

Treading Lightly

White Earth State Forest Interpretive Center + Nature Park

A Design Thesis Submitted to the Department of Landscape
Architecture of North Dakota State University

By

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In Partial Fulfillment of the Requirements for the Degree of Master of
Landscape Architecture

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Thesis Archival Note

The following thesis project, entitled Treading Lightly: White Earth State Forest Interpretive Center + Nature Park, was composed over the course of the 2022-2023 academic school year. The Thesis Booklet, as contained here, was initiated and completed in the fall semester as a part of the LA 763: Programming and Thesis Preparation course. Supplemental material, including the Thesis Boards and Thesis Presentation documents, were generated in the spring semester as a part of the LA 772: Design Thesis studio. Any inconsistencies between the different documents, in terms of research and design, should be excused per the evaluation of the project across the two semesters.

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THESIS ABSTRACT

Human development is the leading factor in wetland habitat loss, whether through direct removal (i.e. deforestation, draining, damming, etc.) or through inadvertent means (harmful chemicals, disruption of migration routes, interrupted feeding habits, etc.). Chemicals leaking into wetland ecosystems contaminates water supplies as well as harming the native populations, both flora and fauna, of these environments. Boardwalks, the most common method used for pedestrians in semi-aquatic environments, are chemically treated to prevent deterioration; these chemicals frequently leach into the surrounding wetlands.

Sustainable ecological intervention in the White Earth State Forest wetland ecosystem in the form of an educational nature center and raised-path network can create opportunities for transformative educational and recreational activities. Wetlands provide ample natural beauty as well as a higher level of biodiversity than any other biome found in Northern Minnesota. Additionally, these unique areas tend to be accessible solely by water craft.

The research undertaken will aim to provide a blueprint for successful, low-impact intervention in sensitive wetland environments. The research will also analyze which plant species are more resistant to human impact (chemical resistance, hardiness, spread, etc.) and suitable for introduction to restore vegetative communities based on additional factors such as root structure, life span, growth rate, and aesthetics. The aim of this project is to serve as an example for wetland intervention and development projects located in the coniferous and deciduous wetlands of Northern Minnesota.

Title: Treading Lightly: Sustainable Intervention Through Ecological Landscape Design
Typology: Wetlands
Site: White Earth State Forest, Becker County, Minnesota

THESIS NARRATIVE



CONTEXT

Merriam-Webster defines 'wetland' as "land or areas (such as marshes or swamps) that are covered often intermittently with shallow water or have soil saturated with moisture". This straight-forward description hides the recipe for biodiversity on a tremendous scale. Across the globe, wetlands are keystone ecosystems that are home to remarkable numbers of both flora and fauna. An extreme example of this richness of species is the Pantanal. Located mainly in central Brazil, while also sneaking tendrils into neighboring Paraguay and Bolivia, the Pantanal is the world's largest wetland area. Despite only being the size of a moderately small European country, the Pantanal is home to more than 2000 different species of plants, over 700 species of fauna and more than 9000 species of invertebrates.

While the Upper Midwest is not blessed with such astounding levels of biodiversity due to a short growing season and harsh winters, wetlands remain one of our most diverse ecosystems. Due to their impenetrable, stoic nature, wetlands also serve as final refuges for endangered species. In the U.S., 43% of threatened or endangered species of plants and animals live in or depend on wetlands. Due to the volume of vegetation produced in wetlands, wave damage has a reduced affect along lakes and stream banks in these areas. Wetlands can slow and retain runoff water, reducing flooding frequency and severity. Some wetlands recharge groundwater by holding surface water and allowing it to slowly filter into the groundwater reserves. Some wetlands are known as discharge areas. This means they receive groundwater even during dry periods and help maintain flows in nearby rivers and streams. For centuries, humans have lived near these hotspots of biodiversity due to the opportunities they provide. The Ojibwe people, an Anishaabe people native to southern Canada and the Upper Midwest, spoke of their ancestors being drawn to Northern Minnesota to "a place where the land grows food on the water," a reference to the plentiful wild rice that grows in the area.

THESIS NARRATIVE

CONTEXT

Wetlands are crucial ecosystems that hold immense biological, as well as economic and cultural, significance. As such, they must be protected. However, they are lush, biodiverse environments that provide vast educational and recreational opportunities as well. As such, rather than being avoided and cordoned off, Instead, they must be cherished and protected, but also explored and enjoyed. Thus, we as a species must learn how to interact with wetlands in a low-impact, thoughtful manner that leads to preserving these areas for future generations.

This thesis project will attempt to answer questions related to sustainable, low-impact development in wetland areas as well as successful methods for introducing educational components into such a project in the form of an educational nature center and boardwalk network.



TYPOLOGICAL RESEARCH

FACTORS CONSIDERED

TPOLOGY

Public park, educational park, ecosystem preservation

CONTEXT

located in coniferous/deciduous forest wetland area

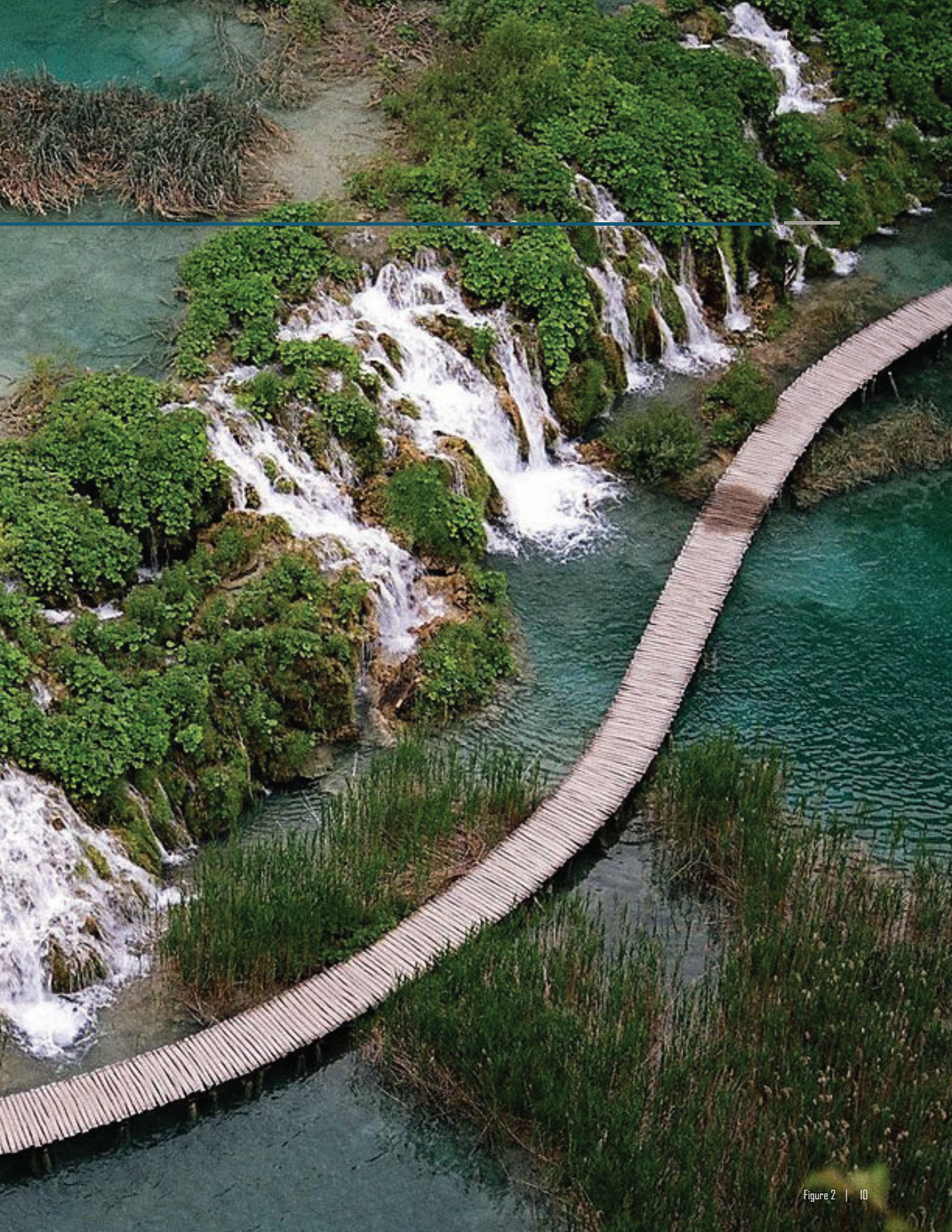
IMPACT

Sustainable design, contains low-impact trail network

INNOVATION

Captures natural beauty without disturbing it





PROJECT PRECEDENT 1

PLITVICE NATIONAL PARK

Introduction

Plitvice Lakes National Park is a UNESCO World Heritage site located in central Croatia, near the border with Bosnia and Herzegovina. It is one of Croatia's oldest and largest national parks, covering an area of approximately 114 square miles.

The park is known for its stunning natural beauty, including 16 interconnected lakes that cascade into one another, forming a series of waterfalls and cascades. The lakes are surrounded by lush forests and meadows, home to a diverse array of plant and animal species.



Research Findings

Plitvice Lakes National Park was first established as a national park in 1949 and was designated a UNESCO World Heritage site in 1979. In 2000, the park was extended to include the nearby Čorkova Uvala forest reserve.

Visitors to the park can explore a network of hiking trails and wooden footbridges that wind their way around the lakes and waterfalls, offering breathtaking views at every turn. Boats and electric trains are also available to transport visitors around the park.

In addition to its natural beauty, Plitvice Lakes National Park is also of historical and cultural significance. The area has been inhabited since prehistoric times and has been shaped by centuries of human activity, including farming, forestry, and tourism.

Today, the park is a popular destination for tourists from around the world, with over one million visitors annually. It is open year-round, with different attractions and activities available depending on the season.



PROJECT PRECEDENT 2

WESTWOOD HILLS NATURE CENTER

Introduction

Westwood Hills Nature Center is a nature preserve located in St. Louis Park, Minnesota. It spans across 160 acres of land and features marshes, woods, and restored prairies. The nature center is operated by the City of St. Louis Park and is open to the public year-round.

The Westwood Hills Nature Center was established in 1971, with the mission to preserve and protect the natural habitats of St. Louis Park. Over the years, the nature center has been actively involved in various conservation efforts, such as restoration of native plant species, management of invasive species, and preservation of wetlands.

Research Findings

The nature center offers a variety of educational programs and activities for visitors of all ages. There are guided hikes, nature walks, and environmental education programs offered throughout the year. The nature center also features an interpretive center with exhibits on the local flora and fauna, as well as a nature playground for children.

One of the highlights of the Westwood Hills Nature Center is its extensive trail system, which spans over six miles. Visitors can hike, bike, or cross-country ski on the trails, which offer stunning views of the surrounding natural landscapes.

The Westwood Hills Nature Center is also home to a variety of wildlife species, including deer, foxes, coyotes, and various species of birds. The nature center serves as an important habitat for these animals and is committed to their conservation and protection.

Overall, the Westwood Hills Nature Center is a valuable resource for the St. Louis Park community and a great place to connect with nature and learn about environmental conservation.





PROJECT PRECEDENT 3

PRAIRIE WETLANDS LEARNING CENTER

Introduction

The Prairie Wetlands Learning Center is a U.S. Fish and Wildlife Service educational facility located in Fergus Falls, Minnesota. It was established in 1994 to provide an opportunity for people to learn about the importance of wetlands and the plants and animals that depend on them.

The Prairie Wetlands Learning Center is situated on over 300 acres of restored wetlands and native prairie. The center features a visitor center with interactive exhibits, a classroom, a library, and a gift shop.



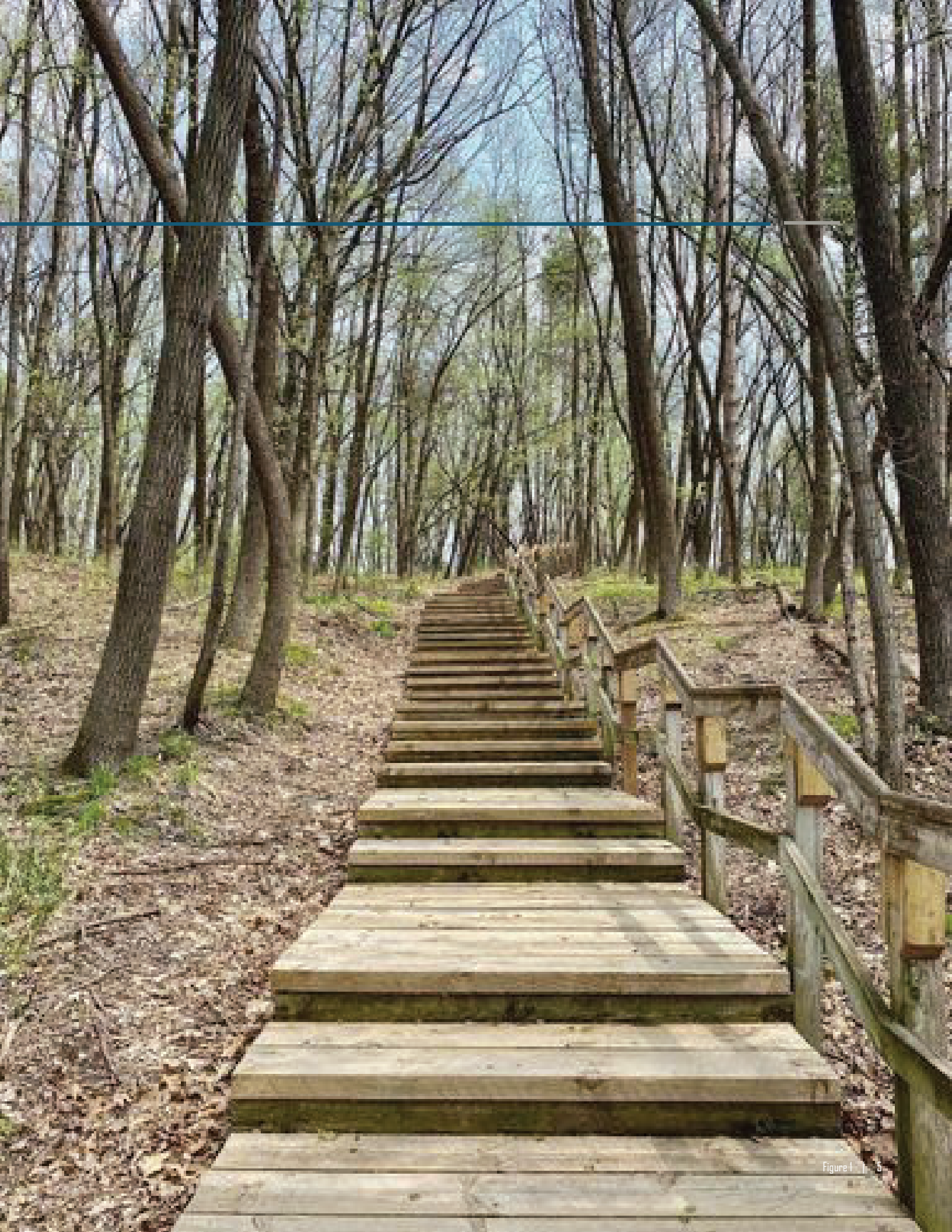
Research Findings

The center offers a variety of educational programs for people of all ages, including guided tours, field trips, workshops, and lectures. The programs are designed to teach visitors about wetland ecology, conservation, and the importance of wetlands in maintaining healthy ecosystems.

The Prairie Wetlands Learning Center is also involved in research and monitoring of wetland ecosystems. Scientists and researchers from various organizations work at the center to study wetland ecology, hydrology, and wildlife. The data collected at the center is used to develop and implement wetland conservation and management strategies.

In addition, the Prairie Wetlands Learning Center is involved in community outreach and engagement. It partners with local schools, community organizations, and other stakeholders to promote wetland conservation and education. The center also hosts events and festivals throughout the year to raise awareness about wetland conservation.

Overall, the Prairie Wetlands Learning Center serves as an important educational and research resource for the community and plays a significant role in promoting wetland conservation and management in the region.



PROJECT PRECEDENT 4

FONTENELLE FOREST

Introduction

Fontenelle Forest is a 2,000-acre nature preserve located in Bellevue, Nebraska, USA. The forest was established in 1913 as a private bird sanctuary by the Fontenelle family, who later donated it to the public. It is now a popular destination for hikers, birdwatchers, and nature enthusiasts.

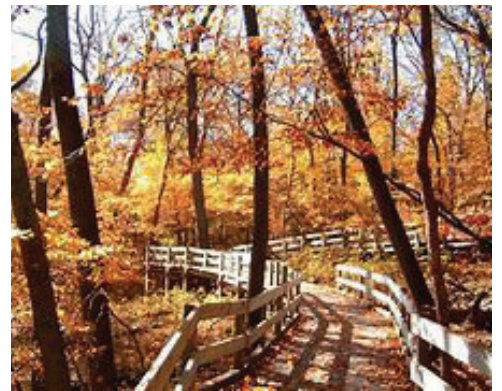
The forest is home to a diverse range of flora and fauna, including over 100 species of birds, 61 species of mammals, and 48 species of reptiles and amphibians. It also features a variety of landscapes, including hardwood forests, wetlands, prairies, and streams.

Research Findings

In addition to its natural attractions, Fontenelle Forest also has a variety of recreational and educational programs, including guided hikes, summer camps, and environmental education classes. It also houses the Nature Center, which features interactive exhibits, live animal displays, and a gift shop.

The forest is a popular spot for photographers, as it offers stunning views of the Missouri River Valley, especially during the fall season when the leaves change color.

Fontenelle Forest is committed to preserving its natural resources and educating the public on the importance of conservation. It partners with local schools, universities, and conservation organizations to promote environmental awareness and stewardship.





LANDSCAPE PERFORMANCE

The SITES matrix can be a useful tool for guiding the research of a wetland landscape architecture project. The matrix's categories and subcategories provide a comprehensive framework for evaluating the sustainability and environmental impact of a site, which can help identify key research areas and inform project design decisions. For example, the water category can guide research on wetland hydrology and water quality, while the soils category can help assess soil health and inform planting choices. Additionally, the biodiversity category can inform research on wetland plant and animal species, and the human health and well-being category can guide research on the potential benefits of wetland ecosystems for human communities. By using the SITES matrix to guide research, landscape architects can develop more sustainable and environmentally responsible wetland design solutions.

SITES v2 Scorecard Summary

YES	?	NO			Possible Points:	
0	0	0	1: SITE CONTEXT		13	
Y			CONTEXT P1.1	Limit development on farmland		
Y			CONTEXT P1.2	Protect floodplain functions		
Y			CONTEXT P1.3	Conserve aquatic ecosystems		
Y			CONTEXT P1.4	Conserve habitats for threatened and endangered species		
			CONTEXT C1.5	Redevelop degraded sites	3 to 6	
			CONTEXT C1.6	Locate projects within existing developed areas	4	
			CONTEXT C1.7	Connect to multi-modal transit networks	2 to 3	
0	0	0	2: PRE-DESIGN ASSESSMENT + PLANNING		3	
Y			PRE-DESIGN P2.1	Use an integrative design process		
Y			PRE-DESIGN P2.2	Conduct a pre-design site assessment		
Y			PRE-DESIGN P2.3	Designate and communicate VSPZs		
			PRE-DESIGN C2.4	Engage users and stakeholders	3	
0	0	0	3: SITE DESIGN - WATER		23	
Y			WATER P3.1	Manage precipitation on site		
Y			WATER P3.2	Reduce water use for landscape irrigation		
			WATER C3.3	Manage precipitation beyond baseline	4 to 6	
			WATER C3.4	Reduce outdoor water use	4 to 6	
			WATER C3.5	Design functional stormwater features as amenities	4 to 5	
			WATER C3.6	Restore aquatic ecosystems	4 to 6	
0	0	0	4: SITE DESIGN - SOIL + VEGETATION		40	
Y			SOIL+VEG P4.1	Create and communicate a soil management plan		
Y			SOIL+VEG P4.2	Control and manage invasive plants		
Y			SOIL+VEG P4.3	Use appropriate plants		
			SOIL+VEG C4.4	Conserve healthy soils and appropriate vegetation	4 to 6	
			SOIL+VEG C4.5	Conserve special status vegetation	4	
			SOIL+VEG C4.6	Conserve and use native plants	3 to 6	
			SOIL+VEG C4.7	Conserve and restore native plant communities	4 to 6	
			SOIL+VEG C4.8	Optimize biomass	1 to 6	
			SOIL+VEG C4.9	Reduce urban heat island effects	4	
			SOIL+VEG C4.10	Use vegetation to minimize building energy use	1 to 4	
			SOIL+VEG C4.11	Reduce the risk of catastrophic wildfire	4	
0	0	0	5: SITE DESIGN - MATERIALS SELECTION		41	
Y			MATERIALS P5.1	Eliminate the use of wood from threatened tree species		
			MATERIALS C5.2	Maintain on-site structures and paving	2 to 4	
			MATERIALS C5.3	Design for adaptability and disassembly	3 to 4	
			MATERIALS C5.4	Use salvaged materials and plants	3 to 4	
			MATERIALS C5.5	Use recycled content materials	3 to 4	
			MATERIALS C5.6	Use regional materials	3 to 5	
			MATERIALS C5.7	Support responsible extraction of raw materials	1 to 5	
			MATERIALS C5.8	Support transparency and safer chemistry	1 to 5	
0	0	0	6: SITE DESIGN - HUMAN HEALTH + WELL-BEING		30	
			HHWB C6.1	Protect and maintain cultural and historic places	2 to 3	
			HHWB C6.2	Provide optimum site accessibility, safety, and wayfinding	2	
			HHWB C6.3	Promote equitable site use	2	
			HHWB C6.4	Support mental restoration	2	
			HHWB C6.5	Support physical activity	2	
			HHWB C6.6	Support social connection	2	
			HHWB C6.7	Provide on-site food production	3 to 4	
			HHWB C6.8	Reduce light pollution	4	
			HHWB C6.9	Encourage fuel efficient and multi-modal transportation	4	
			HHWB C6.10	Minimize exposure to environmental tobacco smoke	1 to 2	
			HHWB C6.11	Support local economy	3	
0	0	0	7: CONSTRUCTION		17	
Y			CONSTRUCTION P7.1	Communicate and verify sustainable construction practices		
Y			CONSTRUCTION P7.2	Control and retain construction pollutants		
Y			CONSTRUCTION P7.3	Restore soils disturbed during construction		
			CONSTRUCTION C7.4	Restore soils disturbed by previous development	3 to 5	
			CONSTRUCTION C7.5	Divert construction and demolition materials from disposal	3 to 4	
			CONSTRUCTION C7.6	Divert reusable vegetation, rocks, and soil from disposal	3 to 4	
			CONSTRUCTION C7.7	Protect air quality during construction	2 to 4	
0	0	0	8. OPERATIONS + MAINTENANCE		22	
Y			O+M P8.1	Plan for sustainable site maintenance		
Y			O+M P8.2	Provide for storage and collection of recyclables		
			O+M C8.3	Recycle organic matter	3 to 5	
			O+M C8.4	Minimize pesticide and fertilizer use	4 to 5	
			O+M C8.5	Reduce outdoor energy consumption	2 to 4	
			O+M C8.6	Use renewable sources for landscape electricity needs	3 to 4	
			O+M C8.7	Protect air quality during landscape maintenance	2 to 4	
0	0	0	9. EDUCATION + PERFORMANCE MONITORING		11	
			EDUCATION C9.1	Promote sustainability awareness and education	3 to 4	
			EDUCATION C9.2	Develop and communicate a case study	3	
			EDUCATION C9.3	Plan to monitor and report site performance	4	
0	0	0	10. INNOVATION OR EXEMPLARY PERFORMANCE		Bonus Points: 9	
			INNOVATION C10.1	Innovation or exemplary performance	3 to 9	
0	0	0	TOTAL ESTIMATED POINTS		Total Possible Points: 200	
KEY			SITES Certification levels		Points	
YES	Project confident points are achievable		CERTIFIED		70	
?	Project striving to achieve points, not 100% confident		SILVER		85	

LANDSCAPE PERFORMANCE



Dakota Skipper Butterfly | *Hesperia dacotae*

The Dakota skipper is a small butterfly that lives in high-quality mixed and tallgrass prairie. The Dakota skipper lost 85 to 99% of its original tallgrass prairie in their historical range. Dakota skippers may survive in areas where lands have some grazing or haying, and in fact, they are dependent on habitat that experiences periodic disturbance; however, Dakota skippers disappear when these disturbances become too intense.



North American River Otter | *Lontra canadensis*

The river otter is Minnesota's largest aquatic carnivore that lives in most northern Minnesota lakes, ponds, and streams. After an absence of more than a century, its range is again extending into southern Minnesota. The river otter serves as a sign of a healthy food chain from top to bottom since they require a large supply of food due to their voracious appetites.



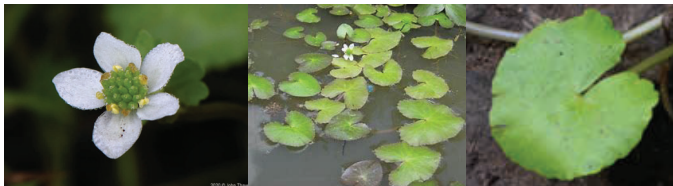
Rusty Patched Bumblebee | *Bombus affinis*

The rusty-patched bumble bee was once commonly found across the northern part of eastern North America, extending south along the Appalachian mountains. It is now listed as an endangered species in the US and Canada, currently found in low numbers in a very small part of its former range. It makes for a suitable sentinel species due to its sensitivity to environmental changes during the hive's reproductive cycle. Survival and successful hive growth require food from consistent floral resources early spring through fall, undisturbed nesting habitat in proximity to foraging resources and overwintering habitat for the next year's queens.



Snuffbox Mussel | *Epioblasma triquetra*

The snuffbox is an endangered species that is declining throughout its range due to habitat modification and destruction, sedimentation, and pollution. Despite this, it remains the most widespread member of the genus *Epioblasma*. The snuffbox is a great sentinel species in regards to health of freshwater systems due to its sensitivity to pollutants and drastic water temperature changes. Additionally, they are one of the few "host-specific" mussel species.



Floating Marsh Marigold | *Caltha natans*

Caltha natans (Floating Marsh Marigold) is a circumboreal aquatic plant that is historically native to Minnesota. Floating marsh marigolds have bright, white flowers, which help to differentiate it from the more familiar common marsh marigold, which has larger, yellow flowers. Marsh marigolds are best suited to shallow, slow-moving water in streams, creeks, pools, ditches, sheltered lake margins, swamps, and beaver ponds. They typically root in mud, silt, or clay.

SENTINEL SPECIES	SIGNIFICANCE OF PRESENCE	REQUIRED ENVIRONMENTAL FACTORS	POPULATION HEALTH
NORTH AMERICAN RIVER OTTER	A healthy river otter population signifies a healthy food chain	River otters are an apex aquatic predator in Minnesota wetland environments. Due to their energetic behaviour and eating habits, a large population of numerous aquatic animals and plants must be present to support a healthy otter population.	1 - No Individuals Found
DAKOTA SKIPPER BUTTERFLY	The presence of Dakota skippers signifies clean air, free of pollutants (chemical + wind pollution)	Dakota skippers are sensitive to changes in the air quality as well as wind patterns in their environment. Dakota skippers are one of the most susceptible butterfly species to air pollutants in Minnesota. Additionally, changes in weather patterns (wind turbines) can disrupt their migration altogether	2 - Individuals found; no new permanent residences/nests/hives/mats/groves
RUSTY PATCHED BUMBLEBEE	Healthy population of flowering plants + suitable nesting(?) conditions	The rusty patched bumblebee makes for a suitable sentinel species due to its sensitivity to environmental changes during the hive's reproductive cycle. Survival and successful hive growth require food from consistent floral resources early spring through fall, undisturbed nesting habitat in proximity to foraging resources and overwintering habitat for the next year's queens.	3 - Individuals w/Groups (mating, residential, etc.) found occasionally 4 - Healthy Populations featuring mating groups + new individuals w/out overcompetition
SNUFFBOX MUSSEL	Snuffbox mussels can only survive in water with minimal contaminants and pollutants	The snuffbox is a great sentinel species in regards to health of freshwater systems due to its sensitivity to pollutants and drastic water temperature changes.	5 - Overpopulated featuring resource shortage, widespread illness, + infant/new growth mortality
FLOATING MARSH MARIGOLD	Floating Marsh Marigolds are signifiers of a stable environment, not subjected to great swings of temperature, chemicals, etc.	The marsh marigold seems to have many adaptations to cope with dynamic systems, and yet the species is extremely rare in Minnesota even when habitat conditions seem ideal. It only can survive in consistent water temperatures as it is known to die off in abnormal temperatures (out-of-season heat or cold).	

LANDSCAPE PERFORMANCE

Macrophyte Tissue	Role in Treatment Process	Effect
Aerial Plant Tissue	<ul style="list-style-type: none"> Light attenuation Influence of microclimate Reduced wind velocity Aesthetic appearance of the system Storage of nutrients 	<ul style="list-style-type: none"> Reduced growth of photosynthesis Insulation during winter Reduced risk of resuspension
Plant Tissue in Water	<ul style="list-style-type: none"> Filtering effect Reduced current velocity Excretion of photosynthetic oxygen Uptake of nutrients Provision of surface for periphyton attachment 	<ul style="list-style-type: none"> Filter out large debris Increased rate of sedimentation, reduced risk of resuspension Increased aerobic degradation
Roots & Rhizomes in Sediment	<ul style="list-style-type: none"> Stabilizing the sediment surface Prevention of the medium clogging in vertical flow systems Provision of surface for bacterial growth Release of oxygen increases degradation (and nitrification) Uptake of nutrients Release of antibiotics, phyto-metallophores and phytochelatins 	<ul style="list-style-type: none"> Stabilizing the sediment surface – less erosion Prevention of the medium clogging in vertical flow systems Provision of surface for bacterial growth Release of oxygen increases degradation (and nitrification) Uptake of nutrients Release of antibiotics, phyto-metallophores and phytochelatins

PROJECT EMPHASIS

Ecosystem Restoration

Reestablish, maintain and expand quality habitat within wetland biome, including woodland, shoreline, and aquatic habitats.

Education

Educate users on site biological diversity, history, significance within the region and state.

Planting Design

Use research methods to design ideal plant communities and planting plans for restoration and erosion control.

Recreation

Allow for new recreation opportunities including aquatic recreation, hiking, etc.

Accessibilitiy

Give access to typically inaccessible natural areas



MAJOR PROJECT ELEMENTS

Wetland Ecosystem

Plants, soils, invertebrates, birds, fish, reptiles, mammals

Deciduous/Coniferous Forest

Mix of coniferous and deciduous forest throughout wetland

Visitor/Education Center

Visitor center building to educate users on park features and attractions

Hiking Trail Network

Loop-based trail system for users to explore furthest reaches of the park

Boardwalk Paths over Water

Elevated paths to bring users to hidden vistas and discoveries

Scenic Viewing Areas

Provide areas for photography of scenic views

ADA Accessibility

Each section of the park and major landmark is ADA accessible

Wildlife Care Center

Location to care for and aid in the recovery of native animals

Project Goals

1) Habitat & Wetland Systems

Establish new habitat areas and allow native species to become established

2) Connect Communities

Allow local residents to access this beautiful gem on the White Earth Reservation.

3) Aquatic Plants

Familiarize myself with the use of northern climate aquatic plants in landscape design

4) Plant Communities & Mitigation

Answer the question of which native plant species are most resistant to human intervention

5) Project Schedule & Deadlines

Practive time management and hold myself accountable to the required deadlines

6) Laws & Regulations

Adhere to all relevant laws and regulations



Plan for Proceeding

Definition of Research Direction

Research will be conducted by analyzing plant species of wetland ecosystem in appropriate Northern Hemisphere climates, hardiness zones, soil types, and soil inundation to determine the makeup of the ideal plant community for the site and the proper planting plan and schedule

Design Methodology

The following design methodologies will be employed in project research:

- 1) Mixed Method Analysis
 - a) Quantitative & Qualitative Analysis
- 2) Digital Analysis Design Process

Design Process Documentation Plan

- 1) Graphics Archiving
 - a) Scanning of process drawings and compiling of graphic works
 - b) Data will be backed up both on external storage devices and on the cloud
- 2) Institutional Repository
 - a) Project proposal, book, presentation, and boards will be perpetually stored on the NDSU Library's Institutional Repository within the Landscape Architecture Theses collection
- 3) Project Presentation
 - a) Project will conclude with an oral and visual presentation of research and design results to a department-selected thesis jury
 - a) Data collection
 - b) Data analysis
 - c) Research results
 - d) Site inventory
 - e) Site analysis
 - f) Concept design
 - g) Schematic design
 - h) Programming
 - i) Presentation graphics



FUNDING + GRANTS

Federal

- U.S. Environmental Protection Agency Wetland Development Grant
- National Association of Wetland Managers

Government Ordinance

- White Earth Nation
 - Division of Natural Resources

Private Funding (International/National)

- McKnight Foundation
- Straughn Environmental
- RES (Resource Environmental Solutions LLC)

Small Business

- Modular Trail Systems

REFLECTIONS

As I stand on the brink of completing my masters, at the end of my college education, I find myself contemplative. Looking back on this school year, I can draw many lessons that I hope to carry with me as I begin my professional career. The (admittedly) arduous task of completing this thesis has helped me hone my skills as a designer, as well as learn new ones. Through the design portion of my thesis, I set out to create a blueprint for a 'new' state park that would provide high-quality recreational opportunities to the community while engaging in the re-establishment and restoration of deciduous wetlands. This led me to a deeper passion for the deciduous wetlands of central Minnesota and discovering the beauty of the White Earth State Forest. However, upon this final reflection of the entire process, the lessons that stand out the most can be applied more generally. As is often the case, I can find many faults with my own work. In addition, if I was tasked with re-doing this project, I would certainly change significant aspects of the research and design methodology. Despite this, the skills I have added to my designers' toolchest through completing my thesis will serve me well as I embark on this next chapter of my life and professional career.