

Green Space Along the Olentangy River Corridor

Hunter Ardrey, Michael Bean,
Melanie Fowler, Morgan Oberly

ENR 2367
Spring 2014

Table of Contents

Topic	Page
Executive Summary	3
Introduction	3
Improving the River Corridor	4
Framework Plan	6
Other Universities	7
Proposal Location and Design	8
Creation of Recreational Space	10
Ecological Function	12
Benefits to Students	14
Addressing Challenges	15
Discussion	16
Conclusion	16
Literature Cited	17

Executive Summary

This report proposes improvements to the current plan for green spaces at The Ohio State University as the College of Food, Agricultural and Environmental Sciences (CFAES) relocates to main campus. It addresses the current changes occurring within the Olentangy River corridor which is affecting the riparian areas on campus, analyzing the University's Framework Plan and how the proposed green space fully captures the vision of The Ohio State University. This report also evaluates the benefits and importance of the proposed green spaces within the riparian area on Ohio State's campus along the Olentangy River corridor, examining the functions, benefits, and challenges that will arise within the green spaces. It includes case studies from the designs of green spaces at other institutions which are in close proximity to riparian areas.

This proposal for green spaces along the Olentangy River will have multi-faceted benefits for The Ohio State University community. Research shows that green spaces deliver a variety of functions such as improving physical and mental health. Students will have access to an enjoyable recreation space connected to the Olentangy River, which also provides wildlife habitat. The area will contribute to improving the environmental health of the river corridor.

When compared to the current design possibilities, the proposed plan in the new CFAES campus will more effectively create an atmosphere for recreation, environmental health and education. This report for the proposed green spaces alongside the relocated CFAES campus addresses the following areas:

- 1) Creating a recreational area which maximizes use and enjoyment for the Ohio State community
- 2) Increasing the area, amount, and diversity of vegetation
- 3) Cultivating the appropriate species of flora suited for the site
- 4) Developing an area which supports ecological/environmental health and education
- 5) Contributing to the restoration of the Olentangy River

Introduction

Creating green spaces is a way for Ohio State to improve the Olentangy River corridor. A green space is defined as "a plot of undeveloped land separating or surrounding areas of intensive residential or industrial use that is maintained for recreational enjoyment" (<http://dictionary.reference.com/browse/green+space?s=t>). The EPA specifies that open space is

an open piece of land that is undeveloped with no buildings which is accessible to the public, while a green space is land that is partly or completely covered with grass, trees, shrubs, or other vegetation (EPA Open Space, 2013).

Our proposal for enhancing the current Framework Plan involves creating a green space that will benefit Ohio State's students and the Olentangy River ecosystem. The proposal stresses the importance of increasing the amount of green space suggested in Sasaki's Framework Plan. Contained within the green space will be a forested area and three recreational fields where spraying herbicides and pesticides will be prohibited unless used for restoration purposes. This green space will increase the use of the existing bike path greenway and enhance the interaction of The Ohio State University with city-wide recreational users, while also providing important ecological functions such as reducing runoff and providing a seed source for the Olentangy River.

The Olentangy River runs through Columbus and alongside The Ohio State University, acting as a corridor for both aquatic and terrestrial organisms. Due to development and pollution, however, the health of this corridor has been severely weakened. A green space including both forest and recreation areas will help improve the river corridor near the University. This will not only enhance the river corridor by incorporating a natural greenscape, but will provide recreational opportunities between the Olentangy River and the Ohio State football stadium, and act as an outdoor learning space for students. Green spaces, a rare and valuable resource in cities, are a high priority when developing urban areas such as The Ohio State University. Creating a green space near the new College of Food, Agricultural and Environmental Sciences campus will benefit both the environment and the university. This paper will address how the space will be managed, how certain challenges will be handled, and will include similar examples from other universities.

Improving the River Corridor

The Olentangy River is currently an unhealthy ecosystem as it is contaminated by polluted runoff and combined sewer overflows discharge into the watershed. A combined sewer overflow system is designed to collect rainwater runoff, domestic sewage, and industrial wastewater and transport it to a wastewater treatment facility where it is treated then discharged to a water body (EPA Combined 2012). When there is heavy rain or snowfall, however, the

systems can overflow and discharge untreated water directly into nearby waterways. Due to the highly urbanized location of the river, each rainfall can cause some polluted storm water and untreated sewage to flow directly into the Olentangy, posing a health hazard for people as well as fish and wildlife (Sierra, 2009).

To improve the health of the corridor, the Olentangy/Scioto Ecosystem Corridor (OSEC) project was proposed by The City of Columbus, The Ohio State University, Audubon, and Friends of the Lower Olentangy Watershed in 2010 (Mitsch, 2012). Stretching from the Olentangy River Wetland Research Park to the Grange Insurance Audubon Center, this restoration project was designed to improve 8.5 miles of the Olentangy River corridor “with dams removed, riparian habitat restored, and bike paths and water trails completed” (Mitsch, 2012). Already, the City of Columbus has invested \$6.9 million to restore this section of the river corridor. In August of 2012, workers began removing the Fifth Avenue Dam, which had negatively affected the hydrology and structure of the river. Major landscaping and excavation have been underway since the removal of the Fifth Avenue Dam, in an attempt to help channelize the Olentangy River (King, 2012).

The City of Columbus’ decision to construct the new channelization path of the river, doing in one year what should have taken the river about 25 years to develop, has increased the necessity for Ohio State to contribute to restoring the Olentangy watershed (Mitsch, 2012). To aid in the health of the river corridor, we are proposing that The Ohio State University improve its green space along the Olentangy’s banks. By providing green space along this corridor, Ohio

State will aid in the City of Columbus’ efforts to restore the Olentangy and connect more students to the river.

Now, The Ohio State University has adopted a plan from Sasaki to improve the university. Known as “One Framework Plan” (Figure 1), it includes the relocation of Cannon Drive further east of the Olentangy River and the removal of berm and parking spaces along the river (Burnett, 2013). “We want to make the river more accessible to the campus community, at least visually,” said Amanda Hoffsis,



Figure 1. Sasaki’s proposal containing green space along the Olentangy corridor (The Ohio State University, 2010)

senior director of Physical Planning and Real Estate. “The first initiative is Cannon Drive and we’re hoping to raise it out of the floodplain, realign it, create a new barrier for water and eliminate the mound” (King, 2012). With the Framework Plan’s proposal to condense the academic campus to one side of the river, there is a greater need for a healthy, riparian ecosystem. Creating a green space and improving the river corridor will thus be beneficial to both the university’s goals and to the broader goals of Columbus.

Framework Plan

Since the adoption of Sasaki’s Framework plan in 2010, Ohio State has been committed



Figure 2. Framework Plan with the proposal to create green space along the Olentangy (The Ohio State University, 2010)

to improving three objectives of this proposal: creating One University, fostering stewardship, and creating a 24/7 campus experience. As the Columbus campus becomes more localized, this reduces the necessity for parking areas around the river and creates the opportunity for more green space (The Ohio State University, 2010). This additional green space will aid in Ohio State’s goal to “foster stewardship” with the new university layout. Our proposed project incorporates Sasaki’s intention of restoring the riverfront (Figure 2) by improving the river’s health with surrounding green space.

The Framework Plan of Sasaki supports Ohio State’s goal of being “One University, building toward a long-term vision of campus and community” (The Ohio State University, 2010). The riverfront will provide uniquely secluded, yet accessible recreation space for students to use, containing native vegetation not found on the Oval. Additionally, the Framework Plan encourages investing in open space. The Olentangy corridor already contains open space, but these areas are not being used to their full potential. We believe the Olentangy River should be transformed into an area that is beneficial to the ecosystem as well as enjoyable to the students. As stated by Sasaki, “open space is a critical component of our civic infrastructure. The Olentangy River is the geographic center of the Columbus campus, and as such represents a singular opportunity. A transformed river corridor will be an active research and learning corridor; a pastoral recreation zone... The reimagined river corridor is the perfect symbol for One University” (The Ohio State University, 2010). This restoration of the Olentangy is an opportunity that cannot be overlooked.

Our proposal suggests enhancing the current Framework Plan's green space into an area that is beneficial for all. The Framework Plan suggests recognizing the whole campus as part of the learning environment. Creating an outdoor space along the Olentangy that is accessible to students can provide outdoor learning opportunities. These green spaces will encourage students to engage with their environment. As stated in the Framework Plan, "The adjacent river corridor...is essentially a large working laboratory" (The Ohio State University, 2010). These suggestions for a "more robust riparian corridor, with opportunities for research, teaching, recreation, and regional connections" show that this green space needs to be more ecologically beneficial than the Oval.(The Ohio State University, 2010). The Sasaki plans already include restoring this area to be a green space. Our proposal encourages that idea and suggests taking the plans a step further to the creation of a wildlife corridor and a recreation area. The area should be as ecologically beneficial as possible, while creating a space that can be enjoyed by students.

Other Universities

As one of the largest universities in the country, The Ohio State University should be a leader. Other universities have realized the benefits of green spaces and are creating or restoring green areas alongside waterways on their campuses, and Ohio State should not fall behind in this trend.

The University of Arkansas at Little Rock (UALR) had adopted a Campus Master Plan in 2005 similar to the Ohio State Framework Plan. Part of UALR's proposed plan is to improve Coleman Creek, which runs through the University. Their goal is to reduce the impact the University and surrounding developed areas have on the creekside in order to restore and enhance their greenway. UALR is currently in the process of restoring Coleman Creek's river corridor (University Greenway, 2013). In their 10 year plan, 47 acres of land surrounding Coleman Creek will be restored, with an intent to "restore the creek waterway and associated floodplain, and to improve water quality downstream, while enhancing the aesthetics of the creek" (University Design, 2013). As these plans come together, a trail alongside the creek is also being constructed as a way to incorporate students with this improving landscape.

Texas A&M University also has a creek and a mission of improving their riparian corridor for teaching and student research opportunities, as well as preservation of natural habitats for plants and animals. This university captured the goal behind our proposal in their mission to "rejuvenate, recreate, and entertain students and visitors." Their greenways "[will]

provide a place for restful solitude, leisure, and passive recreation” (Texas A&M, 2013). The space will contain a rose garden, grassland, tree arboretum, wildflower meadow, and rain garden, as well as many other features. The Texas A&M Gardens and Greenway has been approved as part of the university master plan, and is raising funds to move forward. They envision the space as an outdoor classroom and relaxation area that will also serve to preserve the creek’s habitat, which is critical to sustaining natural flora and fauna (Texas Water, 2013). A simple field of wildflowers has been planted to give passerby a taste of what the area will be like. The results have been incredible, with people literally stopping in their tracks to enjoy the flowers (Futrell, 2014). As other universities experience the benefits of restoring their waterways, Ohio State should take advantage of the incredible opportunity “One University” is providing and improve its greenway.

Proposal Location and Design

Our proposal is to create a green space and restored riverfront between Lane Avenue and Woody Hayes Drive, west of the new CFAES buildings, and adjacent to the south side of Woody Hayes Drive, alongside the Olentangy River. This is a prime location for a green space because it will be near the north campus dormitories, where students will want a closer recreation area than the Oval. It will also be extremely beneficial for students studying in CFAES, not only because they enjoy the outdoors, but because they can use the area for learning about riparian ecosystems and Ohio native species. Though our proposal focuses on this area, it is not to diminish the

importance of also restoring the rest of the Olentangy corridor.



Figure 3. Our design proposal with new recreation areas contained within green space along the new CFAES campus (Google Maps, 2014)

As more land becomes available around Ohio State’s riverside, we propose to turn this new area into a green space that is ecologically beneficial to the river corridor and socially engaging with Ohio State students and the public. We propose that Ohio State continues to allow for the amount of green space shown by Sasaki in Figure 1. The primary focus of our proposal, however, is only dealing with recreational space near the new CFAES campus. Three recreational spaces, as outlined in yellow, will be surrounded by diverse, native vegetation (Figure 3). Two will be directly alongside the new CFAES campus, east of the river and north of Woody Hayes Drive.

An additional field will be south of Woody Hayes Drive beside Ohio Stadium. Trails to these recreation fields will be maintained, and benches will be situated throughout the fields for a scenic study space. Pathways lined with wildflowers will connect the nearby Olentangy Bike Path to the recreation spaces, creating a future possibility for a small restroom facility with water fountains for the convenience of recreational users of the path. The two fields east of the new CFAES campus will have labels and plant identification facts throughout the area. This will aid the green space's role of being an educational tool for students, especially those in CFAES. A "buy-a-brick" program could be used to raise funds for the area, in which an engraved brick could be bought to be placed within the paths. This program could also help in drawing people to the area. Focusing on one particular area will also leave the possibility of having a garden or other development in the future.

Also important to the Olentangy Ecosystem Restoration Project is that this vegetation is composed of diverse, native species. Native plants do not require pesticides, fertilizers, or watering, and are more resilient to pests (EPA Landscaping, 2012). Waterman Farm is already raising trees in their nursery to help supply the riparian area once Cannon Drive is removed and Chadwick Arboretum has created a desired plant list for the Olentangy riparian corridor, suggesting both overstory and understory plants that are native to Ohio. Canopy species suggested include the following: *Acer saccharinum* (silver maple), *Betula nigra* (river birch), *Carya laciniosa* (shellbark hickory), *Diospyros virginiana* (common persimmon), *Larix laricina* (eastern larch), and *Nyssa sylvatica* (black tupelo), and understory species suggested include the following: *Aronia melanocarpa* (black chokeberry), *Asimina triloba* (pawpaw), *Betula alleghaniensis* (yellow birch), *Cephalanthus occidentalis* (buttonbush), and *Cornus racemosa* (grey dogwood). This diversity will improve the resilience of the river corridor to disturbances, reduce the likelihood of invasive species, and be a beneficial seed source for other parts of the corridor.

This green space will not require much maintenance for several reasons. First, using only native fauna that are adapted to Ohio's climate will diminish any tree care or plantings necessary for non native species. Due to the proximity to the river, the use of fertilizers, herbicides, and pesticides will be discouraged in the likelihood of runoff reaching the Olentangy River. Surrounding the recreational fields will be a forested area, which is less dense on the eastward facing side of the field. These trees will serve as a wind and sound break for those utilizing the

recreation space. The goal is to promote the growth of only native Ohio species in this area.

This space can also become an extension to the Chadwick Arboretum, which can help with the design and layout of this recreation area due to their affiliation with CFAES. This space will differ from that proposed in Sasaki's Framework Plan in that there will be forested areas drawing in native wildlife with pockets of recreation space, rather than the entire area being a recreational field.

Creation of Recreational Space

The river corridor is arguably one of the most untapped and under-utilized areas on The Ohio State University's campus. The proposed green space is unique because it will be an extension of the bike path and natural space connected to the Olentangy River. Development in the city of Columbus is fragmenting ecosystems and impairing resources for wildlife. Because of this, the river system serves as a necessary gateway for organisms to access more resources. In its current state, Ohio State's portion of the river corridor has the wetlands research station and large portions of forested areas and parks north of campus, and it meanders past the medical campus and toward the downtown area. From Lane Avenue to Fifth Avenue, it is surrounded by parking lots and open areas, small areas with picnic tables, and small patches of trees that are hidden, uninviting, or dull. Restoration of this area has the potential to ecologically benefit the river.

The Olentangy River bike path is already a gateway, creating an opportunity for interface between Ohio State and the recreational users of the Olentangy Trail. Students and Columbus citizens use the area for recreational activities such as biking, running, rollerblading, birding, and as a means to commute to other areas of Columbus. The new CFAES campus will be closer to The Ohio State University's football stadium, which then allows CFAES to draw people in to use recreational spaces for tailgating during game days, and for events such as graduation.

Optimizing these spaces will have a significant impact on the recreational opportunities at Ohio State and attract users from the Olentangy Bike Trail. Part of the Framework Plan is to "transform the river and green reserve." There is no money for the actual relocation yet, but the city has funded the initial design and engineering study. Moving Cannon Drive and removing these parking areas between Twelfth and Lane Avenues will provide greater opportunities for green space development. Although our planned design only focuses on a recreation space of 3.2 acres, forested recreation space can be added throughout the rest of the river corridor. Twelve

Olentangy River makeover



Figure 4. Possibility for recreational areas in other parts of the corridor. Developed land can be turned into usable recreation spaces. (The Ohio State University, 2010)

acres of developable land will be freed with the removal of the Wexner Medical Center parking area alone (Figure 4) (King, 2012), allowing for the creation of recreation or green spaces. In addition, areas that contain only sparse patches of vegetation or large open spaces without easy access for recreation can be developed into refreshing and aesthetically pleasing spaces.

One of the most important aspects in changing this space should be focusing on what students want on their campus. Students have proven that the campus needs usable recreation space, and if it is available, they will use it. On warm spring days, the Oval is filled with people throwing frisbees, playing football, and simply enjoying the sunshine. On its fullest days, the space is renamed “Oval Beach” and there is little grass visible because of the many people occupying it. The Olentangy Corridor is a valuable resource in an urban setting which will give students a unique area in which to spend time.

A study of OSU students’ opinions about the Olentangy River was conducted in 2013, finding that very few people visited the river corridor more than a few times each school year; however, when asked “Given the changes taking place with the Olentangy River, what recreational opportunities would you like there to be more of on or next to the river?” (Burnett,

2013, p. 5), students seemed very interested in the river corridor. Nearly half of the responses dealt with water related activities; the rest of the students were interested in education, community events, green space, nature/wildlife observation, and land sports (Figure 5). Students are interested in the Olentangy as a recreational

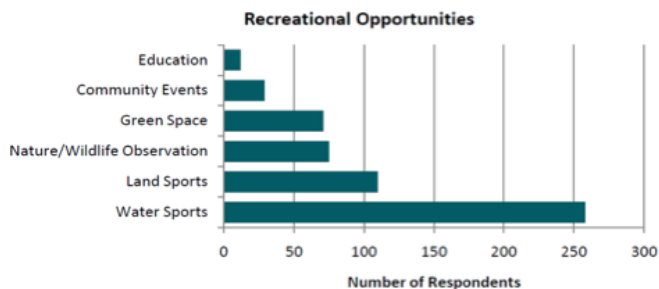


Figure 5. Student survey indicating interest in a restored Olentangy riverfront (Burnett, 2013).

area and a green space would provide opportunities for many of these activities.

Ecological Function

Not only will this provide an area that students will want to use, but this green space will also improve the ecological health of the Olentangy. Including dense forested areas in the riparian corridor, as our project proposes, will reduce the chance of recreational space from being flooded, provide wildlife habitat (Horn, 1997), act as a seed source for other areas of the river corridor, reduce runoff and trash from entering the river (Burnett, 2013), and create a more natural environment for students to experience on campus (Han, 2010).

Restoring the Olentangy Corridor will provide a habitat for wildlife within an urban landscape. The Olentangy River will act as a corridor, providing “a mechanism for the reduction or moderation of the adverse effects of habitat fragmentation by facilitating the dispersal of individuals between remaining areas of habitat, within an otherwise uninhabitable area” (Greenway, 2014). In a study on the size of green spaces and their connection to wildlife habitat, it was found that, for birds in a North Carolina greenway, the width of the greenway corridor did not influence which birds were present (Hull, 2003). This suggests that the presence of the green space will be beneficial to the wildlife, regardless of size. In order to best optimize its use, however, spaces that are mowed or landscaped spaces should be reduced. Hull (2003) also found that vegetation volume correlated with bird abundance and diversity, suggesting that the animals were more likely to inhabit areas that were more covered. “Minimizing managed area within a greenway is essential to providing habitat for development-sensitive species” (Hull, 2003). This result was also found in a study about the presence of deer and fox in urban greenways. Areas that were primarily forested had significantly more of these animals than areas that were managed like city parks (Horn, 1997).

While our proposal includes managed and mowed areas for the benefit of students, forested area will also be included for the benefit of wildlife. Some segments of greenways are beneficial to wildlife simply because they are connected to other usable habitats (Horn, 1997). The Olentangy River can create this connection, allowing this green space to provide an important link for wildlife. Urbanization creates fragmented wildlife habitat, which isolates animals from other potential resources. Creating links between these populations, as is possible through the creation of green corridors, increases available land to many species and increases their survival (County, 2007). Specifically, wildlife corridors can decrease likelihood of inbreeding, maintain species richness and diversity, and lead to a lower incidence of disease

(Greenway, 2014).

In addition to providing habitat for wildlife, green spaces provide many other ecological benefits. A study in Pennsylvania looked at the numerous assets of greenways, finding that the major ones are preserving and protecting our natural resources (Pennsylvania, 2002). Green spaces help to absorb runoff contaminants, cleanse and replenish the air, and mitigate noise pollution (Pennsylvania, 2002). Another benefit of our green space proposal is that a route for alternative transportation is nearby. Alternative transportation is a crucial part of engaging people with the outdoors and encouraging environmental responsibility. A path to walk or bicycle on provides benefits such as reduced congestion, improved air quality, and a safe alternative for residents (Pennsylvania, 2002). The most significant benefit of riding bicycles rather than driving is that it lessens dependence on fossil fuels (Federal, 1993). Additionally, using bicycles helps a small amount in reducing roadway noise. The Department of Transportation found that walking and bicycling play a significant role in reducing emissions (Federal, 1993). One of the greatest barriers to people using walking or bicycling as an alternative to driving is that there is often a lack of infrastructure facilitating this type of travel. With pathways connecting the recreation spaces and the Olentangy Bike Path, users of the path will be easily able to access the green space, and users of the green space will be encouraged to use the path.

The green space can also have a direct benefit on the health of the river. Greenways along rivers prevent soil erosion and filter pollution caused by agriculture and road runoff (Rails-To-Trails, 2013). A combined sewer overflow is present near the proposed site of our green space, creating an opportunity for improvement. Our proposal will reduce this runoff because the trees will capture and store rainwater and runoff then release it back into the atmosphere via evapotranspiration, resulting in fewer sewer overflows (Sierra Club, 2009). The presence of tree roots and leaf litter helps create soil conditions that promote absorption of water into the soil. In addition to decreasing flooding and erosion, the forested area will help reduce pollutants by taking up nutrients and pollutants from the soil and water. The trees use their natural processes to transform the pollutants into less harmful substances. In reducing pollution and overflow from combined sewer overflows, green space will improve the health of the Olentangy Corridor.

Benefits to Students

Our recreational green space will be incredibly beneficial to several aspects of students' lives, including meeting the university's Discovery Theme of Health and Wellness. For example, including a recreation area in the green space will promote physical activity, which will boost both mental and physical health of the students. The forested areas of the green space which benefit the surrounding environment will provide students with an opportunity to study the environment outdoors as opposed to learning in theory in the classroom.

Because this is a project for the university, the main focus should be on creating the best possible learning environment for the students. Studies have shown that moving to an area with more green space can lead to an immediate improvement in mental health of local residents which lasts for three years or more (Alcock et al, 2013). Mental health is an important factor when it comes to students' productivity in school. School work can be very mentally demanding for students and can cause stress, mental fatigue, anxiety, and symptoms of depression. An easily accessible green space on campus will have the potential to help relax the mind, restore its ability to focus, and alleviate stress. Providing a recreation area with the green space will create a calming setting for exercise and social interaction, both of which can greatly reduce stress and improve cognitive function (Wolf et al, 2013). Studies have shown that visual access alone to green space can promote recovery from mental fatigue, induce positive emotion, and assist cognitive functioning (Han, 2010).

There is already some accessible green space available on the Ohio State main campus, notably the Oval and the area around Mirror Lake. Students who spend a significant amount of time on south campus have access to these spaces, and many students use them for recreation or academic purposes. With the recent and current renovations in the north campus area, its green space continues to dwindle, except for the occasional tree. Having a green space near north campus will be convenient for students so they will be more encouraged to interact with nature, and experience all of the benefits that go along with it. Increasing the green space on campus overall will increase the number of students who receive these benefits.

A natural environment with native Ohio plants and animals as part of the river corridor will also provide real world learning opportunities for students interested in biological or

ecological sciences, or anyone involved in the School of Environment and Natural Resources. Students will be able to observe how the plants and animals interact with each other in a real setting as opposed to in a lab or simulation. They will be able to research all aspects of the natural environment including the plants, animals, soil, and water. This will be especially beneficial to all students of the College of Food, Agricultural, and Environmental Sciences and as this will be across the street from the new CFAES campus, there will be convenient, direct access.

Addressing Challenges

While the proposed green space has many benefits, there are potential problems that will need to be addressed. Reducing the amount of impact that the people who use this green space will have on the native plants and animals in the river corridor could be challenging. Once the green space is established, it will be just as important to establish guidelines for both general use and special events.

One of the biggest concerns about our project involves its location near Ohio Stadium. Football game day is very important to students and other fans, with attendance of games exceeding 100,000 and others who tailgate nearby and watch the game elsewhere. Maintaining the natural environment of the river corridor near our recreation space while such a large crowd is present could be difficult. To best diminish the amount of litter produced by such crowds, more trash and recycling receptacles should be provided for the area. Rules should be created and posted to inform people that they should not damage any part of the natural environment along the river, and these rules will be enforced not just on game days, but every other day as well. If interference with the green space on game day becomes an issue, the forested area could be roped off to reduce the effects.

Guidelines will be made for general use of the green space as well. Trash and recycling receptacles should be available, though in smaller quantities than on game day, in order to minimize litter. To prevent damage to plants, grass, and soil, the area should be limited to foot traffic only, except on the bike path next to the river. Other general rules such as cleaning up after pets, and prohibition of vandalism and fires should be enforced. Regular maintenance on the grass of the recreation areas will be required, just as it is on other similar areas on campus. It

will not be difficult to minimize the negative impacts of people on the natural environment in the proposed green space with just a few general rules that will not inconvenience anyone who wishes to enjoy it.

Discussion

The Ohio State University is restoring the degraded ecosystem of the lower Olentangy River and should mimic other schools previously discussed such as The University of Arkansas's Coleman Creek restoration or Texas A&M's. The goal would be to create a riparian area for enjoyment, teaching, student research, and the preservation of natural habitats for plants and animals. The City of Columbus is working alongside several organizations to improve the health of this valuable natural resource.

The Fifth Avenue Dam has been removed and the City of Columbus has spent \$6.9 million to redirect the flow of the river which is leading to major changes to the riverscape. It is now up to Ohio State to improve the Olentangy corridor specifically around the campus area. A proposal to move Cannon Drive and remove parking areas along the river corridor is being finalized, which will open up the opportunity to cultivate valuable natural spaces.

This proposal will create forested area contributing to the current improvements being made on the Olentangy corridor. This will boost the University's image by benefiting students, faculty, staff, and the local community. Environmentally, this green space will help with flood prevention, decrease the amount of combined sewer overflow, provide habitat for wildlife, reduce pollution, and provide nutrients and seed sources for other parts of the river. This green space also serves Ohio State and its students with a secluded environment for studying, recreation, and educational opportunities through hands on learning, especially for CFAES majors who are in close proximity. The benefits on both the environmental and social aspects provided by this recreational green space will ensure the success for both the Olentangy River greenway and the community at The Ohio State University.

Conclusion

As the CFAES campus relocates onto the east side of the river, the time to make a critical decision is now. The current plan laid out by Sasaki does not utilize this area's potential to provide the best environmental benefits and more importantly the learning and recreational opportunities for the Ohio State community. Our proposed green space will utilize the area near

the new campus and not only be appreciated by the students studying environmental sciences, but will also help improve the overall health and wellness of the entire campus community interacting with the green space. The environmentally friendly design with benefits to students, along with the aesthetic value incorporated in this proposed green space adequately encompasses the goals and vision of the Ohio State University.

Literature Cited

- Alcock, Ian., Mathew P. White, Benedict W. Wheeler, Lora E. Fleming, and Michael H. Depledge. "Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas." *Environmental Science and Technology* 48 (2013): 1247-1255.
- Burnett, E.A. 2013. *Student Opinions of the Olentangy River and the Fifth Avenue Dam Removal and Ecological Restoration Project*. The Ohio State University, School of Environment and Natural Resources.
- County of San Diego. *County Strategic Plan Goals*. 2007. Retrieved from <http://atfiles.org/files/pdf/SDCountyPlan.pdf>
- EPA (Environmental Protection Agency). *Combined Sewer Overflows*. N.p. February 2012. Retrieved from http://cfpub.epa.gov/npdes/home.cfm?program_id=5
- EPA (Environmental Protection Agency). *Landscaping with Native Plants*. N.p. March 2012. Retrieved from <http://www.epa.gov/greatlakes/greenacres/>
- EPA (Environmental Protection Agency). *What is Open Space/Green Space?* N.p. September 2013. Retrieved from <http://www.epa.gov/region1/eco/uep/openspace.html>
- Federal Highway Administration. *The Environmental Benefits of Bicycling and Walking*. US Department of Transportation. 1993. Retrieved from <http://atfiles.org/files/pdf/BikePedBen.pdf>
- Fox, Kenneth R., "The Influence of Physical Activity on Mental Well-being." *Public Health Nutrition* 2 (1999): 411-418.
- Futrell, Angel. *Going Wild at College*. Agriculture & Life Sciences: Texas A&M University. 2014. Retrieved from <http://aglifesciences.tamu.edu/blog/2014/03/31/going-wild-at-college/>
- Google Maps. *Ohio Stadium*. Google. 2014. Retrieved from <https://www.google.com/maps/place/Ohio+Stadium/@40.0025106,-83.0202639,848m/data=!3m1!1e3!4m2!3m1!1s0x88388e94019ab4a3:0x61eacc5e543f005e>

- Greenway. *Wildlife Corridor*. 2014. Retrieved from <http://www.greenway.org.au/biodiversity/g-wildlife-corridor>
- Han, K.T. “An Exploration of Relationships Among the Responses to Natural Scenes: Scenic Beauty, Preference, and Restoration.” *Environment and Behavior* 42 (2010): 24
- Horn, Sally P. & Andrew Schiller. (1997). *Wildlife conservation in urban greenways of the mid-southeastern United States*. Retrieved from <http://serverbau.bio.uniroma1.it/web/didattica/att/1bb7.file.00671.pdf>
- Hull, Jamie Rebekah. (2003). *Can Urban Greenways Provide High Quality Avian Habitat?* Retrieved from <http://repository.lib.ncsu.edu/ir/bitstream/1840.16/91/1/etd.pdf>
- Jongman, R. H., & Pungetti, G. (2004). *Ecological Networks and Greenways: Concept, Design, Implementation*. Cambridge ; New York: Cambridge University Press.
- King, Adam (2012). *Under the Framework, a Campus Evolution Begins*. Retrieved from The Ohio State University, onCampus: <http://oncampus.osu.edu/under-the-framework-a-campus-evolution-begins/>.
- Mitsch, William J., & Jay F. Martin (2012). *Lower Olentangy River Ecosystem Restoration: Pre-Fifth Avenue Dam Removal Conditions and Prediction of Dam Removal Effects*. Retrieved from The Ohio State University, Wilma H. Schiermeier Olentangy River Wetland Research Park.
- Pennsylvania Greenways Partnership Commission. *Benefits of Greenways: A Pennsylvania Study*. June 2002. Retrieved from <http://atfiles.org/files/pdf/BenefitsPA2002.pdf>
- Rails-To-Trails Conservancy. *Benefits of Trails and Greenways*. Trails and Greenways Clearinghouse. 2013. Retrieved from http://www.railstotrails.org/resources/documents/resource_docs/tgc_benefits.pdf
- Sierra Club. *Green Infrastructure Prevents Sewer Overflows and Protects Water Quality*. July 2009. Retrieved from http://ohiosierraclub.org/wp-content/uploads/2009/10/factsheet_Greeninfrastructure_July22.pdf
- Texas A&M Agrilife. *Texas A&M Gardens and Greenways Project*. N.p. 2013. Retrieved from <http://agrilife.org/texas-am-gardens-and-greenway-project/>
- Texas Water Resources Institute. *Conservation Matters October 2013*. N.p. 2013. Retrieved from <http://twri.tamu.edu/publications/conservation-matters/2013/october/gardens-and-greenway/>
- The Ohio State University. *The Ohio State University Framework Plan*. The Office of Administration and Planning. August 2010. Retrieved from <http://oneframework.osu.edu/>
- University of Arkansas at Little Rock. *Coleman Creek Design Possibilities*. N.p. 2013. Retrieved from <http://ualr.edu/colemancreek/design.asp>

University of Arkansas at Little Rock. *Coleman Creek Greenway Project*. N.p. 2013. Retrieved from <http://ualr.edu/colemancreek/default.asp>

Wolf, Kathleen., and Katrina Flora. "Green Cities, Good Health: Mental Health and Function." *Urban Forestry/Urban Greening Research*. 26 Dec. 2010.

"Rose Kennedy Greenway Park Use Guidelines for Public Programming, Special Events, and General Use." *Rose Fitzgerald Kennedy Greenway Conservancy* (2010)