and valuable natural ecosystem. They can be found in every state throughout the country. Along the Gulf Coast, wetlands are an essential ecosystem that is extremely important to society. Essential services include reducing floods, trapping sediments, recycling and removing nutrients, supporting a rich biodiversity, and yes - producing timber products.

Unfortunately, the U.S. is losing wetlands at a steady pace. The U.S. Fish and Wildlife Service estimates over half of the wetlands in the Gulf of Mexico were lost between 1780 and 1980. They estimated 396,800 acres of Gulf Coast wetlands were lost between 1998 and 2004. This is six times the rate of wetlands lost along the U.S. Atlantic Coast.

Many individuals own forestland that contains areas classified as wetlands. They have an added reason to be concerned that forest management activities not only protect, but help enhance our fragile wetlands.

# Alabama's Wetlands

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“Trees can reduce the heat of a summer's day; quiet a highway's noise, feed the hungry; provide shelter from the wind and warmth in the winter. You see, our forests are the sanctuaries not only of wildlife, but also of the human spirit. And every tree is a compact between generations.”

-U.S. President George H.W. Bush (1989)

Alabama has been blessed with a rich and plentiful array of natural resources. Foremost of these are our quality water resources and extensive forests, which comprise millions of acres throughout the state. As these two resources are of vital importance and connected to each other hand in hand, their management and conservation are critical to sustain and enhance the quality of our American way of life so that it will continue and prosper.

Despite increasing development pressures, Alabama is fortunate to have a large amount of hydrologic resources with rivers and wetlands of quality that may be conserved and managed to maintain our needs. Conservation of the water resources also includes lakes, streams, headwaters, and marshes. In recent times, more attention has been given to protecting these riverine and wetland ecosystems and their associated habitats.

These water resources are of great importance to forestry operations and concerns throughout the state, and this article places emphasis on those wetland ecosystems associated with forestry practices.

## What are Wetlands?

According to Alabama's Best Management Practices for Forestry, wetlands are described as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support (and under normal circumstances do support) a prevalence of vegetation typically adapted for life in wet or saturated soil conditions.

An area is classified or determined to be a wetland when the three key parameters of hydrophytic vegetation, hydric soils, and wetland hydrology occur together on a site under normal circumstances and of sufficient duration, according to the U.S. Army Corps of Engineers (using the 1987 *Corps of Engineers Wetland Delineation Manual* and its *Regional Supplements*).<sup>2</sup>

Wetlands may include marshes, swamps, wet meadows, natural depressions, bogs, impoundments, ponds, and sloughs. They are present in many environmental settings such as riparian areas, floodplains, and upland forested areas. Some wetlands are fresh water, some are saline, and others are created by underground water that is very close to the surface. Wetlands can be vegetated or non-vegetated, and they can be dry part of the year but wet long enough and often enough to have unique natural functions. Consequently, wetlands perform such unique and complex processes that few definitions adequately describe all wetlands well, or completely.<sup>3</sup>

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## Where are Wetlands and Forested Wetlands Located?

Actually, forested wetlands may be found at any elevation or place on the landscape in Alabama, since these wetlands usually occur whenever the local water table is near the surface. Designated or protected wetlands may be found in the following areas:

- Seeps, along slopes of hills and sloughs
- River, creek, and branch or stream bottomlands
- Bayheads, "grady ponds," bayous, and "bogues"
- Muck swamps, peat swamps, and cypress/gum ponds
- Wet meadows, savannah, and coastal prairie flats
- Tidal fringe marshes, hummocks, and swales
- Barrier island lagoons and backwater bays

Often when a landowner hears the word "wetlands" or any other related term (swamp, marsh, bog, etc.), it usually creates images that are not so favorable. Early coastal settlers commonly associated these 'wet' areas with disease and regarded them with disdain or even fear. They referred to the Yellow Fever, borne by mosquitoes, as "swamp fever," which caused many deaths in the early 1800s. They constantly warned their children not to play too close to the "blackwater swamps" for fear that their "vapours" might cause illness or other strange maladies.

Traditionally people have been taught that those "wet bottomlands" serve little purpose unless they are drained and "put to good use." Despite many years of regarding them in this negative manner, landowners have come to learn that open and forested wetlands actually contain many beneficial uses that serve to enhance water quality and our ecosystem as a whole.<sup>2</sup>

Just from looking at a wetland, it can be hard to imagine what kind of important value or use it might provide. But we have found that these 'wetland worlds' house many of our biological wonders and serve various important functions that make them of increasing value in their natural state. In order to protect these dynamic ecosystems, our forestry landowners and the public must first understand the positive values of wetlands and their functions.<sup>3</sup>

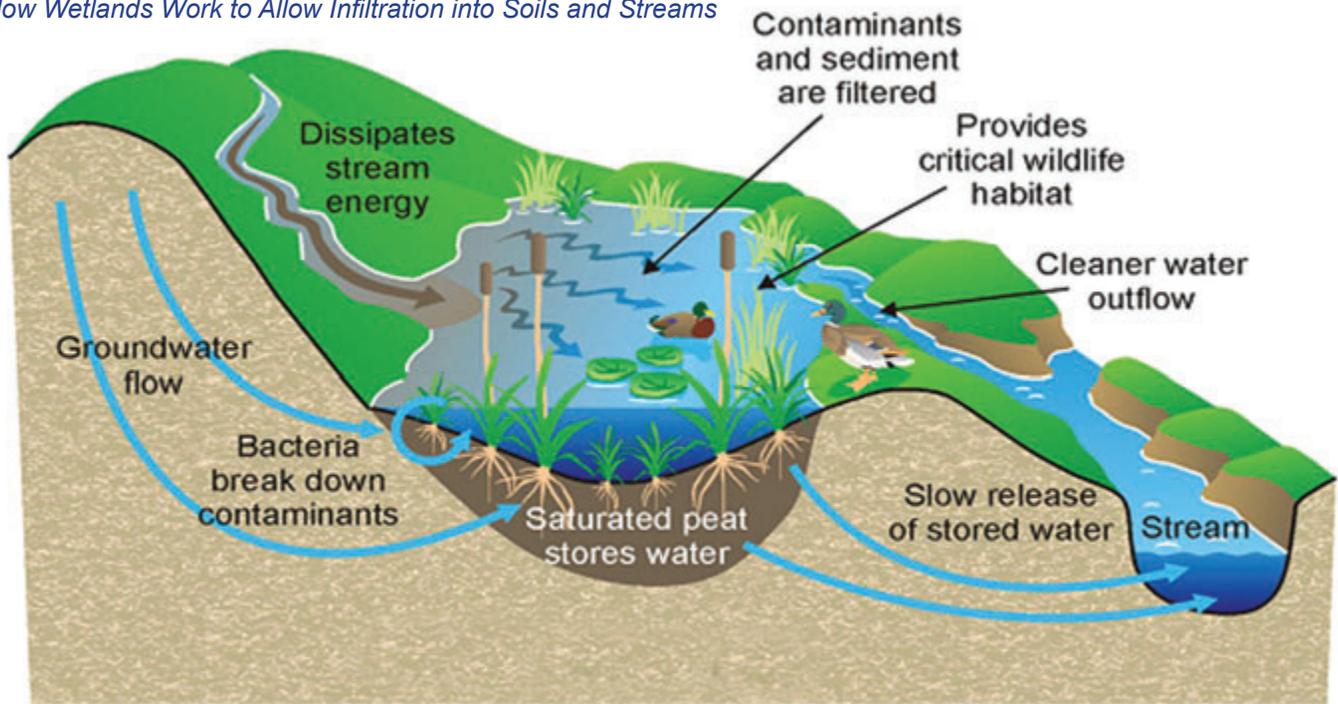
“In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught.”  
— Baba Dioum,  
1968 International Union for Conservation of Nature

## Functions of Forested Wetlands

**Flood control** - Perhaps one of the most important aspects of a wetland is its ability to protect the surrounding forests and lands by acting like a natural sponge. In Alabama, wetland and river floodplains may cover wide areas of specific geographic regions. Floodplains allow the flow of water across or through large areas of the landscape, eventually being received by another stream, wetland, or body of water. The wetlands hold and absorb water during heavy rainfall, snowmelt, or flooding, then slowly release it downstream. Trees, bushes, shrubs, grasses, and other vegetation help impede the flow of water and decrease its velocity as it passes through the wetland, while absorbing much of the water into the water table which is situated in the ground below. As floodwaters move across a floodplain, this combined braking action and water storage lowers flood heights, preventing further water-logging of valuable forestry or agricultural lands.

Another important value is the protection a wetland or forested wetland area offers to nearby urban settings. Because of its

How Wetlands Work to Allow Infiltration into Soils and Streams



flood control capabilities, a wetland is able to offset and counteract the increased volume and rate of water runoff from roadways, pavement, and rooftops of buildings. This is especially critical for Alabama's coastal area where hurricane and tropical storms may drop as much as 3 feet of rain in a single storm event.

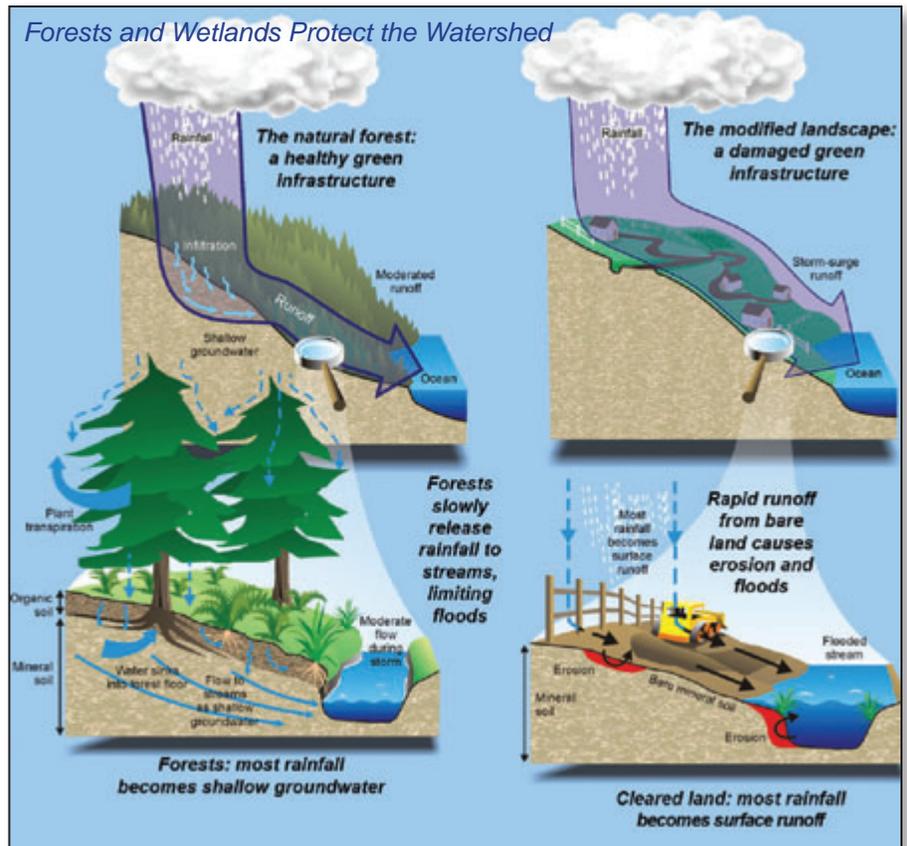
On the other end of the spectrum, a wetland's stored water often makes an important difference, especially to creatures and plants. When a stream or waterway becomes dry during periods of drought, the forested wetland (because of its protective canopy and nearness to groundwater) may continue to slowly discharge its reservoir of water into the nearby streams. In essence, the wetland and stream's dependent plants and animals may be allowed to remain alive and functioning for a much longer period of time.<sup>2</sup>

**Erosion control** - Storm surges and intense rainfall from hurricanes and tropical storms cause incredible damage to nearby coastal areas through flooding and destruction of property. Many times our coastal forested wetlands act as buffers to lessen the impact of these destructive storms. They are the first line of defense as they reduce not only the advance of wind and wave energy, but also currents that flow into them from surges and intense rainfall. The intertwined, steadfast roots of the wetland vegetation and their protective forests hold the soil and sand in place, preventing or minimizing shoreline erosion for rivers, streams, and our important coastline areas.<sup>2</sup>

“Not all wetlands perform all functions, nor do they perform all functions equally well. The location and size of a wetland may determine what functions it will perform.”  
 —U.S. Geological Survey

**Water quality and availability** - It has been shown that much of the coastal wetlands intercept surface-water runoff from higher elevation uplands before it continues into the open waters. Their filtering capabilities here are of extreme importance. Similar to how the human kidney filters the bloodstream of toxic and harmful products, wetlands also function to purify water that runs through it. Containing chemicals, pollutants, and unwanted sediment from upstream, water flowing through wetlands is slowed down and filtered in a seemingly simple process through the associated vegetation. With shallow coastal gradients, the slowing of water allows for suspended sediment to drop and settle on the riverbank terraces, levees, wetlands, and wetland bottoms. This turns out to be most beneficial further downstream, since the process prevents excessive deposition of sediment that could eventually block main waterways.

At the same time, metals, nitrogen, and phosphorus wastes (associated with various pesticide and fertilizer use from upstream) are processed or retained by wetland plants acting as “sinks” that are adapted to break down, or actually utilize, the potentially harmful chemicals. Other organic pollutants are naturally decomposed in the same manner. This purification of the



water “treats” many of the negative effects associated with urban, agricultural, or forestry use and other associated run-off that could have detrimental effects on smaller creatures and ultimately impact our food chain, once the run-off reaches nearby rivers, lakes, and oceans. It is also important to note that these wetland processes prevent harmful chemicals from reaching groundwater, which ensures that higher quality water is available for humans who rely on groundwater supplies for potable drinking water.

Wetlands also help combat the environmental problem of eutrophication [process where water bodies receive excess nutrients that stimulate excessive plant growth], or nutrient enrichment impacts, which leads to rapid algal growth (increase in the population of algae) and depleted oxygen levels that affect other species. These wetland processes utilize or tie-up the excess nutrients or pollutants that cause the problem to begin with. As beneficial as this process of water purification seems, the public must be aware that the capacity of wetlands to function in this manner is limited.<sup>2</sup> The “overloading” of the wetland with pollutant chemicals and sediment can be detrimental, and if excessive, may destroy the wetland entirely.

**Atmospheric benefits** - One lesser known aspect of forested wetlands is their great ability to store carbon within their plant tissue and residual biomass (peat), instead of releasing it into the atmosphere. What would normally be released into the atmosphere as a greenhouse gas (carbon dioxide) is further trapped in the wetland biomass and peat, all helping to maintain global climates. Consequently, by clearing these types of wetlands, high levels of carbon dioxide are released into the atmosphere.<sup>2</sup>

**Fish and wildlife habitat (biodiversity)** - At first glance it may not be evident that wetlands sustain a warehouse of organ-

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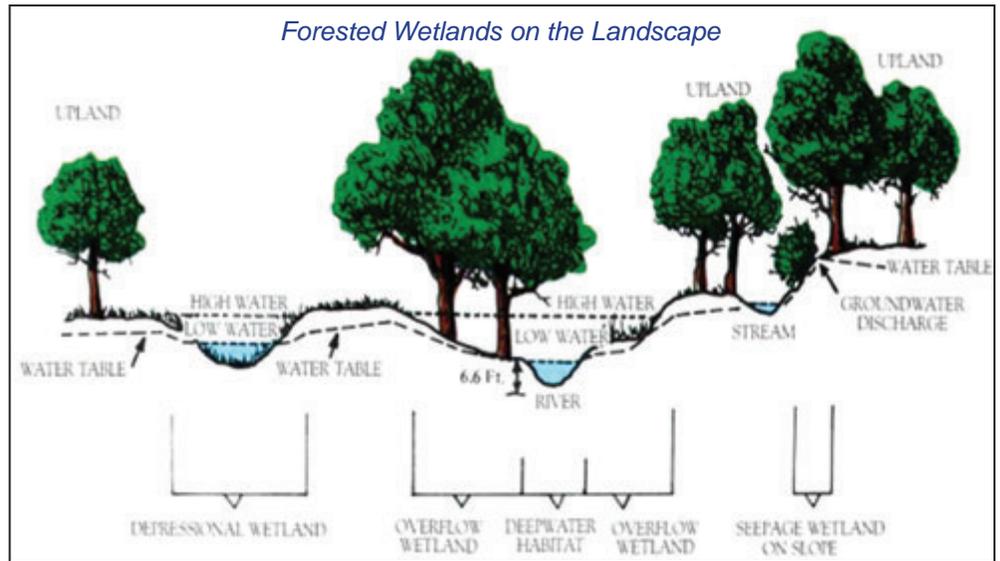
isms, ranging from microscopic bacteria to alligators or rare flowers. Some scientists think that wetlands are comparable to coral reefs and tropical rainforests in their biodiversity. Many of the creatures and wildlife contained within a wetland are wetland-dependent and are only found in these special ecosystems. They rely on the food products and protective shelter provided by forested wetlands. Some of these species are brought to our attention by the “endangered or threatened species” list, which means that they are near or in immediate danger of being exterminated completely. So, it is most curious why we continue to destroy these precious areas that cradle biological diversity.<sup>3</sup> According to the US Fish and Wildlife Service, there are as many as 115 threatened and endangered species in Alabama, with 79 of them found in our streams and wetland areas. Our extensive Mobile/Tensaw Delta watersheds in coastal Alabama contain a number of these endangered creatures; several are only found in these wetland and bayou areas.

Wetlands contain the essential ingredients for the development of organisms that make up the foundation of the food web. These forested wetlands contain high levels of inorganic nutrients, with shallow water, and high rates of primary productivity (plant tissue built up over time through photosynthesis) that help to attract many species of insects, mollusks, and crustaceans. As the built-up plant material begins to break down into smaller particles, fungal and bacterial activity causes it to become increasingly enriched with nutrients. This becomes part of a food-chain that provides food for smaller fish, which then serve as food for larger predators such as amphibians, birds, reptiles, and mammals. This food-chain within a wetland is of critical value to these creatures and their life cycles.

Wetlands provide the principal habitat for virtually all waterfowl. Certain wetlands act as migratory “pit stops,” so to speak, during a flock’s cross-country travels. Some 75 percent of these birds court and breed only in wetlands! Also, these waterfowl and wading birds, along with many other animals (particularly amphibians), require water as a medium for the growth and development of their young. Our forested wetlands may be short-term or seasonal habitats for many of these animals (such as the American alligator, blue heron, and numerous species of ducks), while a vast number of reptiles and amphibians use these wetlands as their primary year-round habitat.<sup>3</sup>

“... safeguard thy fields from soil erosion, thy living waters from drying up, thy forests from desolation, and protect thy hill..., so that thy descendants may have abundance forever.”  
*-excerpt from Walter C. Loudermilk, 1939*

**Natural resources** - As is the case with most other ecosystems, we humans use various natural products from wetlands in the form of mammals, fish, shellfish, medicinal plants, timber, and peat. Certain non-medicinal edible plants are also found in



or near wetlands; most notably these include blueberries and blackberries. Common fur-bearers such as the muskrat, beaver, otter, and mink all make their homes in wetlands, as do alligators, which are valued for their skin and meat.

Without a doubt, the most abundant natural resources stemming from wetlands are fish and shellfish. The National Marine Fisheries Service estimates that almost 70 percent of the annual commercial fish catch depends upon inshore-wetland habitats.<sup>2</sup> As mentioned above, many Alabama fish and wildlife species are wetland-dependent at some stage in their life cycle. Both commercially and recreationally, valuable species such as crabs, shrimp, trout, and snapper spend their early lives in wetlands.

Threatened and endangered species such as piping plover and bald eagles depend on wetlands. Our wetlands also provide habitat for many upland game birds, as well as stopover feeding and breeding grounds for migratory birds. Some of the nation’s most valuable migratory birding areas are the coastal counties of Alabama.<sup>3</sup>

The intrinsic values of wetlands were not recognized until their loss started to reveal problems. For example, sportsmen gradually began to notice a decline in the numbers of fish and wildlife. Also, flooding along rivers and shorelines increased over historical levels. These events led the public to recognize that wildlife habitat, water pollution control, groundwater recharge, and flood control are direct benefits of wetland preser-



Restored bottomland hardwood on forested wetland site in Mobile County, Alabama.

Photo by Randy Shaneyfelt

vation. With this recognition has come an expanded interest in protection, conservation, and management of Alabama's remaining wetlands.<sup>2</sup>

### **Recreation, education, research, and natural beauty -**

Forested wetlands provide cool shade, unrivaled natural beauty, opportunities for wildlife viewing, and unique areas for fishing and hunting. For a private landowner, a forested wetland can be a special sanctuary for family and friends. Aside from providing various environmental benefits to us, many landowners are finding that the "old swamps" and surrounding buffers can create lucrative eco-business opportunities. According to the Environmental Protection Agency (EPA), nearly half the adults in the United States are involved in hunting, fishing, boating, bird watching, or photographing wildlife in these areas, annually spending more than \$59.5 billion!

Forested wetlands are usually underestimated and undervalued, for they often provide many rewarding adventures and memories with family and friends. They are ideal spots for repeated visits. Whether you are a scientist looking to research water quality or plant life, an avid birdwatcher hoping to snap a contest-winning photograph, a hunter waiting in the trees for the next trophy to walk by, a fisherman wanting to try out some new gear, or simply a person in need of a beautiful landscape to put your mind at ease, these wetlands have your name written all over them.<sup>2</sup>

### *Buffers for Wetlands and Forested Wetlands*

Forested wetlands are of unique value and as such, they should be managed more carefully as a sensitive ecosystem. With properly preserved buffer zones, they not only protect the plants and animals within the wetlands themselves, but also provide additional help to protect the surrounding lands from flooding. Much like streamside management zones (SMZs), the use of additional vegetative buffers serves to protect the aquatic functions that are vital for forested wetlands. Vegetative buffers beside forested wetlands also offer a visual signpost for work crews in the field that these areas should be treated differently.

“A people without children would face a hopeless future; a country without trees is almost as helpless.”  
U.S. President Theodore Roosevelt

### *Regulations that Protect Wetlands*

Wetlands are identified for various legal and scientific purposes, including regulation, functional assessment, ecosystem and landscape management, and human use. In general, wetland definitions have evolved from two main sources: the academic or scientific arenas, and entities which have a regulatory responsibility related to wetlands management. For scientific understanding and academic research, wetlands are defined primarily for classification based on ecological function or position in the landscape. Scientific definitions or classification systems are not required to be as concrete or rigid with regard to interpretation as are regulatory definitions, since they are rarely subject to legal scrutiny. In regulatory programs, wetlands are defined primarily for legal purposes, in order to develop rules and standards that can be interpreted consistently to assist in those management efforts. Regulatory definitions require wetland delineation and are usually interpreted more conservatively, since they restrict the use of wetlands in regard to private property and develop-



Photo by Randy Shaneyfelt

*Hummock in West Fowl River tidal marsh in Mobile County.*

ment issues in order to preserve the health, safety, or welfare of our waterways, as well as our communities, under the government's regulatory powers.<sup>3</sup>

Please note that the regulatory aspects that further apply to forested wetlands have been described in more specific detail in the article "Regulatory and Environmental Concerns" beginning on page 29.

**Section 404 of the Clean Water Act** "forbids the unpermitted discharge of dredge or fill material into waters of the United States." Section 404 does not regulate every activity in wetlands, but requires anyone seeking to "fill" a wetland to first obtain a permit from the U.S. Army Corps of Engineers or other regulatory entity that may require it.<sup>2</sup> For example, if a person wishes to construct a building or other development, and wetlands need to be filled to complete the project, Section 404 requires that the person first obtain a permit from the Corps as well as any that may be needed to meet the state, county, or local town requirements.

**The Food Security Act (1985)** takes a different approach to protect wetlands. It basically states that landowners who convert wetland acreage into agricultural tracts are ineligible for agricultural subsidies (price supports, loans, or crop insurance) for forests or crops planted in these converted wetland areas.

From the early 1900s to the present, many environmental laws have been directed toward the protection of wetlands, yet there is still a heated debate over how to properly enforce their defense and restoration. The intent of all these programs is to protect and conserve wetlands by way of increasing cooperative efforts among private landowners and local, state, and federal governments.<sup>2</sup> ♣

### *References*

<sup>1</sup>All figures and illustrations presented in this article were provided courtesy of the U.S. Environmental Protection Agency unless otherwise noted.

<sup>2</sup>ALABAMA WETLANDS. 2012. (<http://www4.samford.edu/howard/biology/wetlands/>) Samford University, the Alabama Wetlands Website Committee.

<sup>3</sup>Coastal Counties Wetlands Conservation Plan. 2001. ADC-NR-Coastal Section/Alabama Coastal Counties Wetlands Working Group.