

1.0 Abstract

1048 million gallons of water are used in Chicago every day. Chicago replenishes <1% of it. Although there is no water shortage currently, the United Nations predicts that 2 out of 3 people will suffer from a water shortage by the year 2025, and that global conflicts will result as people try to obtain this vital resource. Twenty percent of the world's potable water is contained in the Great Lakes. In order to be responsible consumers of this natural resource, Chicago is looking into different plans to return water to Lake Michigan. The purpose of IPRO 322: Growing Water is to create a demonstration park of Best Management Practices (BMPs) on the IIT campus that will serve as an example of practices that could be implemented across the Chicago-land area to manage storm water, so that it can be reintroduced to Lake Michigan. These demonstration parks will also serve as educational facilities to inform the community about the growing scarcity of water, and about how to conserve this precious resource.

2.0 Background

The project, sponsored by IIT and donors, to design and develop an area of land on the IIT campus that will utilize eco-friendly methods researched by the team.

This IPRO consists of two challenges. The first challenge is to design an eco-friendly space where rainwater can be managed naturally and returned to Lake Michigan. The second challenge involves the design of a space that is accessible and provides educational and cultural benefits to the surrounding community.

An adequate amount of research must be compiled to determine viable locations where the demonstration parks can be implemented. The demonstration parks will serve as educational centers of water conservation and sustainable means of coexisting with our local ecological system. Utilizing case studies of how other communities have created eco-friendly spaces along with researched methods of green roofs, cisterns, permeable paving, natural landscaping and filter strips, a proper ecological park with a habitable social space can be attained.

Case studies of the Parc de La Villette, in Paris, Cultuurpark Westergasfabriek in Amsterdam, Cheonggye Stream in South Korea and many others have proved that such a space can impact an urban area and convert it from a dead zone to a major social attraction for all. Sustainable technologies have been accepted with much success in the Chicago land area. Other than a slight increase in initial cost, implementation of sustainable technologies is beneficial to the environment and IIT's exposure as an advocate of green technology.

A need exists to increase awareness of water conservation. This will especially be the case when land owners of adjacent properties are confronted with the decision of approving construction. The initial

cost of construction may be higher due to the implementation of green construction methods. However, the long term financial benefits of maintaining such a facility will offset the initial expenses. The social impact of such a space will turn an area devoid of social activity into a hub of activity that is located within walking range of a beach. The design of the eco-boulevard for IIT will be the basis for others in the city. Its impact will be invaluable to the surrounding residents as well as the citizens of Chicago.

Growing Water is a continuing IPRO. Last semester, the IPRO conducted a significant amount of the useful research on best management practices and living machines. The previous team also created an educational website that will aid in the promotion of the prototype. The web page can be used to investigate the impact of different living machines and eco-boulevard attractions and is a useful resource to those interested in the IPRO or if they would like to develop their own demonstration park.

3.0 Objectives

The ultimate goal of this IPRO is to create an Eco-Boulevard along 31st street that will collect and clean both storm water and sewer water and return it to Lake Michigan, while also serving as a social green space. To this end, these were this semester's goals:

- To create publicity and awareness about the state of Chicago water and the need to start taking steps to preserve and restore it
- To improve our website (www.growingwater.com), so that it contains all of the information we have obtained this semester and offers new interactive features to peak the public's interest
- To build upon the catalog of sustainable methodologies and case studies to serve as templates for future reference
- To select the best spaces for a prototype in the IIT community and to design the ideal best management practices (BMP) to use in the space selected.
- To collaborate with the Illinois Institute of Technology Sustainability committee and facilities to create the prototype on the IIT campus that incorporates BMPs and psychosocial benefits.

4.0 Methodology

The first half of the semester was devoted to selecting an ideal site for the prototype, researching the best BMP's and living machines that could be implemented at the site, and the possible social, cultural, and educational interactions that could be encouraged through the site. The team was divided into four subgroups for this section.

Sub Team Responsibilities

Best management practices: Ecological

- The objective of this subgroup is to investigate the ecological implications that best management practices (BMP's) will have, and to discover their potential impact in a design scheme. This group will focus only on BMP's that have a potential to be used on the chosen site within the IIT campus, and will help inform the final decision of which BMP's to implement on the actual site.

Best management practices: Cultural

- Investigate the cultural implications that specific BMP's will have, and to discover their potential impact in educational, social, and community aspects. This group will focus only on BMP's that have a potential to be used on the chosen site within the IIT campus, and will help inform the final decision of which BMP's to implement on the actual site.

Site Analysis: Ecological

- Develop a matrix containing criteria for sites to deploy experimental Best Management Practices, and analyze the potential sites in accordance with the matrix. This team is also responsible for proposing and researching more potential sites.

Site Analysis: Cultural

- Develop a matrix containing cultural and social criteria for experimental BMP site and analyze the potential sites in accordance with the matrix. This team is also responsible for proposing more potential sites and recommending which sites are best for the prototype deployment.

The goal of second half of the semester was to prepare our findings for IPRO day. The team reorganized its structure in order to communicate the conclusions developed from the sub groups. After some discussion, several sites were chosen as the best sites for the demonstration park. The team's proposals of potential sites and BMP's needed to be expressed using visual aids and detailed documents in preparation for IPRO day.

Sub Team Responsibilities

Graphic Design

- To design BMP's for potential sites on the IIT campus, develop graphical representations of these proposals using Adobe Illustrator, Photoshop, and Auto CAD, design icons for BMP's and case studies for the website

Web Design

- To develop a web interface using Flash to present our proposals and research in a clear, well-defined manner on GrowingWater.com, update the catalog of BMP's and case studies available on the website

Presentation

- To develop the brochure, posters, presentation slides, exhibits for the IPRO Day display table (Paver Demonstration Box, Permeable Pavers, etc.), and final report

Community Outreach

- Responsible for communicating and organizing meetings with IIT's Sustainability Committee and other groups to express our goals for collaboration in developing a demonstration park on IIT's campus

The IPRO team decided to select several potential demonstration sites with the intent of developing a network of demonstration parks. Offering several demonstration parks also offers flexibility if unforeseen restrictions prevented a potential park.

The team also recognized that it was in our best interest to inform IIT's facilities department. We would work in collaboration to develop a park. The facilities department will inform the group on upcoming projects so that the IPRO team can utilize this information for future proposals.

5.0 Team Structure

Name	Major	Skills & Strengths	Experience and Academic Interests	Team	Contributions to Teams Goals
Daniel Beissinger	Chemistry	Leadership, People skills,	Experience in Western American agriculture, riparian areas, and watershed management.	1. Site Evaluation: Ecological 2. Community Outreach	Communicated with IIT's facilities and other groups to promote collaboration to develop a demo park, Developed a list of potential demo parks and analyzed the ecological effects at every site
Matthew Boder	Architecture	Design, Adobe Creative Suite, Auto Cad, 3d modeling	Music, Philosophy, History, Aesthetics	1. BMP: Cultural 2. Web Design	Analyzed the cultural effects of BMP's and selected suitable BMP's for the potential sites,

					Designed a web interface to present our design proposals and findings, Analyzed the cultural effects of BMP's, Contributed to the project plan
Steven Booher	Architecture	Auto CAD, 3D modeling, Photoshop, Illustrator, InDesign, Construction Documents	Art and Architecture theory, rock climbing, the Large Hedron Collider	1. Site Evaluation: Ecological 2. Web Design	Developed a list of potential demo parks and analyzed the ecological effects at every site, Designed a web interface to present our design proposals and findings
Kristin Bryant	Psychology/ Political Science	Proficient in MS Word, PowerPoint, and Adobe Photoshop, leadership experience; hardworking	Psychological/ Sociological Research, music, and reading	1. Site Evaluation: Cultural 2. Presentation	Developed a list of potential demo parks and analyzed the cultural effects at every site, Contributed to display table exhibits (poster, brochure, etc.), Contributed to project plan and final report
Ewa Guzek	Architecture	Auto CAD, Adobe Photoshop + Illustrator, 3d modeling, research and design	City and Regional Planning, Integrated Public Design, Mix-Media/Material Design, (Urban) Politics, Economics, and History of Art and Architecture	1. BMP: Ecological 2. Web Design	Analyzed the ecological effects of BMP's and selected suitable BMP's for the potential sites, Contributed to project plan, Designed a web interface to present our design proposals and findings,
David Horabik	Architecture	AutoCAD, Adobe Photoshop +	Architecture, Music, Environment	1. Site Evaluation: Cultural	Developed a list of potential demo parks and

		Illustrator, 3d modeling, research and design		2. Graphic Design	analyzed the cultural effects at every site, Developed proposal for demo park on 31 st Parking lot including graphical depictions and photos
Natalia Klusek	Architecture	Auto CAD, 3d modeling, Adobe Photoshop + Illustrator, design, Microsoft Office, research	City and Regional Planning, Integrated Public Design, Mix-Media/Material Design, (Urban) Politics, Economics, and History of Art and Architecture	1. BMP: Cultural 2. Graphic Design	Contributed to project plan, Analyzed the cultural effects of BMP's and selected suitable BMP's for the potential sites, Developed proposal for demo park in front of Keating Hall and MTCC, including graphical depictions and photos
Malgorzata (Margaret) Kochanek	Psychology/ Biology	Proficient in Microsoft Word, PowerPoint, Publisher, and Excel; experience in research, leadership, and teaching; previous IPRO experience	Research in Biology, Medicine, Chemistry, Psychology, Architecture, Computer Programming, and Law.	1. Site Evaluation: Ecological 2. Presentation	Developed a list of potential demo parks and analyzed the ecological effects at every site, Contributed to project plan and final report, Contributed to display table exhibits (poster, brochure, etc.),
Michael McCarthy	Architecture	Auto CAD, 3ds Max, Adobe Photoshop and Illustrator, Design	Architecture, Sustainability, Research	1. Site Evaluation: Ecological 2. Graphic Design	Developed a list of potential demo parks and analyzed the ecological effects at every site, Developed proposal for demo park at the SSV parking lot

					including graphical depictions and photos
Marcin Mejsak	Architecture	Computer Aid Design. Building Physical Models. Furniture Building. Research.	Karaoke, inline skating, and cooking	1. BMP: Ecological 2. Community Outreach	Analyzed the ecological effects of BMP's and selected suitable BMP's for the potential sites, Communicated with IIT's facilities to promote collaboration to develop a demo park, Developed proposal for demo park in front of SSV
Ryan Oblenida	Electrical Engineering	Java Programming with teaching experience, heavy machinery and tool experience, Circuit modeling	Computer Programming and architecture, Electronics, Communication Systems, Product design and development	1. Site Evaluation: Cultural 2. Presentation	Developed a list of potential demo parks and analyzed the cultural effects at every site, Contributed to display table exhibits (poster, brochure, etc.),
Carolina Slota	Architecture	CAD Drafting, 3d Studio Max, Adobe Photoshop & Illustrator, Design Skills, Research	Intern Architect, Architecture, Product Design, Philosophy, and Music	1. BMP: Cultural 2. Graphic Design	Analyzed the cultural effects of BMPs and selected BMPs suitable for the potential sites, Developed proposal for demo park at the SSV parking lot including graphical depictions and photos
Marco Veneziano	Architecture	AutoCAD, Adobe Photoshop + Illustrator, 3d modeling, research and	City and Regional Planning, Integrated Public Design, Mix-Media/Material	1. BMP: Ecological 2. Web Design	Analyzed the ecological effects of BMPs and selected BMPs suitable for the potential sites,

		design	Design, (Urban) Politics, Economics, and History of Art and Architecture		Designed a web interface to present our design proposals and findings,
--	--	--------	--	--	--

Sub Team Breakdown

Part 1

Within the four subgroups, there is a team leader and tasks are assigned to the subsequent group members as necessary.

BMP: Ecological

- Ewa Guzek*
- Marco Veneziano
- Marcin Mejsak

BMP: Cultural

- Matthew Boder*
- Carolina Slota
- Natalia Klusek

Site Evaluation: Ecological

- Malgorzata (Margaret) Kochanek*
- Michael McCarthy
- Daniel Beissinger
- Steven Booher

Site Evaluation: Cultural

- Kristin Bryant*
- Ryan Oblenida
- David Horabik

*Denotes sub group leader

Part 2

Graphic Design

- Carolina Slota*
- Natalia Klusek
- David Horabik
- Michael McCarthy

Web Design

- Matthew Boder*
- Steven Booher
- Ewa Guzek
- Marco Veneziano

Presentation

- Kristin Bryant*
- Malgorzata (Margaret) Kochanek
- Ryan Oblenida

Community Outreach

- Daniel Beissinger*
- Marcin Mejsak

*Denotes sub group leader

6.0 Budget

Category	Explanation	Store	Amount
Supplies	Native Chicago plants	Possibility Place Nursery	\$16.85
Supplies	Materials to go inside the Paver Model and supplies for the plants	The Home Depot	\$49.68
Supplies	Materials to make the frame of the Paver Model	Menards	\$21.78
Travel	Gasoline	Bridgeport Shell	\$7.50
TOTAL			\$95.81

7.0 Results

We accomplished the following goals:

- Improved our website (www.growingwater.com), so that it contains all of the information we have obtained this semester and offers new interactive features to peak the public's interest
- Built upon the catalog of sustainable methodologies and case studies that were gathered by the previous IPRO to serve as templates for future reference
- Developed a systematic approach to selecting sites and evaluating each site
- Selected the best five spaces for prototypes in the IIT community and designed the ideal best management practices (BMP) to use in the spaces selected.
- Collaborated with the Illinois Institute of Technology Sustainability committee and facilities in order to move the project forward

8.0 Obstacles

There were several obstacles our group encountered throughout the semester. One of the obstacles was to find the resources used in the previous semester's work and cite them correctly. This is a major ethical and professional concern. There was a large amount of time was spent trying to decide which information needed to be cited and uncovering where that information was found. We did know that all of the information could be found online or in articles we had in last semester's files. Unfortunately, we could

not uncover all of the resources that were used, but a significant amount was found and cited. In the future, we will continue to search for and correct this problem.

Another obstacle faced by the team was that there was an overwhelming amount of architecture students and not very many students that knew the biological and chemical repercussions of our project. This is a problem that could not really be anticipated because of the nature of class registration for IPRO's, but would be useful to correct in the future. The way our group overcame this obstacle was by going outside our comfort zones and investigating as much as we could about those areas we needed biology and chemistry students' assistance. To prevent this obstacle, we would have had to regulate who was allowed in the group and advertise for people with a specific background in these areas. For the following semesters, we will hopefully find more students in the biology and chemistry disciplines who are interested in participating in our project.

9.0 Recommendations

Recommendations are action steps that should be followed because you believe that more effective or less costly research results can be obtained if the recommendations are followed. The recommended next steps should relate back to the project problem and purpose and should describe how the team's findings can be used in conjunction with the recommended next steps to further research in the area.

10.0 References

- Reading
 - Plan Of Chicago Chapters 1&4 by Burnham and Bennett
 - Articles by Peter Annin:
 - “To have and have not”
 - “Aral Sea”
 - “Reverse a River”
 - “Close Deep Tunnel” by Harold Henderson
 - “The Last Drop” by Michael Specter
 - “They Need it. We waste it” by Essay of Water in Chicago
- Case Studies/Research/ Projects
 - “A Guide to Storm Water Best Management Practices” by City of Chicago Richard M. Daley
 - “Chicago Department of Transportation Sustainable Infrastructure Sustainability” Janet L. Attarian, AIA Project Director Streetscape and Sustainable Design Program CDOT Division of Project Development
 - “Chicago Department of Transportation Sustainable Development Initiatives” Streetscape and Urban Design Program CDOT Division of Project Development
 - “Growing Water” Urban Lab (Idea Organization)
 - “Strategic Plan for Water Resource Management” Northeastern Illinois Planning Commission

11.0 Acknowledgments

I PRO 322: Growing Water would like to thank our advisors, Professors Martin Felson, Paul Anderson, Robert Chorazy for their guidance and background knowledge that was fundamental to continuing this project and acquiring contacts. We would also like to thank Illinois Institute of Technology's Facilities department and IIT's Sustainability Committee for their thoughtful advice and enthusiastic investment in our project.