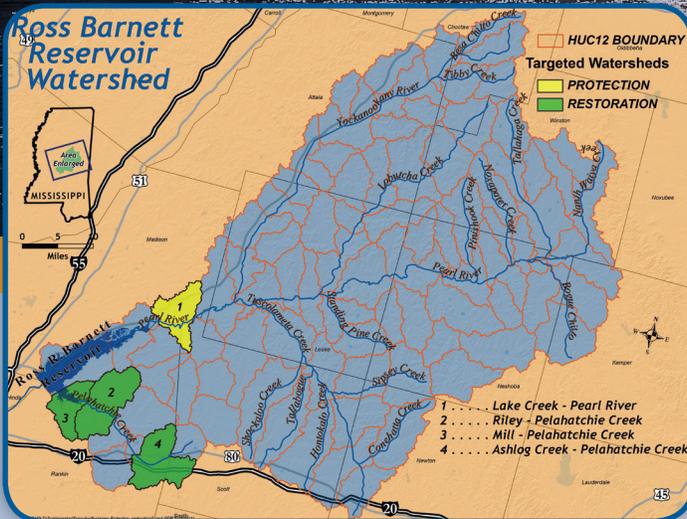
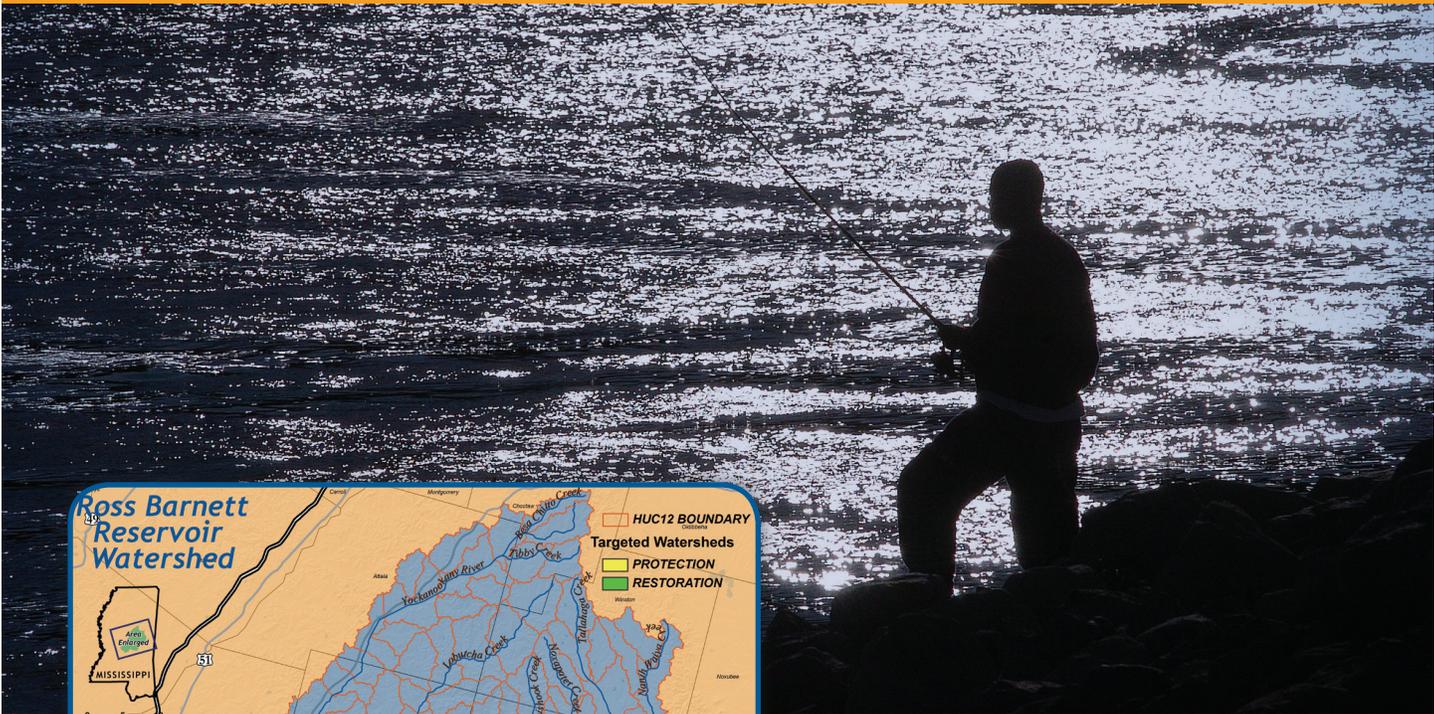




COMPREHENSIVE PROTECTION & RESTORATION PLAN
 for the
ROSS BARNETT RESERVOIR WATERSHED, MISSISSIPPI

EXECUTIVE SUMMARY



OCTOBER 31, 2011

Since its construction in the late 1960s, the Ross Barnett Reservoir has been an irreplaceable resource for central Mississippi. The Reservoir serves as the primary water supply for the City of Jackson, which is located southwest of the Reservoir. As it has done for more than 50 years, this plentiful water resource supports economic growth in central Mississippi and provides outstanding recreational opportunities, scenic beauty, and vital wildlife habitats. Recognizing this, the Mississippi Department of Environmental Quality and the Pearl River Valley Water Supply District jointly developed the Ross Barnett Reservoir Initiative, known as **Rezonate!**.

The Reservoir's watershed includes more than 3,000 square miles of land and over 4,000 miles of flowing rivers and streams. All uses of land within the Reservoir's watershed can potentially impact water quality in its tributaries and ultimately in the Reservoir itself. This *Comprehensive Protection and Restoration Plan for the Ross Barnett Reservoir Watershed* will serve as the framework for long-term, coordinated multi agency efforts to protect and restore water quality in the Reservoir and its watershed.

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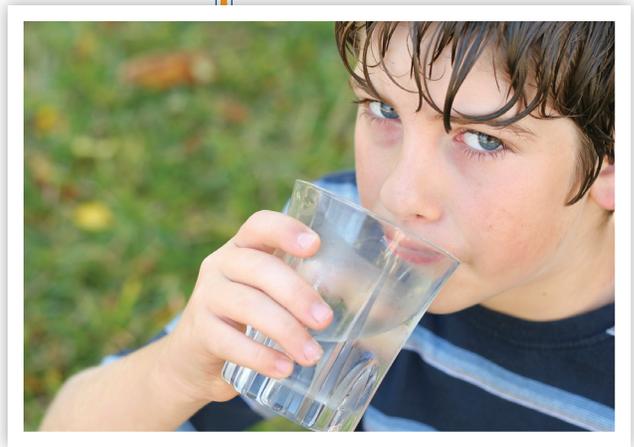


The Reservoir provides many social and economic benefits.

Photo by Brian Albert Broom.

This Plan recognizes six high priority issues in the Reservoir and its watershed, and recommends management measures for reducing and controlling them. The majority of the pollutants originate from diffuse sources throughout the Reservoir watershed, including urban stormwater, stream bank erosion, and runoff from rural and agricultural areas. Since these diffuse pollutant sources cannot be attributed to a single location or regulated entity, they are termed “nonpoint source pollutants.” Specific issues are:

- **Sediments and turbid water,**
- **Nutrient enrichment and algae growth,**
- **Bacteria and other pathogens,**
- **Invasive aquatic plant species,**
- **Pesticides (currently used herbicides and insecticides), and**
- **Trash dumping and littering in and around the Reservoir and its shoreline.**



The Reservoir provides drinking water to citizens of the City of Jackson.

Photo by Shutterstock.



Recreational benefits of the Reservoir.

Photo by Brian Albert Broom.

This Plan is intended to address the entire Reservoir watershed and recommends general management concepts applicable throughout the drainage basin along with specific pollution reduction measures for targeted areas. The use of **green infrastructure management practices**, a cost-effective, sustainable, and environmentally friendly approach to stormwater management, is the key pollution management concept recommended in this Plan.

Green infrastructure management practices include streamside buffer zones, bioretention basins, vegetated drainage swales, constructed wetlands, and preserved trees/vegetation. Preserving and restoring natural landscape features (such as forests, stream buffers, and wetlands) are critical components of green infrastructure. Communities in the Reservoir watershed can use green infrastructure to improve water quality and solve stormwater management issues, while providing wildlife habitat and opportunities for outdoor recreation.

Nine overarching management strategies have been developed for the Reservoir watershed. The strategies incorporate green infrastructure management principles to achieve the goals and realize the **Rezonate** vision statement.

Green infrastructure management practices maintain or mimic natural processes by capturing and cleaning stormwater close to its source.



The Reservoir supports important fish habitats.

Photo by Brian Albert Broom.

Improved water quality, better human health, and increased property values are among the many benefits of green infrastructure.

STRATEGY 1: *Maintain, and restore where possible, the existing riparian buffer zones along the Reservoir shoreline and the banks of tributaries.*

Vegetated buffer zones are an effective and low-cost element of green infrastructure that can be used in the Reservoir watershed. Maintaining a vegetated buffer along shorelines and streams provides an attractive landscape and can improve water quality by removing sediment and chemicals before they reach surface waters. In addition, buffers provide flood control, help recharge groundwater, prevent soil erosion, and improve wildlife habitat. When feasible, buffer zones should be restored to a width of at least 50 ft in already-developed areas. Avoid disturbance of buffer zones in undeveloped areas.

STRATEGY 2: *Do not remove vegetation or disturb soils, if possible. If disturbed, minimize the exposure time of bare soils.*

The Reservoir watershed contains some of the most highly erosive soils in the United States, especially in portions of Rankin, Madison, and Leake counties. When bare soils are exposed (due to construction and surface mining) to intense rain they will quickly erode, which eventually leads to large gullies. This eroded soil washes into surface waters, which in turn chokes streams and fills the Reservoir. Retain existing trees and other vegetation where feasible, and quickly replant disturbed sites with native vegetation.

Properly managed development using a green infrastructure approach can support sustainable economic growth and maintain the water quality in the Reservoir.



Reservoir shoreline.

Photo by Laura Sheely.

STRATEGY 3: Control urban runoff within sites where it is generated, and reduce the quantity of stormwater and pollutants through capture, infiltration, and evapotranspiration.

Excess stormwater from developed areas can damage stream channels and carry tons of sediment and other pollutants to surface waters.

Management measures that remove pollutants close to the source, such as bioretention basins, constructed wetlands, and rain barrels, are much more environmentally effective and cost-effective than attempting to treat the water downstream.

STRATEGY 4: Use natural, bioengineering techniques to repair failing stream banks and eroding gullies.

Preliminary estimates indicate that as much as 65% of the sediments transported to the Reservoir in some areas originate from instream sources (i.e., eroding banks, resuspension from stream beds, and sediments stored in channels from past activities). Bioengineering erosion control techniques combine structural components and native plant material to protect the banks, improve aquatic habitat, and improve the appearance of eroding streams.

STRATEGY 5: Adopt new ordinances or expand existing ordinances regulating land development, stormwater management, and landscaping if voluntary measures are shown to be insufficient.

Review local stormwater management and erosion control policies for stream buffer protection, undisturbed green space, erosion and sediment controls on individual lots within



Bank failures contribute to sediments and turbid water in Reservoir tributaries.

Photos by Laura Sheely.

developments, and post construction stormwater management. If water quality problems persist, zoning policies, and local ordinances will need to be strengthened in order to sustain the long-term health and beneficial uses of the Reservoir and its tributary streams.

STRATEGY 6: Continue public outreach and education by implementing the activities recommended for each targeted audience in the Comprehensive Education and Outreach Plan.

Nonpoint source pollution control is a community-based activity. Effective management of nonpoint source pollution requires a long-term commitment to educating the general public, educators and students, civic groups, homeowners, decision-makers, and developers/contractors. Keep the public informed about **Rezonate** events, restoration projects, and success stories. Cultivate local champions (individuals, civic groups, or businesses) to take personal ownership and have a leading role in promoting conservation in the Reservoir watershed.

STRATEGY 7: Work with federal, state, and local agencies to support conservation activities that are in progress on forested and agricultural lands and animal production. Many rural landowners in the Reservoir watershed are already participating in programs of the Natural Resources Conservation Service (NRCS) and Mississippi Soil and Water Conservation Commission (MSWCC) to install and maintain best management practices (BMPs) in pastures and row-crop fields and for poultry-growing operations. Look for new opportunities to enhance green infrastructure through practices such as field borders and filter



Mr. Whiskers was created as the *Rezonate* mascot.

strips, while taking advantage of cost-sharing programs to fund their installation and maintenance. Work with NRCS to prioritize funding for practices in targeted subwatersheds. Also, participate in forestry stewardship programs and use the technical expertise available from the Mississippi Forestry Commission (MFC) to properly manage logging operations on forest land.

STRATEGY 8: *Develop and implement an incentive program to encourage the voluntary use of green infrastructure management*

measures. The successful implementation of this Plan relies heavily on the willingness of landowners to implement measures on their properties and the ability of designers to include them in retrofits and new developments. Incentive programs are creative tools that nonprofit organizations or governments can use to encourage the use of green infrastructure on these private properties. Incentives allow governments to act beyond the confines of their regulatory authority to improve stormwater management and encourage the use of measures not required by local zoning and ordinances. Examples of incentive programs include property tax credits, expedited permit approval, grants, awards, and recognition. Incentive programs must be developed and implemented by local or state governments or non governmental organizations based on available resources.

STRATEGY 9: *Focus Phase I restoration and protection efforts on targeted subwatersheds defined by 12-digit hydrologic unit codes*

(HUC12s). Develop detailed watershed implementation plans (WIPs) for high priority areas. Use early successes realized in these watersheds to shape future management measures through an adaptive management process.



A constructed wetland is used to treat stormwater from the parking lot of the Mississippi Museum of Natural Science.

Photo by Laura Sheely.

This Plan recommends specific management measures for targeted subwatersheds. **Restoration** measures are recommended for subwatersheds that contain the most significant pollutant sources (i.e., hot spots) or have known water quality issues. **Protection** measures are recommended for subwatersheds that have little development and few pollutant sources. Protection measures help preserve the pristine condition of these areas.

Implementation of management measures on a watershed-wide scale (i.e., the entire Ross Barnett Watershed) is not practical or economically feasible. Thus, this Plan recommends focusing the first phase of implementation efforts on three subwatersheds targeted for restoration (Mill-Pelahatchie Creek, Riley-Pelahatchie Creek, and Ashlog-Pelahatchie Creek) and one subwatershed targeted for protection (Lake Creek-Pearl River) (see Figure ES.1).

In future years, implementation efforts will be extended to other subwatersheds as additional funding, stakeholder interest, and technical resources become available.



Pearl River upstream of the Reservoir is largely underdeveloped.

Photo by Brian Albert Broom.

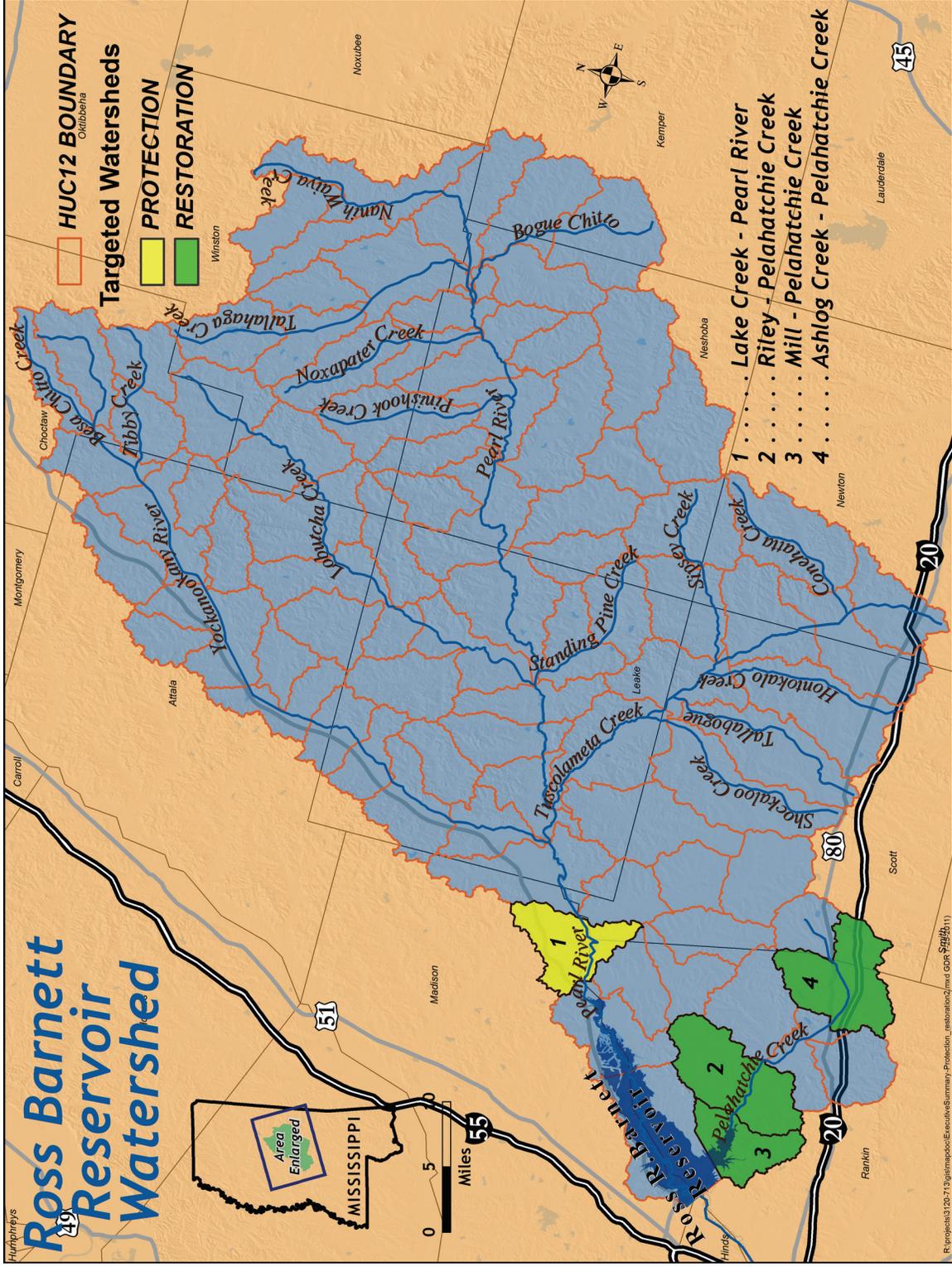


FIGURE ES.1. Targeted subwatersheds.

Restoration: Mill-Pelahatchie Creek

The Mill-Pelahatchie Creek subwatershed is located entirely in Rankin County. It is adjacent to Pelahatchie Bay, an important location for drinking water protection efforts. This watershed contains a high percentage of developed area (Figure ES.2). Thus, urban green infrastructure practices would be effective and highly visible in this area. Restoration measures will reduce pollutants contributed from construction sites and developed areas.

Recommended restoration measures are as follows:

- **Incorporate green infrastructure stormwater management practices in new construction and retrofits,**
- **Coordinate with Rankin County officials in matters related to stormwater management in developed areas,**
- **Improve construction stormwater controls on individual lots that are within a larger common plan of development,**
- **Stabilize disturbed soils on construction sites and surface mines by quickly replanting with native grasses and other vegetation,**
- **Identify and restore shoreline and streamside buffer zones and banks in needed areas, and repair eroding gullies,**
- **Leave undisturbed vegetated areas (i.e., green space) and shoreline/streamside buffer zones within new developments, and**
- **Develop an incentive program to encourage the use of green infrastructure management practices.**

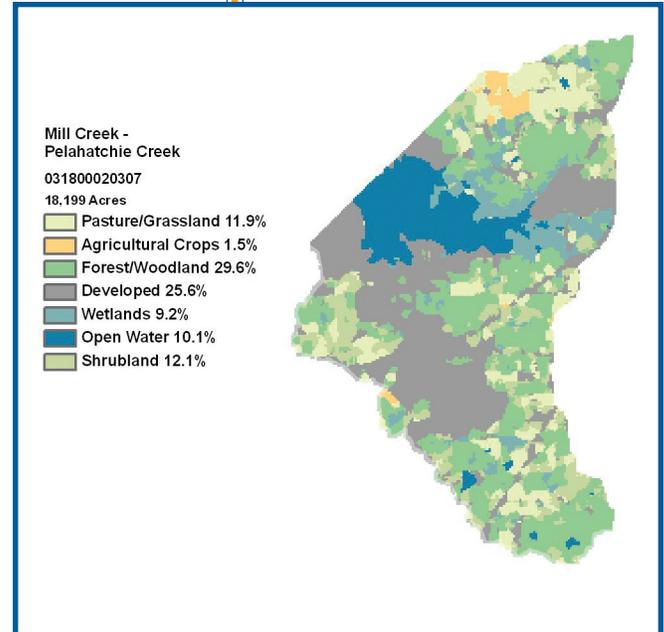


FIGURE ES.2.
Landuse in the Mill Creek-Pelahatchie Creek Watershed.

Restoration: Riley-Pelahatchie Creek

The Riley-Pelahatchie Creek subwatershed is also located in Rankin County and contains some development from the outskirts of Flowood and Fannin. As growth continues, these areas should be managed in the same manner as Mill-Pelahatchie Creek (i.e., construction stormwater control and green infrastructure management measures). This HUC12 also contains extensive pasture and timber areas that should be carefully managed to control nonpoint source pollutants (Figure ES.3).

Recommended restoration measures are as follows:

- **Address compliance issues at a wastewater treatment facility discharging into Pelahatchie Creek (Reservoir East) and encourage all new homes and buildings to connect to a central sewer system because most soils are not suitable for septic tanks,**
- **Incorporate green infrastructure stormwater management measures for new construction,**
- **Preserve streamside buffers and green space as new development expands to this area,**
- **Stabilize disturbed soils on construction and surface mining sites by quickly replanting with native grasses and other vegetation,**
- **Implement pasture management practices on all areas with willing landowners, and**
- **Encourage participation in forestry stewardship programs.**

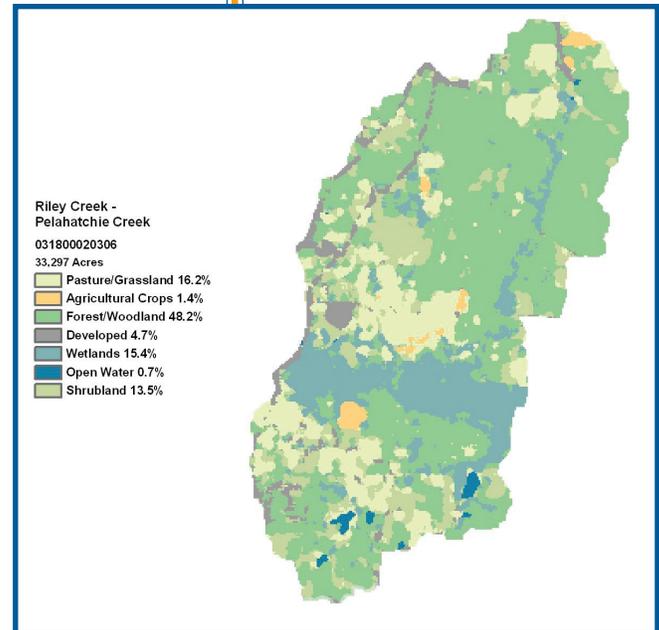


FIGURE ES.3.
Landuse in the Riley Creek-Pelahatchie Creek Watershed.

Restoration: Ashlog-Pelahatchie Creek

The Ashlog-Pelahatchie Creek subwatershed is located in the headwaters of Pelahatchie Creek within Rankin and Scott counties. Headwater systems are generally more responsive to BMPs (i.e., nonpoint source reductions can be detected more quickly in smaller streams). There is some urban development in the City of Pelahatchie. However, the watershed contains mostly forested and pasture land with limited row crop agriculture (Figure ES.4). There are several poultry growing operations located within this HUC12.

Recommended restoration measures are as follows:

- **Incorporate green infrastructure stormwater management measures in new construction and retrofit projects in the City of Pelahatchie,**
- **Preserve streamside buffers and green space as development continues in this area,**
- **Assist poultry growers to ensure that they have access to technical expertise and cost-sharing programs to implement nutrient management plans,**
- **Implement pasture management measures and best management practices for agricultural crops in all areas with willing landowners,**
- **Investigate flooding concerns through evaluation of Pelahatchie Creek's flow capacity, and**
- **Encourage participation in forestry stewardship programs.**

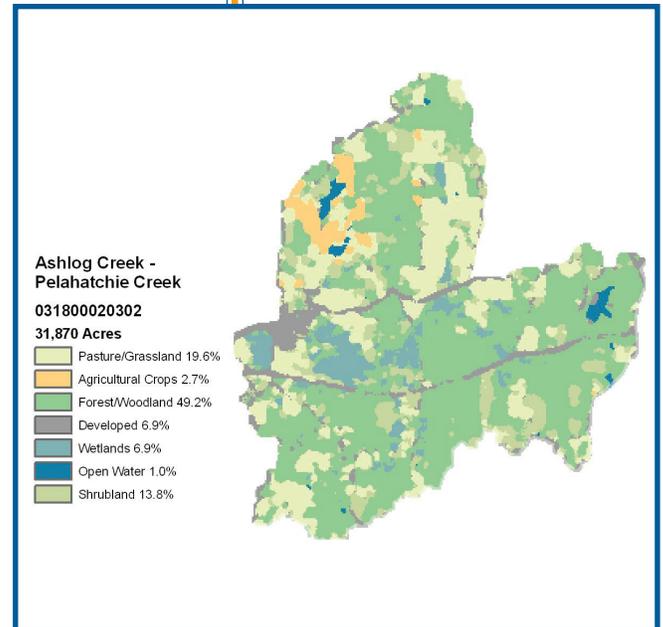


FIGURE ES.4.
**Landuse in the Ashlog Creek-
Pelahatchie Creek Watershed.**

Protection: Lake Creek-Pearl River

The Lake Creek-Pearl River subwatershed is located upstream of the Reservoir in a section of the Pearl River that is used extensively for recreation (between Ratliff Ferry and the Low-Head Dam). There are few roads, making most access by boat. Also, there is little development and almost no croplands in this watershed (Figure ES.5). It is important to protect the wetland areas as they serve important functions for water quality preservation and flood protection for areas downstream.

Recommendations for protection measures are as follows:

- **Maintain wetlands, streamside buffer zones, and undisturbed green space,**
- **Partner with *Keep the Reservoir Beautiful* to curb littering by recreational boaters,**
- **Use education programs to promote a sense of pride and responsibility for environmental preservation of this area, and**
- **Promote conservation easements through partnerships between non-profit groups and private landowners.**

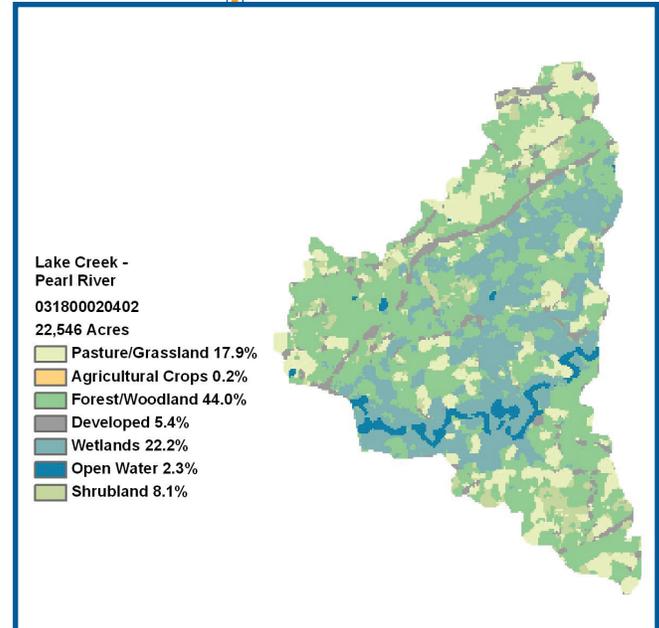


FIGURE ES.5.
**Landuse in the Lake Creek-
Pearl River Watershed.**

This *Comprehensive Watershed Protection and Restoration Plan* was developed with input from local citizens, resource agency representatives, and technical experts in watershed planning and nonpoint source pollution management. This Plan, the product of almost 2 years of research and collaboration, ties together the following set of comprehensive planning documents.

- **Water Quality Monitoring Plan for the Reservoir and Watershed,**
- **Pathogen Source Assessment and Wastewater Management Plan,**
- **Comprehensive Education and Outreach Plan for Rezonate!, and**
- **Source Water Protection Plan for the O.B. Curtis Drinking Water Intake.**



Sunset on the Ross Barnett Reservoir.

Photo by Charles M. Foreman Jr.

Protecting and maintaining clean water in the Reservoir and its watershed is a community-based activity that will require the long-term cooperation and commitment of many individuals. This Comprehensive Watershed Protection and Restoration Plan is intended to sustain these waters as a useful and healthy resource for many years to come.