The Campaign for Urban Eco-literacy: Communicating ecological principles in the urban landscape

A Thesis Presented for the

Master of Landscape Architecture

Degree

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DEDICATION

My family: Your support means everything

Cory: From the bottom of my heart, thank you

Kurt Vonnegut, Jr.: You changed my worldview

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My sincerest appreciation goes to my thesis committee: Brad Collett, Valerie Friedmann, Mike McKinney, and Virginia Kupritz. You've generously given your time, support, encouragement, and knowledge to help me produce something I'm very proud of. It's been a pleasure getting to know each of you.

A special thanks goes to Brad Collett, my primary advisor and mentor, for believing in me from the very beginning. His dedication to the Landscape Architecture program and its students is unparalleled.

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This thesis wouldn't be possible without the help of my classmates. They taught me so much and made me feel optimistic about the world. You guys are the best.

And, of course, my deepest gratitude goes to my friends and family who have been supportive of me the entire way through this journey.

The way to achieve a harmony with nature is first to break free of old metaphors and embrace new ones so that we can lift the veils that prevent us from accepting what we observe, and then to make use of technology to study life and life-supporting systems as they are. A harmony between ourselves and nature depends on – indeed, requires – modern technological tools to teach us about the Earth and to help us manage wisely what we realize we have inadvertently begun to unravel.

Daniel Botkin, Discordant Harmonies (1990)

We often forget that WE ARE NATURE. Nature is not something separate from us. So when we say that we have lost our connection to nature, we've lost a connection to ourselves.

Andy Goldsworthy

If wilderness can stop being (just) out there and start being (also) in here, if it can start being as humane as it is natural, then perhaps we can get on with the unending task of struggling to live rightly in the world – not just in the garden, not just in the wilderness, but in the home that encompasses them both.

William Cronon, The Trouble with Wilderness (1996)

Education is the most powerful weapon, which we can use to change the world.

Nelson Mandela

ABSTRACT

Though built by humans, a native species to the planet, the city is often seen as something unnatural. Cities are perceived as being separate from nature. Humans may think of “nature” as places that are separate from where they live and work. Organisms thrive and biological processes persist in urbanized environments in spite of the concrete, air, water pollution, dense human population and otherwise seemingly harsh conditions. This condition of the city as nature illustrates the ecological principles of survival, adaptation and resilience. Through a deeper understanding of these complex interconnections between other organisms, our physical surroundings and ourselves, we as a society become more ecologically literate. Cities provide a wealth of opportunities, a venue and an audience to accomplish this.

Landscape architects, dedicated “stewards of land,” have a history of integrating ecologically educational elements into public spaces. However, the educational messages integrated into designs are often left to interpretation. It remains unclear whether these messages are being received, or whether the intent behind these designs is fully understood by the public. This thesis investigates how the application of proven communication theories and mass media communication strategies can enhance the ability of landscape architects to reach a wider audience with their ecological messages. The result of this investigation is the “Campaign for Urban Eco-literacy.”

The Campaign is a series of virtual, spatial, and experiential interventions that will appeal to a wide audience by utilizing visual and interactive communication techniques, increasing the reach and effectiveness of the campaign’s overall message. The interventions intend to increase awareness of the ecological concepts of adaptation, evolution, and interconnectedness within the urban landscape. The Campaign’s message will be integrated into the urban fabric of downtown Knoxville, Tennessee, to reach the diverse mix of people present in the space. Taking this approach to increasing eco-literacy allows for multiple levels of interaction from the audience, thus enhancing their experience in the urban landscape and imparting important ecological lessons.

PREFACE

The city is an ecosystem. It's a natural ecosystem with which are very familiar, because, afer all, we helped build it. Every element, big and small, visible and invisible, is connected and these relationships are vital to the ecosystem's survival. Through this thesis, I hope to enliven a sense of curiosity and appreciation for the urban landscape, bringing people closer to the nature they often seek outside of the city. Every weed growing through a crack, mouse nesting in a wall, and algae blooming on wet concrete is a message, reminding us that the city is nature.

TABLE OF CONTENTS

CHAPTER I
INTRODUCTION 1

The City is a Habitat 1

CHAPTER II
BACKGROUND 5

Ecological Literacy 5
Increasing Ecological Literacy 6
The Center for Eco-Literacy 6
Public and Private Education 8
Cary Institute of Ecosystem Studies 9
Landscape Architecture 10
The Challenge of Interpretive Signage 13
Audience Reach 16
Missed Opportunities 18
Reaching Adults 18
Diversity 19

CHAPTER III
STRATEGY 21

Effective Communication 21

CHAPTER IV
PROPOSAL 27

Communication Strategy 27
Site selection 28
Site 28
Audience 36
Visitors 36
Residents 38
Workers 38
Targeting the Audience 39
Messaging 39

TABLE OF CONTENTS

CHAPTER V
DESIGN 43

Campaign Strategy 43
Opening Exhibit 50
Urban Rangers 52
Signage 54
Wild Thing Mobile App 57
Interactive Installations 66
Fern Wall 67
Urban Vivarium 69
Climbing Vine Sculpture 71
Moss Graffiti Wall 73
Soil Exposition and Media Wall 75
Tree Root Sculpture 78
Microorganism Light Show 81
Hyphae Sculpture Garden 83
Eco-sculptures 85
Lawn Lounge 86
Virtual Landscape Viewer 88

CHAPTER VI
DISCUSSION 91

Measurement 91
Implementation in Other Cities 92

CHAPTER VII
CONCLUSION 95

Benefits of Increasing Eco-literacy 95
Benefits of the Campaign Strategy 97
Implications for Landscape Architecture 98

LIST OF REFERENCES 97

APPENDIX 103

APPENDIX A: LITERATURE REVIEW 104

VITA 123

LIST OF FIGURES

Figure 1: Gardens of Versailles: a classic example of the depiction of man's dominance over nature 2
Figure 2: A "sublime" natural scene from the Smoky Mountains 2
Figure 3: An urban meadow 2
Figure 4: Birds nested inside of a traffic light 2
Figure 5: Rock Ferns growing on the side of a brick building 2
Figure 6: Restored River Lea at Queen Elizabeth Olympic Park 12
Figure 7: Constructed wetland at Queen Elizabeth Olympic Park 12
Figure 8: Educational signage at the wastewater treatment at Dockside Green 13
Figure 9: Signage at Dockside Green 13
Figure 10: Signage at Brooklyn Bridge Park 14
Figure 11: Renderings depicting the use of interpretive signage, an informational brochure and mobile app in the plan for Des Moines Water Works Park 15
Figure 12: The National Mall and Lincoln Memorial in Washington, DC 17
Figure 13: Aerial view of Queen Elizabeth Olympic Park located outside of London 17
Figure 14: Effective communication diagram 22
Figure 15: Developing a common language 22
Figure 16: Visual and interactive communication research shows that most people communicate well using these two methods 25
Figure 17: Layers of human development surrounding Knoxville 29
Figure 18: Examples of novel ecosystems found in the Knoxville area 30
Figure 19: Call-out of central downtown Knoxville, the selected area of study 31
Figure 20: Central downtown Knoxville is a hub of activity featuring events, shopping, restaurants, festivals, tourism, businesses, and government services 33
Figure 21: Map of central downtown Knoxville showing areas of interest to tourists 34
Figure 22: Map of central downtown Knoxville showing areas of business 34
Figure 23: Map of central downtown Knoxville showing residential areas 35
Figure 24: Map of central downtown Knoxville showing public spaces 37
Figure 25: Map of central downtown Knoxville showing common pedestrian pathways and parking areas 37
Figure 26: Map of central downtown Knoxville showing overlapping layers of tourists, residents, workers, pedestrians, and public spaces; circled is the area of concentration 38
Figure 27: The Center for Eco-literacy's list of "Core Ecological Concepts" 40
Figure 28: Series of photos from author's inventory of novel ecologies in downtown Knoxville, TN 41
Figure 29: The Campaign for Urban Eco-literacy intervention diagram 44
Figure 30: Decision-making diagram for the Campaign for Urban Eco-literacy 45
Figure 31: Map of central downtown Knoxville with locations of campaign features 47
Figure 32: Map of central downtown Knoxville with locations of way-finding sculptures 48
Figure 33: Way-finding weed sculpture example 49
Figure 34: Example image of the Opening Exhibit and event 51
Figure 35: Example image from the Urban Rangers tour 53

Figure 36: Example of a 12” elliptical sign on a brick wall 53
Figure 37: Example of a 6” circular sign placed inside a planter 56
Figure 38: Wild Thing Mobile App home screen 58
Figure 39: “What Are Wild Things” feature from Wild Thing Mobile App 59
Figure 40: “Where Are They” feature from Wild Thing Mobile App 60
Figure 41: Initial Mobile App GPS triggers, found “wild things” to get people started 61
Figure 42: Example of map after users add their own “wild things” to the map 61
Figure 43: Example of map “wild things” spreading beyond city center 61
Figure 44: “Help Me Find Some” feature from Wild Thing Mobile App 62
Figure 45: “What the Heck is it?” feature from Wild Thing Mobile App 63
Figure 46: “Look What I Found!” feature from Wild Thing Mobile App 64
Figure 47: “Virtual Landscape Viewer” feature from Wild Thing Mobile App 65
Figure 48: Map of downtown Knoxville indicating which installation teaches which ecological principle 66
Figure 49: Fern Wall installation and sculpture 68
Figure 50: Existing wall of ferns below the sidewalk 68
Figure 51: Urban Vivarium 70
Figure 52: Climbing Vine Sculpture 72
Figure 53: Moss Graffiti Wall 74
Figure 54: Soil Exposition and Media Wall 77
Figure 55: Tree Root Sculpture 78
Figure 56: Live habitat viewing station 79
Figure 57: Virtual reality simulator showing the process of seed dispersal 80
Figure 58: Microorganism Sculptures and Light Show in Krutch Park 82
Figure 59: Hyphae Garden 84
Figure 60: Example of an Eco-Sculpture 85
Figure 61: Lawn Lounges 87
Figure 62: View from the observation deck of the Sunsphere looking southeast 89
Figure 63: Virtual Landscape Viewer app using augmented reality to add layers to the view 89
Figure 64: Virtual Reality Simulator sequence and description of programs 90
Figure 65: Diagram of the economic, social, and environmental benefits of increasing eco-literacy 96

CHAPTER I
INTRODUCTION

THE CITY IS A HABITAT

Humans, like many animals, have the natural inclination to build. The human species has built and adapted to elaborate habitats we call cities. Similar to an ant colony or a rabbit warren, the city offers humans their basic biological needs: shelter, safety, and nourishment. The city habitat is a blending of rivers, streams, and sewer pipes. It is built of wood, stone, plastic, and metal. Within it are vibrant communities of organisms living among the built environment. Microbe communities flourish among sewage and landfills, birds and insects nest behind neon signs. There is indeed a strong association between humans' perception of nature and the human city. Though built by humans, a native species to the planet, the city is often seen as something unnatural. Cities are perceived as being separate from nature.

Gloria Flora argues that because of our current dependence on manmade technology to survive, we have lost our connection and understanding of important natural processes (Flora, 2010). Technology, particularly in urban areas, allows us to create "artificial environments" with air conditioning, lighting, and heating as climate control, by using manmade materials like plastic, and eating heavily processed foods. This can give the illusion that our urban areas are completely manmade and disconnected from the natural world. We see our cities as being distinct entities, completely separate from nature. We don't see our cities for what they are: a natural habitat for the human species.

Human developments in modern technology allow us to shape our landscape to suit our biological needs. There are many examples of this power across our planet (Figure 1) and on a scale that may lead us to believe that humans indeed have control over nature. Over time we have learned to view nature as something separate from humans, something that is "out there," independent from us (Flora, 2010). We tend to recognize nature only as the sublime (Figure 2), but often fail to recognize natural elements in our urban areas (Figure 3). When we do



Figure 1: Gardens of Versailles: a classic example of the depiction of man's dominance over nature
Source: National Geographic

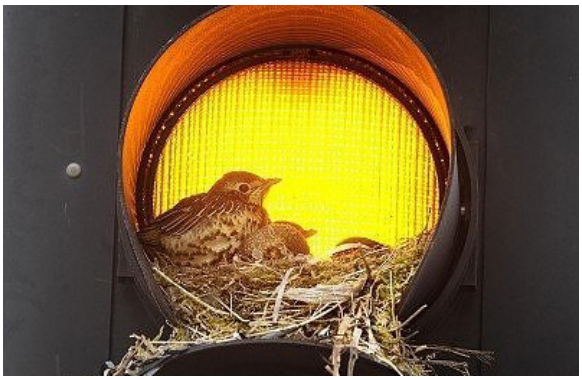

Figure 4: Birds nested inside of a traffic light
Source: amazingdata.com



Figure 2: A "sublime" natural scene from the Smoky Mountains
Source: author



Figure 5: Rock Ferns growing on the side of a brick building
Source: author



Figure 3: An urban meadow
Source: author

recognize nature in our cities, we often see only the surface qualities and not the natural elements existing below the surface (Thayer, 1994). The vital ecological functions that make life possible are often invisible or imperceptible to humans, making them difficult to understand. Without being aware of or understanding these functions and processes, humans are eco-illiterate, and cannot understand the connection between themselves, other organisms, and their natural surroundings.

There is an inherent danger in this. This lack of ecological literacy is believed to be at the heart of our environmental problems today (Cronon, 1996). It is a concern that humans as a species do not have a clear understanding of the ways in which our actions can affect other vital systems. Our perception of being separate from nature may lead to irresponsible management of natural resources and advance environmental degradation (Botkin, 1990). Many experts believe that societies with enhanced levels of eco-literacy will be better prepared to face the future challenges associated with population growth, resource depletion, and climate change (Capra, 2010). Increasing ecological literacy can help the human race to take control of its actions and manage their effects on natural systems.

Cities are full of examples of the complex connections between humans and nature. Urban development has created conditions for many new types of ecosystems to flourish. Humans and other organisms are thriving and adapting together in these novel ecosystems (Figures 4-5). While they may not seem to be “natural” as we’re programmed to see it, these ecosystems are examples of our deep-rooted connection to nature. These novel ecosystems present an opportunity for us to learn important ecological principles like resilience, adaptation, evolution, and interconnection with the urban context.

The city offers the opportunity to build ecological literacy in a context familiar to humans. We can begin to understand that there is no separation between our human cities and the natural environment. We can learn to see “nature as it is, not as we imagine it to be” (Botkin, 1990). By seeing the city as nature, we can become more ecologically literate and start to understand the connections between other organisms, our physical surroundings, and ourselves (Capra, 2000).

Landscape architects can play a role in this endeavor by creating spaces and experiences that use the urban landscape as a catalyst for ecological education.

In order to increase ecological literacy, people must engage in educational opportunities that reveal and describe the interconnection between humans and nature. Doing so in an urban context increases the reach of the message and also brings to attention the complex connections between humans and nature in a predominantly human environment. The objective of this thesis is to propose a comprehensive communication strategy that blends landscape architectural design with the science of communication to increase ecological literacy in the urban landscape.

CHAPTER II
BACKGROUND

This thesis proposes a strategy to educate the public about the lack of distinction between nature and the city. By seeing the connection between natural phenomena occurring within the built environment of the city, one can begin to understand the relationships that make the urban ecosystem function, and thus increase their level of eco-literacy. To develop a more effective educational approach to increasing eco-literacy, the strengths and weakness of past educational, outreach, and design efforts that have sought to do the same have been analyzed. This section outlines the concept of ecological literacy and review the past efforts to increase it.

ECOLOGICAL LITERACY

Ecological literacy, or "eco-literacy," is the ability to understand the complex interconnections and relationships of organisms and their physical surroundings. To be eco-literate is to recognize the organizing principles of ecological communities (i.e. ecosystems) and each organism's role in those communities (Orr, 2010). Educator David Orr and physicist Fritjof Capra coined the term eco-literacy in the 1990s in order to introduce a way of thinking about the world in terms of its interdependent natural and human systems. Inspired by the theory of systems thinking, Capra and Orr developed an ecologically based systems thinking theory (Orr, 2010). Eco-literacy focuses on the consideration of the consequences of human actions and interactions within nature.

The concept of eco-literacy began as a way to incorporate this type of thinking into educational practice. Capra and Orr believe that students who possess this type of knowledge will be better prepared to help shape a more sustainable society. By integrating ecological education into schools, Capra and Orr believe that our future generations will develop communities that "do not interfere with nature's inherent ability to sustain life" (Capra, 2010). Capra holds that the ecological problems our societies face today are rooted in a fundamental lack of understanding our place in what he calls "the web of life" (Capra, 2010). A key concept in eco-literacy is reconnecting humans

to other living systems.

Capra went on to co-found the Center for Ecoliteracy, a nonprofit organization that “advances ecological education in K-12 schools” (Center for Ecoliteracy, 2015). The Center has contributed research and published several books on eco-literacy and engages with schools and other agents in education. The Center has developed a list of six core ecological concepts that must be realized in order for students to be able to understand the “real world,” meaning the natural living systems that provide life to the planet (Capra, 2000). The list implies that in order to become eco-literate, one must grasp the concepts of Networks: that ecosystems are interconnected through networks of relationship, Nested Systems: that nature is made up of systems that are nested within other systems, Cycles: that ecosystems depend on an exchange of resources in continual cycles, Flows: that organisms require a continual flow of energy to survive, Development: that all life changes over time, and Dynamic Balance: that ecological communities act as feedback loops to sustain relative stability (Center for Ecoliteracy, 2015).

INCREASING ECO-LITERACY

Since the concept was first introduced in the 1990s, several disciplines have adopted the notion and worked toward integrating it into common culture. Educators, designers, scientists, and others have used eco-literacy as a platform to educate on environmental and ecological issues. This sections outlines the contributions and shortcomings of specific attempts to increase ecological literacy.

THE CENTER FOR ECO-LITERACY

The Center for Eco-literacy was founded in 1995 by Fritjof Capra, Peter Buckley, and Zenobia Barlow in Berkeley, California. The Center offers education seminars and consulting services to encourage ecological education in all realms, but their specific focus is on schoolchildren between the ages of 5 and 12. The nonprofit’s mission is to “advance ecological education in K-12 schools” through engagement with schools, community leaders, foundations, and other stakeholders.

The Center has published numerous books and articles on eco-literacy including Ecoliterate: How Educators Are Cultivating Emotional, Social, and Ecological Intelligence; Smart by Nature: Schooling for Sustainability; and Ecological Literacy: Educating Our Children for a Sustainable World. The Center has also created several food-related resources such as Big Ideas: Linking Food, Culture, Health, and the Environment; the Rethinking School Lunch Guide; and the cookbook and professional development guide Cooking with California Food in K–12 Schools.

The Center also relies on a well developed website to share resources with the general public. Within the website are lists of recommended readings, general information about eco-literacy and related topics, and instructional tools such as workshop outlines and lesson plans. The Center for Eco-literacy employs a staff of educators who visit schools to give consultations and teach instructional methods that aim to increase ecological literacy among students. In addition, the Center has developed a school lunch program in which schools begin serving locally sourced foods and teaching students about the ecological processes involved in creating and harvesting food.

The Center for Eco-literacy makes the effort to spread their message to children by visiting schools and inviting schools to participate in events and workshops at their headquarters. This effort to proactively reach their audience is effective because it does not rely on the audience to seek their message out. By bringing their message to their audience the Center eliminates the possibility of the audience missing the message. Also, it increases the chance of effective communication to occur between the Center for Eco-literacy and its audience. That is, the audience is more likely to receive their message and understand it in the way the Center intended.

The research and publications from the Center for Eco-literacy have paved the way for ecological literacy efforts across the globe. These publications have mostly been focused on school-aged children, however, and largely in California. Increasing eco-literacy among children is important, as it will ensure more eco-literate generations to come. However, the Center's focus on teaching mostly school-aged children is limiting its overall scope. Their message is targeted at

children, parents, and teachers, one small, specific audience, which leaves out other eco-illiterate audiences from learning their lessons.

PUBLIC AND PRIVATE EDUCATION

Building on the successes of the Center for Eco-literacy's work in schools, many private and public school districts have adopted environmental (or ecological) curriculum programs. Canadian public schools began teaching "Living Systems" within science and geography courses in 2000 (Puk & Behm, 2003). This integration of systems thinking into the courses is meant to encourage an understanding of our world as a series of interconnected systems. The state of California's public schools have had the benefit of participating in many of the programs offered by the Center for Eco-literacy and have since adopted programs like the Edible Schoolyard Project, which incorporates environmental education into school lunchrooms, teaching children how to grow food.

There are countless environmental learning programs in the United States that have appeared over the past decade. This is largely in reaction to a phenomenon that Richard Louv calls "nature deficit disorder," a hypothesis that humans, especially children, are spending less time outdoors and therefore lack an understanding of natural processes. Schools have incorporated experiential nature learning into their curriculum because studies show that it can reduce the likelihood of childhood obesity, reduce the symptoms of attention deficit disorder (ADD), and increase cognitive development (Louv, 2005). Louv also states that children with an increase ecological literacy will respect their immediate natural surroundings, fostering a sense of environmental responsibility that they will carry into adulthood.

This focus on hands-on, experiential learning can lead to a better understanding of the concepts being taught. Children who are seeing, hearing, feeling, smelling, and touching elements of the outdoor "nature" experience are more likely to build an appreciation for the "non-human elements" on our planet (Orr, 1992). Visualizing and experiencing the processes and systems that create life (e.g. the water cycle) help children to see their role in the ecosystem and fosters a sense of

responsibility in protecting them (Louv, 2005).

Children are an impressionable and captive audience and there are obvious benefits to focusing educational efforts on them. While it is essential to teach children to become more ecologically literate, one could argue that other groups need ecological education as well. As public and private education keep their focus on students, they miss the opportunity to teach a wider range of people the lessons of ecological literacy. It is equally important to enhance the ecological literacy of policy makers, working-age people, and the general population whose day-to-day decisions and actions impact the health and well-being of ecological systems.

CARY INSTITUTE OF ECOSYSTEM STUDIES

The Cary Center of Ecosystem Studies is an independent environmental research organization that specializes in the ecology of infectious diseases, environmental chemistry, invasive species, and climate change. The Institute's goals are:

- Advance understanding about the structure and function of ecological systems.
- Provide the scientific knowledge needed to solve environmental problems.
- Enhance the ecological literacy of students, decision makers, and the public.
- Train the next generation of ecologists and resource managers.

Since its founding in 1983 the Institute's research has heavily influenced United States climate change policies and was instrumental in informing the Clean Air Act.

The Institute's Science Program has a specific research team who focuses on "understanding how ecosystems work" (Cary Institute of Ecosystem Studies, 2015). The scientists on this team work to study explicitly the resources that humans depend on and help to guide policy to ensure sound management practices are put into place. A research project, led by Dr. Alan Berkowitz, focuses solely on ecological literacy and the role it can play in "environmental citizenship," or what Berkowitz defines as "people's ability to act on their values and interests in the environment

using knowledge and skills from science" (Cary Institute of Ecosystem Studies, 2015). Through this research project, Berkowitz and his team developed an Ecological Literacy Survey that helped established a system of metrics for assessing ecological literacy among different groups, particularly teachers and K-16 students. The survey offers an opportunity to gauge the ecological literacy of a given group and work to improve in specific areas based on the results.

The Institute's focus on research and education helps ensure that future generations will become more eco-literate. The reach of this program is limited and it only touches a small audience – those who are in a K-16 program with the Institute or other scientists in a similar field. While the Institute as a whole does work to change national (and global) policy, its ecological literacy program's focus is centered mainly on school-aged children. The Institute recognizes the importance of reaching "the public," however there is little evidence of the program engaging audiences outside of K-16 schools. With such incredible ecological literacy research means within the Cary Institute, it's a missed opportunity to engage such a small, specific group.

LANDSCAPE ARCHITECTURE

Landscape architects have historically held a responsibility towards environmental education and stewardship. In fact, the American Society of Landscape Architects Code of Environmental Ethics lists the following tenets:

- The health and well-being of biological systems and their integrity are essential to sustain human well-being.
- Future generations have a right to the same environmental assets and ecological aesthetics.
- Long-term economic survival has a dependence upon the natural environment.
- Environmental stewardship is essential to maintain a healthy environment and a quality of life for the earth.

In Ethical Standard 6 of the code, it states that landscape architects will "Actively engage in

shaping decisions, attitudes, and values that support public health and welfare, environmental respect, and landscape regeneration" (ASLA, 2006). With environmental stewardship written into the discipline's code and carried as a core value of practitioners, it is not surprising that many landscape architects attempt to educate with their designs.

In the late 1990s, a movement developed in landscape architecture towards a design theory that combined both ecological and cultural education. The Eco-Revelatory Design (ERD) movement began with a design exhibit called "Nature Constructed/Nature Revealed." ERD can be defined as "a design strategy that attempts to enhance site ecosystems as well as engage users by revealing ecological and cultural phenomena, processes and relationships affecting a site" (Brown, Harkness, & Johnston, 1998). In other words, it aimed to make ecological processes visible in order to reveal their connection and importance to human society. Of particular importance to this thesis is the assumption that "if one is more aware of environmental phenomena and processes – if one is able to see and comprehend them – one is better able to appreciate, evaluate, and make wise decisions concerning them" (Brown, Harkness, & Johnston, 1998).

Eco-revelatory design has been criticized for its lack of using a common language. Many of the design projects featured in the original exhibit were critiqued for being too complex or vague for the general public to understand. As Robert Thayer says in his critique, "In the intent to reveal an ecology, is that ecology revealed if the people 'don't get it'?" (Thayer,1998). Landscape architects have had difficulty revealing ecological processes that are typically invisible or happen below the surface out of human sight. In the Queen Elizabeth Olympic Park in London, the designers intended to "restore" the River Lea and make it easily accessible for park visitors (Hargreaves Associates, 2015). While the plantings and treatments of the river's edge does encourage wildlife and fosters many ecological processes, it does not explicitly show or explain what these processes are to visitors (Figure 6). Giving access to the processes does not necessarily offer a learning opportunity as some visitors may not have the educational background to make the connections between what they see and the invisible processes embedded within. This thesis aims to help

people make that connection by providing additional information to aid in the development of ecological literacy.

The ERD movement helped to reinforce the idea that landscape can be used to communicate and educate, an idea that has been widely influential among designers. Many contemporary designers incorporate educational elements into their designs. The Queen Elizabeth Olympic Park (Figure 7) features many educational opportunities such as ecological wetland restoration, increased access to the River Lea, green stormwater infrastructure, and educational playgrounds. The designers intended to educate the public about the importance of water resources and the use of green infrastructure in protecting them. However, the design of the park is such that the visitor must be aware of and actively seek and/or engage in the educational venues of the project. If one does not read (or notice) the sign explaining the processes that make a wetland beneficial, or if they do not come into the park with a preconceived idea of the benefits of wetlands, they will leave the park without a better understanding. This thesis proposes the embedding of supplementary information into designs to better explain ecological processes.



Figure 6: Restored River Lea at Queen Elizabeth Olympic Park
Source: author



Figure 7: Constructed wetland at Queen Elizabeth Olympic Park
Source: author

THE CHALLENGE OF INTERPRETIVE SIGNAGE

As is the case in Queen Elizabeth Olympic Park, many landscape architects rely on interpretive signage to help explain the processes that their designs attempt to reveal. Another such example is the Dockside Green development in Victoria, British Columbia, extensive signage is used to explain the various green infrastructure and ecological restoration projects within the development. In one element, a wastewater treatment plant, a large sign diagrams the process of reclaiming used water allowing visitors to learn each step of the process (Figure 8). Its aim is to educate residents and visitors of Dockside Green. It contains a great deal of information, but requires visitors to stop and read it in order to understand the process. In another, a sign placed adjacent to a stormwater retention pond explains the purpose behind the pond, but does not show the processes that make the pond effective (Figure 9). Again, if the signage is not noticed or read, there is no alternative communication to help the public better understand the functions of these features. Visitors without prior ecological knowledge may need more than a sign to help explain complex processes and build a better understanding.



Figure 8: Educational signage at the wastewater treatment at Dockside Green
Source: theatlantic.com



Figure 9: Signage at Dockside Green
Source: theatlantic.com

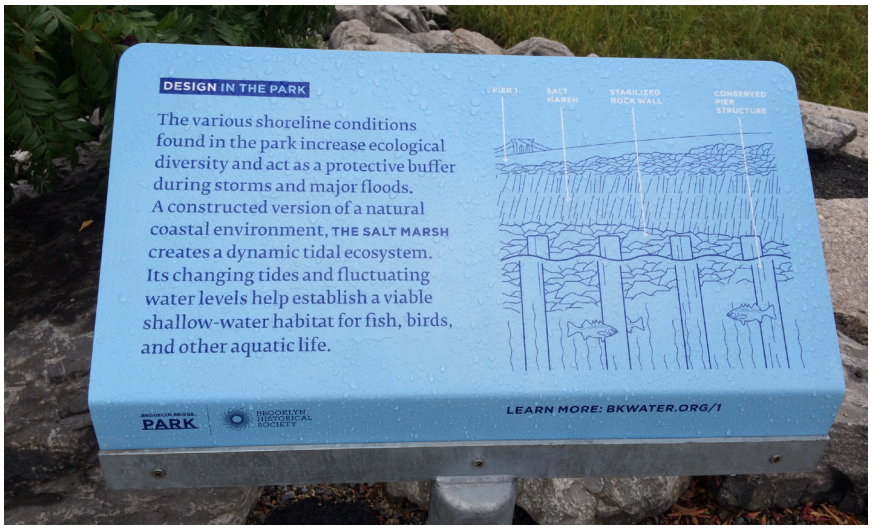

Figure 10: Signage at Brooklyn Bridge Park
Source: author

At Brooklyn Bridge Park, the designers created a marsh habitat to restore important ecological function to the shore. They rely on signage to explain the benefits of the habitat, but do not reveal the habitat itself through the design (Figure 10). Seeing the marsh is an important step towards understanding it, however, the thriving habitat exists below the surface. Perhaps giving visitors a glimpse inside of the habitat would increase their understanding of it. The signage is helpful in adding information to the site *in situ*, however, can easily be ignored as visitors walk by the marsh. The sign features a website link for visitors to access more information if they are interested, which offers another level of understanding to those who are interested. This website offers an additional venue for communication, however relies on visitors to make the extra effort to access it.

Sasaki and Associates go one step further and add a brochure and a mobile application to the interpretive signage in their plan for Des Moines' Water Works Park (Figure 11). This park's design intends to "transform the way society thinks and understands the role of water in the region" (Sasaki, 2015). The plan integrates two different immersive experiences with both "engineered" and "wild" water. Throughout both complementary sections there is interpretive signage, which offers opportunities for people to think about the "role of the site in harvesting and



Figure 11: Renderings depicting the use of interpretive signage, an informational brochure and mobile app in the plan for Des Moines Water Works Park
Source: sasaki.com

cleaning drinking water." In addition to the signage, the plan features a visitor's guidebook that illustrates the plan and adds thorough descriptions of the intent behind the project's design. A mobile app acts as a complement to the brochure, offering additional information and scheduling information. The combination of these three communication tactics increases the possibility of effectively communicating with (and educating) visitors to Water Works Park. Though the visual aids of signage and the brochure help explain the processes, it is still difficult for visitors to see them in action.

AUDIENCE REACH

There is a limitation in audience reach with many types of landscape architecture projects. Landscape architects often incorporate educational elements into public parks and plazas, which is an excellent way to reach people. However, not all public spaces are the same. Some attract more people than others, and some attract specific types of people over others.

The location of the public space is critical. If a public space is in an area where only a small population is likely to travel to, it limits the scope of education. A small park within a residential area, for example, is likely to reach only the residents of that area. A prominent public space, like the National Mall in Washington, DC, is an excellent place to reach people since such a variety of different people are frequenting the space every day (Figure 12). In addition, the amount of time that people are likely to spend in a space can affect the probability of education in that space. People tend to visit the National Mall and spend time walking around, visiting the monuments, or sitting on the benches or the stairs of the Lincoln Memorial. The more time they spend in the space the more likely they may be to participate in educational opportunities.

The amount of effort it takes to visit the park is also a factor in reaching audience. For example, the Queen Elizabeth Olympic Park was built with the intention to serve as a stage for the 2012 Olympic Games and also to offer a new residential and industrial complex after the Games. During the Olympic Games the park had the potential to reach a vast crowd of visitors. This offered an incredible opportunity to reach and educate a diverse audience of different backgrounds, levels



Figure 12: The National Mall and Lincoln Memorial in Washington, DC
Source: owtk.com



Figure 13: Aerial view of Queen Elizabeth Olympic Park located outside of London
Source: 2pat.com

of education, and age groups in one place. However, now that the Olympic Games are over, and since the park is located outside of London, the park attracts a more limited audience of people who live nearby. Tourists and visitors must travel from London to reach the park, which may limit the amount of time they will spend in the park (Figure 13).

MISSED OPPORTUNITIES

Though the organizations and professions mentioned above have made great strides in terms of opening dialogue, contributing research, publishing literature about ecological literacy, and designing educational spaces, they have struggled to reach a broad spectrum of the population with their message. The Center for Eco-literacy, the Cary Institute of Ecosystem Services, and public and private education have all aimed their message at school-aged children, leaving out the rest of the population. Teaching school children is vital to building ecological literacy over time; however, the rest of the population needs to be educated as well. Landscape architects have tried to create educational opportunities in public spaces, but have little control over the audience that actually reaches those spaces. In order to increase eco-literacy in a broader population, different approaches to communication must be made.

REACHING ADULTS

The Center for Eco-literacy, the Cary Institute of Ecosystem Studies, and public and private education aim their eco-literacy education at school-aged children. Teaching children certainly promises that future generations will be better prepared to face upcoming challenges, but educating adults may have more immediate benefits. Adults can apply their education in many meaningful ways that may have more of an urgent effect on society.

Typically, adults (ages 18+) are working members of society and bring a particular set of values with them to work, no matter what the discipline. These values affect their work, which can trickle down to other aspects of society. For example, a garbage collector who does not believe recycling trash is a worthwhile endeavor may not make the extra effort to sort out recyclables from

a customer's trash bin. However, a garbage collector who sees the benefits in recycling trash may make the effort to remove the recyclables and divert them from the landfill. Increasing ecological literacy among working adults means that they may carry ecological ideals with them into their careers and make decisions with a more systems-based approach. For people in positions of power, these ecological ethics could filter into other areas, such as policy.

Adults can influence policy decisions through direct or indirect involvement. Direct involvement means actively participating in government administration as a policy maker or representative. Ecologically literate policy makers are more likely to encourage policy that supports the common good (Orr, 1992). Indirect involvement happens through participating in any aspect of society. For example, purchasing a specific product increases the revenue of the company who made the product. The purchase inadvertently supports the values that are inherent in that product's parent company. Ecologically literate adults may make more informed decisions about whom they choose to financially support and whom they do not based on the values of the company or manufacturer (Orr, 1992).

The adult population is more influential on overall human society and can have more of an impact on the ways in which society interacts with the natural environment. Increasing ecological literacy among adults could have a more immediate impact than increasing it among children. In order to increase ecological literacy, the message must reach as many people, and as many age groups as possible. By focusing on one small segment of the population, children, the groups mentioned above miss the opportunity to reach a larger number of people with the message of eco-literacy. This thesis aims to increase ecological literacy among a wider demographic population, both children and adults, from different backgrounds, with various levels of education and eco-literacy.

DIVERSITY

There is a risk in relying on academic research and publications to educate an entire population. This type of communication implies that its audience has a certain level of education and access

to these types of information. Much of the Cary Institute's and the Center for Eco-literacy's publications exist on the internet or in books, making them accessible to most people, but not all people. It is not explicitly marketed to the general population, but rather an audience with a pre-formed interest in ecological or environmental issues. There is a possibility that these messages are only reaching a well-educated audience, perhaps one with a higher level of ecological literacy. People from all backgrounds and all levels of education must be reached.

Using public space to reach a diverse group of people is a good tactic, since public space is open to all types of people. However, the location and context of the public space is critical. The space must be in a location where many different types of people are comfortable spending time regardless of socioeconomic, cultural, or educational backgrounds. The ideal space would have multiple uses that attract visitors throughout the day and week.

CHAPTER III
STRATEGY

As discussed in the previous chapter, prior attempts at increasing ecological literacy have had a limited reach among the general population. While each party have made their messages somewhat accessible through publications, the internet, and public landscape design, they have communicated in such a way that people would be required to seek the messages out. In addition, many of these messages have been aimed at a specific age group, leaving out the remainder of the population.

Landscape architects have attempted to reveal ecological phenomenon, but have not embraced the diverse communication preferences and styles of their audience. Their approach has not been tailored to suit individual communication needs. In order for landscape architects to play a role in increasing ecological literacy in the public, a new hybrid communication strategy must be developed. Educational messages in the landscape need to reach a wide audience and speak in terms that most can understand. Landscape architects can apply knowledge from the field of communication studies to advance their efforts in educating the public.

EFFECTIVE COMMUNICATION

Humans communicate, and therefore learn, in very different ways. Communication experts have long studied the effects of strategic communication on learning. Effective communication is the “relational process of conveying and interpreting messages that elicit the intended response” (Griffin, 2009). Effective communication is essential in education. Communication happens on the receiving end of a message. Regardless of the intent, the way in which the audience perceives the message is what matters. A message’s intent must be perceived in the way it was intended for effective communication to happen (Figure 14). When a message is sent to an audience with the intent to teach a lesson, the lesson will only be taught if the audience perceives the message accurately.

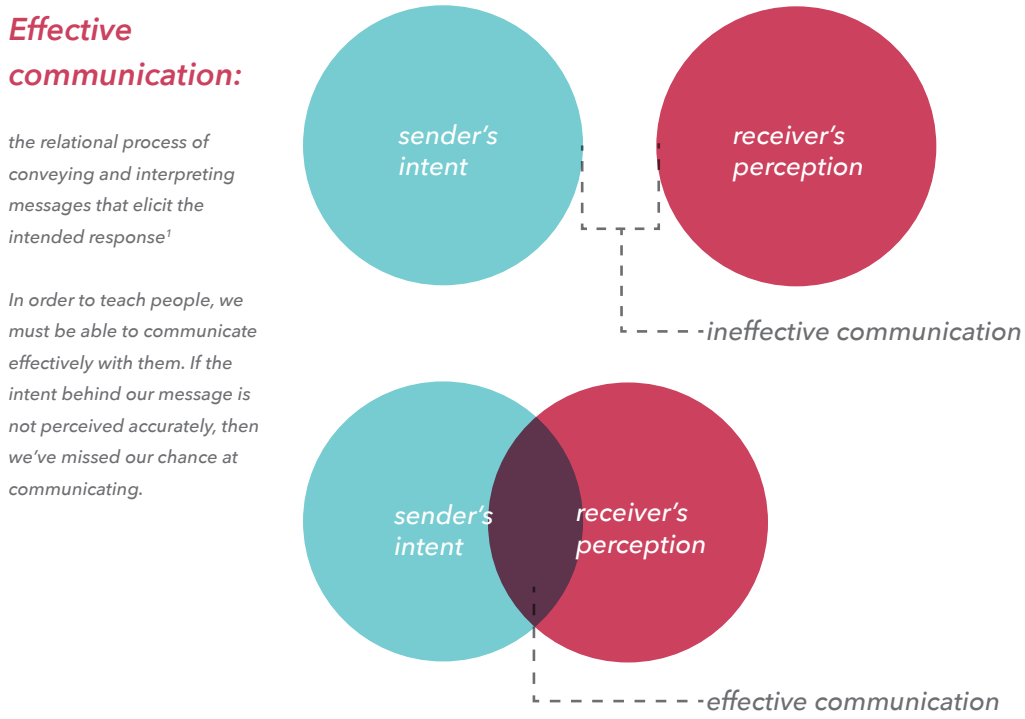

Figure 14: Effective communication diagram
Source: author

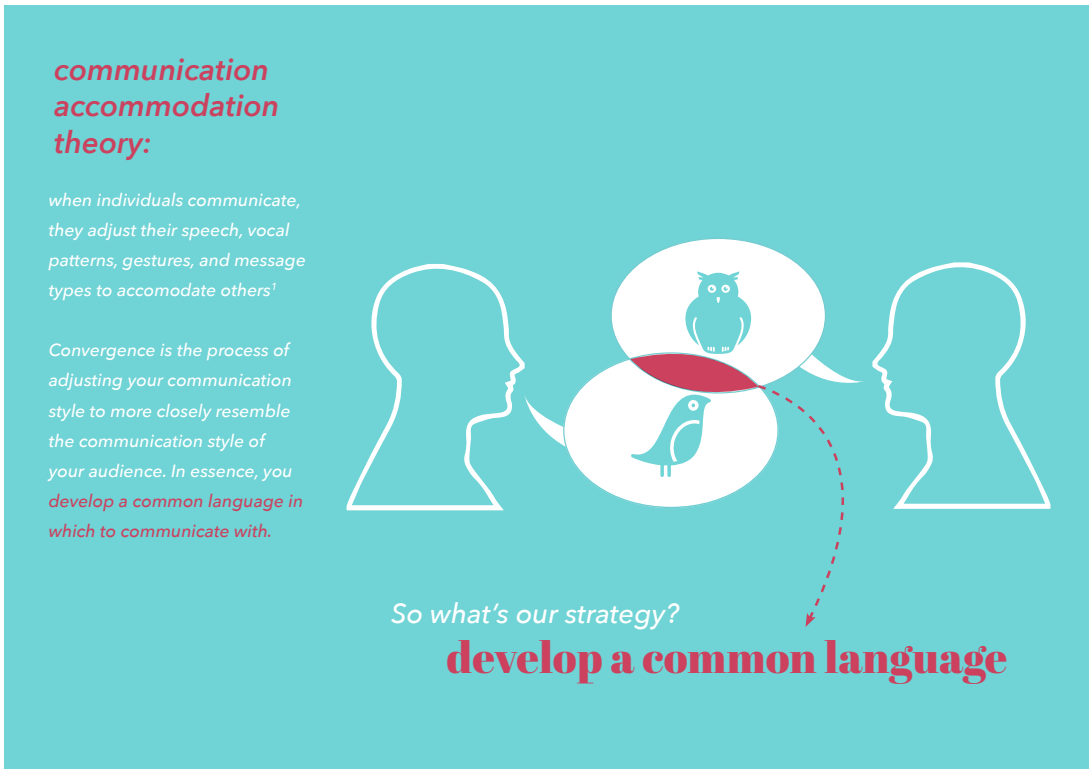

Figure 15: Developing a common language
Source: author

One group that excels in effectively communicating to a wide audience is the mass communication industry, or mass media. Typically educated in communication studies, mass media communicators understand the theories and behavioral science behind communication. The mass media relies on effective communication strategies to communicate to, persuade, and educate a wide audience. Mass media communicators develop strategic messages to reach their specific audiences so that the intended response is achieved. The mass media aim to converge their communication style to that of their audience, thus increasing their chance of effective communication.

The Communication Accommodation Theory states that “when individuals communicate, they adjust their speech, vocal patterns, gestures, and message types to accommodate others” (Griffin, 2009). Within that theory are the concepts of communication convergence and divergence. Convergence is the process of adjusting your style to more closely resemble the communication style of your audience (Griffin, 2009). In essence, developing a common language with which to communicate (Figure 15).

To develop a common language with an audience, one must first understand the audience it intends to communicate with. In many cases, this is a time-consuming, expensive, and complex task. Typically, an audience can be easily narrowed down from a global population to a regional population, based on cultural preferences and language, but it becomes more difficult as you narrow down from that point. When a message needs to reach an entire population, say that of a city, and a specific common language cannot be determined, the mass media often develop communication campaigns. These are cohesive combinations of diverse messaging types, such as print, television, and social media, which accommodate many different communication styles and can reach a much larger population (Griffin, 2009). Using a combination of communication methods increases the possibility of the intended message being received among a varied audience. Within a city there are many types of audience with different backgrounds, levels of education, age groups, and communication styles, thus, using the campaign approach increases

the chance of reaching all of them.

The intent of this thesis is to develop a communication campaign that will help to increase ecological literacy among the population of an entire city, including children, adults, business people, residents, students, government workers, and tourists. While it is nearly impossible to understand the communication styles of each individual in this large of an audience, there is research describing the overall communication tendencies of the average person. To develop a common language with a large and diverse audience without performing audience research, it is necessary to make some generalities. Research shows that most people communicate and learn best through visual and interactive communication.

In their 2003 study on visual learning, Mayer and Massa found that people tended to remember only 10% of what they heard and 80% of what they saw. They found that combining visual information with text improved participants' communication and learning ability by 89%. They estimated that around 83% of learning occurs visually (Mayer & Massa, 2003). Interactive communication involves multiple senses, which helps to create more memorable experiences for those who are communicating (Horn, 2001). When communication is two-way (interactive), either between two people or a person and a device, is increases the chance of effective communication (Griffin, 2009). Therefore, it seems that developing a common language with the general population of a city can be facilitated through visual and interactive communication (Figure 16).

For landscape architects who seek to introduce educational and interpretive elements into their projects, doing extensive audience research is highly uncommon and unlikely. Landscape architects are often working on public spaces, where the audience is potentially the entire population of the city it is operating in. While this is a very broad audience, it still needs to be understood in order for effective communication strategies to be established. In the past, landscape architects have not recognized the need to communicate ecological messages using the varied communications styles necessary to reach a broad, diverse audience.

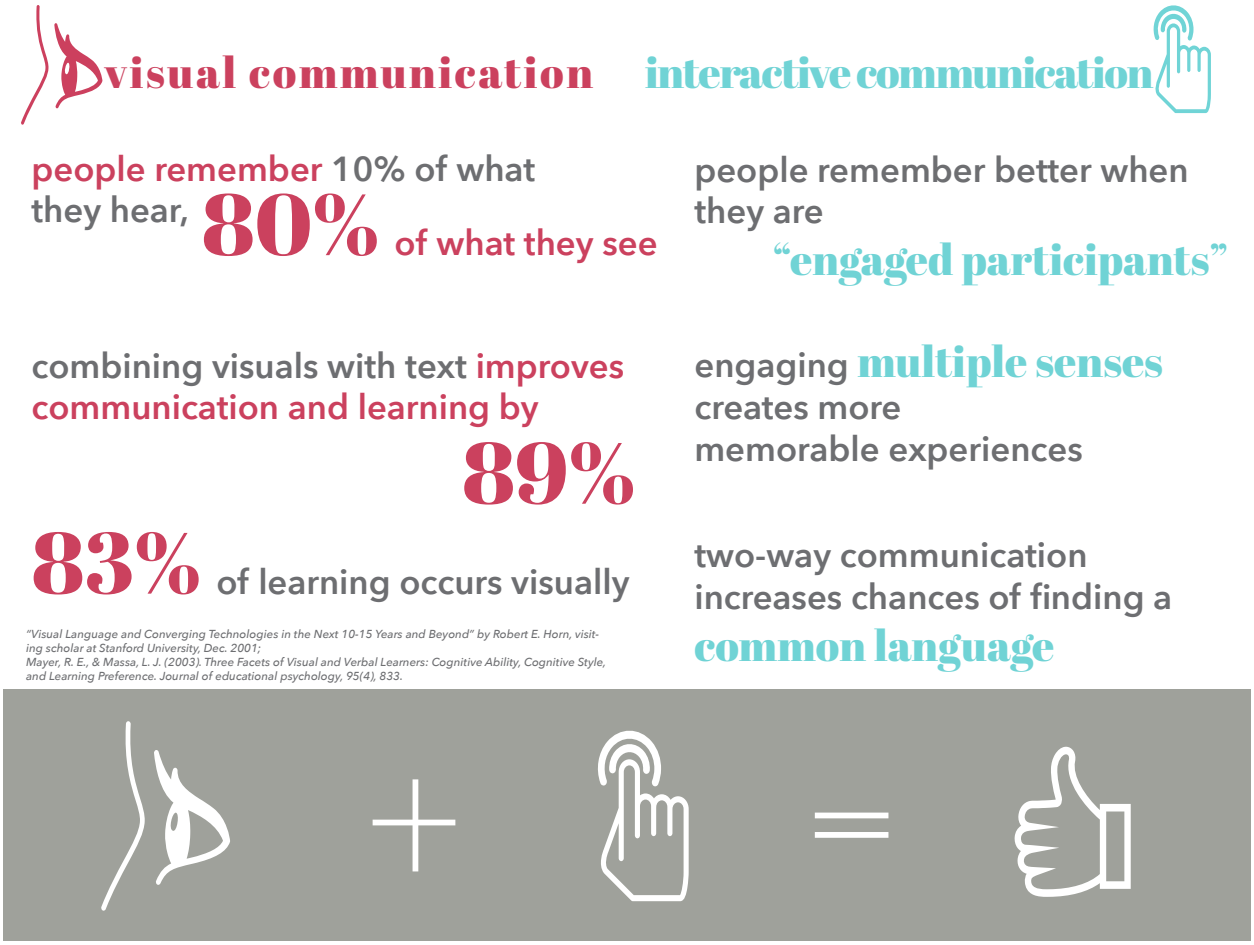

Figure 16: Visual and interactive communication research shows that most people communicate well using these two methods
Source: author

CHAPTER IV
PROPOSAL

COMMUNICATION STRATEGY

Based on an understanding of the successes and shortcomings of past eco-literacy initiatives to reach a wide audience, a respect for the ethical obligations, role, and potential reach of the profession of landscape architecture, and knowledge of effective mass communication strategy, it seems that a new model of communication must be developed. The model must include tactics that will overcome the weaknesses associated with the deficiency of in-depth audience research. As discussed in the previous chapter, visual and interactive communication strategies are effective on most people. The model must also address the various types of communication styles that are inherent to any large audience. The mass media often develop communication campaigns that use a variety of different messaging types to communicate to their audiences in meaningful ways. In addition, the communication model must promote the audience's accessibility to the message.

To increase eco-literacy within a large population, the following strategy is proposed:

1. Use visual and interactive communication to develop a common language with which to speak to the audience.
2. Develop a communication campaign – a suite of different tactics that will reach a wider audience and cater to diverse communication styles.
3. Take the campaign to the audience, rather than asking the audience to seek out the campaign.

SITE SELECTION

As discussed in previous chapters, it is essential that ecological literacy education reaches a broad and diverse audience that includes all age demographics, education levels, and socioeconomic and cultural backgrounds. Integrating educational elements into landscape architecture can have a wider reach when done in prominent public spaces that people have easy access to, are spending a lot of time in, and attract many different types of people. To test the communication model mentioned above, a site that offers easy access and attracts a multitude must be selected.

The ideal site will attract an audience at all times of day and throughout the week. Such a site will appeal to different types of users who occupy the space in different ways. The average amount of time spent in the space must be considered since this can determine the likelihood of participation from the audience. In addition, the frequency of visits by individuals in the space should also play a role in site selection. The more frequently a person visits, the more prone they may be to interacting with the campaign.

To increase eco-literacy it is important to have available examples within the site with which to teach. The presence of relevant and visible human/nature relationships within the site is necessary to teach ecological concepts. Novel ecosystems offer the opportunity to show the audience how human development and the ecological principles of adaptation and interconnection come together in the city. This type of setting allows the audience to view the city as an ecosystem, full of ecological elements and processes.

There is a unique opportunity within downtown Knoxville, Tennessee, that offers both a diverse audience base and unique ecological conditions that will be conducive to increasing eco-literacy. In order to test the new communication model, it will be applied to downtown Knoxville.

SITE

A fundamental part of becoming more eco-literate is understanding the human role in an ecosystem, specifically an urban ecosystem in this case. The Knoxville area can be considered

an anthropogenic biome, or anthrome, because it is dominated by humans (Figure 17) (Ellis, 2014). Within the anthrome is a grouping of similar physical characteristics, as well as similarities in species and vegetational communities and climate. There is a complex mosaic of different layers on this urban landscape, which creates a matrix for novel ecosystems to evolve. These conditions offer a unique opportunity to reveal ecologies within the urban context (Figure 18). The central area of downtown is the most densely developed and therefore offers the most robust opportunities (Figure 19).

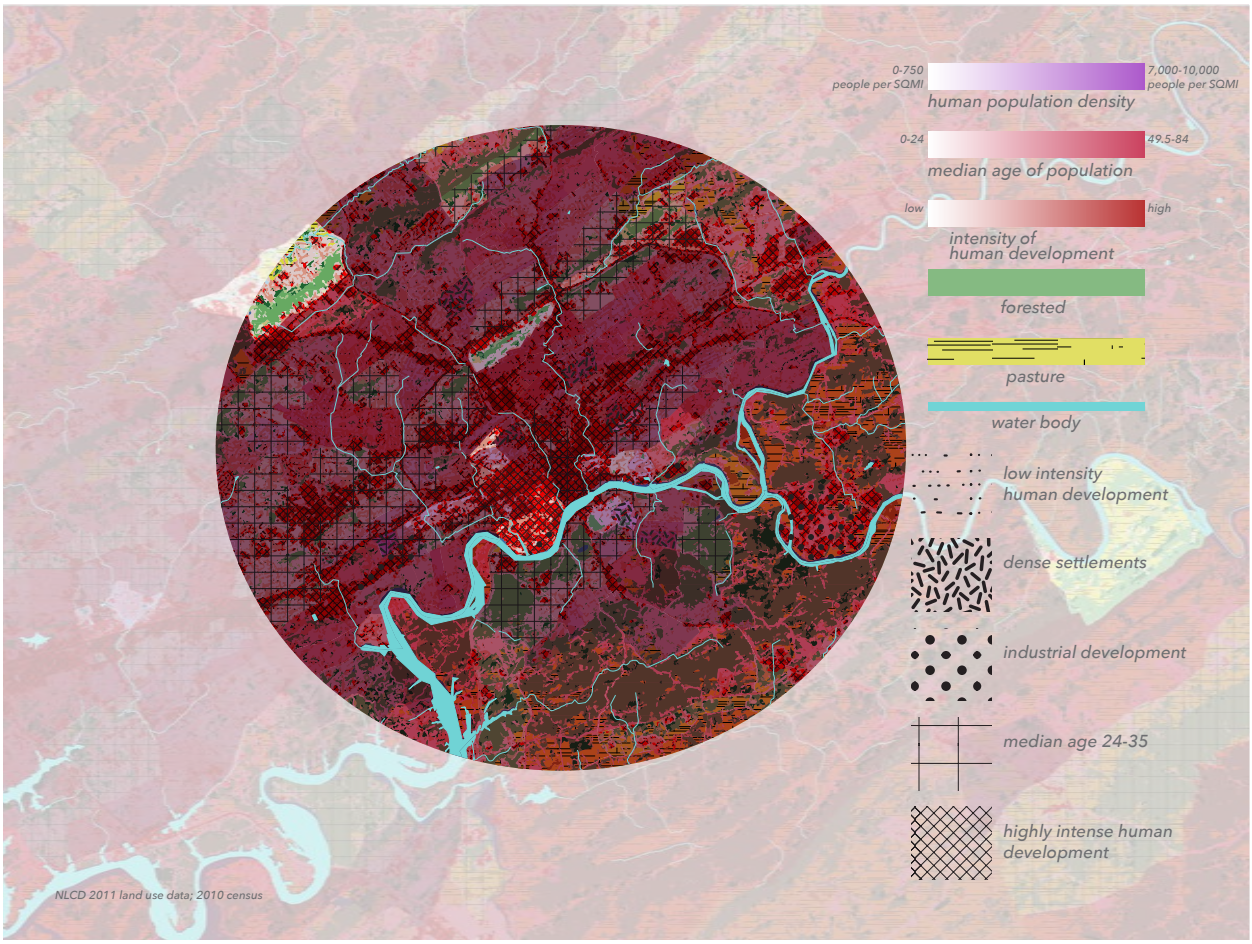

Figure 17: Layers of human development surrounding Knoxville
Source: author

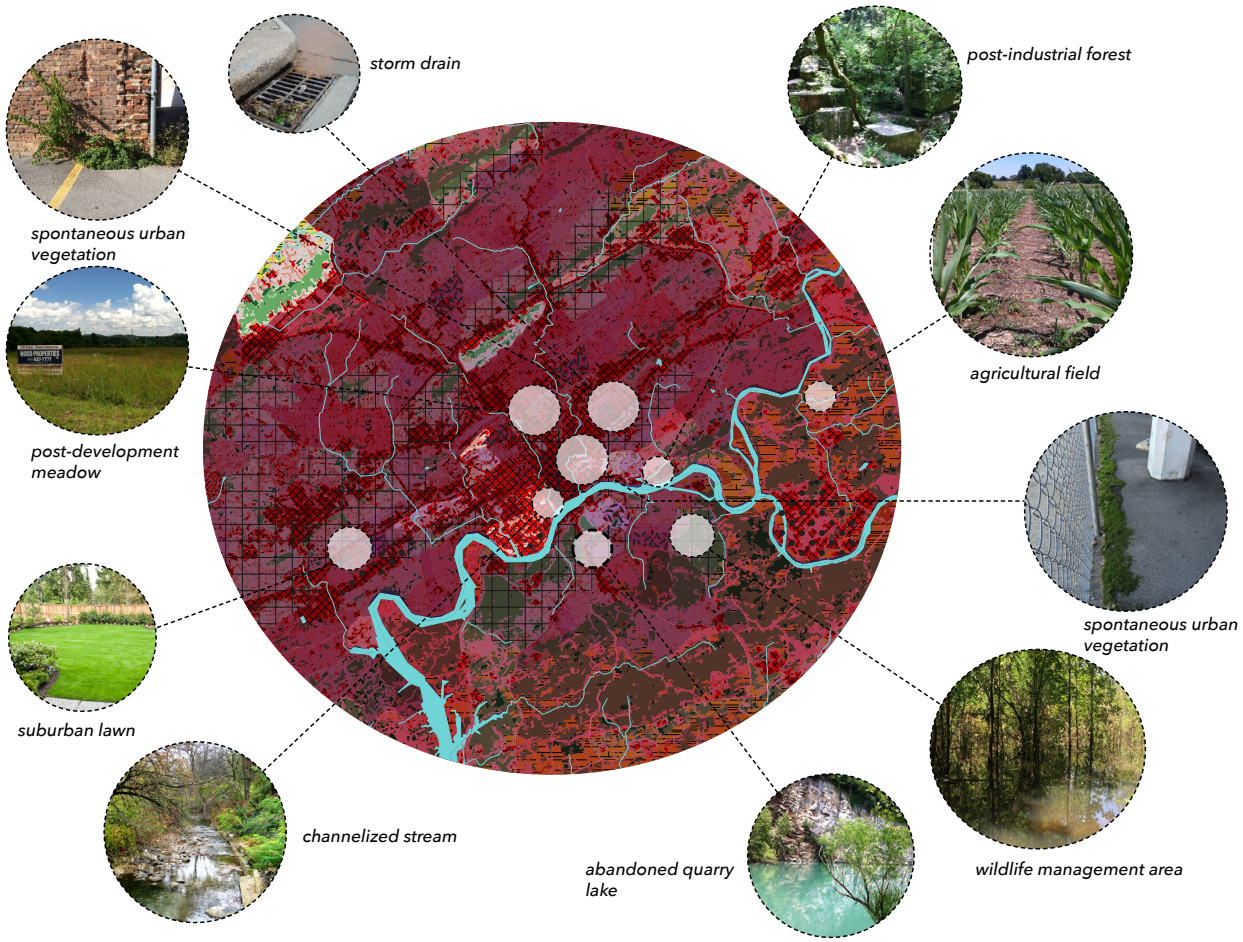

Figure 18: Examples of novel ecosystems found in the Knoxville area
Source: author

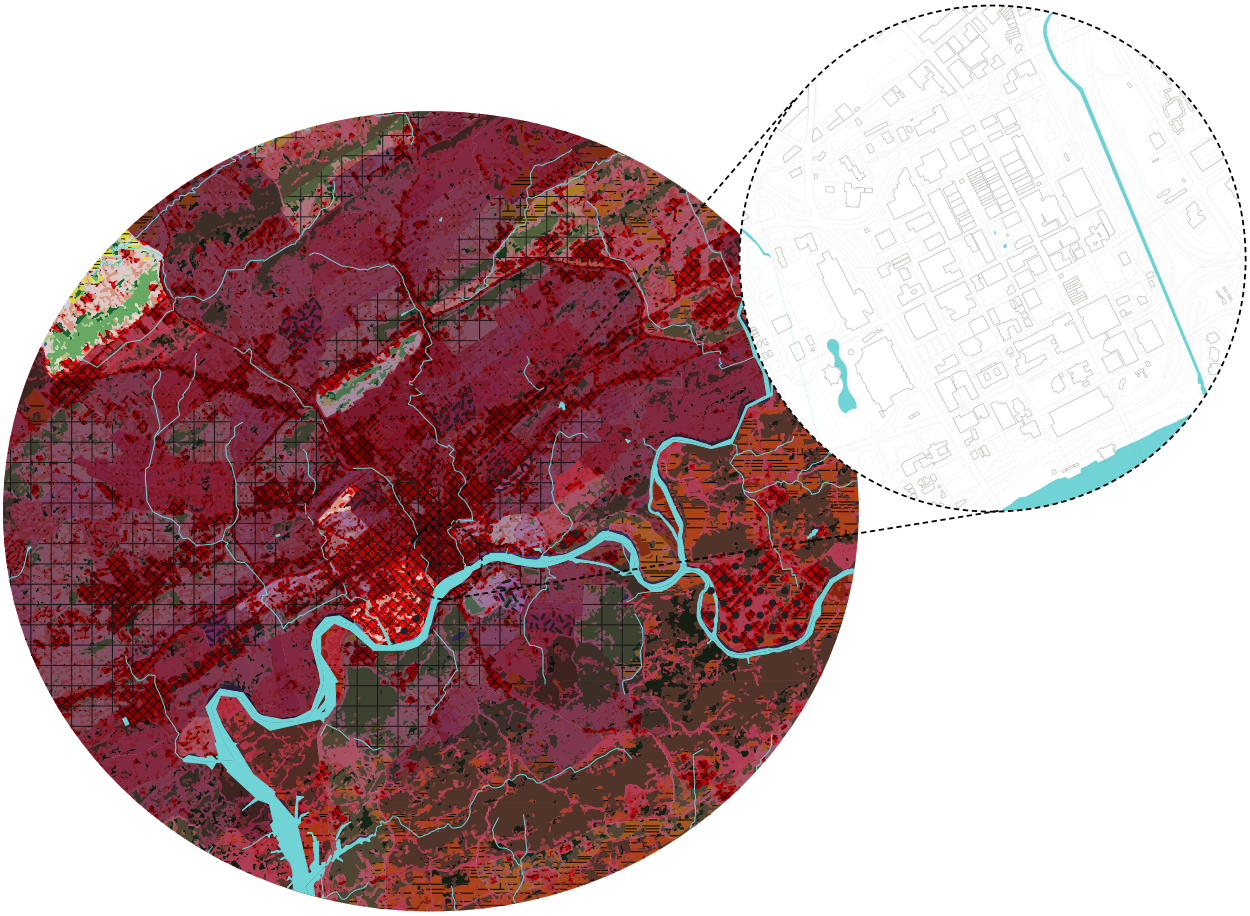

Figure 19: Call-out of central downtown Knoxville, the selected area of study
Source: author

Michael Hough stated in his book, Out of Place, “environmental literacy lies at the heart of understanding the places with which we are familiar” (Hough, 1990). By revealing elements of the urban ecosystem within downtown Knoxville there is an opportunity to increase eco-literacy among a population who is familiar with their surroundings. It can be assumed that the visitors, residents and workers who frequent downtown Knoxville have some level of care for the space since they visit it frequently, spend their time there, and/or live there. By building an education of the ecological functions of a space people care for, it may not only increase that level of care, but also increase their ecological interest of the space.

The central area of downtown Knoxville is frequently used for events such as the Market Square Farmer’s Market, live concert series, holiday parades, and street festivals (Figure 20). Visitors who come to downtown are often attracted to these areas because of the variety of activities (Figure 21). The Market Square area is one of the most popular spaces for people to gather in downtown Knoxville and features several restaurants, bars, and boutiques. In addition, many businesses and government services exist in this area, which attracts people from other parts of Knoxville to the center of downtown (Figure 22). Most of the residential areas within downtown are in this central core as well (Figure 23).



Figure 20: Central downtown Knoxville is a hub of activity featuring events, shopping, restaurants, festivals, tourism, businesses, and government services
Sources: oakridgetoday.com; planning.org/greatplaces; knoxnews.com; thehoppycouple.com



Figure 21: Map of central downtown Knoxville showing areas of interest to visitors
Source: author



Figure 22: Map of central downtown Knoxville showing areas of business
Source: author



Figure 23: Map of central downtown Knoxville showing residential areas
Source: author

AUDIENCE

Three main audience types have been identified within this area of downtown Knoxville; visitors, residents, and workers. These groups were identified based on their motivation for being downtown. One can conclude that people exist in downtown Knoxville because they are visitors, they live downtown, or they work downtown. Each of these groups exhibit certain behaviors based on their reason for being downtown. This analysis can help determine which areas of downtown are most conducive to communicating with each audience and which communication tactics will be most effective in reaching them.

VISITORS

Visitors who come from within the Knoxville area mostly visit downtown to socialize. Visitors meet friends for dinner or drinks, shop, and participate in events. Visitors also go downtown to take care of government business like license plate renewals, court appointments, or government meetings. Visitors are likely to spend time in public spaces (Figure 24) and observe their surroundings. They also spend much of their time in downtown on foot (Figure 25).

Visitors from outside the Knoxville area visit downtown to experience the history and culture of the city. They also spend most of their time downtown on foot and explore and observe their surroundings more so than Knoxvillians would tend to. They frequently participate in events and are typically open to trying new experiences. These visitors also spend a lot of time in public spaces while they are downtown, particularly if they are spending the night.

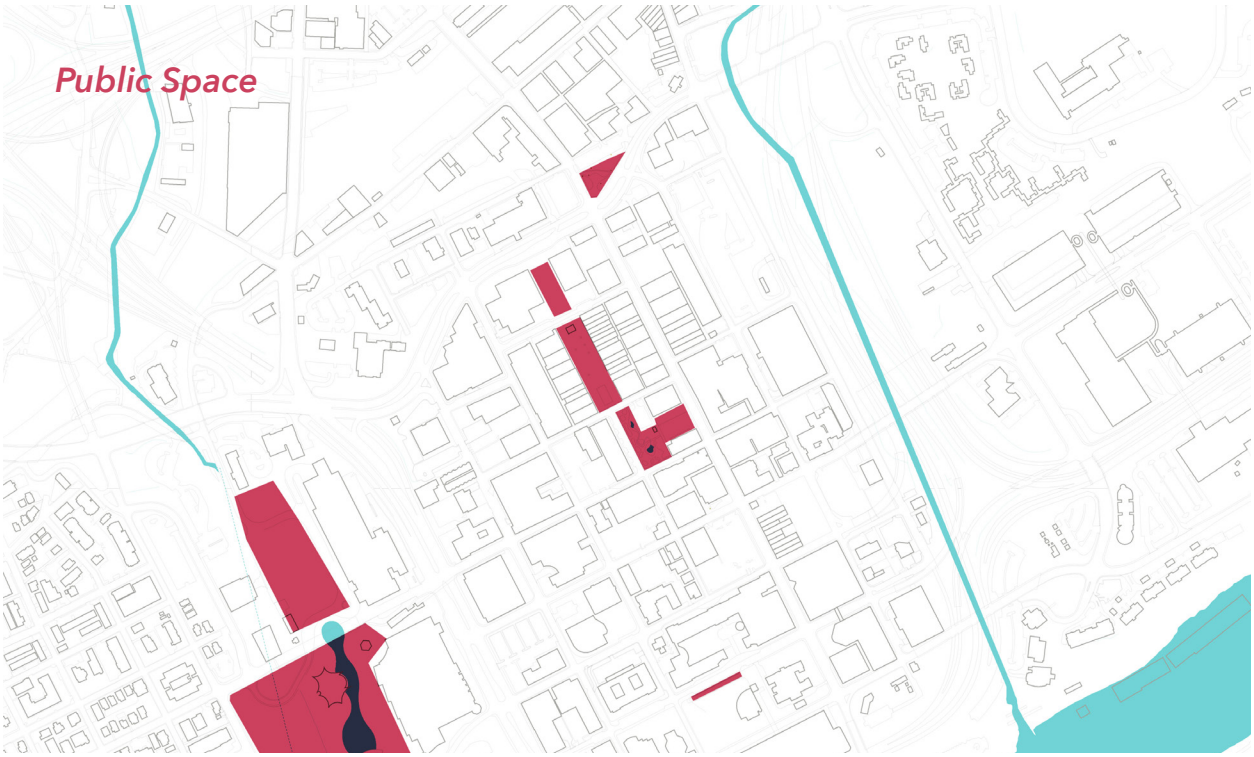

Figure 24: Map of central downtown Knoxville showing public spaces
Source: author



Figure 25: Map of central downtown Knoxville showing common pedestrian pathways and parking areas
Source: author

RESIDENTS

People who live downtown spend a great deal of their time there, especially if they also work downtown. Residents of downtown travel mostly on foot, spend a lot of time in public spaces, and tend to participate in events. Residents will likely show interest in new experiences and opportunities downtown since downtown is their home.

WORKERS

People who work downtown spend the majority of time in their offices; however, they do spend some time in public spaces as well. Workers typically walk through downtown, to and from their cars, to meetings, or to a restaurant for their lunch break. Workers are not as likely to take part in events or participate in new experiences in the downtown area.

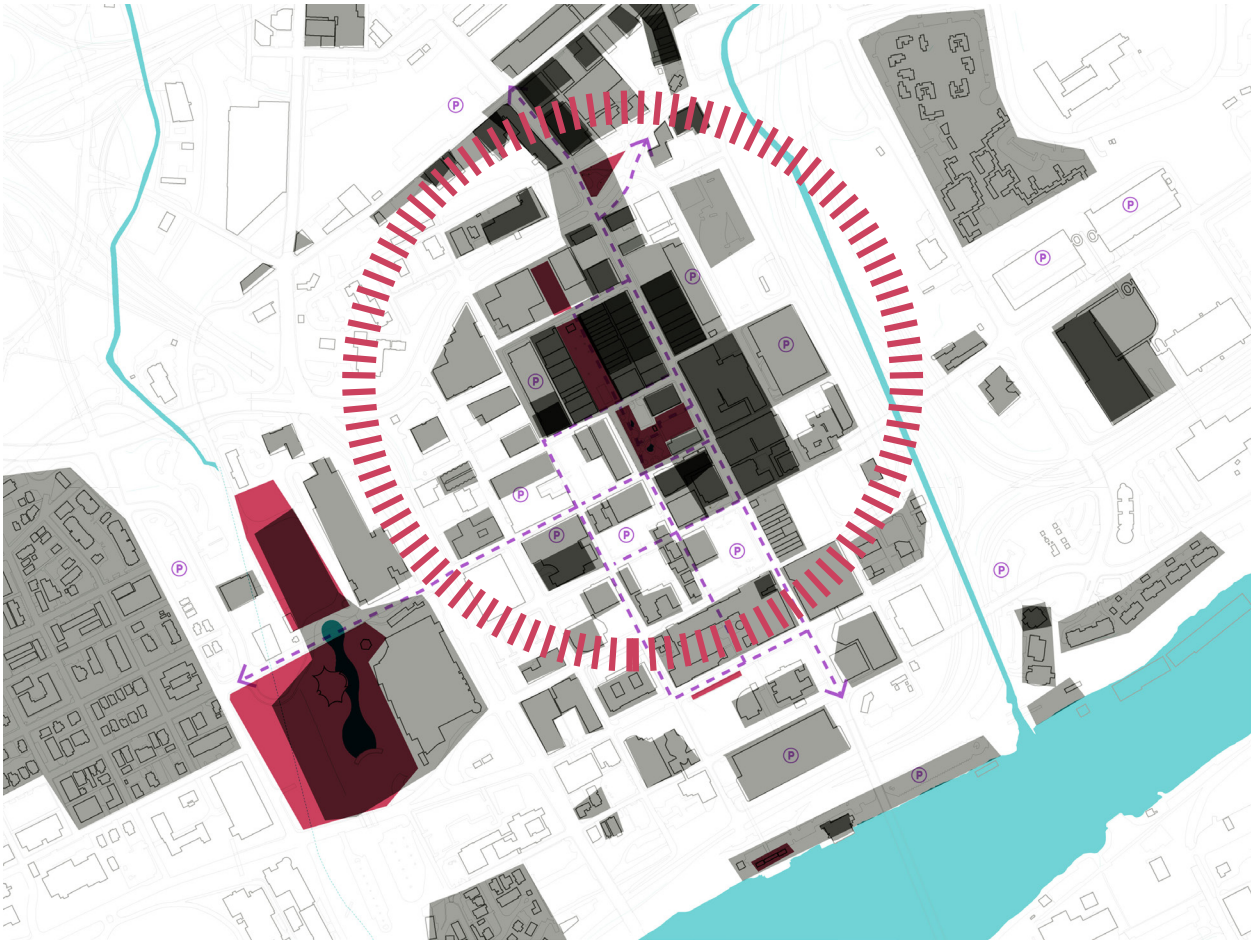

Figure 26: Map of central downtown Knoxville showing overlapping layers of visitors, residents, workers, pedestrians, and public spaces; circled is the area of concentration
Source: author

TARGETING THE AUDIENCE

Visitors, residents, and workers all convene in a few main areas of downtown (Figure 26). The Market Square, Gay Street, and Krutch Park areas are the center of action in central downtown Knoxville. With all of the activity and the concentration of different audience types in this area, it is possible to reach a large segment of the population here. This audience includes people of all ages, with different backgrounds, levels of education, and levels of eco-literacy, making it an excellent target for the communication strategy.

MESSAGING

To increase ecological literacy within the targeted audience in downtown Knoxville, a messaging plan has been developed that uses a common language to teach relevant ecological concepts. The Center for Eco-literacy published the “Core Ecological Concepts” that they believe are central to ecological literacy (Figure 27). According to the Center for Eco-literacy, one can become ecologically literate by learning and understanding these six principles of ecology:

- Networks: All living things in an ecosystem are interconnected through networks of relationship. They depend on this web of life to survive.
- Nested Systems: Nature is made up of systems that are nested within other systems. Each system is an integrated whole and – at the same time – part of larger systems.
- Cycles: Members of an ecological community depend on the exchange of resources in continual cycles.
- Flows: Each organism needs a continual flow of energy to stay alive.
- Development: All life – from individual organisms to species to ecosystems - changes over time. Individuals develop and learn, species adapt and evolve, and organisms in ecosystems coevolve.
- Dynamic Balance: Ecological communities act as feedback loops to sustain

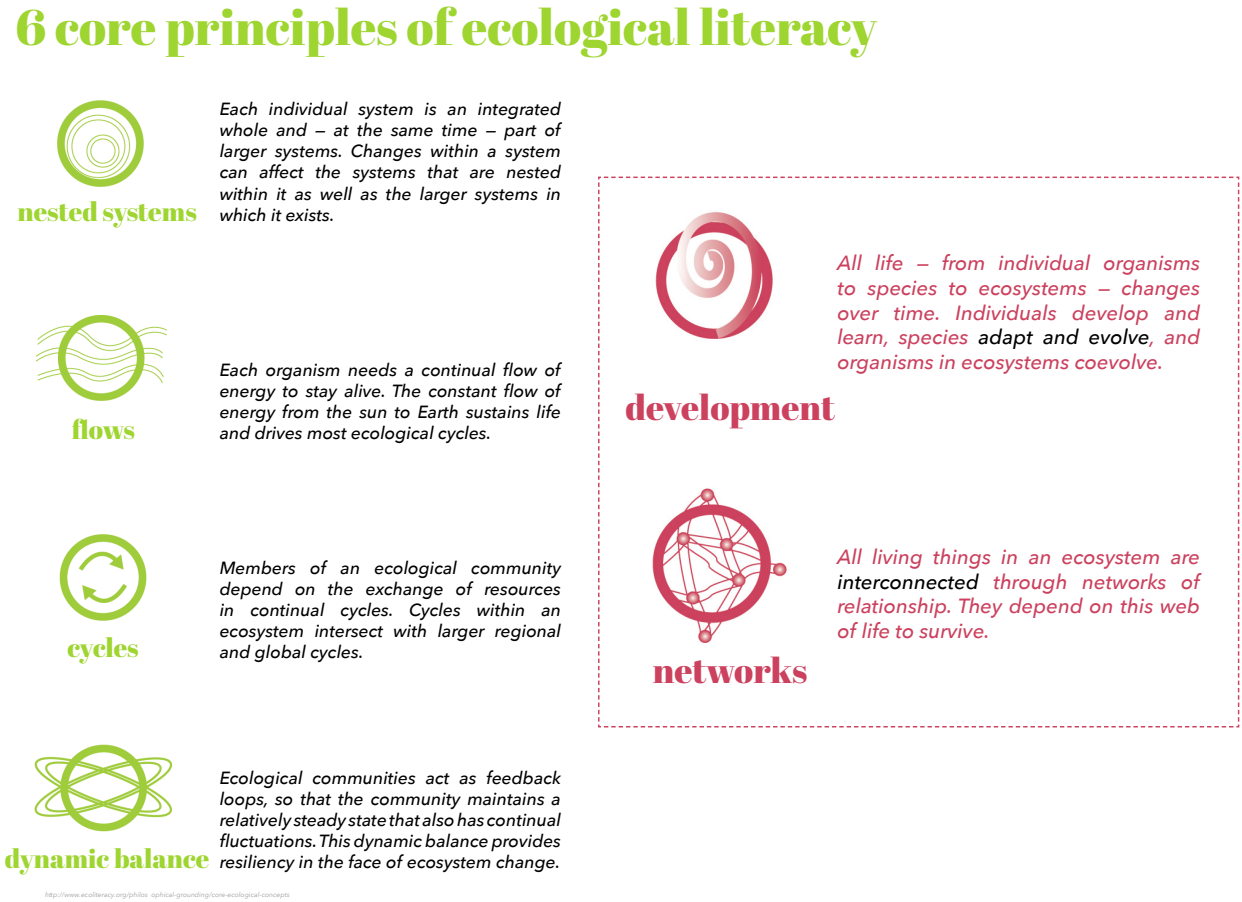

Figure 27: The Center for Eco-literacy's list of "Core Ecological Concepts"
Source: Center for Eco-literacy

relative stability (Center for Ecoliteracy, 2015).

This thesis focuses its messaging on the two principles of Networks and Development because they are the most relevant to this specific urban ecosystem. During several inventories of the downtown area many examples of these principles within the landscape were discovered (Figure 28). The principle of development is apparent through the many examples of organisms that have adapted and evolved to thrive within the urban landscape. The principle of networks is apparent in the dynamic, complex system of organisms and processes that exist in the urban ecosystem. By focusing on teaching these two principles the audience may become more eco-literate.



Figure 28: Series of photos from author's inventory of novel ecologies in downtown Knoxville, TN
Source: author

CHAPTER V
DESIGN

CAMPAIGN STRATEGY

To communicate the messages of development and networks to a diverse group of audience members a communication campaign will be used. This is a suite of different communication tactics that will help the intended message reach a variety of different communicators. Each element of “The Campaign for Urban Eco-literacy” was chosen because of its ability to visually and/or interactively communicate, thus creating a common language with which to speak to the audience (Figure 29). This combination of tactics will offer the audience multiple channels in which to receive the message, increasing the likelihood of effective communication.

The Campaign for Urban Eco-literacy includes:

- An Opening Exhibit and Event that includes art, workshops, and guided tours to help people understand the overall goals of the campaign. The Exhibit will help begin the conversation of eco-literacy, provide face-to-face interaction with other interested people, and generate excitement for the other elements of the campaign.
- The Urban Rangers are trained professional tour guides who will give guided urban nature walks and live demonstrations. This provides face-to-face interaction and helps remove ambiguity about the concept of eco-literacy.
- Signage will be strategically integrated throughout the campaign to reach people in various places with diverse and meaningful messages.
- The ‘Wild Thing’ Mobile App is a mobile phone application that allows users to geolocate “wild” elements within the city. The app brings attention to existing “wild things” and asks users to find their own.
- Virtual Reality Simulators will feature virtual programs that help users

to visualize normally imperceptible processes and seemingly hidden connections within their urban landscape.

- Interactive Installations will be placed strategically throughout the city to bring attention to urban nature, reveal specific ecological features, and stretch people's thinking about their urban ecosystem.

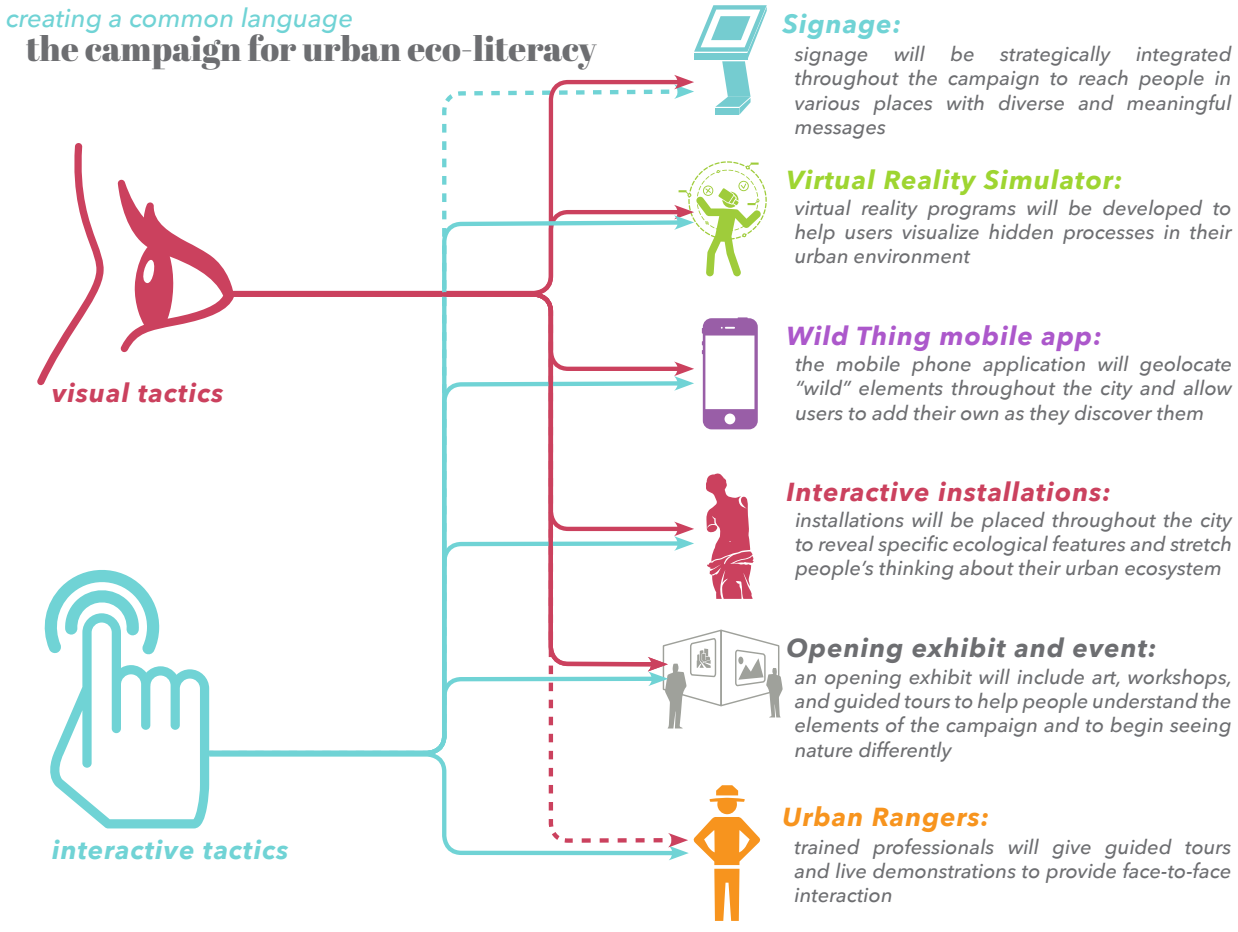

Figure 29: The Campaign for Urban Eco-literacy intervention diagram
Source: author

The campaign is designed so that it can be adjusted based on audience types and site conditions. This allows the campaign to work in cities other than Knoxville in the future. It also allows the designer to choose which elements will be the most viable according to the site and targeted audience (Figure 30). Within the core of downtown Knoxville there is a mix of visitors, residents and workers, there are plenty of public spaces, and there are many pedestrians. Therefore, it will be possible to use all six elements of the campaign effectively in this area. Using all six elements increases the likelihood of effectively communicating the message to the audience. The spatial, virtual, and experiential interventions of the campaign offer the audience a multitude of different opportunities to interact and engage with the city, giving each individual a chance to experience the campaign in their own way.

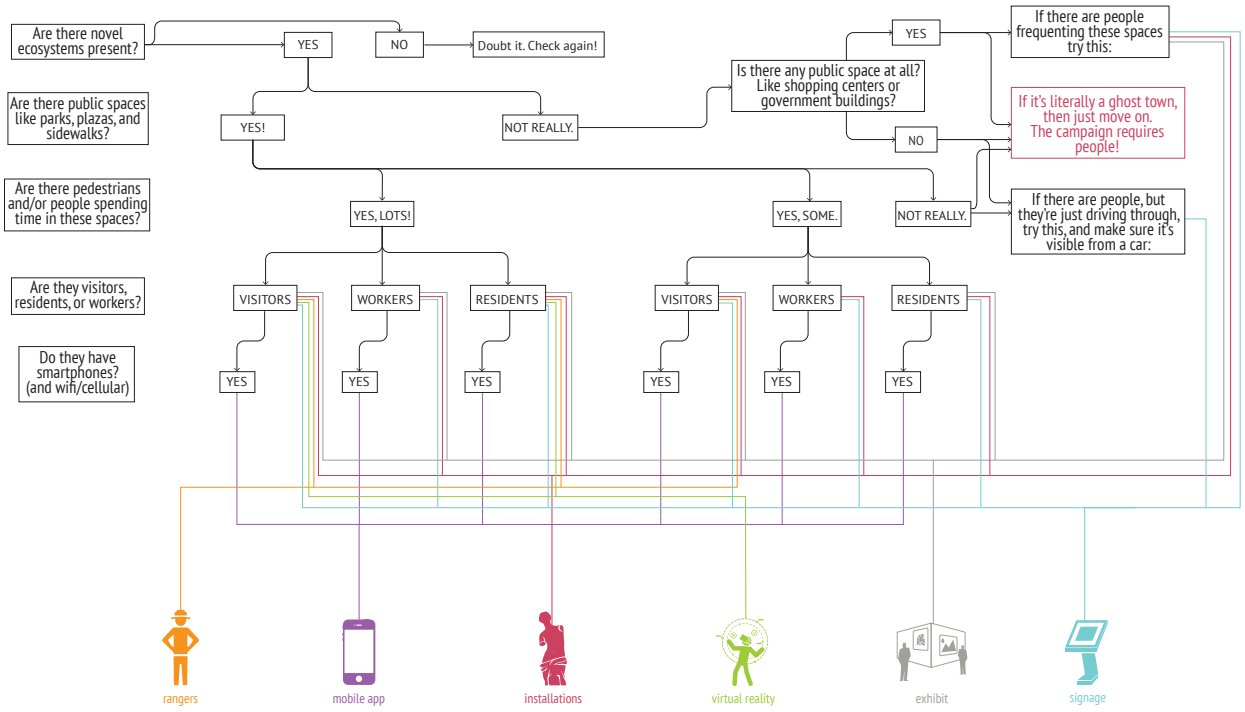

Figure 30: Decision-making diagram for the Campaign for Urban Eco-literacy
Source: author

Participants are invited to interact with the elements of the campaign in multiple ways. The audience can experience each element of the campaign in one visit, or piece by piece across several visits. By participating in a guided tour the audience will experience the campaign in a sequence, visiting each element in a specific order depending on the tour. Using the mobile app and signage allows the audience to guide themselves through the campaign and interact with the elements they choose. Passersby can experience elements of the campaign as they walk to their destination, stopping for a few moments to interact with an installation or read a sign. Mobile app users can virtually access specific elements of the campaign from anywhere at any time. By offering a variety of different experiences, and applying several methods of communication, the audience can tailor the campaign experience to meet their own needs.

The overall plan of the campaign is featured in a map (Figure 31), which the audience can use to guide their experience. The map will be placed in strategic locations throughout the city to help guide participants. It features the locations of each element of the campaign and a QR code that allows the audience to easily download the Wild Thing mobile application. The interventions are woven together by a system of way-finding sculptures (Figure 32). These sculptures mimic weeds that are growing throughout the city (Figure 33). They are constructed of a powder-coated steel and painted in bright colors to attract the audience's attention. These weed sculptures act as a visual cue to draw people into the experience or guide them to and from the different campaign elements. People can use the map, the mobile app, the signage, or the way-finding sculptures to direct their experience of the campaign.

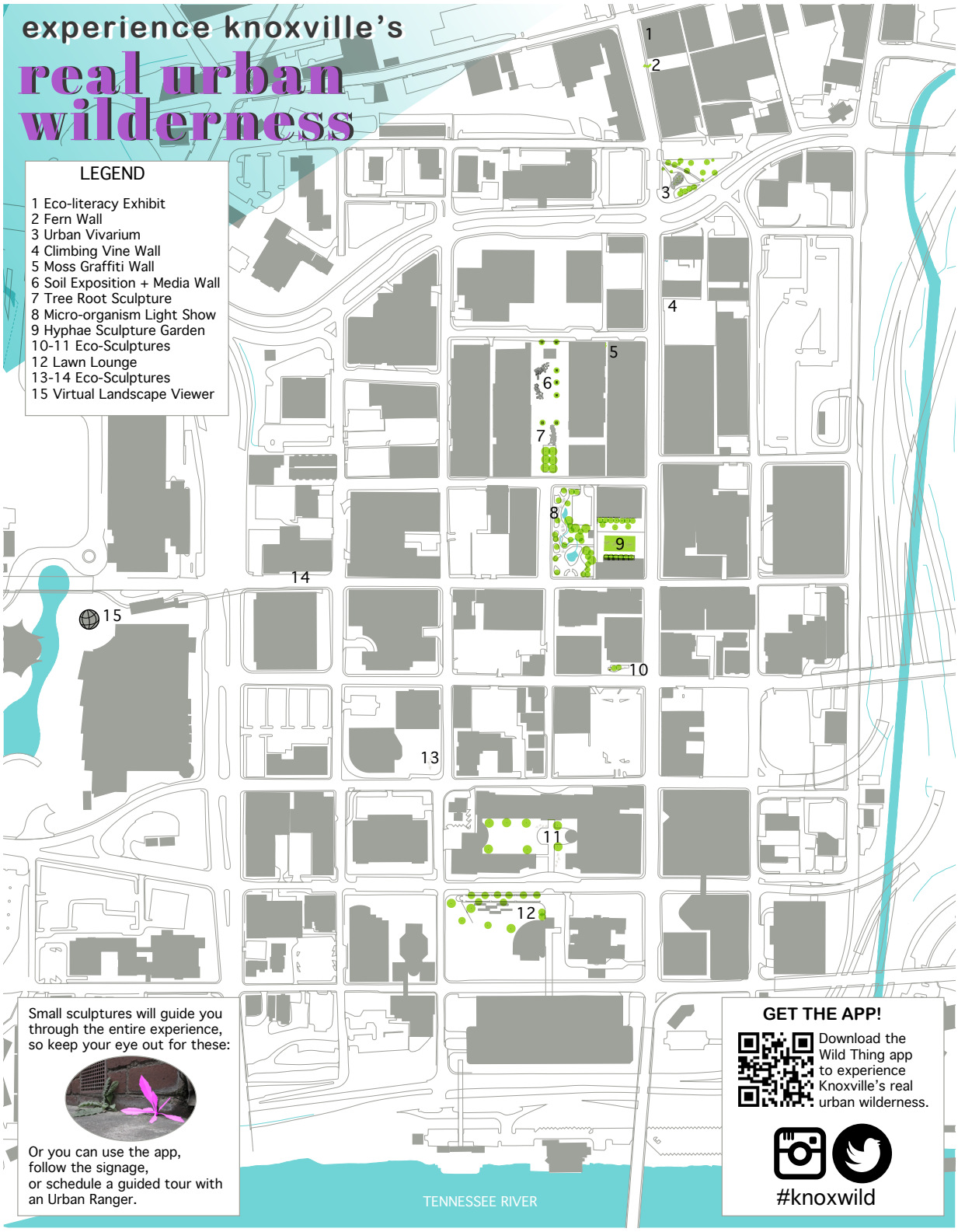

Figure 31: Map of central downtown Knoxville with locations of campaign features
Source: author

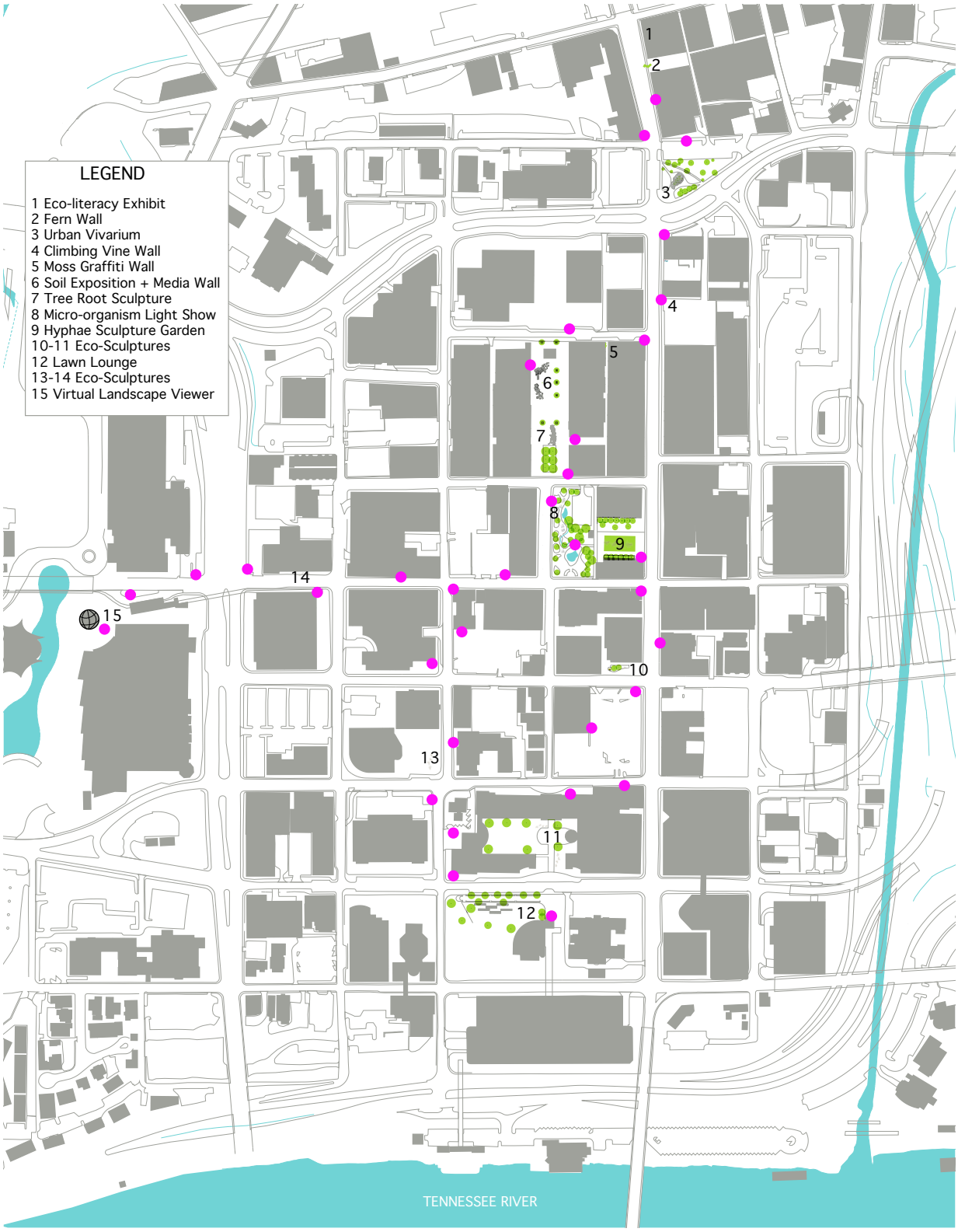

Figure 32: Map of central downtown Knoxville with locations of way-finding sculptures
Source: author



Figure 33: Way-finding weed sculpture example
Source: author

OPENING EXHIBIT

To launch the Campaign for Urban Eco-literacy, an exhibit will be held in the UT Downtown Gallery on Gay Street, featuring art, design work, films, workshops, and guided tours that focus on the concept of novel ecosystems in the urban environment and eco-literacy (Figure 34). The exhibit offers visitors the opportunity to familiarize themselves with the goals behind the campaign and ecological concepts with which they may not be familiar. It offers face-to-face communication opportunities among participants and experts, which can encourage interaction and learning among some of the audience (Kupritz & Cowell, 2011). The exhibit offers both an interpretive experience through viewing art, film and design, and a more practical experience with literal explanations of ecological concepts and principles. This fosters discussion and helps build excitement (buzz) for the campaign.

Prior to the exhibit's opening an invitation will be sent to city leaders, schools, and related organizations. Local news media will be personally invited to ensure that information about the event is broadcast throughout the Knoxville area. The opening night of the exhibit will fall on the first Friday of the month (exact month to be determined) which coincides with the Knoxville "First Friday" art walk. On First Friday art galleries and other businesses open their doors for extended hours, hold special art exhibits, serve snacks and drinks and encourage visitors to explore downtown. First Fridays have been a tradition in Knoxville since 2008 and often draw a large and diverse crowd to the downtown area. It has been established as an event that attracts many types of people, not just art lovers. The UT Downtown Gallery and the adjacent Emporium Gallery have traditionally been a part of First Friday and have some of the largest exhibition space in the downtown area. By holding the exhibit here it increases the probability of drawing a crowd and allows ample space for displays, films, and mingling among participants. Its location attracts visitors, residents, and workers alike, and also serves as an excellent starting point for many of the guided tours.

The exhibit will be open for one month after the campaign is initially installed, and will feature

workshops and events on the weekends to encourage visitation. The featured art and films will slightly adjust every weekend to continually offer new material for visitors. Some audience members may start their experience with the exhibit and then follow the map, app, signage, or way-finding sculptures through the entire campaign experience. The exhibit is the symbolic starting point of the campaign, however, it can be visited any time throughout the experience as participants decide they would like more information.



Figure 34: Example image of the Opening Exhibit and event
Source: bustler.net

URBAN RANGERS

The Urban Rangers offer guided tours through the campaign experience (Figure 35). Some members of the audience may feel as if they need some guidance through the campaign elements since many of the concepts may be new or confusing. The Rangers will explain ecological principles in a simple way to encourage the audience to understand the concepts behind the campaign regardless of their level of eco-literacy or education upon entering. The Rangers will point out 'wild things' throughout the tour and elaborate on the functions and processes they demonstrate. By using the specific phrase "wild thing" in their narrative, the Rangers help ease the audience into using the Wild Thing mobile application either during or after the tour. The Rangers help to remove any ambiguity from the experience, which can help encourage the audience to participate in other elements of the campaign on their own.

The tours will follow several different routes offering more personalized experiences based on the size of the group, specific interests or time constraints. Each tour will visit several of the installations throughout the city and give face-to-face explanations of the design intent behind them. The Urban Ranger tours can be tailored to different user groups. For example, visitors from out of town may need more explanation about the general landscape, climate, and history of Knoxville during their tour, while visitors from the Knoxville area may not need that information. A group of art enthusiasts may want a tour that focuses more on the sculptures, installations, and aesthetic qualities of the campaign elements. A more ecologically literate group, for example a group of biology students, would perhaps be more interested in a tour that included scientific explanations of the urban natural phenomenon. The Urban Ranger tours could evolve over time to include different interests and appeal to various user groups.



Figure 35: Example image from the Urban Rangers tour
Source: karensmoss.net

SIGNAGE

Throughout the campaign experience, various types of signage will be integrated. Signage is a commonly used intervention that helps add layers of information to an experience. Using language and images to describe a concept can be powerful to many types of audience. Signage allows visitors to gain knowledge of their surroundings at any point along their journey through downtown. By using the signage as a guide, the audience can work their way through the campaign, learning what the signs have to teach along the way. Many of the signs in the campaign are a traditional style of sign, meaning a static piece of material displaying information. These signs are integrated throughout the city and into the interactive installations. They offer simple explanations of the ecological phenomenon found in the city.

These signs are meant to catch the audience's attention, but not appear too garish in the city. The intent is not to change the city, but rather highlight elements that already exist within it. They are constructed from a brightly colored transparent acrylic material, which allows the city to be seen through the signage. The bright colors grab attention, but the transparency and relatively small size keep them from being too loud. They range in size from small, 6" circles, to large, 12" wide ellipses (Figure 36 & 37). These signs add a layer of information to the city, without dramatically altering the look of the city.

In an effort to build a common language, the language used on the signage is a casual, colloquial, yet authoritative style. The signage is meant to appeal to different age groups, education levels, and audience types (residents, workers, visitors), and uses a fun and youthful tone. The use of scientific or academic jargon could exclude some members of the audience from receiving the intended message, so a more casual tone is used.

Not all of the signs use text to communicate, offering alternative communication methods. Other types of signage that are more covert can be seen throughout the interactive installations. Many of the sculptures can be considered signs, which draw attention to and give information about the natural phenomenon throughout the city. The mobile app also offers a type of signage

through adding information to the city in a virtual manner. Using different types of signage may increase the probability of audience members noticing and reading (or interpreting) the signs.



Figure 36: Example of a 12” elliptical sign on a brick wall
Source: author



Figure 37: Example of a 6” circular sign placed inside a planter
Source: author

WILD THING MOBILE APP

The Wild Thing Mobile App is an interactive mobile application that the audience can download to their smartphones and use as a guide throughout their engagement with the campaign. The mobile app allows the audience to have a more involved experience of the campaign by encouraging different levels of participation both spatially and virtually. The app is intended to reach all members of the audience, but some are more likely to use it than others. The app is more likely to appeal to a younger, tech-savvy generation who habitually use their smartphones in everyday life. Residents and visitors who frequent downtown Knoxville are more likely to use the mobile app than out-of-town visitors and workers. The mobile app's features are designed to accumulate images and information specific to the user's interests over time. This means that the user needs to use the app more than once to get the most out of it. The mobile app focuses on teaching the development and networks principles by pointing out adaptive growing conditions for urban plants, animals that have evolved their habitats to city infrastructure, and microclimate conditions within the city. These phenomenon are referred to as "wild things" since they are occurring in the city on their own, as opposed to the cultivated species we typically notice in cities.

The Wild Thing app has several features that allow various levels of participation from the audience. From the home screen (Figure 38) the users can navigate to the various features. The first feature is called “What Are Wild Things?” and it explains the concept behind the mobile app and how it works (Figure 39). It describes what “wild things” are and gives an overview of how to use the app to find them.



Figure 38: Wild Thing Mobile App home screen
Source: author



Figure 39: “What Are Wild Things” feature from Wild Thing Mobile App
Source: author

The main feature of the Wild Thing app is the interactive map that participants can use to navigate through the city and find wild things (Figure 40) in the “Where Are They?” feature. To begin, there will be a series of found wild things that are located on the map to act as a starting point for participants (Figure 41). As the app users become familiar with the concept of wild things and begin to find their own, they can add previously unmapped wild things to the map (Figure 42). App users will begin to notice wild things in their own neighborhoods and add them to the map as well. As users add their wild things to the map it expands the experience outside of the center of downtown and into other parts of the city (Figure 43). The map will serve as a visualization of the fact that users can find novel ecosystems throughout the entire urban landscape. Over time, the accumulation of wild things on the map reinforces one of the underlying concepts behind the campaign – the city is on a spectrum of natural conditions.



Figure 40: “Where Are They” feature from Wild Thing Mobile App
Source: author

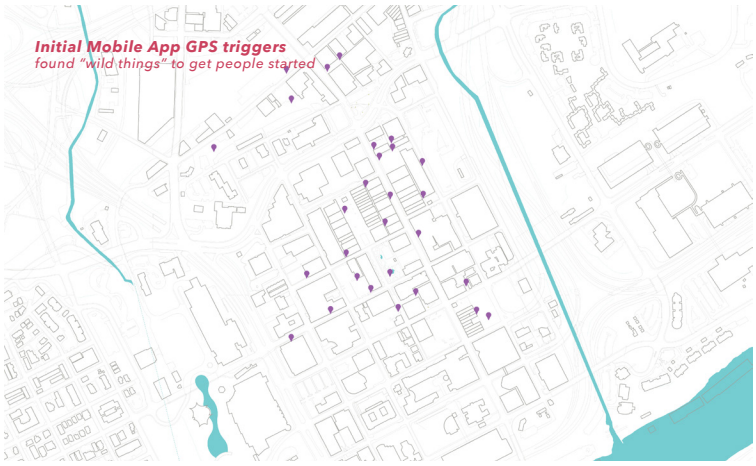

Figure 41: Initial Mobile App GPS triggers, found “wild things” to get people started
Source: author

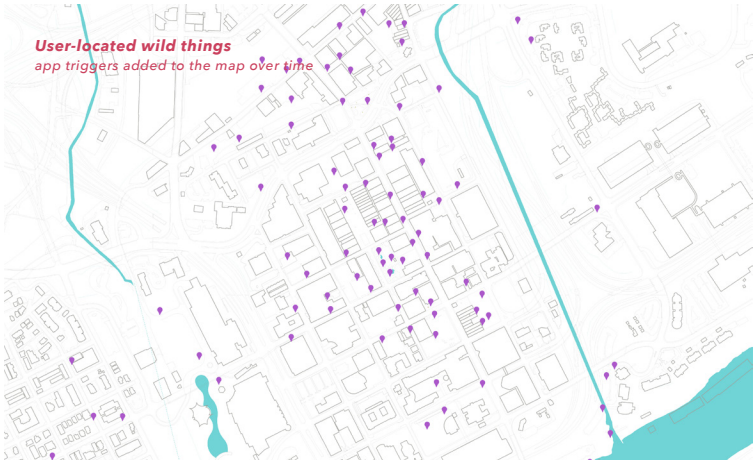

Figure 42: Example of map after users add their own “wild things” to the map
Source: author

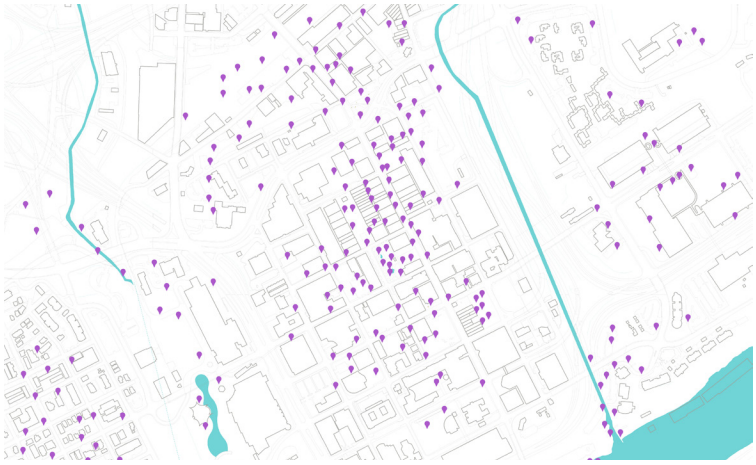

Figure 43: Example of map “wild things” spreading beyond city center
Source: author

Since the app is meant to encourage interaction from the audience, the “Help Me Find Some!” feature offers the user suggestions and tips to help them find their own wild things in the city (Figure 44). The tips inspires users to see the city a little bit differently since they are seeking specific phenomenon throughout the experience. For example, one suggestion is to “look up” since wild things often exist above our line of sight. As users look up to the rooftops, sides of buildings, or in trees, they begin to see parts of the city they may not have noticed before.



Figure 44: “Help Me Find Some” feature from Wild Thing Mobile App
Source: author

The “What the Heck is it?” feature is an identification system that helps participants learn about each wild thing they encounter (Figure 45). There may be instances when an app user comes across a plant or organism in the city and wants to know more about it, such as what it is called, what it does, and its role in an urban ecosystem is. This feature allows you to take a picture of the wild thing and it will automatically search through a database to identify what the image. Users can browse through the database and find the wild thing themselves. This feature also allows users to collect images in their own database to reference later.



Figure 45: “What the Heck is it?” feature from Wild Thing Mobile App
Source: author

The app also offers the opportunity to share images and comments with other app users through the “Look What I Found!” feature (Figure 46). This feature also invites participants to share their photos and comments that interact with other parts of the campaign. By using a hashtag (for example, #knoxwild) on Twitter or Instagram the audience’s messages and photos will appear on a feature wall in Market Square. This interaction allows users to feel as if they are a part of the experience and it also encourages them to interact with other parts of the campaign.



Figure 46: “Look What I Found!” feature from Wild Thing Mobile App
Source: author

In addition to the feature wall in Market Square mentioned above, the app works in conjunction with other parts of the campaign as well. The “Virtual Landscape Viewer” feature uses augmented reality technology to visually overlay elements of the urban ecosystem onto a scene through the user’s phone screen (Figure 47). This is specifically programmed to work from the observation deck of the Sunsphere where the audience can get a view of the entire urban landscape. As they walk around the Sunsphere, the audience can look at the view through their phone and add or subtract different layers, like dense development, water systems, or forested areas, to see how these elements overlap in the urban ecosystem.



Figure 47: “Virtual Landscape Viewer” feature from Wild Thing Mobile App
Source: author

INTERACTIVE INSTALLATIONS

One of the main elements of the campaign is series of interactive sculptures and installations that are placed strategically throughout downtown Knoxville. These installations highlight naturally occurring phenomenon in the city. This will help people to see things in the city with which they are familiar, but that they may not have noticed before, and to build an understanding of the dynamic processes in the urban ecosystem. The installations each focus on teaching the development and networks principles of ecology (Figure 48).

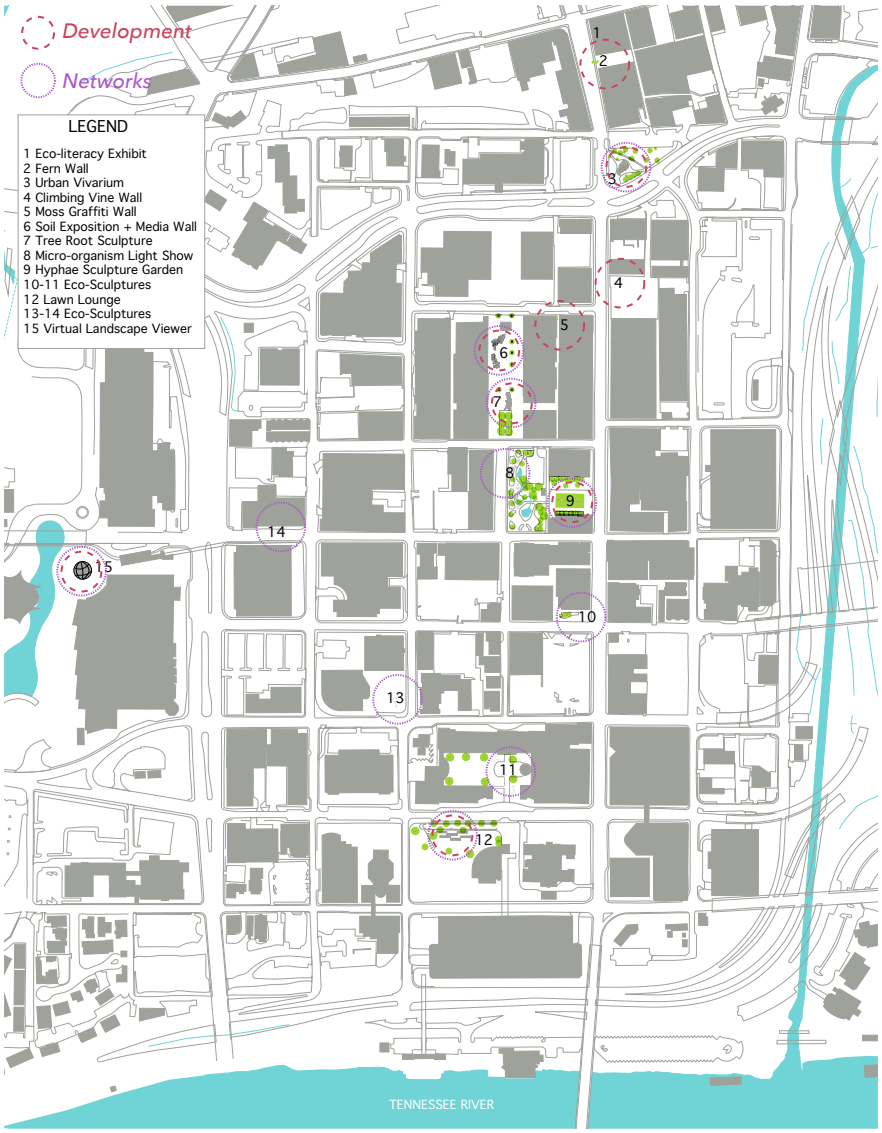

Figure 48: Map of downtown Knoxville indicating which installation teaches which ecological principle
Source: author

FERN WALL

The Fern Wall installation is a large fern-shaped sculpture that brings to attention the naturally occurring wall of ferns growing nearby (Figure 49-50). The sculpture is on Gay Street, near the Opening Exhibit gallery. The sculpture visually communicates the form and characteristics of the fern, fostering appreciation for the plant. The fern sculpture appears as if it is growing up from the wall. This encourages passers-by to look down at the wall that the natural ferns are growing on. The ferns have adapted to a dark, moist condition on the side of a building. The sculpture has a soft glow to it, which emphasizes the fern's dark habitat and helps to teach the development principle by highlighting the conditions the ferns have adapted to.

The Fern Wall appeals to anyone walking by the sculpture. Visitors, residents, and workers are likely to see this sculpture while walking on Gay Street. This installation uses visual communication tactics to encourage the audience to see new parts of the city and to view the unique living conditions of the ferns. The audience can interact by touching the sculpture and actively bending over the railing to see the real ferns.



Figure 49: Fern Wall installation and sculpture
Source: author



Figure 50: Existing wall of ferns below the sidewalk
Source: author

URBAN VIVARIUM

The Urban Vivarium is an open, green glass structure that houses various plants from throughout the city (Figure 51). It acts as an urban reinterpretation of a botanic garden/conservatory of urban plants, featuring signage and descriptions of each plant in the vivarium. Plant specimens from the city are responsibly gathered and placed in planters with the appropriate signage (Figure 28). As the audience walks through the vivarium they can see these plants out of the context in which they are typically considered weeds. This new context offers the audience the opportunity to view these plants as something interesting, functional, and/or beautiful. Each plant's sign explains its origins, species, and function in the urban ecosystem, which helps to teach the networks principle of ecology.

The vivarium is placed at the corner of Gay Street and Summit Hill where there is currently a small park and open space. As one of the major intersections in downtown Knoxville, a diverse group of people walk and drive through this area. The vivarium uses visual communication tactics to encourage the audience to see urban plant specimens up close and to appreciate them in a more formal context. The vivarium encourages interactivity by being open so that people can easily walk through. As people walk through they can touch the plants and understand their structure and form more closely.

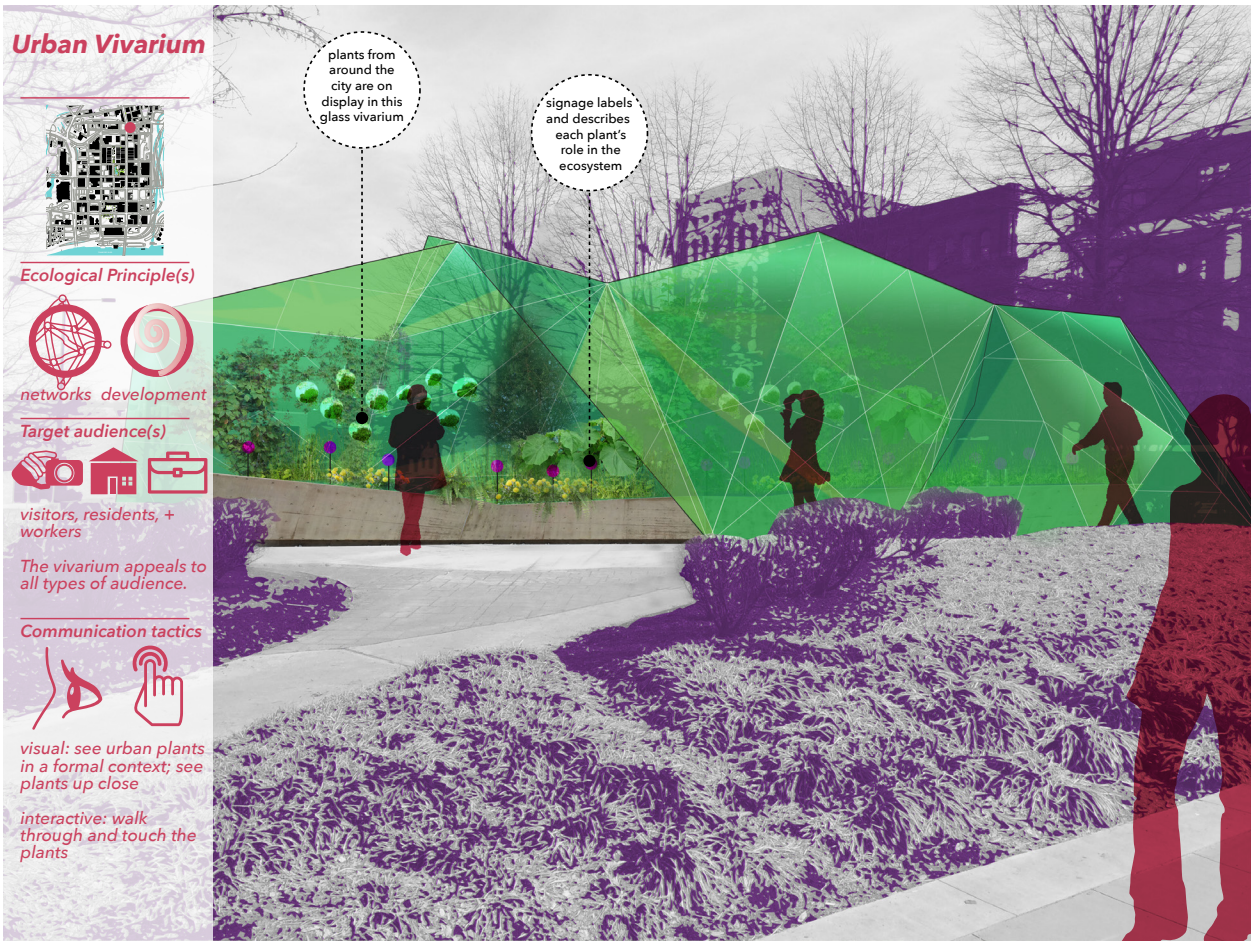

Figure 51: Urban Vivarium
Source: author

In a sunken parking lot off of Gay Street, this Climbing Vine Sculpture begs the attention of the pedestrians on the sidewalk above and invites them to see the Virginia Creeper vines growing on the wall of a brick building (Figure 52). The sculpture climbs up the wall, emulating enlarged portions of the vine's stems and adhesive pads. It acts as a climbing structure, offering ladder-like steps for participants to climb. The sculpture beckons people to climb up the wall alongside the existing vine, which brings them to a closer view and different experience of the vine.

The form of the sculpture helps the audience to visualize and understand how the vine is able to adapt to the urban landscape by climbing brick walls. The vine sculpture is secured to the wall using screws, which are sunken through a series of small pads that mimic the living vine's climbing mechanisms. By getting close to the vine and interacting with it through climbing, the audience can learn how the vine has evolved and adapted to this specific condition. Also, the living vine is able to continue growing underneath the pieces of the sculpture and over time will grow over some portions. This will allow the audience to watch the vine and sculpture develop together as time passes.



Figure 52: Climbing Vine Sculpture
Source: author

MOSS GRAFFITI WALL

In an alley behind Market Square where there is a microclimate and habitat in which moss has established itself voluntarily and is thriving, a wall will be reserved to be used as a moss graffiti wall (Figure 53). Moss graffiti is made by combining live moss with buttermilk in a blender until it forms a smooth liquid. The liquid is brushed or sprayed onto a surface and after a few weeks the moss will sprout. Signage will be placed on the wall to inform visitors how they can produce this moss graffiti mixture and participate in creating their own. The Opening Exhibit will feature workshops in which an instructor demonstrates the process of making the mixture and participants can create their own graffiti on the wall. Small kits will also be supplied at the Opening Exhibit for people to take home. The kit includes a sample of moss and the recipe and instructions to make the moss graffiti. By creating the moss mixture at home it adds another level of involvement for the audience. The process can be shared with friends and family and invite more participation from different audiences.

This graffiti wall invites the audience to first observe the specific conditions that moss has adapted to in the city. Then the audience is asked to interact with the moss by adding their own moss to the existing habitat by spraying or painting on a graffiti message. By watching the graffiti wall grow, the audience will have the opportunity to see the development principle in action. It also reinforces the concept of humans and nature being connected. For audience members who choose not to participate in creating graffiti, the moss graffiti wall will simply bring attention to the existing moss habitat and the particular environment that it grows in in the city.



Figure 53: Moss Graffiti Wall
Source: author

SOIL EXPOSITION AND MEDIA WALL

Market Square is the main square in downtown Knoxville and attracts many different types of audience. Visitors, residents, and workers often spend time here. In Market Square lies one of the larger and more involved installations in the campaign. The Soil Exposition and Media Wall help to teach both the development and networks principles of ecology by revealing the interconnection of ecosystem components and highlighting the evolution and adaptation of elements within the urban landscape (Figure 54). The Soil Exposition is a large fired clay sculpture that emulates oversized versions of the clay particles that exist under the concrete plaza. The clay material allows the audience to make the connection between the clay underground and the clay we use to build our human cities (usually in the form of bricks). The concrete plaza is cracked in several places to create the illusion that the sculpture is emerging through the concrete and to allow the clay soil below to be exposed to the elements. The exposed soil allows plants to establish over time, which offers the audience the opportunity to see the development principle in action.

The large clay particle sculptures create extra seating in Market Square, a climbing and play space for children, and a sculptural art feature. By interacting with and visualizing the form of the clay particles it enforces the concept of networks, showing the interconnection of different elements in the ecosystem. Signage within the sculpture area helps to explain the ecosystem services of clay and other soils and discusses the interconnection of these components in the urban ecosystem.

Within the sculpture is one extra-large clay particle that is used as a media wall to display images and messages generated by the audience. The wall will ask the audience to respond to specific questions that are meant to provoke thought about the urban ecosystem. For example, “What is the most important part of the urban ecosystem?” The audience can submit responses in the form of messages or images through the Wild Thing app or through other social media outlets such as Twitter or Instagram. The messages are then projected onto the wall and change as messages are submitted. A hashtag (#knoxwild) is used to filter the messages to the wall.

The various responses to the questions can be collected and analyzed at a later time to determine the general sentiment of the audience at the time the question was asked. This provides a set of data to help establish the level of eco-literacy among the population. The data is one small part of that determination, but can be used towards developing new types of surveys and investigational strategies to gauge eco-literacy.

Another feature of this soil sculpture is a large five-side structure made of cor-ten steel. Each side of the structure has a series of words laser cut from the steel. These words represent components of the urban ecosystem: human, soil, energy, birds, water, etc. These words are possible answers to the questions being asked on the projected media wall mentioned above. The sculpture is lighted from within, projecting outlines of the cut-out words onto the ground in a decorative display. Each word has a translucent colored plastic slide that participants can move over the words they choose. The colored slide changes the color of the reflected word on the ground, making some words stand out more than others. As participants change the colors of the words the sculpture changes as well. This interaction allows not only participants, but also passersby, to reflect on the words, their meanings, and how they are related.



Figure 54: Soil Exposition and Media Wall
Source: author

TREE ROOT SCULPTURE

On the other end of Market Square lies an iconic grove of trees and a children's play fountain. Many people gather here in the warm weather to eat, socialize, participate in events, and watch children play in the fountain. In an effort to reveal the trees' root systems to the audience this sculpture mimics an enlarged section of tree roots that appear to be breaking up through the concrete (Figure 55). The large tree root sculpture creates seating, a play structure, and an artistic feature. A large portion of the sculpture is made of reinforced porous concrete, which, like the tree's roots, can absorb moisture. As the concrete sculpture absorbs water, the color of the concrete changes, which makes the process of absorption visible. Another portion of the sculpture

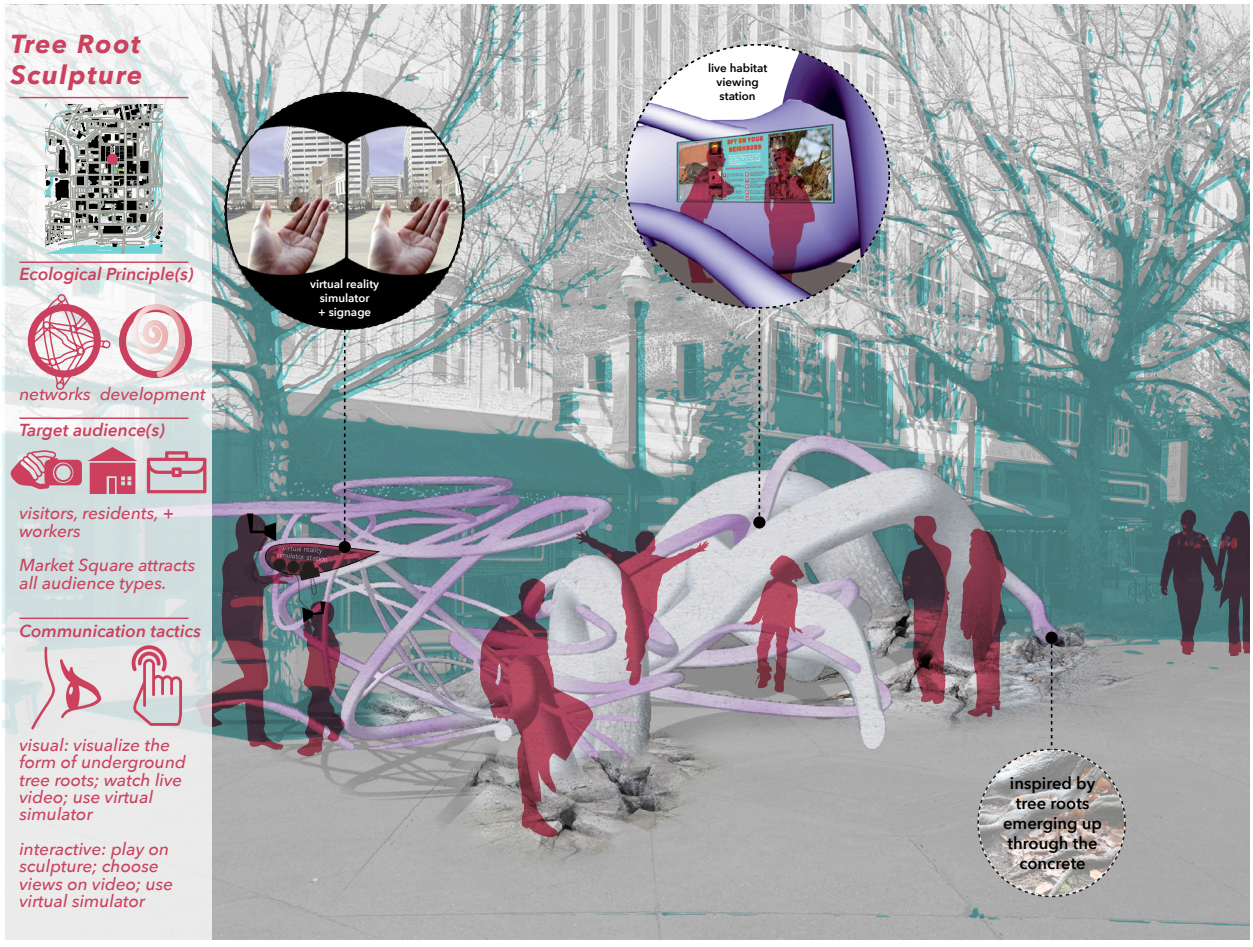

Figure 55: Tree Root Sculpture
Source: author

is meant to emulate the mychorrizae that often live in symbiosis with tree roots. This portion is made of powder-coated steel tubing.

Visualizing the tree roots helps bring attention to the ecosystem services that exist underground and the interconnection of our urban ecosystem. Making the connection that there is life under the concrete is important to understanding the networks and development principles. In order to remove ambiguity from this experience, the sculpture features signage explaining these connections in simple language. In addition, there is a live video viewing station where the audience can get a glimpse into the lives of non-human organisms in the city (Figure 56). Cameras and microphones will be placed throughout city in various types of urban habitats, for example, birds' nests on light posts, squirrels' nests in street trees, wasps' nests on store signs, or mouse habitats in the sides of buildings. At the touchscreen viewing station there is a description of what each camera view is recording. The audience can choose who they want to watch and



Figure 56: Live habitat viewing station
Source: author

listen to by tapping the screen. This allows the audience to see firsthand the various ways in which other organisms are adapting to the city, emphasizing the concept of development.

The tree root sculpture also features a virtual reality simulator station that shows participants the invisible or imperceptible forces acting upon the urban ecosystem (Figure 57). There are several programs in which the audience can participate in, each allowing the audience to visualize evolutionary processes or examples of interconnection that are normally invisible. For example, one program goes through a sequence of visualizing the process of seed dispersal and its role in establishing spontaneous vegetation throughout the city. Other programs show and describe the process of soil development in the urban context, water flow and stormwater management, and energy flow through the city.

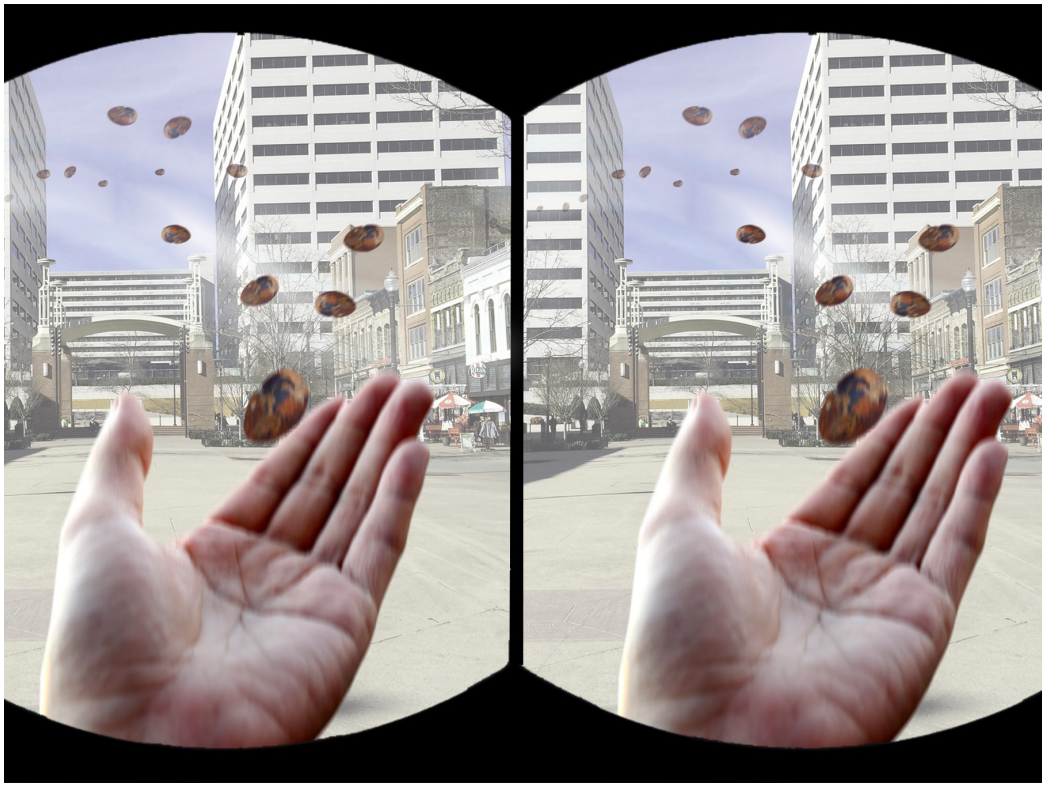

Figure 57: Virtual reality simulator showing the process of seed dispersal
Source: author

MICROORGANISM LIGHT SHOW

Krutch Park is a small park in downtown Knoxville just off of Market Square. It is a gathering space for visitors, residents, and workers alike, and attracts large crowds during downtown events. Throughout the park are established flower beds with mulchy soil and water features that are home to microscopic organisms such as algae and bacteria. To bring attention to the existence of these microscopic creatures, a series of small sculptures are spread throughout the park that emulate enlarged versions of the microorganisms (Figure 58). The microorganism sculptures would replace the existing sculptures that are featured in Krutch Park. Signage is integrated among the sculptures to explain the ecosystem services of the specific microorganisms.

In addition, microscope images of bacteria and microorganisms found within Krutch Park are projected onto the main walkway in a lighted, decorative display. These projections bring attention to the existence of the microorganisms, make them visible, and also encourage an appreciation of their form and structure. This visualization helps the audience to see the interconnection of visible and invisible elements in the urban ecosystem.

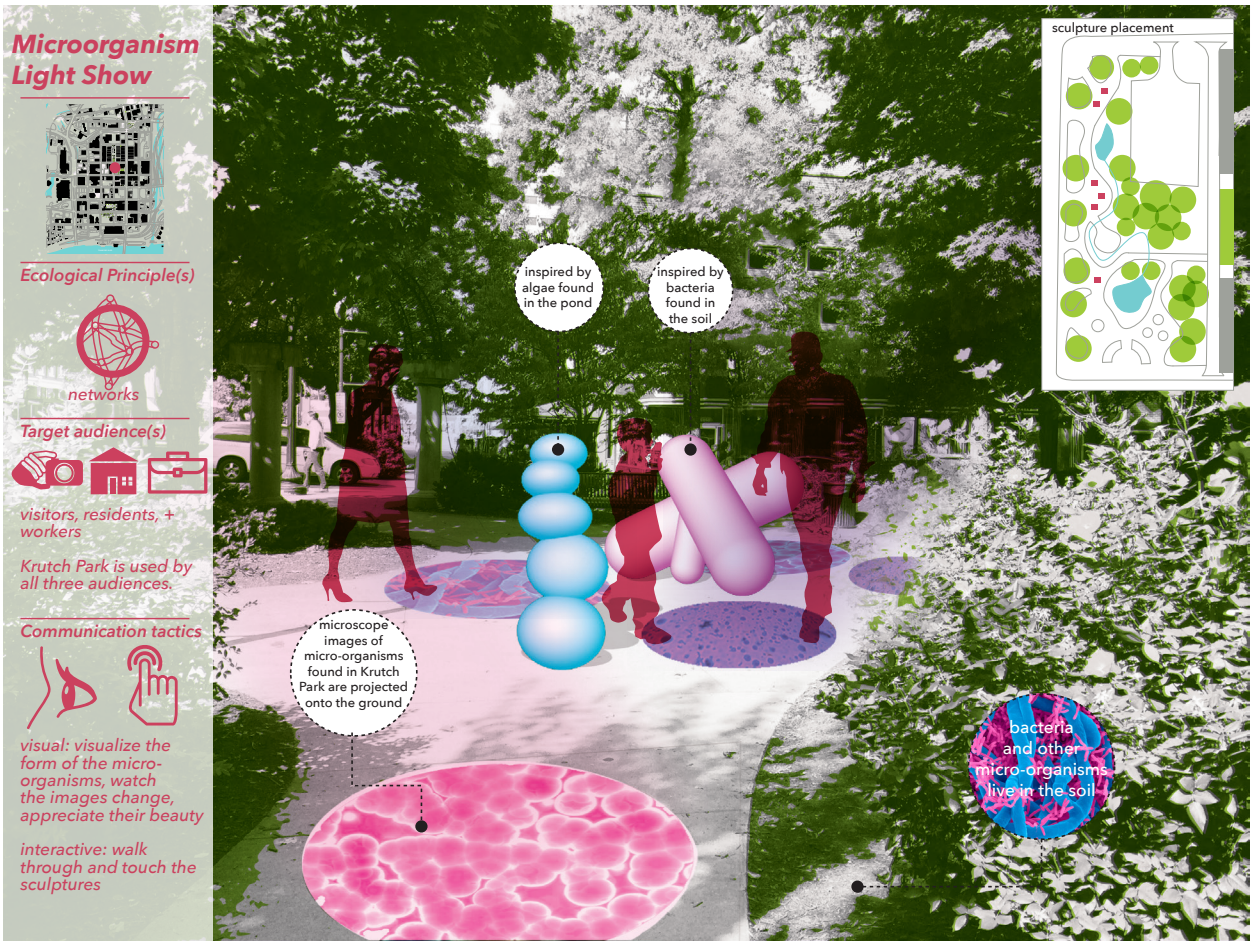

Figure 58: Microorganism Sculptures and Light Show in Krutch Park
Source: author

HYPHAE SCULPTURE GARDEN

There is an open lawn area off of Gay Street where downtown residents often walk their dogs. Benches that are often used as a quiet seating area for residents and workers during the week flank this lawn space. During events the space is often crowded with tents and people, but typically the lawn area is left open and unused except by dogs. The dogs' waste creates an environment for fungus to grow in the lawn. Decomposers like fungus are an important, yet often unnoticeable, part of the urban ecosystem. To bring attention to this phenomenon this installation imitates enlarged fungal hyphae that are emerging from the turf in a playful sculpture (Figure 59). The sculpture forms a playground structure for the audience to interact with. The form of the sculpture and the featured signage educate the audience on the importance of decomposition in the ecosystem, which helps to teach the networks principle of ecology.

The form of the sculpture also prohibits part of the lawn are from being treated or mowed, which allows the plants and fungus below the sculpture to flourish. As the plants below the sculpture grow and interact with the sculpture, the audience can watch the processes of adaptation and evolution, helping to reinforce the development principle.



Figure 59: Hyphae Garden
Source: author

ECO-SCULPTURES

Throughout downtown Knoxville there are several formalized planting beds featuring maintained plantings. While these seem very formal and tidy, there are wild and natural processes entrenched within them. To bring attention to these wild elements there are miniature versions of the hyphae, microorganism, tree root, and soil sculptures placed within several planters throughout downtown (Figure 60). These add an aesthetic, sculptural element to the city, while also helping to teach ecological principles. The repetition of these forms through the city helps reinforce the notion that nature exists everywhere, even in manmade planting beds.



Figure 60: Example of an Eco-Sculpture
Source: author

LAWN LOUNGE

Outside of Knoxville's main government buildings there is a large lawn space and seating area. People waiting for appointments in the nearby government buildings or waiting for the bus frequent this area. These are mostly visitors from Knoxville who come downtown to take care of government related business, such as license plate renewals. This area also attracts workers, specifically in the Knoxville government or judicial system. This lawn space seems ordinary, and may not be noticed by many, but there are important ecological principles at work underground. The Lawn Lounge installation exposes the soil, roots, and other organisms living underneath the turf to help teach the development and networks principles (Figure 61).

The turf is sculpted into a series of lounge-chair-shaped berms that invite the audience to enter the space. On one end of each lounge the turf is raised into a berm, formed to act as a lounge chair that people can sit or lay on. This brings people to a closer view of the turf and allows them to interact with it. On either side of the berm, the soil is exposed and protected by a layer of thin transparent plexiglass. The audience is able to see the exposed soil, roots, and other organisms living below the turf.

On the other end of the lounge, the turf and soil is removed to create a sunken walk path, which invites the audience to bend down and view the turf from a different angle. The soil on this end is also exposed on either side and protected with a thin plexiglass layer. On this end, the turf is more established and will have a deeper and more robust root system. By viewing both the soil beneath new and established turf, the audience can work towards understanding the development principle of ecology. The turf is able to change and adapt to these conditions over time. This installation also helps teach the networks principle by revealing the hidden connections between the turf above ground and the roots and organisms in the soil below.



Figure 61: Lawn Lounges
Source: author

VIRTUAL LANDSCAPE VIEWER

The observation deck of the Sunsphere is 220 feet high, offering the opportunity to see the city and several miles of surrounding of landscape. While the other interactive installations in the campaign offer the audience an up-close and on-the-ground view of the urban landscape, this unique view of the surrounding regional landscape allows the audience to consider the relationship between all of the elements of the ecosystem (Figure 62). Signage throughout the observation deck will provoke the audience to think of the connections between the biotic and abiotic elements of the urban ecosystem.

The “Virtual Landscape Viewer” feature of the Wild Thing mobile app uses augmented reality technology to visually overlay components of the urban ecosystem on the user’s mobile phone screen (Figure 63). As the user looks through their phone’s screen, they can tap the menu on the left of the screen to add different layers to their view. As the view changes, the shapes and locations of the layers change with it. Augmented reality technology allows the computer-generated images to be synched with the geographic locations seen through the phone’s screen. The app helps the audience to visualize the complex, layered, overlapping mosaic of components within the urban ecosystem, which helps to teach the concepts of both development and networks.

In addition to the app, a virtual reality simulator offers the audience the chance to visualize some of the natural processes that occur across the urban landscape. This simulator is slightly different than the one featured at the Tree Root Sculpture in Market Square because the audience is able to view the entire landscape from this perspective, rather than a small urban scene on the ground. The two simulator experiences work in conjunction, however, and feature the same explanations of processes, but from different contextual experiences.

Like the simulator in Market Square, this one goes through a sequence of different programs that help the audience to visualize normally invisible or imperceptible processes (Figure 64). The simulator’s program begins at the entrance to the observation deck where the user places his or her goggles on. The view from this standpoint is of the Tennessee River so the simulator begins



Figure 62: View from the observation deck of the Sunsphere looking southeast
Source: author



Figure 63: Virtual Landscape Viewer app using augmented reality to add layers to the view
Source: author

by describing and showing the flow of rainwater through the urban ecosystem. As the user walks around the Sunsphere, the program asks them to stop at certain locations. The next location is a view of the ridges to the North of downtown and the program shows and describes the geologic forces that formed and shaped the ridge and valley landscape of Knoxville. At the next stop the user gets a view of the downtown core and the program shows and describes the process of seed dispersal throughout the landscape, emphasizing the ways in which seeds plant themselves in tiny cracks and crevices within the city. At the final stop, there is a view of the city, the river, and ridgeline that flanks the river. The program visualizes the flow of solar energy through the landscape and emphasizes how certain elements, like buildings or ridges, can affect the flow.

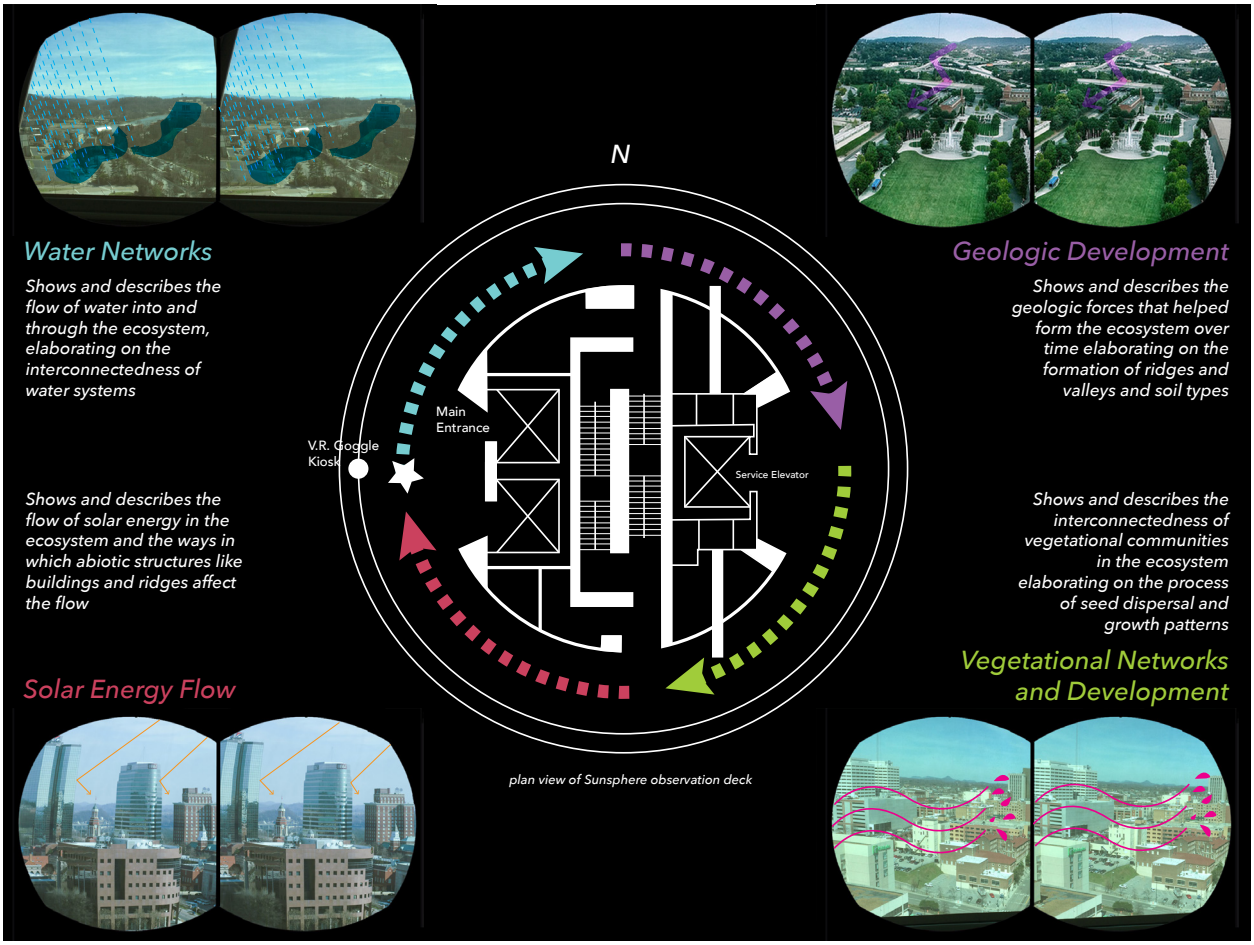

Figure 64: Virtual Reality Simulator sequence and description of programs
Source: author

CHAPTER VI
DISCUSSION

MEASUREMENT

Measuring the success of the Campaign is an important element of the strategy. In order to continually improve upon the campaign's messaging and communication tactics, I will need to collect data from my audience. Analyzing audience data and using it to develop more effective strategies will make the campaign more sustainable over time.

The Wild Thing mobile app allows me to measure the level of audience participation and gauge their interest in each element of the app. The interactive map uses GPS to track the locations of user-generated "wild things" as they get added to the map. This information can tell me where the audience is participating, what they are finding, and whether or not they are sharing what they found with their friends. The app can also track whether or not users are accessing the information associated with the original set of wild things on the map.

Mobile app technology is somewhat dynamic. Features can be added, removed, or modified after the initial download. This allows the app to adapt alongside the users' interests and preferences. If the app's data shows that one feature is being used more than others, that feature can be expanded upon and improved to better serve the audience. The app needs to be flexible in order to continue offering educational opportunities for its users. By collecting data, the app can be continually updated to remain effective.

To further this research, I would like to develop a more elaborate system for data collection within the app. Currently, the app can collect usage data, but there is not a strategic system set in place to collect more qualitative data from users. Many mobile apps have built-in surveying features that ask the user to participate in a quick survey or answer a specific question while they are using the app. This could help in tracking whether or not the app is helping to increase ecological literacy among its users, which features are helping the most, and which features need improvement. A more robust system of data collection would not only help the campaign in

Knoxville be more effective, but it could help establish successful launches of the campaign in other cities.

Another way to gauge the success of the campaign would be to distribute a survey, either in person or electronically. Perhaps I could generate a survey that would be administered before the campaign launched to measure the average level of eco-literacy prior to the campaign. Another survey could be administered several times after the campaign's launch to measure any change in the levels of eco-literacy.

IMPLEMENTATION IN OTHER CITIES

The Campaign is intended to act as a toolkit that can be applied to any city to help increase the eco-literacy of its population. Some elements of the campaign may be more or less effective in other areas, so the campaign allows for adjustment. Depending on the city's public infrastructure (i.e. public spaces, pedestrian access) and the types of audience it attracts, the campaign can be adjusted accordingly using the decision-making diagram (Figure 30).

Perhaps as a second phase to the experiment, the campaign could launch in another southeastern city of a comparable size to Knoxville. This would possibly allow for a similar campaign design, but with subtle differences that could be easily adjusted. This would offer the chance to understand the adjustment process and create efficiencies that could carry through to the next campaign launch. The campaign could build up to larger and larger cities, adjusting the campaign elements along the way as necessary. The campaign must remain organic and dynamic and allow for modifications as time passes.

Within each city, the culture, social structures, and built environment are different, which is a challenge for the campaign to address. As the campaign travels from city to city it may face unique challenges presented by various factors associated with the amount of public space, types of audience, presence of accessible ecological phenomenon, and general interest within the public. The installations I have designed for downtown Knoxville may not be relevant to the urban

landscape of another town. The site-specific conditions of each city should inform the design of the installations and sculptures. In addition, the interactive map feature of the mobile app will need to be adjusted to each city. The “wild things” in each city must be located, tagged on the map, and have written descriptions associated with each one.

CHAPTER VII
CONCLUSION

BENEFITS OF INCREASING ECO-LITERACY

Many experts believe that societies with enhanced levels of eco-literacy will be better prepared to face the future problems associated with population growth, resource depletion, and climate change. Building ecological literacy allows people to gain a clear understanding of the ways in which our actions can affect other vital systems. Learning to see the world as a system made of interconnected parts will lead to decisions and behaviors that respect the entire system, rather than disparate parts.

The environmental implications of increasing eco-literacy are numerous. It is believed that more ecologically literate societies will respect their environmental resources and manage them responsibly (Orr, 2010). A society with respect for natural systems will be more likely to mitigate damages to them (Botkin, 1990). This type of environmental responsibility can potentially lead to reductions in all types of pollution, a decrease in waste, an increase in care and stewardship for non-human organisms, and an increase in sustainable and resilient thinking. Urban eco-literacy can help foster an understanding of cities as ecosystems, with interconnected parts that all require some level of stewardship. This type of thinking can improve not only the health of the city, but also its people (Flora, 2010).

Increasing eco-literacy also has social implications. A culture that views their society as being part of a whole system will be more likely to think of the common good when making and/or acting on decisions. A feeling of connection with their fellow man and with their ecosystem may foster a sense of belonging and happiness. Humans are, after all, a social species, and thrive in healthy communities. The notion of individualism, particularly in the United States, has caused a disconnect, impairing many healthy communities (Glaeser, 2011). Ecological and ecosystem education could help bring communities together, leading to a system of shared responsibility.

Thinking of cities as ecosystems can lead to the development of policies and regulations

that consider the entire system, rather than just the human elements. Many current policies only considers human priorities, leaving out the multitude of non-human entities in the ecosystem. Policies that protect non-human entities will in turn benefit the human population. Eco-literate individuals of all socioeconomic, cultural, and educational backgrounds will favor policy makers who consider the entire ecosystem, leading to change in leadership and government policy.

The economic benefits of increasing eco-literacy are directly tied to the environmental and social benefits. Spending on environmental issues like pollution and waste clean up decreases as those issues diminish (Glaeser, 2011). As a population becomes healthier and more sustainable, spending on certain social services decreases. Systems thinking can lead to better economic policies and budget strategies. Societies that consider the entire ecosystem will be more likely to manage their natural resources more efficiently and responsibly, which can lead to reduced spending (Figure 65).

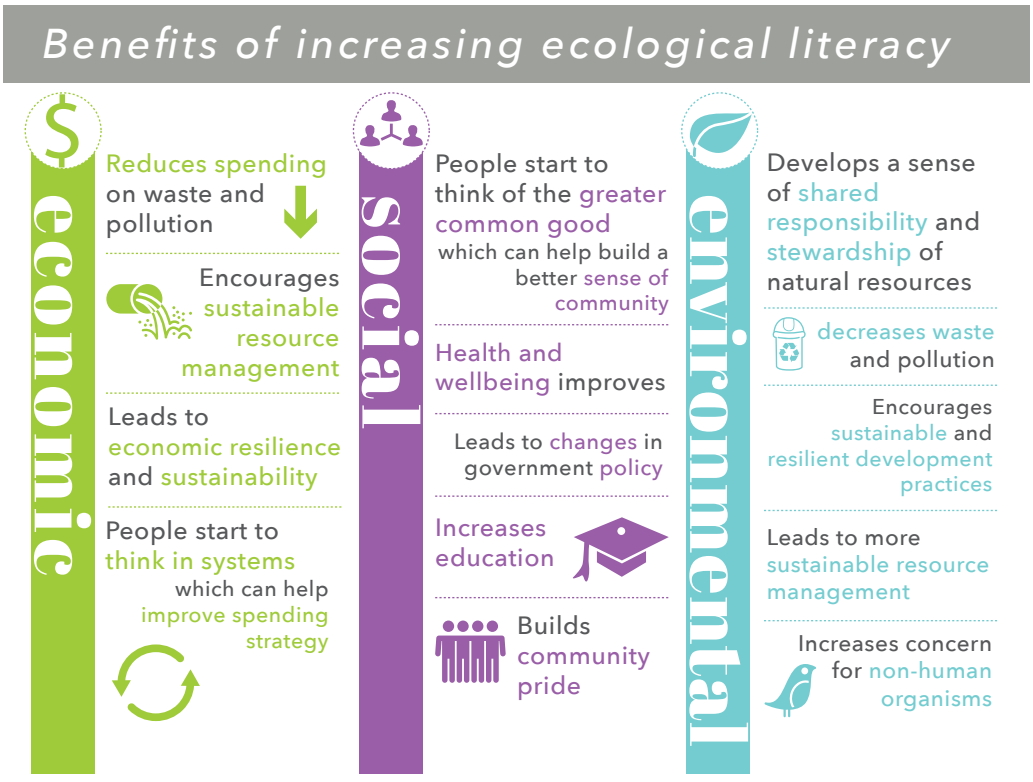

Figure 65: Diagram of the economic, social, and environmental benefits of increasing eco-literacy
Source: author

BENEFITS OF THE CAMPAIGN STRATEGY

The Campaign for Urban Eco-literacy builds on the successes of communication strategies used in the mass media, educational efforts made by environmental education organizations, and the visual communication efforts of landscape architectural designers. Past efforts at increasing ecological literacy through landscape design have been limited by their audience reach and effectiveness at communicating ecological principles. Taking inspiration from the mass media, the Campaign implements strategic interventions that develop a common language with a large audience, leading to more effective communication.

By implementing various communication strategies the Campaign is able to reach a broader range of people. Everyone communicates, and therefore learns, in different ways, and the Campaign aims to reach a multitude of different communicators. Research has shown that visual and interactive communication strategies are effective on most people (Horn, 2001). By using visual and interactive communication strategies to develop a common language, the Campaign is likely to reach and influence more members of the audience.

A critique of the many past efforts to increase the eco-literacy of the general population is that the messages are often inaccessible or obscure to many individuals. Though an abundance of resources (research, publications, and books) on eco-literacy are available to the public, they are not marketed to a general group. Without prior knowledge or interest in eco-literacy, it is unlikely that some members of the population would seek these resources out. By taking the lessons of eco-literacy directly to an audience through the use of public space, the Campaign is able to reach an audience that would likely miss this message otherwise. Taking the message to the audience is one of the most effective strategies behind the Campaign.

Because the Campaign is aimed at increasing urban eco-literacy, it is vital to consider the specific ecological principles that are present in the urban ecosystem. The Campaign intends to increase awareness and knowledge of the development and networks principles of ecology because of the relevant and unique examples present in the city. Throughout downtown Knoxville

(and other cities) there are diverse examples of organisms that have adapted and evolved to the specific urban conditions. The Campaign capitalizes on these examples and uses them to educate the public on the many ways in which non-human organisms are evolving alongside human development. There are many invisible or unnoticeable elements within the urban landscape that also show the connection between humans, nature, and the city. The Campaign aims to reveal some of the processes, functions, and services embedded in the urban fabric in order to foster a new appreciation of them.

IMPLICATIONS FOR LANDSCAPE ARCHITECTURE

Through the application of communication theories, landscape architects and other designers who wish to educate through their designs can strategically communicate more effectively with their various audiences. Communication strategy can inform design decisions throughout the project. From site selection, to design development, to material choices, making strategic decisions that will affect the audience's perception of a space is fundamental to education.

Landscape architects who wish to educate should consider their target audience as a group of receivers. Communication is a receiver phenomenon, meaning that communication occurs on the receiving end of a message (Kanu, 2009). Designers must put themselves in the place of the receiver and tailor their messages appropriately. Converging communication styles to match that of the receiver of the message increases the possibility of effectively communicating with and educating an audience. Designers who use a language that some may not understand, reduce their chance of effectively communicating through their designs.

This thesis explores the opportunity of locating an audience as a means to selecting a site for intervention. Landscape architects don't often have the opportunity to choose their entire site, rather it is dictated by a client or other group. However, if the designer is wishing to educate through the site, it is recommended that they look for specific opportunities within their site boundaries where a diverse mix of audience types are converging, spending time in the space,

and/or visiting the space frequently. By locating a diverse group of people, designers can more efficiently communicate the intended message and educate.

Rather than relying exclusively on interpretive signage, a common intervention among landscape architects, this thesis suggests that multiple modes of communication are more effective in educating. Designers can cohesively integrate various communication strategies into both found or newly designed landscapes. Sculptures, art, signage, planting schemes, ecological features, and even materials are able to communicate messages to the audience. As seen in this thesis, technologies such as mobile phone applications, live video, microscope images, and virtual reality technology can also add educational elements to a landscape. By combining these strategies, a new language is formed – one that can speak to a multitude of different people but deliver a similar message. In addition, offering multiple opportunities for engagement and participation with the audience creates a space that encourages them to create different experiences, reducing the possibility for the space to become stale over time.

Landscape architecture as a discipline relies heavily on visual communication to educate. By taking a more strategic approach informed by proven communication theory, the profession as a whole could make a bigger impact in changing values and perceptions of nature. Landscape architects have the opportunity to use novel ecosystems as a catalyst for ecological education, building an appreciation for our human habitat and fostering a deeper respect for all of its connected parts. Designers can enhance the elaborate human habitat with educational experiences that benefit everyone - people of all age groups, all cultural backgrounds, and all levels of education.

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APPENDIX

APPENDIX A
LITERATURE REVIEW

MONAGHAN, K., & CURTHOYS, L. (2008). ADDRESSING BARRIERS TO ECOLOGICAL LITERACY. PATHWAYS: THE ONTARIO JOURNAL OF OUTDOOR EDUCATION , 20 (3), PP. 12-16.

This article discusses the challenges associated with building ecological literacy in the general population. They claim that ecological literacy means more than just a measure of one's ecological knowledge, but also depends on one's "ability and willingness to use that knowledge to live a more sustainable lifestyle." The authors assert that developing an ecologically literate population means more than just educating, but rather it involves the development of entirely new cultural practices. The authors refer to bioregionalist theory to confirm their belief that ecology and culture must be restored together. In other words, in order to be ecologically literate, one must also be literate of "place" and culture.

The authors list 6 "Ecological Literacy Competencies" based on a literature review:

1. Natural history skills that foster familiarity with community members and life-sustaining processes of one's own bioregion, as well as the ability to interpret ecosystem health.
2. Awareness, sensitivity, and compassion toward other life forms that engenders kinship with natural systems.
3. Knowledge of ecological laws and patterns that inform how actions might affect natural systems.
4. Critical thinking skills that illuminate connections between actions, the health of natural systems and community well-being.
5. A sense of responsibility, willingness, and practical skills that enable engagement in creative and socially just actions addressing sustainability issues.
6. Understanding of cultural values and worldviews that affect human

perceptions of and relationships with nature.

According to the authors, these competencies show that ecological education and outdoor education will play a key role in the development of eco-literacy. However, they also show the need for understanding of place and region and culture.

The authors outline some myths of western culture that have perhaps caused our lack of ecological literacy. Western culture has typically believed that man is above nature, separate from it. We've believed that we are dominant over nature and that we have the right to "progress" and growth in whatever terms we feel necessary to the human race. These myths are "serious barriers" in our values that interfere with our ecological knowledge and education. In order to overcome these myths, the authors say that they myths need to be exposed as "faulty and damaging." A new set of environmental values must be taught. They say the mass media must have an important role in creating this paradigm shift.

Finally, the authors offer suggestions as to how our society can move forward in building ecological literacy. They claim, "Recognizing the inherent wisdom of nature will likely require daily ecologically centered cultural practices. These practices should acknowledge the interdependence of humans with other life forms, instruct us on sustainable ways of being, reward ecological intelligence, and celebrate the wonder of life." The authors then list several "Ecological Literacy Practices" that educators and thought leaders can use to develop eco-literate students.

Key takeaways:

- Ecological literacy can't be defined with just "green nature" in mind, but it must include human ecologies as well. Urban ecologies. New ecologies. This includes culture and social structures.
- Mass media can be used as a tool to help people better understand ecological issues, but this would require a paradigm shift in social values toward the environment.
- "Daily ecologically centered cultural practices" could be launched in the

city. It could become a center for this type of practice, leading people to practice in other places as well.

- Overcoming barriers is about educating. In order to educate you must communicate effectively and provide opportunities for active education.

BOTKIN, D. B. (1990). A VIEW FROM A MARSH: MYTHS AND FACTS ABOUT NATURE. IN D. B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY (PP. 3-14). NEW YORK, NY: OXFORD UNIVERSITY PRESS.

In this first chapter of Botkin's *Discordant Harmonies*, the author introduces the concepts found in more detail in the rest of the book. His basic premise is that our perceptions and values of the environment are based on very old worldviews that have now become outdated. Specifically, the basic concepts behind the environmental movement of the '60s and '70s are outdated. He claims these outdated views are detrimental to the environment and have caused the current state of environmental disorder that we face today (or in 1990 when it was written). Botkin says that in order to repair damage that's already been done and to secure a more sustainable future we must change our views of nature. He says, "Solving our environmental problems requires a new perspective that goes beyond science and has to do with the way that everyone perceives the world."

Botkin believes that we need to make two changes in order to shift our perspective of nature for the better. First, we recognize the Earth as dynamic rather than static; second, we must accept a "global view" of life on Earth. Botkin thinks we need to embrace and accept that nature changes, and needs to change to survive. He also wants us to recognize and appreciate the connections and systems and networks involved in life on Earth. He says, "Life is sustained only by a group of organisms of many species… and their environment, making together a network of living and non-living parts that can maintain the flow of energy and the cycling of chemical elements that, in turn, support life." Botkin comments that the fact that Earth can support life makes it extremely rare and special - something to be celebrated.

Key takeaways:

- "The potential for us to make progress with environmental issues is limited by the basic assumptions that we make about nature, the unspoken, often unrecognized perspective from which we view our environment."
- "It is only by understanding how nature works and applying this understanding in our management of nature… that we can successfully achieve our goal: people living within nature, neither poisoning it nor destroying its reproductive capabilities."
- Botkin believes we have great potential to build societies and civilizations that are more in line with natural systems. We have to make significant changes to our views and perceptions of our position within nature and nature itself in order to achieve that.
- A better understanding of nature is key to changing perspective.
- We need to use technology in better and more inventive ways to create harmony with nature.

BOTKIN, D. B. (1990). THE MOON IN THE NAUTILUS SHELL: NATURE IN THE TWENTY-FIRST CENTURY. IN D. B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY (PP. 185-192). NEW YORK, NY: OXFORD UNIVERSITY PRESS.

In the final chapter of his book *Discordant Harmonies*, after explaining in great detail the concepts he outlines in the first chapter, Botkin brings it full circle and explains what it all means to us in the twenty-first century. He argues the importance of modern technology and the role it plays in teaching us about the environment. He says that technology allows us to see nature as we would not be able to see it otherwise. For example, from an airplane we can see landscapes as a bird would, we can see the vastness and connectivity between different types of landscapes. We can even see cities within landscapes – the juxtaposition of built space within nature itself. With the help of technology, Botkin says we can "arrive, with the best information available for us in our

time, at a new organic view of the Earth, a view in which we are a part of a living and changing system whose changes we can accept, use, and control, to make the Earth a comfortable home, for each of us individually and for all of us collectively in our civilizations."

Botkin claims that the awareness that humankind can, and does, have an effect on the planet and biological systems has increased over the last few centuries. He says we understand now better than we ever have (again, this was written in 1990) that life effects the planet, which in turn effects life, and so on. Understanding this is important, but Botkin believes that we must also take responsibility for the planet's health. Deeper awareness of environmental issues is vital to that endeavor. He says, "If we do not understand the true nature of populations, biological communities, and ecosystems, how can we expect to husband them wisely?" Botkin ends the chapter by stating that we must think like engineers and "monitor the dials" and "turn the knobs" on Spaceship Earth. Rather than observing the Ozone layer disappearing or species of frogs dying off, we should create a proper system of monitoring our environment and taking control of our effects on it.

Key takeaways:

- Modern technological tools can teach us about the Earth – show us things we wouldn't normally see
- Understanding the details of how the Earth works is essential to its health. It's essential to the formation of solutions to our many manmade problems.
- "Once we realize that we are part of a living system, global in scale, produced and in some ways controlled by life, and once we accept the intrinsic qualities of organic systems – with their ambiguities, variabilities, and complexities – we can feel a part of the world in a way that our nineteenth-century ancestors could not, but our ancestors before them did."
- "Having altered nature with our technology, we must depend on technology to see us through to solutions."

- “observe nature as it is, not as we imagine it to be.”
- Helping people see what makes our environment work will likely change their values of it. They can see their place in the environment and how they are connected to it.

THAYER, R. L. (1994). DYNAMICS AND PHILOSOPHICAL DILEMMAS. IN R. L. THAYER, GRAY WORLD, GREEN HEART: TECHNOLOGY, NATURE, AND THE SUSTAINABLE LANDSCAPE (PP. 140-143). NEW YORK, NY: JOHN WILEY & SONS, INC.

In this section of his book, *Gray World, Green Heart*, Thayer elaborates on his concept of surface and core values of the landscape. He claims that the “dislocation” of these values is contributing to the dissonance between humans and the environment and leading to environmental damage. Surface values are things we can see, sense, and easily access in the landscape in some way. Core values are the functional, technological, and ecological properties of landscape. That is, the way that landscapes “operatively connect” with the larger context. He argues that people are more likely to have stronger surface values, and care about the way things look or the “surface impressions and images,” than they are to have strong core values. Thayer says a landscape can be either “opaque” or “transparent.” An opaque landscape’s ecological functions are invisible and/or inaccessible. A transparent landscape is the opposite – the core properties are visible and easily accessible, that is, you can see them somehow.

Thayer also says that landscape can be “incongruent” or “congruent.” If the core and surface properties of a landscape are “incompatible and contradictory” then the landscape is said to be incongruent. That is, what you see is not necessarily what you get. Rather, in a congruent landscape what the landscape appears to be is the same as how the landscape works. What you see is what you get, so to speak. Thayer believes that despite the human tendency to appreciate the surface values in a landscape, what are most important are the core values. The core values are literally what keep us alive and it is dangerous for us to move further away from understanding the core properties of our landscape.

Key takeaways:

- Understanding the core values (functions and processes in the landscape) is key to our survival as a species.
- While surface values are important we must understand what lies beneath them. “Pretty is as pretty does.”
- It may be difficult to be completely transparent in a landscape. Not every function and process can be revealed easily, or understood easily. This is perhaps why technology might be helpful in explaining such complex concepts.

CAPRA, F. (2010). NEW LESSONS FROM LEONARDO. RETRIEVED JUNE 9, 2014, FROM THE CENTER FOR ECOLITERACY: WWW.ECOLITERACY.ORG

In this article, Capra applies lessons from the great works of Leonardo Da Vinci to modern day situations. He claims that the system that Leonardo developed and practiced, a system of blending art, technology and science, is one that could solve many of today’s environmental and sustainability problems. He says, “we urgently need a science and technology that honor and respect the unity of all life, recognize the fundamental interdependence of all natural phenomena, and reconnect us with the living Earth.” Leonardo sought to understand the “nature of the living forms of nature.” He studied geological forms and transformations of the Earth, the movement of water, botanical diversity, and the growth of plants, in order to understand the origins of life. This type of thinking, Capra argues, is the foundation of ecoliteracy.

Key takeaways:

- The importance (and implications) of blending Art-Technology-Science.
- “Nature is full of infinite causes that have never occurred in experience.”
- It’s important to look backwards in time to reshape the way we think about our future.

FLORA, G. (2010). REMAPPING RELATIONSHIPS: HUMANS IN NATURE. IN THE POST CARBON READER: MANAGING THE 21ST CENTURY SUSTAINABILITY CRISES (PP. 184-193). HEALDSBURG, CA: WATERSHED MEDIA.

Flora claims that humans have evolved away from nature – leaving us disconnected and ignorant of important natural processes. The author believes that the more humans rely on "clever" technologies and innovations, the more "its bonds with, and recognition of, the significance of natural processes and ecosystems recede." Particularly in urban areas where the bulk of people are relying on technology to create "artificial environments" using air conditioning, heating, lighting, relying on manmade materials like plastic, and eating heavily processed foods, it can give people the illusion that we do not depend on the natural world. This illusion can foster a feeling of indifference towards nature, and ecosystems lose their importance. Flora says that generally the only time "nature and functioning ecosystems" are thought of is when they stand in the way of progress or when the elite wish to frolic among them.

The author asserts that the only hope "to implement meaningful solutions… is to reestablish, that is to say, rebalance, the relationship of humans with their landscapes." While Flora acknowledges that landscapes provide "the stuff of life" (clean air, clean water, carbon sequestration, etc) she claims that what people really want from their landscapes are "rejuvenation and inspiration."

Key takeaways:

- Urban dwellers rely on technology to survive, which can lead to a belief that natural ecosystems are less important to our survival.
- Reestablishing human relationships with "nature and functioning ecosystems" is an important step in the process of solving our sustainability crises.
- While it may be true that people want "rejuvenation and inspiration" from their landscape, I think showing people the importance of other factors, what she calls "the stuff of life," is more important to the above-mentioned cause

CRONON, W. (1996). THE TROUBLE WITH WILDERNESS; OR, GETTING BACK TO THE WRONG NATURE. IN W. CRONON (ED.), UNCOMMON GROUND: RETHINKING THE HUMAN PLACE IN NATURE (PP. 69-90). NEW YORK, NY: W.W. NORTON & CO.

Cronon reminds us in this writing that the idea of wilderness is a human construction. The answer to the question “What is wilderness?” is not easy to find. We have no true definition for nature or wilderness as it varies across time and culture. Cronon argues that man has somehow moved away from feeling that we are part of nature, to feeling separate, or even above nature. At one point in time the “wilderness” was seen as a barren wasteland full of deadly savages – something to be avoided. Cronon says the idea of the great western frontier changed that and wilderness became a prize worth winning, particularly for the wealthy. Even though today, Cronon says, we don’t necessarily see ourselves as being a part of nature, we still make efforts to protect it. He argues that man doesn’t want to destroy nature, but we also don’t want to be inconvenienced by it either.

Cronon believes that our standards for what we consider “nature” are too lofty. We see certain landscapes as natural and others as not. His argument is really that all things are natural, but not all are wilderness. Our urban ecosystems are the natural habitats of humans and must be considered as part of the planet along with other habitats. He says, “If wilderness can stop being (just) out there and start being (also) in here, if it can start being as humane as it is natural, then perhaps we can get on with the unending task of struggling to live rightly in the world – not just in the garden, not just in the wilderness, but in the home that encompasses them both.” Cronon believes a change in human values and perceptions of nature and wilderness are needed in order for humans to lead more sustainable, healthy lives on the planet.

Key takeaways:

- “it is quite profoundly a human creation”
- Culture dictates our relationship with the “wilderness”
- Wilderness once considered a barren wasteland, scary, to be avoided,

later it was considered a prize worth admiring and preserving (Thoreau)… one could argue that it is somewhat ignored at this point. Some admire, some don't care, some still think it's scary…

- Seems like today there is more of a balance though – an improvement to the old mindset.
- "sublime landscapes were those rare places on Earth where one had more chance than elsewhere to glimpse the face of God."
- Wilderness had to become "sacred" - must evoke emotion – pull on the heartstrings – make people feel closer to God, or whatever/whoever
- Importance of great writing – wilderness is depicted in a certain way by writers, giving it a new meaning to readers (John Muir as an example – he had the power to sway people, to frame nature in a certain way that led people to appreciate it)
- We separate ourselves from nature, but also see it as our true home, our true self, our backbone – we live in civilization, but don't claim civilization to be an actual part of ourselves, but rather, nature is an actual part of ourselves… odd how we can push it far from us in everyday life, but still lightly hold onto it enough to let it replace what really makes us… which is civilization, our culture, our cultural constructs
- Humans are a part of nature, so perhaps true nature is whatever we have constructed today – it was a natural process for humans to progress in this way, and there may be no fighting it… nature is changing and will continue to change, and that in itself is what makes it natural?
- We may not understand that cities are part of nature, technically… if you consider the entire planet to be nature.

LISTER, N.-M. (2011, JUNE 7). INTERVIEW WITH NINA-MARIE LISTER ON ECOLOGICAL URBANISM. (J. GREEN, INTERVIEWER) ASLA'S THE DIRT BLOG.

In this interview with Nina-Marie Lister, she elaborates on some ideas she wrote about in the book Ecological Urbanism. Her first answer is to the question of how ecology has become central to contemporary urban landscapes. She says that a paradigm shift in ecology and ecological research has occurred over the past quarter century. People are now more apt to see ecosystems as dynamic and, to a degree, unpredictable, while in the past it was widely believed that they would reach a "climax" stage and remain there. She claims it is now more common for people to recognize that "change is built into living systems; they are characterized in part by uncertainty and dynamic change." Lister argues that conservation management has also shifted to recognize the importance of ecological functions, rather than focusing on "natural objects" that need protection. These functions are less tangible and visible to people, however, making them difficult to promote as worthy of conserving in some cases. Lister says that it's crucial for designers to "be able to show how ecosystems work so that people then appreciate and participate in the unfolding and working of a landscape in which they are participants, not merely consumers." She says the increased use of green infrastructure is a good example of how designers can do this.

Lister also speaks about a mobile app that is being created to help engage the public about designed wildlife crossings. The app will be linked to a live camera feed of animals using the crossings so that app users can see the action. Typically drivers are passing these crossings at highway speeds and would never have the chance to actually see the wildlife using it. Lister argues that "allowing people to become more engaged with a landscape" that they normally can't see, could help them appreciate its purpose and perhaps more could be built.

Key takeaways:

- Change, dynamism, function, interconnectivity – all things that are difficult to see and understand in a landscape. All are crucial to understand.
- "show how ecosystems work so that people then appreciate and participate in the unfolding and working of a landscape in which they are participants, not

merely consumers”

- “By making these processes visible, we have the potential to make ecology directly relevant to our publics.”
- A mobile app can use visual + interactive strategies to engage the public – very effective in trying to communicate a message. Allow users to receive the message in different ways. Visually (when typically it would be invisible) and allowing interaction (which gives them ownership of it, participation in it).

LISTER, N.-M. (2010). INSURGENT ECOLOGIES: RE(CLAIMING) GROUND IN LANDSCAPE AND URBANISM. IN M. MOSTAFAVI (ED.), ECOLOGICAL URBANISM (PP. 536-547). ZURICH, SWITZERLAND: LARS MULLER PUBLISHERS.

According to Lister, “ecology has come of age.” She says that designers have become increasingly interested in ecology over the past few decades, increasing the number of designed spaces that incorporate ecological function. Lister says, “ecology is often used in a metaphorical context for the relationship between humans and their various constructed environments.” She believes this has led us to a paradigm shift in how we view ecology as a whole. “This coupled and reinforcing relationship between ecology and landscape hinges around design…” and inform and shape our surroundings. Lister says that we affect landscape as much as it affects us. Lister argues that prior to the industrial revolution the concept of “city” and “landscape” were never opposing one another. However, after industrialization, landscape became something separate from the city. The city was something that man could control, while landscape was wild and unpredictable. She says that new understandings of ecology have changed this thought and the “post-industrial landscape” is now thought of as “a new breed of urbanism – one that is characterized by multiplicity, plurality, diversity, and complexity” as well as dynamism.

Lister argues that a new design concept, her concept of “adaptive design” specifically, must be used in today’s new “ecological” urban context. Adaptive design is defined as “an integrated, whole-system, learning-based approach to the management of human-ecological interactions.”

Adaptive designs are adaptive and resilient and react to “sudden, discontinuous” environmental change. She argues that environmental change is normal, but cannot be predicted; therefore design must be adaptive and even reactive to this inevitable change. Adaptive design is also educational, allowing participants to interact with and experience landscapes. In addition, adaptive design must gather data so that it can improve upon itself and adapt and change accordingly.

She lists a few examples of adaptively designed landscapes and explains why each is successful. She claims these examples are proof that ecology has become a “design partner” in landscape architecture. Ecological urbanism is a natural evolution as city dwellers begin to develop more resilient and sustainable urban ecosystems. She says that “good” design is “adaptive, resilient, and reflective; it is born of place, and it honors the land that sustains us.”

Key takeaways:

- Ecology→Design/Build→Ecology
- “relationship between ecology and landscape hinges on design” – ecology informs design; designed landscapes (emergent landscapes) shape ecology
- restoring ecosystems to their former pristine states is not possible, nor is it necessary… things are too complex and too dynamic
- I would argue that people don’t care about the “pristine state” of ecosystems to begin with, which is why they’re damaged… we can’t keep patching problems, we have to fix the source of the problem and prevent problems from occurring in the first place.
- adaptive design – “integrated, whole-system, learning-based approach to the management of human-ecological interactions…”;
- “learning is a collaborative and conscious activity” – experience leads to knowledge
- “To design ecologies that sustain vibrant, healthy, and self-organizing urban landscapes, our interventions must necessarily be contextual and

deliberative. To do so demands both fundamental renegotiation of our relationship with what we perceive as “nature” and our place within it, and a consequent reengagement with culture.”

HOWETT, C. (1998). ECOLOGICAL VALUES IN TWENTIETH-CENTURY LANDSCAPE DESIGN: A HISTORY AND HERMENEUTICS. LANDSCAPE JOURNAL , 17, PP. 80-98.

In this article, Catherine Howett discusses the history of ecological values in landscape design, as the title suggests. She begins with talking about Olmsted and his various projects, such as the Backbay Fens, that incorporated ecological functions into the design, while still creating a visually pleasing landscape. Howett goes further to discuss the idea of landscapes as works of art, and argues that creating spaces that are visually beautiful “works against awareness of the landscape as a dynamic, changing, and exchanging force field of ecological process in which humans are actively immersed and engaged.” However, she also argues that people enjoy looking at scenery and designers have sought for balance there. She mentions Jens Jensen’s attempts at making time and change visible in his landscapes by creating spaces that highlighted the movement of the sun and moon, shifts in seasons, and the play of light and shadow. While he had an “imperfect” understanding of ecology, his aim was to reveal something and to foster appreciation.

Howett examines Garrett Eckbo’s “optimism” that art based in science (rather than mysticism) could solve the world’s problems. Ecological design in landscape architecture was to be the new norm. She then mentions Halprin and his view of ecology as “recognizing natural, cultural, and aesthetic forces.” Halprin designed with the same dynamism as the natural processes he was working with. Later, Howett mentions McHarg’s belief in having an ecological understanding of “nature as process” and that humans operate within the process. McHarg, of course, created the well-known layering model of site design ensuring that all natural processes and parts of an ecosystem were considered in designs. Howett concludes by discussing new (in1998) trends in ecology in modern design and praises the projects from the Eco-revelatory Design proposal,

saying they were on the right track as far as integrating ecology into landscape design.

Key takeaways:

- Ecology in landscape design dates back to Olmsted, arguably further.
- Throughout the history of incorporating ecology into landscape design, it seems that effectively communicating ecological concepts to the general public has been a challenge. For example, in Olmsted's case, the public typically didn't realize his designs were actually designed, and therefore had no idea there were ecological benefits built in on purpose.
- Combining art and science is a key concept in landscape architecture. "Arting up" scientific concepts can make them more palatable for the masses.

FRANCE, R. (2003). GREEN WORLD, GRAY HEART?: THE PROMISE AND THE REALITY OF LANDSCAPE ARCHITECTURE IN SUSTAINING NATURE. HARVARD DESIGN MAGAZINE, 18.

In this article France critiques the original 1998 eco-revelatory design proposal projects, projects that happened after the proposal, and eco-revelatory design in general. He believes that eco-revelatory design is exaggerating its claims and that it cannot possibly deliver on its promises. France says that since most projects happen on a small scale, they are not likely to have any sort of significance on the larger environmental/ecological problems in the world. France believes that eco-revelatory design is simply a phase that landscape architects have been drawn to because of its promises of sustainability and ecological restoration. He thinks this is dangerous because these claims are not founded on data or the proven ability of these designed landscapes to do what they say they will do. His main critique is that these projects lack data to back up the claims, but he also feels they lack clarity and effective communication to the general public. While France commends eco-revelatory design on its basic premise to reveal ecology to the world, he feels it's not an adequate method to do so.

Key takeaways:

- Data is needed to make the designs more credible and convincing.
- Eco-revelatory landscape design is not the answer to our environmental problems. It needs help from other disciplines or methods to become effective.
- Be careful when throwing around ecological claims if you're not capable of backing them up with data.
- Again, effective communication strategies are needed in order to get the intended message across.

THAYER, ROBERT J. (1998). LANDSCAPE AS AN ECOLOGICALLY REVEALING LANGUAGE. LANDSCAPE JOURNAL , 17, 118-129.

In his review of the Eco-Revelatory Design proposal, Thayer suggests that eco-revelatory design may be limited to revealing only "the tip of iceberg." He refers to his theory of "visual ecology" to explain that landscape is merely the surface of an ecosystem. "We tend to see and notice surfaces, but not the invisible processes happening beneath them," he says. Perhaps eco-revelatory design can only reveal the processes on the surface – the processes we can actually see. His main critique of the projects in the proposal is that the messages may be over the heads of most people visiting these sites. He says, "In the intent to reveal an ecology, is that ecology revealed if the people "don't get it"?" People without a design background or an ecological knowledge are likely to require more information than just the landscape.

Key takeaways:

- Communication is key. If people "don't get it" then you've missed your chance at showing them anything.
- Just putting yourself into "nature" doesn't guarantee an understanding of how that nature works. We are likely to see only the surfaces of our landscape, rather than the underlying processes.
- Eco-revelatory design attempts to reveal ecologies, but not necessarily

the complex processes or functions that make those ecologies important.

- Eco-revelatory design on its own may not be the best way to reveal complex processes to the general public.

FRANCE, R. (2000). SMOKY MIRRORS AND UNREFLECTED VAMPURES: FROM ECO-REVELATION TO ECO-RELEVANCE IN LANDSCAPE DESIGN. HARVARD DESIGN MAGAZINE.

France critiques the projects featured in the 1998 proposal of Eco-revelatory design. His main critique is that the projects lack any scientific data to back them up. He says that ecology is not the focus in these projects, but rather art and natural history. Ecology, he claims, requires quantitative data to predict outcomes. He believes that even if eco-revelatory design did rigid testing on its projects, it still wouldn't amount to much in the grand scheme of things. He believes there would be a fundamental problem in the communication of the projects to the general public. He thinks that landscape architects' egos tend to lead them to create projects that appeal more to the elite art crowd rather than the common man. He thinks that most of the eco-revelatory designs in this proposal would be over people's heads and the message would be lost.

Key takeaways:

- Designers need to leave their unique perspectives and prejudices behind them when trying to reveal things in the landscape to the general public. Speak to your audience in a way that makes sense to them.
- Eco-revelatory design needs numbers to back it up, otherwise it's just another design. Leave the science part out unless you're willing to back it up with data.
- Communication is key. Make the information accessible.

BROWN, B. (1998). HOLDING MOVING LANDSCAPES. LANDSCAPE JOURNAL , 17, 52-68.

Brenda Brown offers her reaction to the Eco-revelatory Design exhibit in this article, which mostly discusses the importance of language and culture to the public's understanding of the exhibit's intent. She claims that designed landscapes have the potential to communicate, but require that a specific language be developed to effectively communicate. She says that the exhibit's title may have had the ability to frame the works in such a way that observers would understand it in the way that it was intended. However, if the title had been different, perhaps the projects would not have been understood in the same way. She discusses exactly how each project could potentially reveal something to viewers, going into detail on the various ways systems can be revealed.

Brown suggests that revelation within the landscape may be based on either presentation or representation. Presentation, she says, is "variously directly introducing, offering, and bringing the public to or bringing before the public ecological phenomena, processes, and relationships." While representation is, as she explains, "a secondhand conveyance of specific qualities, characteristics, forms, or functions through symbolism, depiction, or portrayal." She also states that revelation is "inherently human-centered." She says that all of the exhibits attempted to instigate experiences that would cause people to understand, read, perceive, participate, and appreciate their landscapes. She commends the designers for that, but also mentions the possibility of lost messages due to language barriers or the audience's lack of "prior knowledge" or ecology.

Key takeaways:

- "Landscapes are media as well as messages, subjects, and settings." (The medium IS the message – Marshall MacLuhan)
- "The very idea of landscape necessitates a human observer." – participation in landscape is key to its existence and understanding.
- Designed landscapes potentially have communicative power… key word: potentially

- reveal: verb [with obj.]
    - make (previously unknown or secret information) known to others
        - cause or allow (something) to be seen
        - make (something) known to humans by divine or supernatural means
- Are things truly revealed? Are they known to others? Or are they just seen?
- Can ecologies/ecosystems really be revealed if the audience is eco-literate? Just seeing something is very different than actually understanding it.
- Importance of developing a common language so that others can understand what you're trying to tell them. This means using an accommodation strategy of communication. Converging your language to one that the audience will understand.
- Language/words have the power to frame things in certain, intentional ways that can persuade or sway (communication theory = agenda setting)
- Around 2/3 of the population are "visual learners"
- All physical and visual access to ecosystems
- Enunciate and celebrate change
- Site = medium → method to reach audience
- Kinesthetic + visual experience can lead to better knowledge
- Some designs require prior knowledge to understand them – this is ineffective communication if the audience does not have prior knowledge

VITA

Whitney S. Tidd moved from Paris, France, to Knoxville, Tennessee, in 1999 to pursue her Bachelor of Science in Communication and Information at the University of Tennessee. She worked in the cable television industry as a marketing professional for 9 years and earned her Master of Science in Communication in 2011. She has been pursuing her Master of Landscape Architecture degree since 2012. Whitney has been an active member of the student ASLA chapter, acting as Treasurer in the 2013-2014 school year and Vice President in 2014-2015. Whitney founded the student organization Women in Design at UTK in the summer of 2014. She currently acts as Director of the organization. In addition, Whitney has served on the Graduate Student Senate, TAAST committee, Dean's Advisory Committee, and the Graduate Studies Committee. Whitney was awarded the Landscape Architecture Program Scholarship for Entrepreneurial Activity in 2014. She was also awarded a TN ASLA Honor Award in Planning + Analysis for her collaborative work on the "Gateway Corridor 61" project in Norris, TN. In 2015 Whitney was honored as a national Olmsted Scholar and received the University of Tennessee College of Architecture and Design Faculty Award for Research and Scholarship Excellence. After graduating she plans to use communication theory to guide the design of places and experiences that enliven a sense of curiosity and appreciation of our urban ecosystems.