

Wetlands Education and Functions on a University Campus, Mississippi State University

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Introduction

Creating human awareness to wetland values is an important step in safeguarding these critical resources. In 2006, the Department of Wildlife, Fisheries and Aquaculture, and Landscape Architecture at Mississippi State University (MSU) conceptualized the Wetland Education Theater (WET) project. The “seed” for WET was “planted” at MSU in 2002, mostly as a result of interest in a wetland site on the MSU campus studied by students enrolled in the course, Wetlands Ecology and Management (WFA 4383/6383). Since then, the concept evolved into a substantive effort that is embraced by various stakeholders at MSU and surrounding communities in Mississippi. The WET will become a >2 acre demonstration project that integrates wetlands and associated upland grassland communities on MSUs campus in Starkville, Mississippi (33° 27'; 88° 49').

WET History

The current School of Landscape Architecture buildings were constructed at MSU in 2001. Soon after, a naturally wet swale formed east of the new structures. Native wetland vegetation quickly established in the swale, and campus landscape maintenance crews were challenged by advancing succession of wetland herbaceous and woody vegetation. Although an “eyesore” to some, insightful university professors and students viewed the swale as a tremendous opportunity for education. For example, students from the Department of Wildlife, Fisheries & Aquaculture and Landscape Architecture swooped into the cattails (*Typha* sp.) and other native plants, extracting soil cores and otherwise investigating the new natural wetland treasure. Other classes seized opportunities to design unique storm-water retention facilities, such as bio-swales, rain gardens, runnels, and weirs in the wetland.



In fall 2006, three graduate students from the Wetlands Ecology and Management class at MSU began developing a landscape design and management plan for the site to earn graduate credit for the wetlands course, then under the instructorship of Dr. Rick Kaminski. The concept was so greatly regarded by faculty and students that these graduate students ultimately presented their vision to the MSU President, and seed money was provided by MSU to help leverage additional project funding. Eventually, a comprehensive promotional packet was produced in 2009. In 2010, Mr. C. Clark Young of West Point, Mississippi was introduced to WET and he eagerly supported it. Through a generous gift from him and his wife, MSU Foundation, Inc. retained a landscape architect to develop the design and layout.

WET's Design Process

A thorough design of WET was developed in 2012, after important baseline data, including soil pH and moisture profiles were identified. Case studies also were conducted of similar naturally occurring wetlands and grasslands in the area. For example, the contracted landscape architect investigated nearby Chickasaw and Osborn Prairies, the Sam D. Hamilton Noxubee National Wildlife Refuge, and habitat fragments surrounding MSU's Technology Park for environmental characteristics that might parallel those at the WET site. After a water management plan was developed, zones of plant communities were planned for the site relative to their hydrological adaptations. Based on existing soil and predicted flood conditions, plant communities and other resources pertinent to WET included:

- upland prairie (both alkaline and acidic soils)
- distinct wetland types
- emergent plants (persistent/temporarily flooded)
- forested wetland
- emergent plants (non-persistent/semi-permanently flooded)
- floating and submerged plants (intermittently or permanently flooded)
- deepwater habitat
- upland prairie integrated with forest edges and patches
- two types of upland forests transitioning to forested wetland

Because education of visitors is a fundamental goal of WET, identifying accessible areas for people was necessary. Final design efforts included placement of bridges, walks and structures in locations that incurred the least ecological impact. Structures were positioned so as to optimize natural function (e.g., bridges widths and orientations will allow sunlight underneath for plant

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growth). This design will encourage visitors to experience natural water flow between wetlands, native plant communities, use by wildlife (e.g., waterbirds, amphibians), and other local ecological features. Such a unique design approach will maximize perceptual experience while maintaining the integrity of the ecological community.

Given the ecological and social complexities of WET, campus-wide experts were invited to critically review the project. To date, personal meetings, questionnaires, e-mails, and telephone surveys with >25 faculty and staff from 10 campus departments greatly improved project design and awareness.

A most challenging aspect of WET was development of the wetland footprint and grading plan. Micrograding techniques will be used to create several wetlands with nexus, ranging from 3" – 6' depths to provide habitat diversity. Weirs, mud-flats, and small islands also will be created, along with gabions (i.e., blocks of wire wrapped stone) used in deeper areas to create a submerged wading deck. These wetlands will promote storm-water management and help retain sediments discharged from surrounding areas prior to their release into Catalpa Creek, a tributary of nearby Tombigbee River. Wetland cells > 6' deep will retain water year around and support aquatic life. Several species of native grassland and wetland plants will be established along gradients, representative of their niche in natural systems. Although ecological succession will be encouraged, periodic management, such as burning warm season grasses and managing any invasive species, will be implemented. Mississippi State University has authorized prescribed burning to maintain grassland integrity onsite. Safety policies for this and other practices are being developed and will be shared with visitors through signage installations. Interpretive displays will be developed and housed in separate structures throughout the site. Each educational assemblage will emphasize specific habitat communities and their values to wildlife and people. For example, specialized interpretive clusters will include:

- Wetlands – emphasizing three components necessary to comprise a jurisdictional wetland (hydrology, hydrophytes, and hydric soils)
- Hydrology and the beaver (*Castor canadensis*) as ecosystem engineer; and function of weirs for flood control and improvement of water quality
- Seasonally flooded Bottomland Hardwood – ecosystems and forest products
- Slope Hardwoods/grassland understory and pine savanna – ecosystems and forest products



- Upland prairie with variable pH and moisture, with structure that harvests rainwater
- Sustainable Sites Initiative with vegetated roof
- WET's unique design approach

As part of this interpretive/educational effort, there are plans for a comprehensive suite of technologies to integrate with the placards. Ideas include a comprehensive web site, touch screen technology, smart phone and tablet applications, time-lapse photography to document seasonal and successional dynamics, and podcasts providing guided tours.

Summary/Conclusion

The WET will: 1) educate the public about ecological benefits of wetland and associated upland communities, and 2) reduce runoff and improve water quality on a university campus that is incrementally growing. Project WET's network of pocket wetlands will enhance storm-water management and perform other ecological services. In addition, best management practices (BMPs) resulting from WET will benefit MSU's South Farm and downstream tributaries subjected to increasing rainwater overflows with campus and adjacent city expansion. Besides creating functional wetlands that perform natural services, WET will serve a unique role in outreach to educate students and visitors about storm-water management, the ecology and management of wetlands and grasslands, and create an overall awareness and appreciation for these critical systems, in a safe and convenient setting. To our knowledge, WET may be a unique venue on wetlands education, conservation, and demonstration nationwide on a university campus. Our vision is to attract thousands of visitors annually and provide a unique educational and aesthetic experience in an increasingly urban university setting. Design plans are nearly completed with initial ground breaking scheduled for fall 2012.



Figure 1: Rendering of WET, Mississippi State University campus, 2009. Graphic by K. Langley.



Figure 2: Rendering of Project WET in relation to existing infrastructure on the campus of Mississippi State University, 2011. Graphic by R. Poore.



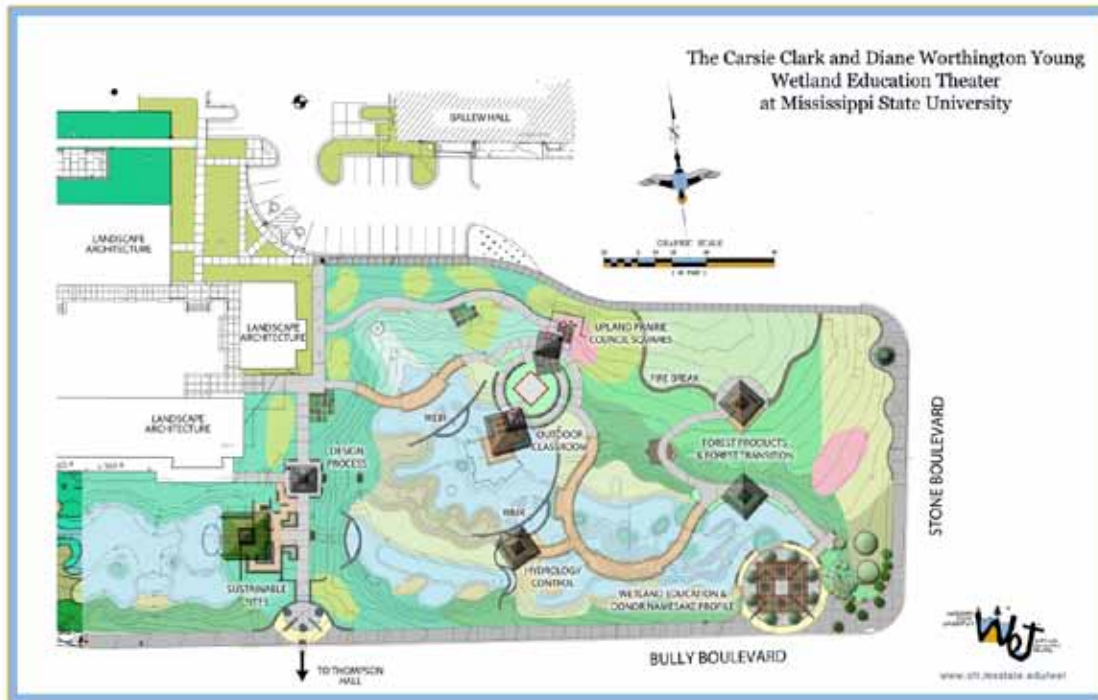


Figure 3: Rendering of Project WET with proposed grading plan, planting zones, walks, bridges, and structures, campus of Mississippi State University, 2011. Graphic by O. Harris.



Figure 4: Rendering of Project WET proposed classroom structure overlooking primary wetland unit, on campus of Mississippi State University, 2012. The structure has passive solar features, is fully ADA compliant, and can seat up to 50 students.
Graphic by D. Havelin