

The Ohio State University  
Campus as a Living Laboratory

# Effective Sign Content at The Wilma H. Schiermeier Olentangy River Wetland Research Park Pavilion

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## **Executive Summary**

In today's society, signs and information are everywhere we look, and The Wilma H. Schiermeier Olentangy River Wetland Research Park is no different. Signs at the park's pavilion, an area of heavy visitor traffic, should be used to convey the most important aspects of the wetland ecosystem and research. Although the current signs on the pavilion originally served their purpose, they have outlived their contribution and are now somewhat ineffective at conveying the proper information.

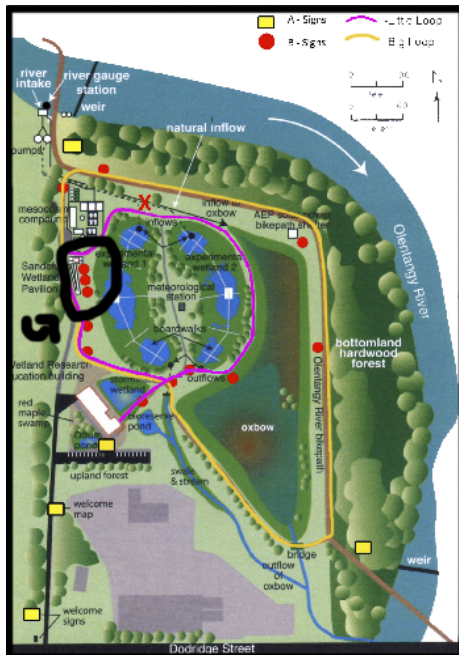
After researching the keys to effective language, and communicating with leaders at the wetlands, we are prepared to make suggestions on how to improve the content of these signs. Although we are making recommendations on the content of the signs, we recognize that more research will need to be done on the design and layout of the potential signs. If the designers for these signs decide that changes to our content are necessary, they should still take our recommendations into consideration for the signage content.

Through our discussions with Brent Macolley, the facilities service manager at the park, we learned that the content of the signs needed to be updated. This report is focused on recommending content for the three pavilion signs. The first potential sign is entitled *History and Development of the OSU Wetlands*, and will discuss the four phases the park has undergone throughout its history. The next sign, *What is a Wetland?*, will give general information about wetlands to visitors via three categories including: a definition of what a wetland is, *Why are they important?*, and *Promoting Conservation*. The third and final sign is the *Wetland Research* sign. On this sign, the park's initial experiment is outlined in scientific method form - a way that can be understood by people of all ages. This sign also mentions the mesocosm system utilized by the park. Deciding what research to include here proved to be an area of particular difficulty for the group, since it is constantly changing. Examples of the layout of these signs can be found in Appendices A, B, and C.

After researching this topic, we feel that new sign content for the pavilion will be a highly effective communication tool for the research park. It will provide information in a basic, easy to understand format that nearly anyone can read. The sign content we are proposing is a vast improvement over what is currently at the park, and can be used for years to come.

## Introduction

The Ohio State University (OSU) is home to one of the most important wetland research facilities in the world. The Wilma H. Schiermeier Olentangy River Wetland Research Park was labeled as a Ramsar site of International Importance nearly six years ago for collaboration and success in wetland research. Today, this beautiful park serves to inform visitors about wetlands research and the importance of wetlands worldwide. As OSU students, we feel it is important



*Figure 1. Wetlands Map. (Apple, Early, Rhodus, Robbins & Senuta, 2013)*

that the significance of our university, and the work of our peers, is portrayed in the best way possible. With significant research being performed every day, this site is something to be proud about. However, this research isn't being presented in the most effective way because existing signs, the three specifically located at the pavilion area shown on the map in Figure 1, are out of date and irrelevant. With the signs in their current condition, it is difficult for visitors to grasp the true importance of this site and the research being conducted here.

This is the reason why we found ourselves drawn to the three signs along the OSU Wetland pavilion, located just north of the park's visitor center. Brent Macolley, the facility service manager at the park, informed us that these signs were made several years ago in a rush to get them out before a tour group visited (B. Macolley, Personal Communication, September 16th, 2014). While they initially served their purpose, they were never meant to be permanent. With improved signs and up-to-date information, the OSU Wetlands will be able to better communicate the meaning of the park and properly educate its visitors. Signage requirements at OSU state that the key to constructing a successful sign is making sure it is "clear, legible, and understandable" (The Ohio State University, 2014). Keeping this in mind will be helpful for tailoring the signs and information in a proper and efficient format.

the topic of each sign, as well as the order in which it is presented, needs to be carefully considered.

For this reason, Brent and our group believe that the first sign should pertain to the history of the OSU Wetlands: how were they constructed, and how has the site changed over time? The answers to these questions will give visitors an idea of how the park came to be, and how it has developed over the years. But in order to understand the actual applications of the OSU wetlands, it would be helpful to have an idea of what a wetland is and the biological connections between wetlands and the services they provide. The second sign will offer this information to visitors so that they can grasp the importance of wetlands to communities. Finally, the third sign will offer the original case study conducted at the park, in order to connect the OSU Wetlands research to science as a whole. This sign will also include information on mesocosms, an integral part of scientific study at the OSU Wetlands. The transition from the *History and Development of the OSU Wetlands*, to *What is a Wetland?*, and then to *Wetland Research* is an effective way to allow each sign to build upon the others. In a fluid manner, visitors will gain each piece of knowledge on their way up the pavilion. Ultimately, after viewing each of these three sign topics, guests will have an in-depth understanding of the park's most important features.

### **Old Signs**



*Figure 2.* Current signage. Photo courtesy of Wesley Morris.



Figure 3. Current signage. Photo courtesy of Wesley Morris.

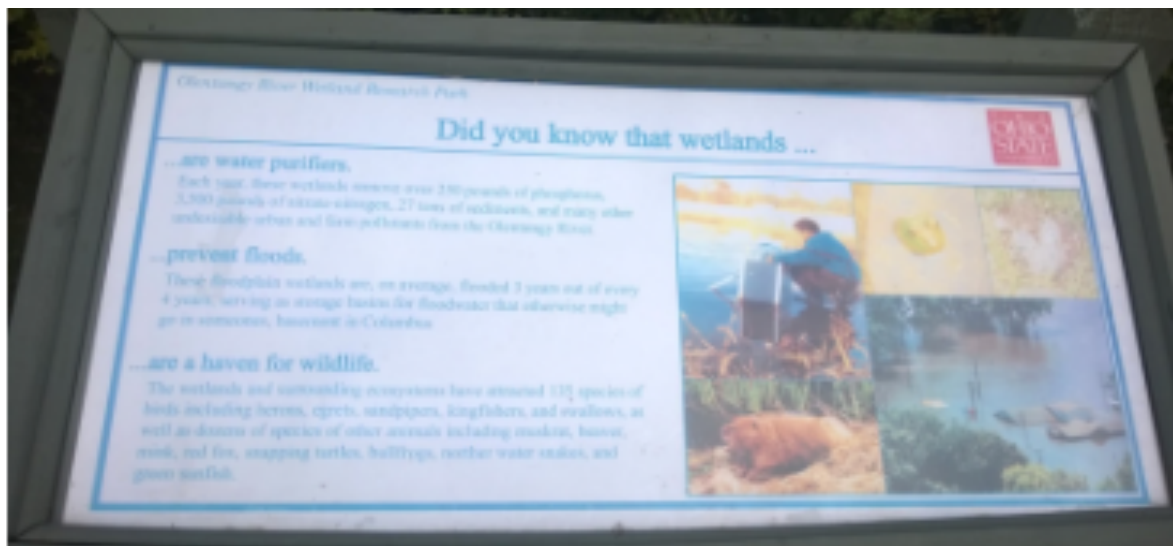


Figure 4. Current signage. Photo courtesy of Wesley Morris.

The current signs at the pavilion each have very distinct flaws that cause them to be ineffective at conveying proper information. As seen in Figures 2 and 3, the existing signs are composed mostly of pictures with very few words. Failing to include a description of the images on the signs greatly reduces the signs' effectiveness. For example, Figure 2, titled "Building a Wetland Research Park," could work if it discussed how one side of the park was planted, while

the other was left to grow up on its own in an effort to see which was more practical. These textual concepts could then be shown through pictures, allowing readers to understand the history of the OSU wetlands. While this sign may be aesthetically appealing, it would communicate more information if it included more words. Figure 3 is more of the same, with a map of the park and numerous pictures, but almost no text to describe any of them. Figure 4 is the most effective of the current signs. It provides a bulleted list of the benefits of wetlands, and briefly explains each of the points. We will aim to make our content suggestions to be near Figure 4's length, which comes out to be around 150 words. Overall, updating the signs so that they are more informative and attractive to the viewer can solve these issues.

### **Effective Communication**

One of the most influential factors of effective text is how well the text fits its audience. Presenting a scientific study and statistical data just wouldn't make sense at an elementary school book-reading, for the same reason that a comedy act isn't appropriate for a campaign against local crime. Understanding our audience is crucial to selecting the information that should be included on each sign.

While the initial audience for our suggestions is Brent and his staff at the Wetlands, it's necessary to take the main audience of the signs into consideration. After all, these will be the individuals actually engaging with the signs. The OSU Wetlands draw a variety of people along the pavilion and around the park, varying from first time visitors, to frequent guests, to OSU students performing research. With the pavilion signs being static, the main audience ends up being those first time visitors to the Wetlands, because reoccurring guests would have already seen them. In order for the majority of visitors to be able to understand these concepts, each sign must be written so it is easy to read, but remains factual. According to the South Dakota Historical Society, sign text should be written at a 7th - 9th grade level (n.d.). Signs should not include too much technical jargon that might confuse readers, or underdeveloped language that fails to provide enough depth.

From the start, signs should inform readers in a clear, methodical manner. It is this first impression that is so crucial for the pavilion signs. Phil McAleer, a psychology professor at the University of Glasgow, conducted a study on first impressions to see if people typically agreed upon conclusions drawn from a first mark. He was able to record over 60 different readings of the word "hello," and then present the recordings to 320 participants. Each individual was asked

to rate the “hello” for a number of traits. McAleer found that most people tended to rate the individual recordings very similarly for particular traits, showing that even after the first word we speak, others are already beginning to make judgments (McAleer, Todorov, & Belin 2014). With an uninformative sign, visitors might tend to follow this same pattern and make a quick judgment not only about the park, but also of the research being done here. An improved sign will allow for a quick, positive reaction to the park, and will hopefully spark further interest in its uses.

While the appearance of a sign is crucial, it is important that a sign also reads and informs in an agreeable manner. Some scientists, like Esther M. Van Dijk, a professor at the University of Hildesheim, believe that science is merely a “family resemblance,” in which the aspects from each distinct field are all related in the family of science (Dijk, 2011). This is similar to how the resemblance of siblings shows their relationship within a family. By looking at science in this way, it makes it easier to overlook the differences within each discipline and see science with an open view. This “philosophically neutral” understanding of science is a great way to communicate to a broader audience (Dijk, 2011).

#### **“History and Development of the OSU Wetlands” Sign**

The first sign will be focused around the history of the OSU Wetlands. It will include brief but descriptive information covering each phase of the research park’s development. The research park was developed over a series of phases beginning in 1992. These four phases are important to include in this sign regarding the history of the park because they are significant milestones in the park’s maturity. An example of what this sign may look like is shown in Appendix A.

The first phase included the construction of two, 2.5-acre, deep-water marshes and a river water delivery system that allowed researchers to compare and contrast the development of a marsh left unplanted versus a marsh planted by scientists. Researchers have used these two marshes to see which one would be more successful or if they would eventually evolve into similar marshes.

The second phase was the development of a research and teaching infrastructure. This included the construction of boardwalks, experimental mesocosms, a plant-material greenhouse, additional wetlands, instrumentation for long-term research, and a visitor pavilion (Mitsch,



2011). The creation of these sites and items allowed the scientists to expand their research while at the same time allowing them to educate the general public.

The third phase was the construction of the Heffner Wetland Research and Education Building, which made it possible for students at The Ohio State University to actually go out to the wetlands and take classes there, enhancing students' ability to learn about the wetlands. Along with the building, three additional wetlands were built to expand the research opportunities that could be offered.

The final and current phase includes international collaborations, river restoration, and urban ecotourism that allowed the Wetlands to gain international recognition. This has helped to raise funds for establishing long-term endowments to ensure that this research and teaching site continues to run and remain a part of The Ohio State University in the future.

The purpose of this sign is to summarize the development of the park, "concisely and attractively to help publicize it and generate discussion" (*Poster basics*, n.d.). This sign will use concise headlines and bullet points, which will make the sign easier to read than putting the information into a single body paragraph. It also makes it easier to separate the different milestones, while at the same time keeping the sign organized in a consistent layout.

The title of the sign will be "History and Development of the OSU Wetlands" with four subtitles, including each phase of the wetland development. Our suggestions for the information that will be displayed on this particular sign are as follows:

*The park was developed over four main phases...*

***Phase 1 (1992-1994): Initial Development***

- *Two 2.5-acre deep water marshes and a river water delivery system were constructed. One wetland basin was planted with marsh vegetation; the other marsh was left as an unplanted control.*

***Phase 2 (1994-1999): Development of a research and teaching infrastructure***

- *Construction included boardwalks, experimental mesocosms, a plant-material greenhouse, additional wetlands, instrumentation for long-term research, and a visitor pavilion.*

***Phase 3 (2000-2003): Construction of Heffner Wetland Research and Education Building.***

*This building provided classrooms and labs for students. Three additional wetlands were also built, including:*

- *A storm water wetland*
- *A pond dug deep enough to reach the water table*
- *An emerging red maple swamp*

***Phase 4 (2003-present): International collaborations, river restoration, urban ecotourism.***

- *Named the USA's 24th Ramsar Wetland of International Importance (2008).*
- *Received a Green Globe Award as the best wetland restoration site in North America (2010).*

(Mitsch, 2011).

**“What is a Wetland?” Sign**

Through email communications with Mark Dilley, a researcher at the Olentangy River Wetlands Research Park, we decided that a sign dedicated towards general information on wetlands should include three things: a simple description of the wetlands, the value wetlands provide to society, and what the research park is doing to promote conservation throughout the world (M. Dilley, Personal Communications, October 24th 2014). Using these suggestions, we decided to include three headings on the general information sign: *What is a Wetland?*, *Why are they important?*, and *Promoting Conservation*. Appendix B shows a potential mock-up of the *What is a Wetland?* sign.

Perhaps the most important heading on this sign will be the *What is a Wetland?* heading. This also serves as the sign's title, and will give visitors a general idea of what they are looking at and, if done correctly, will entice them to read the rest of the sign and learn more. Everglades Forever (2007) defines a wetland as “an area that is inundated or saturated by surface water or groundwater with vegetation adapted for life under those soil conditions.” Wetlands are also home to countless species of plants, fish, and wildlife. According to the Michigan Department of Natural Resources, wetlands are home to more species of plants and wildlife than any other ecosystem in the United States (Michigan DNR, 2001). These two pieces of information will form the basis for the definition that we will include on the sign, “*A wetland is an area where the land is saturated with water, such as a marsh or a swamp. Wetlands are home to more species of plants and wildlife than any other ecosystem in the United States.*” This definition will allow

visitors to have a good understanding of what a wetland is, without including too much technical jargon, or being too advanced for most readers.

The next heading is *Why are they important?*. For this part of the sign, we will list the functions that a wetland provides to the environment. According to the US EPA, a wetland can provide three main benefits: flood control, water filtration, and biological productivity. During floods, they act as giant storage tanks that can help hold floodwaters while they are slowly released back into the area, reducing flooding and property damage downstream. In today's society, flooding has become a major issue partly due to the destruction of wetland ecosystems, and reconstructing these areas could be a step towards preventing unnecessary flood damage in the future (Davis, 2001).

Another benefit provided by wetlands is water filtration. With the toxic algae blooms in lakes around Ohio, scientists and legislators are looking for ways to reduce farm runoff, sewage discharge, and other pollutants from entering lakes, and wetlands could be a part of the solution. As the water that flows through wetlands sits and comes into contact with plants, pollutants are filtered and settled out of the water. This makes for cleaner water and could be a key to keeping lakes and streams healthy (Davis, 2001).

The final benefit is biological productivity. Since the water discharged from wetlands is cleaner, more species can live there, causing an increase in the quality of ecosystems downstream. Wetlands also provide habitat for countless birds, fish, vegetation and other wildlife. Because of the unique nature of the ecosystem, people may come to the area just to see it, potentially adding a boost to local economies (Davis, 2001).

The last section of the sign will be *Promoting Conservation*. Here, we will list what the Olentangy River Wetlands Research Park is doing to promote worldwide wetland conservation by discussing the park's involvement in the Ramsar Convention of Wetlands. Ramsar is an international treaty designed to promote the conservation of wetlands throughout the world. It encourages collaboration between countries on wetland areas and is a major proponent of using wetlands wisely (Ramsar, 2014). This park is on the Ramsar list of Wetlands of International Importance. While this will be the largest group of text that will be included on this sign, it will still be very concise and to the point. It informs visitors that the OSU Wetlands are a part of the Ramsar Convention, while avoiding difficult words. It doesn't go into great detail about the

research being done because that will be covered on the Wetland Research sign, and including that information here would be repetitive. Our suggestions for this sign are as follows:

***What is a wetland?***

- *A wetland is an area where land is saturated with water, such as a marsh or a swamp. Wetlands are home to more species of plants and wildlife than any other ecosystem in the United States.*

***Why are they Important?***

*Wetlands provide many benefits including:*

- *Water Storage: Wetlands can store massive amounts of water and slowly release it in the event of floods, which can reduce potential property damage downstream.*
- *Water Filtration: Wetlands act as a natural filter, removing pollutants and nutrients that could be dangerous to people and the environment.*
- *Biological Productivity: Wetlands provide habitats for countless species of fish, birds, plants, and other wildlife.*

***Promoting Conservation***

- *This park is a member of the Ramsar Convention – a group of over 2,000 sites across the globe dedicated to the conservation of wetlands worldwide. The park provides valuable research on the effects of wetlands for the environment.*

**“Wetland Research” Sign**

The third and final sign leading up to the pavilion will focus on the current and ongoing research being conducted at the park. Our main goal for this sign is to present research conducted at the park, and to convey information that will be relevant over long periods of time so a reader won't be shown outdated information in the future. During our initial meeting with Brent, we were informed of a sign, currently located near the pavilion, that gives information on an project that has been discontinued for years (B. Macolley, Personal Communication, September 16th, 2014). Visitors who look at this sign are greeted with irrelevant information that doesn't convey the message that park administrators want. To avoid this potential problem, our group is proposing that this sign focus on the initial experiment led by Dr. William J. Mitsch, as well as a description of the mesocosms used to perform research at the OSU Wetlands today. Both of these topics are important enough for the park's success to be relevant in the future. We also believe that including a link to the OSU Wetlands website should be provided for readers who

have interest in the OSU Wetlands, and we will do so on this sign under the sub-header, *Want to know more?* (B. Maccolley, personal communication, September 16th, 2014).

The potential layout of this sign is shown in Appendix C. This will be the most text-heavy of all of our sign suggestions, and future sign designers will need to take this into account when planning the layout of the sign. Brent mentioned to us that if the information on mesocosms could not fit on *Wetland Research*, there is a fourth sign located closer to the mesocosm tubs that would also be suitable to display information on the mesocosms (B. Maccolley, personal communication, September 16th, 2014). Using our word count standards, this sign will be lengthy without the inclusion of the mesocosm information. We still feel that the topic is important enough to include, but the designer will have to decide whether to keep the information on the third sign, or move it to the potential fourth sign. If the latter is the case, we ask that our initial suggestions be considered for the fourth sign.

To present the main research conducted at the OSU Wetlands, we plan to display the information in the scientific method format. The scientific method, the basis of scientific experiment, is taught formally as early as middle school, and readers will be able to conceptualize the research conducted (Wolfs, n.d.). This section of the sign will have five subtitles based around this concept: *Asking a Question, Background Research, Forming a Hypothesis, Experiment, and 15 Years Later*.

To explain *Asking a Question*, it is important to give information on the questions Dr. Mitsch and his team were asking leading up to the experiment. Creating and restoring wetlands was a common practice around the United States in an attempt to make up for the loss of ecosystems due to past development projects. This caused a swirl of controversy as scientists questioned the uncertainty of the actual process of restoring a wetland. What is required to create and restore these wetlands? How can success be measured? Most importantly, the scientists were keen to discover what happens when a wetland restoration project is left to nature's self-design compared to a botanical engineering approach by humans (Mitsch et al., 1998). These were the main questions that were asked as the investigation began to develop and should be included in the sign content.

The *Background Research* section centers on the experiment design Dr. Mitsch and his team came up with in order to test the questions they had. An experiment was proposed that would create two identical kidney shaped wetland basins: one comprised of plants chosen by the

researchers, the other left for nature to select its own assemblage of plants (Mitsch et al., 1998). This sets up the next section, because a hypothesis can't be made without an experimental design.

*Forming a Hypothesis* will focus on the first predictions the scientists' made before the study began. Dr. Mitsch and his colleagues developed a hypothesis focused on the rate of growth in ecosystem function in each basin, suggesting they would be similar in function at first, diverge in the following years, and eventually converge back together in both structure and function (Mitsch et al., 1998). For this section, the reader needs some background information on the experiment to get a better understanding behind the development of the hypothesis.

In the *Experiment* section, the content should focus on the actual experiment and the standards of development. After the two identical basins were dug, one was planted with 13 species of plants common to midwestern marshes and the other was left unplanted. Through a series of pumps, equal amounts of water were pumped from the Olentangy River to match river flow. Over the next years, development of the wetlands was measured using a number of standards, including vegetation richness and cover, algal community, water column productivity, water quality, nutrients, the benthic community, and the bird population spotted in the area (Mitsch et al., 1998). When considering what to include on the sign, it is important to keep in mind that many will not know what these terms may mean in the context of wetland ecology. Selectively choosing to include information that readers will understand, such as vegetation, water quality, and ecosystem service productivity, will allow for better understanding.

The information under *15 Years Later* will concentrate on the ideas the scientists drew from their data fifteen years after the initial water introduction. Dr. Mitsch and his team released a second research paper detailing the progress of the two wetlands thus far. While the initial hypothesis was mostly validated, both styles of wetland reclamation provided some different benefits and costs. The planted wetlands maintained increased vegetation diversity over the 15-year span, as well as a higher retention of nutrients from agricultural run off. Comparatively, the unplanted wetlands were more productive overall in ecological services like carbon sequestration, but released more methane, a harmful greenhouse gas, into the air. The paper concludes that quality ecosystem management mostly depends on the stability of an area and the time an ecosystem is given to develop (Mitsch et al., 2012). Content on this sign should relate back to the previous signs, answering any questions that hadn't been addressed.

*Mesocosms* will center on what mesocosms are used for, and how they are applied at the OSU Wetlands. Mesocosms are a form of fragmentation seen in wetland research today. They are controlled systems that can be used simultaneously and in conjunction with a larger natural environment, or in this case, a wetland. The use of mesocosms all stems from the change in science that we have seen over the past seventy years. In this period, nearly every category of science has been broken up more and more into smaller subsections (Odum, 1984). Each of these divisions helps to provide more specific knowledge that can then be collected into the larger domain of science, very similarly to Dijk's idea of family resemblance.

At the OSU Wetlands, there are a total of eighty mesocosms that can be used to study a variety of effects on this ecosystem. This is a great way for scientists to collect data because it is much easier to implement a test factor on multiple small-scale wetlands than changing it on a larger scale. By comparing both levels of study, scientists can draw conclusions on the success or failure of the mesocosms and implement healthier, more sustainable practices at the Wetlands.

In previous years, the OSU Wetland mesocosms have been used to test a variety of things. Early research included the effects of hydrologic pulsing on plant nutrients. Currently, OSU is testing the predator-prey relationships of bass and crayfish. On the sign itself, we feel that it is important to inform guests of the purpose and potential uses of mesocosms on a more general scale.

Our suggestions for this sign are as follows:

### **Asking a Question**

*Wetlands restoration was common practice leading up to the early 1990s, but little research was done on the restoration process. Dr. William J. Mitsch and his team of scientists began to wonder, is there a right way to create a wetland?*

### **Background Research**

*Dr. Mitsch and his team developed an experiment that would create two identical wetlands. They planned the development of one, and left the other unplanted to develop naturally.*

### **Forming a Hypothesis**

*Dr. Mitsch and his team formulated a hypothesis that both wetlands would eventually develop to be similar.*

## **Experiment**

*Water from the Olentangy River was pumped in equal amounts into each basin. Scientists used a number of standards to measure development including plant diversity and productivity of ecosystem services like carbon sequestration.*

## **15 years later**

*With the experiment ongoing, data has shown that while both wetlands have developed similarly, each has particular benefits. The planted wetland has more plant diversity, while the unplanted is more productive.*

## **Mesocosms**

*A mesocosm is a small-scale model of a natural environment used in scientific research. At the park, there are eighty mesocosms located just north of the pavilion. These miniature ecosystems allow scientists to test hypotheses and collect data before applying these practices on a larger scale.*

## **Want to know more?**

*Visit [swamp.osu.edu](http://swamp.osu.edu) for more information.*

## **Conclusions**

The Wilma H. Schiermeier Olentangy River Wetland Research Park is not only an important area of research for The Ohio State University, but maintains international significance in the field of wetland ecology. While it served its purpose initially, the current signage content at the research park pavilion is outdated and doesn't convey the proper information to visitors. Our group believes that three topics are better suited to inform guests about the significance of wetland research: the park's history, general wetland information, and the research being done at the park.

This paper, focused on sign content, is only one part of implementing new signage on the pavilion. In addition to improving the content, the design and layout will have to be improved before signs can be applied. Utilizing the university's art and design programs could be one path to improve the aesthetics of signage. Furthermore, the sign holders are also in need of improvement. In discussions with Brent, we discovered that vandalism is a problem for signage in the area, together with the glass fogging up on humid days, making the signs nearly unreadable (B. Macolley, Personal Communication, September 16th, 2014). For a reference on



potential sign holder improvements, there was already a student report that researched materials for signs that could be implemented at the wetlands (Apple et al., 2013). Referring to this paper could save time and money when deciding how to implement new sign improvements. We also realize that because our group is focused specifically on sign content, there may be design restrictions that we are unaware of that would warrant adjustment to our suggestions. If that is the case, we still recommend making these adjustments with our content suggestions in mind. We have also provided a sample design of each sign, located in the appendices, which could be helpful in conceptualizing what the potential signs could look like. It is important to note that these were made with limited knowledge of proper sign design and layout.

Through our research, and with the help of Brent Macolley and Mark Dilley, we have proposed suggestions about what to include on all three signs leading up the pavilion. Each proposal has been made to ensure that readers of future signage can grasp the core concepts the park wishes to convey without being overwhelmed with uninformative, unimaginative, and unappealing text. We ask Brent Macolley and his staff to consider our sign content suggestions when deciding to implement new signs, realizing that he and his colleagues have the final say in any signage decisions.

## Works Cited

- Apple, M., Early, K., Rhodus, E., Robbins, J., & Senuta, K. (2013). *Public education at The Wilma H. Schiermeier Olentangy River Wetland Research Park: Outdoor signage*. 1-27, Retrieved October 10th, 2014, from <http://kb.osu.edu/dspace/handle/1811/54587>
- Davis, D. (2001). *Functions and values of wetlands*. US EPA. Retrieved October 18, 2014, from <http://water.epa.gov/type/wetlands/outreach/upload/functions-values.pdf>
- Dijk, E. (2011). Portraying real science in science communication. *Science Education*, 95(6), 1086-1100. doi:10.1002/sce.20458
- Everglades Forever. (2007). *Glossary of terms*. Retrieved October 24, 2014, from <http://www.dep.state.fl.us/evergladesforever/about/glossary.htm#>
- McAleer P., Todorov A., & Belin P. (2014) *How do you say 'Hello'? Personality impressions from brief novel voices*. PLoS ONE 9(3): e90779. doi:10.1371/journal.pone.0090779
- Michigan DNR. (2001, January 1). *What is a wetland?*. Retrieved November 18, 2014, from [www.michigandnr.com/publications/pdfs/wildlife/viewingguide/eco\\_wetland.htm](http://www.michigandnr.com/publications/pdfs/wildlife/viewingguide/eco_wetland.htm)
- Mitsch, W. J., Wu, X., Naim, R. W., Weihe, P. E., Wang, N., Deal, R., & Boucher, C. E. (1998). Creating and restoring wetlands: A whole-ecosystem experiment in self-design. *Bioscience*, 48(12), 1019-1030.
- Mitsch, W. (2011). History of OSU's Wetlands. In *2010 Annual Report: Wilma H. Schiermeier Olentangy River Wetland Research Park* (pp. 4-5). Columbus.
- Mitsch, W. J., Zhang, L., Stefanik, K. C., Nahlik, A. M., Anderson, C. J., Bernal, B., & Song, K. (2012). Creating wetlands: Primary succession, water quality changes, and self-design over 15 Years. *Bioscience*, 62(3), 237-250.
- Odum, E. P. (1984). The mesocosm. *Bioscience*, 34(9), 558.

Poster basics - How to create a research poster. (n.d.). Retrieved October 18, 2014, from <http://guides.nyu.edu/posters>

Ramsar. (2014). *Homepage*. Retrieved October 24, 2014, from <http://www.ramsar.org/>

South Dakota State Historical Society. (n.d.). *Recommendations for developing interpretive signs*. Retrieved October 18, 2014, from <http://history.sd.gov/preservation/OtherServices/CHTInterpretiveSignRecommendations.pdf>

The Ohio State University: Facilities operations and development services (2014). *Signage policy and guidelines*. pp. 14. Retrieved September 15, 2014, from <http://fod.osu.edu/signage/signage.pdf>

Wolfs, F. (n.d.) *Introduction to the scientific method*. Retrieved October 18th, 2014, from [http://teacher.nsr1.rochester.edu/phy\\_labs/appendix/appendix.html](http://teacher.nsr1.rochester.edu/phy_labs/appendix/appendix.html)

<h1>History and Development of the OSU Wetlands</h1>	
<p><b>Phase 1 (1992-1994): Initial Development.</b> Two 2.5-acre deep water marshes and a river water delivery system were constructed. One wetland basin was planted with marsh vegetation; the other marsh was left as an unplanted control.</p>	<p><b>Phase 2 (1994-1999): Development of a research and teaching infrastructure.</b> Construction included boardwalks, experimental mesocosms, a plant-material greenhouse, additional wetlands, instrumentation for long term research, and a visitor pavilion.</p>
<p>PICTURE?</p>	<p>PICTURE?</p>
<p><b>Phase 3 (2000-2003): Construction of Heffner Wetland Research and Education Building.</b> This building provided classrooms and labs for students. Three additional wetlands were also built, including:</p> <ul style="list-style-type: none"><li>• A storm water wetland</li><li>• A pond dug deep enough to reach the water table</li><li>• An emerging red maple swamp</li></ul>	<p><b>Phase 4 (2003-present): International collaborations, river restoration, urban ecotourism.</b> Named the USA's 24th Ramsar Wetland of International Importance (2008). Received a Green Globe Award as the best wetland restoration site in North America (2010).</p>
<p>PICTURE?</p>	<p>PICTURE?</p>

<p style="text-align: center;">PICTURE?</p>	<p style="text-align: center;">PICTURE?</p>
<h2 style="text-align: center;">WHAT IS A WETLAND?</h2> <p>A wetland is an area where land is saturated with water, such as a marsh or a swamp. Wetlands are home to more species of plants and wildlife than any other ecosystem in the United States.</p>	<p><b>Why are they important?</b> Wetlands provide many benefits including:</p> <ul style="list-style-type: none"><li>• <b>Water Storage:</b> Wetlands can store massive amounts of water and slowly release it in the event of floods, which can reduce potential property damage downstream.</li><li>• <b>Water Filtration:</b> Wetlands act as a natural filter, removing pollutants and nutrients that could be dangerous to people and the environment.</li><li>• <b>Biological Productivity:</b> Wetlands provide habitats for countless species of fish, birds, plants, and other wildlife.</li></ul> <p><b>Promoting Conservation</b> This park is a member of the Ramsar Convention – a group of over 2,000 sites across the globe dedicated to the conservation of wetlands worldwide. The park provides valuable research on the effects of wetlands for the environment.</p>

# WETLANDS RESEARCH

**Asking a Question**  
Wetlands restoration was common practice leading up to the early 1990s, but little research was done on the restoration process. Dr. William J. Mitsch and his team of scientists began to wonder, is there a right way to create a wetland?

**Background Research**  
Dr. Mitsch and his team developed an experiment that would create two identical wetlands. They planned the development of one, and left the other unplanted to develop naturally.

**Forming a Hypothesis**  
Dr. Mitsch and his team formulated a hypothesis that both wetlands would eventually develop to be similar.

**Experiment**  
Water from the Olentangy River was pumped in equal amounts into each basin. Scientists used a number of standards to measure development including plant diversity and productivity of ecosystem services like carbon sequestration.

**15 years later**  
With the experiment ongoing, data has shown that while both wetlands have developed similarly, each has particular benefits. The planted wetland has more plant diversity, while the unplanted is more productive.

**Mesocosms**  
A mesocosm is a small-scale model of a natural environment used in scientific research. At the park, there are eighty mesocosms located just north of the pavilion. These miniature ecosystems allow scientists to test hypotheses and collect data before applying these practices on a larger scale.

PICTURE?

**Want to know more?**  
Visit [swamp.osu.edu](http://swamp.osu.edu) for more information.