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# A Self-Guided Tour at the Olentangy River Wetland Research Park

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## **Executive Summary**

The Wilma H. Schiermeier Olentangy River Wetland Research Park (ORWRP) is a valuable site of research and educational opportunities for the Ohio State University community. It also provides a rare opportunity for members of the greater Columbus community to observe and learn about an ecosystem that they would not otherwise encounter in an urban environment. However, the facility remains underutilized by the public. By welcoming visitors and offering a self-guided tour, the ORWRP can become a more accessible and desirable site of informal science learning.

## **Introduction**

Not all learning takes place in traditional learning environments. Many valuable educational experiences take place in free-choice learning environments, or those in which an individual can determine when, how, and what to learn. The ORWRP has the potential to become an important site of informal science education. It is currently home to research conducted by students and staff of the Ohio State University, which has been the facility's primary focus for many years. However, as a Ramsar Wetland of International Importance, the research park is a valuable resource to the Columbus area and, with a few changes, could become a more visitor-friendly and engaging learning environment for the general public.

The ORWRP could greatly benefit from a comprehensive self-guided tour. By creating a route through the facility that identifies various checkpoints, the tour can guide visitors to the areas that will give them the fullest possible experience in the park. In addition, engaging an audience in a free-choice-style learning environment provides for a comfortable and informal educational experience. Rather than relying on an interpreter to relay information, a self-guided tour allows guests the opportunity to explore, observe wildlife, and learn at their own pace. A self-guided tour of the ORWRP can educate the public and help the facility become an institution in the community that people visit in their leisure time. By improving the visitor experience within the ORWRP, the facility can reach and inform a larger audience, which will help spread understanding and awareness of these vital ecosystems.

This paper proposes the creation of an educational self-guided tour for visitors to the ORWRP. The key aspects of the proposal will include a map that highlights the tour route, and a brochure that will serve as a guide for visitors. This proposal will also include a discussion of the benefits of free-choice learning, the drawbacks of the project and our proposed solutions, and the costs associated with the project.

## **Facility Background**

Wetlands are some of the most vulnerable, yet most important ecosystems on the planet. They provide many important services including biodiversity support, flood and storm mitigation, and water quality improvement (Mitsch, 2012). In general, there is a lack of knowledge and understanding about the functions of created and restored wetlands and how they compare to natural wetlands. The concepts of self-design and self-organization are important to understand in the context of ecosystem creation and restoration. Self-design relies on the self-organizing ability of ecosystems. If an ecosystem is open to allow seeding through human or natural means, the system, itself, will optimize its design by selecting the plants or animals that are best adapted for existing conditions (Mitsch, 1998).

In 1994, two wetlands, one planted and one non-planted, were constructed at the ORWRP at the Ohio State University. These wetlands contain a water delivery system from the Olentangy River. The project, which was created and developed by William J. Mitsch, was originally designed to answer two main questions. First, does human introduction of wetland plants have any measurable effect on ecosystems? In other words, can wetlands be created and restored? Second, will a diverse biological ecosystem develop in a basin in which little life initially existed (Mitsch, 1998)? The experimental wetlands were not designed exclusively for water quality improvement. They were designed to be a sustainable, multiple-ecosystem feature in a river setting to provide self-designed wetland research.

Throughout the study, the planted and unplanted wetlands developed similarly in terms of vegetation and water quality. In 2008, after 15 years, it appeared that the unplanted wetland basin was more productive and maximized its power, while the planted wetland had more community diversity (Mitsch, 2012).

Today, the ORWRP is a large-scale aquatic research facility and a gateway to research, education, and outreach related to water resources at the Ohio State University. The research building includes classrooms as well as teaching laboratories. This provides training for both undergraduate and graduate students as well as services to the community through environmental outreach. Regardless of the Olentangy wetland's size, it has had a large impact both locally and globally (Filipic, 2008). According to the "International Wetland Announcement," Mitsch believes that the work of students and staff has been very significant for wetland research as a whole. In addition, he believes that having the wetlands in an urban area is very important. "We're not out in the middle of nowhere. We give 150 tours a year, with thousands of people visiting and learning about the importance of wetlands" (Filipic, 2008, p.25).

The facility is currently open to the public and has educational signage placed throughout the park, however the information found on these signs is minimal. To receive more detailed information about the facility and wetland ecosystems, visitors must schedule a tour with a member of ORWRP staff. The need to schedule a tour can be a major barrier for visitors. It requires people to consciously plan an educational outing, the formality of which is likely to discourage casual visitors.

As a site of such ecological importance situated in a major city, the ORWRP offers the residents of Columbus access to a rich and unique educational experience. Though Mitsch estimates that thousands of people visit the facility, the number could greatly increase by providing easy access to information and by creating a welcoming environment.

### **Educational Environments**

When discussing public interest in an activity such as visiting the ORWRP, it is helpful to consider research in the fields of education and visitor behavior, particularly that which concerns free-choice learning. The term free-choice learning applies to many types of educational opportunities. Environments that promote free-choice learning are those in which learners have control over the subject, pace, and manner in which they receive information, which generally applies to sources found outside of the compulsory school setting (Bamberger & Tal, 2007). Common examples include facilities such as

museums, zoos, aquariums, and other public spaces in which visitors are able to learn on their own without the need for a formal instructor or guide.

Speaking of free-choice science and environmental education, Falk (2007) notes that in order to distribute knowledge, efforts must shift from simply “communicating science” to providing a chance for people to engage and better understand it (p. 457). Audience engagement is a crucial aspect of free-choice education. The very nature of these settings is the learner’s ability to choose to participate or not, which means that their success rides on the ability to maintain interest.

It is, of course, impossible to make generalizations about the public, as every individual has a unique background with prior knowledge, attitudes, and levels of interest. However, studies in visitor behavior and educational outcomes in places such as nature parks have communicated a few common themes. The main goals for an environmental education experience such as a tour through the ORWRP are to inform visitors, promote understanding, challenge environmental attitudes, and encourage information retention (Ballantyne & Packer, 2005).

Many of the strategies of successful learning experiences draw on the major role that emotion plays in education. Visitors tend to get the most out of experiences that inspire some level of personal attachment. Simply spending time in a natural environment such as the ORWRP presents opportunities to directly observe and interact with wildlife, which has been shown, particularly in children, to help develop more positive attitudes toward the environment (Ballantyne & Packer, 2005). When people are able to see the wildlife about which they learn, there is a greater tendency toward an emotion-driven response, which ultimately leads to a higher likelihood of retaining the information after the visit. In addition to the impact of the physical environment, the content of the educational material can also give rise to an emotional response. Pairing general information about a particular area or species with information about the impacts of human activity upon it has greater potential to influence post-visit behavior. The most successful experiences are those that combine both the cognitive and affective aspects to create a cohesive whole (Ballantyne & Packer, 2005).

Some of these strategies found in successful free-choice environments can be applied to the ORWRP. Messaging should emphasize the importance of wetland

ecosystems to the health of other ecosystems, or the ways that they can directly benefit the lives of visitors. By combining the cognitive educational material with the emotional stimulation of a nature setting, the ORWRP can help visitors to develop pro-environmental attitudes.

### **The Self-Guided Tour**

The tour will provide a path that guides visitors to the key points of interest within the research park. The proposed path will feature checkpoints that have existing educational signage or offer views of wildlife, vegetation, and research equipment. For each checkpoint, the supplemental information provided in the brochure will draw from the script previously used by the wetland staff for guided tours (B. Macolley, personal communication, September 16, 2014). Each stop will feature information that highlights different aspects of wetland ecosystems or the facility. We have identified the major points of interest and provided recommendations of potential content for each. The numbers listed below correspond to the numbers seen on Figure 1.

#### **(1) The Stormwater Garden:**

This stop provides an opportunity to educate visitors on the role that wetlands play in flood management and water quality improvement. This stop can help visitors recognize the benefits of preserving wetlands in the modern world.

The Stormwater wetland is a created wetland that collects all of the rain and snowfall from the roof of the Heffner Building. This particular wetland is unique in two ways:

1. It is the only wetland on site that has a clay liner. The liner helps to retain water to and slow the process of it seeping into the ground.
2. It was created using soil from a natural wetland from another site that was later destroyed. The soil brought seeds, microorganisms, nutrients and carbon that helped stimulate growth in this created ecosystem.

In a world full of pavement, wetlands prove very helpful in the event of heavy rainfall by collecting the, often polluted, runoff water and slowly

releasing it over time. This helps prevent flooding and keep waterways clean.

## **(2) Creating New Wetlands:**

This stop will discuss the loss of wetlands in Ohio and the policies in place that prevent future loss.

The 7-acre Oxbow is a mitigation wetland, meaning that it was created to offset the loss of another wetland elsewhere. Under the Clean Water Act, wetlands are able to be destroyed as long as the loss is compensated for through the restoration of a degraded wetland, the enhancement of an existing wetland, or the creation of wetland where one did not previously exist. The Oxbow is also a good spot for bird watching in the spring and autumn months.

## **(3) Nature Walk:**

This path lies between Experimental Wetland 2 and the Oxbow. Here, many plants and animals can be observed. This is a part of the self-guided tour that will be the most fun for children because it can act as a scavenger hunt. It gives the visitors the opportunity to take a break from reading and start looking. This section of the tour can also serve as the more relaxing portion. We are disconnecting visitors from the world and surrounding them in nature. The visitors should be immersed in the wetland ecosystem. Visitors should keep all their senses aware, experience their surroundings, and take nature into themselves. Some animals the visitors could look for would be: white-tailed deer, northern cardinal, American robin, grey squirrel, and mallard ducks. Some plants they could identify would be: swamp milkweed, common cattail, black cherry, quaking aspen, and bush honeysuckle. Visitors can also look out for the bird boxes along parts of the self-guided tour to observe any birds.



#### **(4) Experimenting with the Natural World:**

This stop will focus on the two original wetlands that started the park's research, leading them to where they are today. This section is important because it tells the visitors of the original plan and how they've grown in their research. It shines light on the facility's desire to conserve and create healthier wetland ecosystems.

In 1993 and 1994, two wetlands were created for a wetland ecosystem experiment. One was planted with native wetland herbaceous plants, while the other was left alone to act as the control. This was to see how the ecosystems developed both structurally and functionally over a long period of time. The hypothesis of this experiment stated that the two wetlands would not be very complementary until they would mature. When they matured, the wetlands would start to look and act similar. The intake brings water from the Olentangy River into each of the experimental wetlands. The intake keeps the water levels balanced, creates a more natural water flow, and allows diversity of different plants and animals to enter into the wetlands from the river. To encourage friendly water use, the ORWRP has two pumps, conventional and bio-friendly, that supply water from the river that are only used during certain seasons.

#### **(5) The Pavilion:**

The Sandefur Pavilion looks out over the original planted kidney wetland. To the north lies the mesocosm compound, an area in which graduate students and staff conduct smaller-scale experiments. There are smaller sized pools that imitate wetland ecosystems to give researchers the best experimental conditions. There are blue tarps that cover some of these pools to simulate an environment without light. Some tarps do not cover the pools entirely to act as partial shade, like a tree would give partial shade to some shrubs underneath it. These smaller pools also allow researchers at the facility to conduct experiments that would be too difficult to control in a large natural setting. Some previous experiments that have been investigated are nutrient loading and methane emissions.

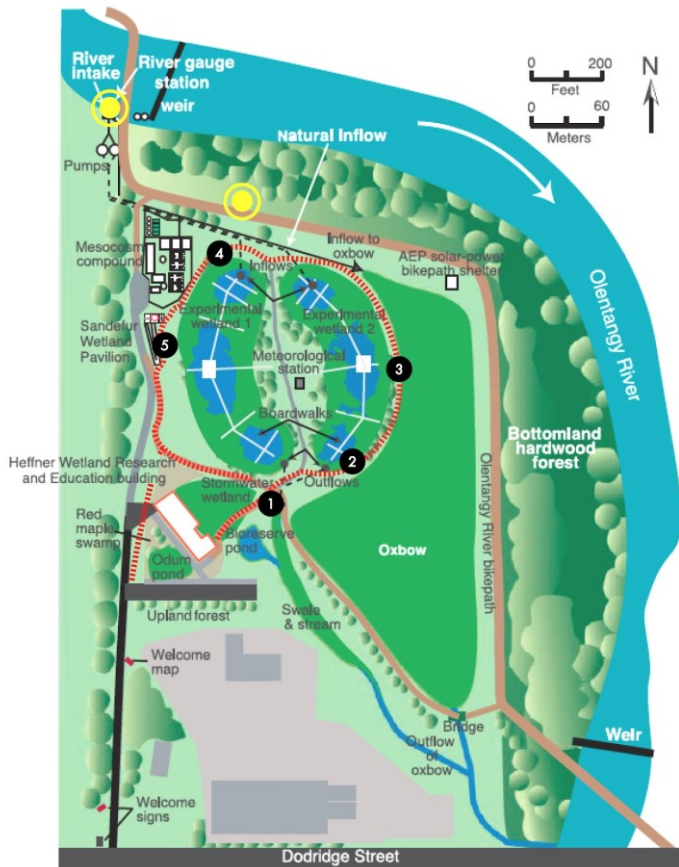


Figure 1: The map of the facility highlights in red the primary route for the self-guided tour. The numbered circles are checkpoints that will feature signage and corresponding information within the brochure. The yellow circles identify the secondary checkpoints that will also feature signage (Modified from Mitsch et al., 2012).

## The Brochure

To replace the presence of a guide, information will be provided for the self-guided tour in the form of brochures. The information will offer supplemental material to the signage that appears throughout the ORWRP. The brochures offer visitors a tangible piece of educational material to carry along with them as they explore the park. In order to minimize foot traffic through the building, we propose placing two weather-proof boxes to house the brochures at two key points in the outdoor area of the park. The first box will be attached to the map outside of the Hefner Wetland Research and Education building to provide easy access to visitors arriving by car. The second will be placed at the entrance to the park leading from the Orentangy Greenway Trail, which will be accessible to visitors arriving by bicycle or on foot.

The brochure itself will contain general information and, most importantly, a map of the research park (Figure 1). The map will feature a highlighted route that guides visitors to the major points of interest throughout the park. It will also include two secondary stops outside of the primary tour route. One stop will be at the river intake pump in the Olentangy River near the bridge at the north end of the facility. Here there will be information about the mechanisms that help sustain the wetlands. The second stop will be on the Olentangy Greenway Trail in the bottomland hardwood forest where there will be information that will identify and discuss the forest while educating visitors on the different types of wetlands. We have chosen to omit these stops from the primary tour route to avoid leading too many visitors to the Olentangy Greenway Trail and causing traffic issues with those who use it.

The brochure will also include a few added safety measures because with more visitors come more security risks. While much of the park is open, certain areas are shielded by thick vegetation. Since the park cannot be feasibly monitored by any sort of security staff, emergency phone numbers will be listed in the brochure, including that of Campus Police, to help ensure the safety of all visitors. The brochure will also include a warning about the Olentangy Greenway Trail in order to make visitors aware of the constant foot and bicycle traffic and help prevent accidents.

To avoid the risk of litter associated with brochures, we also recommend that the facility invest in two recycling bins. The bins can be placed near existing trash cans to minimize maintenance. One can be placed beneath the Sandefur Wetland Pavilion for visitors using the north exit, and another near the parking lot for those using the south. We hope to encourage visitors to keep their brochures, but would also like to provide an opportunity to sustainably dispose of them.

## **Pathways**

A major goal of this project is to increase the number of visitors to the ORWRP, however, more visitors can lead to issues with foot traffic. Increased foot traffic has the ability to affect the slope and texture of the ground surface as well as create unnatural muddy areas (Tejedo, 2012). These alterations to the ecosystem surrounding the experimental wetlands could affect the speed at which runoff enters the pools, which

could potentially affect the research taking place. While we cannot completely prevent soil compaction, we can limit it to a smaller area. The best way to prevent soil degradation throughout the park is to provide a clearly marked trail. The facility currently has a paved path leading from the parking lot through the western half of the trail route, linking checkpoints 1 and 5 (Figure 1). However, the remainder of the tour route is unpaved and surrounded by unkempt vegetation, which could cause confusion and lead visitors to stray from the designated trail, potentially causing more soil compaction.

Though the map featured in the brochure will help visitors navigate the park, the ORWRP would benefit from installing directional signs to ensure that visitors keep to the appropriate path. The facility could also benefit from trimming the vegetation that obstructs certain areas of the trail, particularly on the Nature Walk, to keep the trail route clear while also providing a more enjoyable walking experience.

The points that could benefit most from additional signage are near the southern end of the trail route (Figure 2). Here lies a four-way intersection of paved and unpaved paths that could cause confusion for some guests. To help orient visitors and keep them on the designated path, we recommend installing simple signs with small arrows to point visitors in the right direction and allow them to continue on their tour.

In the same area, there are openings in the vegetation that allow the public easy access to the experimental wetland pools. As an added precaution, we recommend placing signage that talks about the fragility of the wetlands, asking visitors to please refrain from tampering with the research pools.



Figure 2: The red circle highlights the intersection that could benefit from directional signage. The yellow dots indicate openings in the vegetation where prohibitive signage should be placed. (Modified from Mitsch et al., 2012).

## Updates

Updating the brochures is also an issue to consider with the self-guided tour. The brochures will mainly focus on general information about the facility and its permanent features which will not require frequent updates. However, in order to provide information about ongoing research and fresh material for returning visitors, the brochures will include a section that provides the most up-to-date information. This will, in the long run, require a member of the ORWRP staff to update the brochure. We propose that this job be assigned to the individuals conducting the research, as they are the most knowledgeable about their own findings. While we do not want to burden ORWRP staff or students with additional work, the proposed section will be very small and will only require a brief summary. To make it as easy as possible, we will create the general framework for the layout of the brochure and provide the staff with a digital file that can be easily edited.

## Costs

Overall, the cost of implementing the self-guided tour will be fairly low. According to George Patton Associates, Inc. (Displays2Go.com), the cost of a weather-proof box ranges from about \$11-91. We propose that about \$65 would be the maximum and best

cost for one weather box with multiple brochure slots, which would need to be attached to the front map by the entrance to the lobby and at the entrance from the Olentangy Greenway Trail. UniPrint from the Ohio State University has plenty of sources to print multiple copies of brochures.

The simple directional and cautionary signs to be placed at the four-way intersection could also be easily built. Materials from a retailer such as Lowe's or Home Depot would include 1x6 wood board, 8ft wood post, screws, and paint. Together, this would cost around \$50. Another option is to have the signs custom-made. Online retailers suggest that a simple aluminum sign can be made for under \$40. Ultimately, the project may be a little expensive to install (~\$220), but the maintenance is fairly low cost and easy.

## **Conclusion**

The ORWRP could greatly benefit from more public involvement and interaction with the facility. In order to attract more visitors while minimizing the burden on staff members, establishing a self-guided tour with a supplemental brochure is a simple, low-cost solution. The proposal ultimately includes the installation of weather-proof boxes and directional or cautionary signs, and the printing of new brochures. The project will initially require the efforts of ORWRP staff members to install the various pieces, but once in place, the tour requires very little maintenance.

The ORWRP is currently in need of a more efficient and effective way to provide educational experiences to the public. They wish to get the public more involved with the facility and gain stronger support for wetland ecosystems as a whole. A self-guided tour is one way to help achieve those goals. The tour will make use of the principles of free-choice learning and provide a relaxed atmosphere in which the general public can informally learn about a vital ecosystem. The updated tour will help provide clearer information in a more comfortable environment to help bring in new visitors as well as establish returning ones. By placing the experience in the hands of the visitor, guests can have a new experience with each visit. With a new self-guided tour, the wetlands will likely see an increase in visitors which will help to spread knowledge about the facility and its research.

The ORWRP has the potential to become an essential part of the Ohio State University and greater Columbus communities. Providing a more welcoming atmosphere can help change attitudes and inspire people to learn more and care about wetland ecosystems. A firsthand informative experience in the ORWRP can help promote pro-environmental attitudes within the general public.

To make a substantial impact on the number of visitors to the ORWRP, the facility will need to utilize other forms of outreach as well. This project is not the final solution, but rather the first step toward the goal of creating a better-educated society that works to promote the conservation of vital ecosystems.

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