

## **Case Study –The Preserve Golf Club**

By Stephen Miles



Aerial view October, 2005

### **Site Location**

The Preserve Golf Club is located in the southern portion of Jackson County, Mississippi near the town of Vancleave. The specific location is in a portion of Section 1, Township 7 South, Range 8 West and a portion of Section 6, Township 7 South, Range 7 West, Jackson County, Mississippi. The property is located within the Fort Bayou Creek drainage basin, a tributary of Old Fort Bayou which flows into the Back Bay of Biloxi in the southwestern portion of the county.

## Description/Habitat



Hole 11 with native wetland habitat surrounding tee boxes

The Preserve Golf Club has approximately 32 acres of mitigated wetlands. The site is home to a diverse amount of native flora unique to southern Mississippi. The site includes yellow pitcher plants and bald cypress bogs along with long leaf pine savannahs filled with an abundance of native grasses and sedges. Live oak groves with shrubs such as yaupon, wax myrtles, and sweet bay fill the under story of the forested sites.

## Construction Protocols

Significant importance was placed on limiting the impact of construction to the surrounding natural environment and constructing the facility to operate with minimal potential for ground or surface contamination of water exiting the site and impacting the Old Fort Bayou drainage system. All drainage infrastructures were installed in a manner that dictated all water is filtered through 25 foot of natural vegetation or turfgrass prior to entering any water body or leaving the site. Research has proven that thick vegetation or turfgrass provides an excellent mode of filtration of chemicals and other impurities from water. Bridges were constructed to cross wetlands rather than constructing concrete cart paths that traverse through the sensitive areas. These concepts were implemented

throughout the property to help minimize the impact of the natural hydraulic flows of the site and to protect wildlife corridors.

### **Irrigation System**

The irrigation system is designed to allow site specific control. The system was designed with 65 ft – 75 ft spacing and single head control as needed to minimize drift and maximize water use efficiency. Part circle heads are installed along the boundaries of each hole to minimize the quantity of irrigation impacting native flora. The irrigation control system allows the operator to irrigate the site based on evapotranspiration that is computed by the onsite weather station. This enables the operator to input a specific amount of irrigation based on the needs of the turfgrass system promoting greater water conservation.

### **Water Quality Management**



Vegetative buffer strip located along tee boxes

Buffers and Special Management Zones were installed around all areas hydrologically connected to water bodies. These are identified in 3 categories: wetlands, Old Fort Bayou and constructed lakes. Special Management Zones function to keep fertilizers and pesticides away from surface water bodies and ground water. These areas were preliminary and could change as the project progressed. The initial plan was as follows:

**Special Management Zone A – No spray Zones.** No spray zones are established around each water body 25 feet landward from normal water elevations for non-perennial streams. Pesticides will not be used in these areas, and only organic nitrogen fertilizer will be permitted. Phosphorus will not be applied unless the soil test report indicates values in the low range. All phosphorus containing materials will only be applied if rain is not forecasted for at least 48 hours. The area will be watered immediately after application.

**Special Management Zone B – Limited Spray Zones.** Limited spray zones are established around each water body, beginning 25 feet landward from normal water elevation and extending 50 feet landward from normal water elevation. Only pesticides passing a high sensitivity, single-step risk assessment performed for The Preserve Golf Club, and only organic nitrogen fertilizer will be permitted. Phosphorus will not be applied unless the soil test report indicates values are in the low range. All phosphorus containing materials will only be applied if rain is not forecasted for at least 48 hours. The area will be watered immediately after application. Application of fertilizers at low N and/or P rates (1/10 to 1/8 lb. N/1000 ft<sup>2</sup>) in a liquid form (micro-dosing) may also be used.

**Special Management Zone C – Bridge Crossings.** Bridge crossings are short-term, special management zones for the construction of bridges associated with the cart path. Erosion barriers will be in place for bridge crossings. Bridge construction will be conducted so that construction equipment does not enter a stream. Only the location of the footings will disturb the streams. The bridges are built with the bridge itself as the work platform.

After a year of operation the above guidelines were reevaluated and amended to better meet the needs of the facility while maintaining water quality standards. Chemicals that passed the risk assessment performed for The Preserve Golf Club are allowed for use within Special Management Zone A but are to be hand applied while winds are less than 2 mph and rain is not forecasted for a minimum of 48 hours.

The language specifying the use of “organic” nitrogen in Zone A was modified to specify the use of “slow release” nitrogen fertilizers. The turf within Zone A will be maintained at a minimum height of 2 inches to reduce weed competition.

## Habitat Management and Restoration



Native Area May, 2007



Native Area Jan., 2008

The use of fire has been incorporated into the management plan. Fire is a useful tool for weed management and promotes greater biodiversity in our ecosystem. Areas requiring vegetation maintained at a low height are burned during the late spring and early summer to promote a grass prairie environment. Areas where trees and shrubs are preferred are burned during the fall. These areas are burned on a two to three year rotation. Areas that are poor candidates for fire management are mechanically maintained or cleared by hand.



Hole 16 in May, 2005



Hole 16 in October, 2006

175,000 individual native plants were established during construction which restored disturbed “out of play” areas to natural habitat. Returning these areas to native vegetation added contrast and diversity to the golf course while providing additional habitat for wildlife.

A proactive program has been implemented at The Preserve Golf Club in an effort to eliminate and monitor the population levels of plants that have been categorized as invasive to our natural habitat. The property is routinely monitored for invasive populations. Once these areas are identified the plant material is physically removed or cut to ground level and treated with glyphosate as needed. Plants that have been identified for removal include the following:

- chinese tallow tree (*Sapium sebiferum*)
- cogon grass (*Imperata cylindrica*)
- chinese privet (*Ligustrum sinense*)
- torpedo grass (*Panicum repens*)
- morningglory (*Ipomoea spp.*)

## Wildlife Management



**Blue bird houses** are located in strategic locations throughout the course. Population levels are monitored and recorded on a bi-weekly basis.



**Hummingbird feeders** have been installed on the back porch of the clubhouse. The general public is able to view the activity while dining.



**Bat houses** are strategically placed around the clubhouse to mitigate the population of mosquitoes, etc.

**Native Wildlife** identified on the course since opening includes the following:

Bobcat ( <i>Lynx rufus</i> )	Osprey ( <i>Pandion haliaetus</i> )
Armadillo ( <i>Dasypus navencinctus</i> )	American Alligator ( <i>Alligator mississippiensis</i> )
Coyote ( <i>Trichechus manatus</i> )	Great Blue Heron ( <i>Ardea herodias</i> )
Opossum ( <i>Didelphis marsupialis</i> )	Red Bellied Woodpecker ( <i>Centurus corolinus</i> )
Rabbit ( <i>Sylvilagus spp.</i> )	Mourning Dove ( <i>Zenaida macroura</i> )
Raccoon ( <i>Procyon lotor</i> )	Red-tailed Hawk ( <i>Buteo lineatus</i> )
Squirrel ( <i>Sciurus spp.</i> )	Bobwhite Quail ( <i>Colinus virginianus</i> )
Whitetail Deer ( <i>Odocoileus virginianus</i> )	
Oldfield Mouse ( <i>Peromyscus polionotus</i> )	

### **Nature Resource Management Center**

The facility was designed with an emphasis on worker protection, pesticide containment, and organization. It was imperative that the facility be constructed to meet strict guidelines to protect natural resources and water quality. Other benefits achieved by the design were increased associate safety and maximized operational efficiencies of the facility.

The **Nature Resource Management Center** consists of four structures. The main building is a facility consisting of 10,000 sq. ft. with 6,000 sq. ft. for equipment storage,



2,500 sq. ft. in administrative space and 1,500 sq. ft. for equipment maintenance and parts storage. All buildings located on the property are fitted with lightning protection.

The administrative area accommodates offices for the Head Superintendent and two Assistant Superintendents, fully equipped staff dining/meeting room, men's and women's restrooms and lockers, shower area for the maintenance crew, and a conference/training room. This building is the central hub for all communication and surveillance infrastructure for the property. Offices are fully integrated with the latest technology for efficient operations of administrative duties and record keeping. This integration has greatly reduced the use of paper products.



Equipment storage

All mowing equipment and attachments have a designated storage area within the building. The storage area is organized in a manner to promote safe passageways throughout the facility, maximizing operational flow of equipment entering and exiting the structure while promoting a sense of professionalism within the staff.



The **Fuel and Wash Pad** is an impermeable concrete pad fitted with a wash water recycling system, a concrete containment area for storage of all bulk petroleum products, and a blow down station for removing debris from equipment prior to entering the pad. The pad slopes to two collection basins connected to the recycling system ensuring containment of all liquids. Located within the fuel storage area are two 500 gallon double walled storage tanks, a 50 gallon waste oil recycling drum, a 25 gallon mixed fuel tank,

and an emergency spill kit. The pad is designed to contain 1000 gallons of spilled fuel in the event of a tank rupture or emergency. The area is covered for protection from the environment, lighted for operation during non-daylight hours, and equipped with a key lock and emergency cutoff system for security and safety.

The **Chemical Storage Building** is a self-contained structure that incorporates dry bulk storage, pesticide storage, sprayer equipment storage, and mix and load operations under a single structure. The impermeable concrete pad drains to collection basins located in the center of the mix and load station and the two pesticide storage rooms. These basins are connected to a holding tank until the liquid can be used in sequential chemical applications on the course.



Chemical mix and load area

Stored within the mechanically vented mix and load area is a 300 gallon and 175 gallon sprayer. Each sprayer has a dedicated overhead swinging boom system fitted with a high flow fill line enabling the operator to perform mix and load procedures efficiently at the sprayers designated storage area in a controlled environment. The mix and load station is equipped with a 40 gallon hot water heater, stainless steel mixing table/sink and emergency eye wash/shower that is connected to the rinsate collection system.



Fertilizer Storage

**Fertilizer Storage** is enclosed with concrete block walls and is fitted with explosion proof lighting and fans. Noncorrosive pallet racks are installed for efficient organized storage.

There are two rooms designated for **Chemical and Pesticide Storage** in the building. One room is for pesticides and the other for chemicals used to maintain and clean all buildings located on property. Each room has a dedicated collection basin which is incorporated into the rinsate storage system. The shelving is constructed of non-absorbent materials.



Aerial view June, 2006

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