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River and Ridge: Eco-Revelatory Design at Seven Islands Wildlife Refuge

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To the Graduate Council:

I am submitting herewith a thesis written by Valerie Friedmann entitled "River and Ridge: Eco-Revelatory Design at Seven Islands Wildlife Refuge." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Landscape Architecture, with a major in Landscape Architecture.

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River and Ridge: Eco-Revelatory Design at Seven Islands Wildlife Refuge

A Thesis Presented for the

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Valerie Star Friedmann

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DEDICATION

Mom and Dad: Thank you for all the walks in the woods
Uncle Bruce: Your old microscope changed my life
Jeremy: I owe you a vacation or three

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Landscape reshapes the world not only because of its physical and experiential characteristics but also because of its eidetic content, its capacity to contain and express ideas and so engage the mind.

James Corner, Recovering Landscape (1999)

I argue that social policy and environmental design often fail today because they are founded on the superficiality and forced contact of connection rather than on the depth and genuine contact of relationship.

David Seamon, Dwelling, Seeing, and Designing:
Toward a Phenomenological Ecology (1993)

A pebble polished by waves is pleasurable to the hand, not only because of its soothing shape, but because it expresses the slow process of its formation; a perfect pebble on the palm materializes duration, it is time turned into shape.

Juhani Pallasmaa ,The Eyes of the Skin (1996)

ABSTRACT

Eco-revelatory design (ERD) emerged in 1998 as a reaction to polarity within the field of landscape architecture. Two predominant schools of thought, one insistently cultural and the other assertively ecological, reigned over the conceptual and theoretical dialog in landscape design and planning. The authors of ERD proposed a design theory in which landscape architecture is “intended to reveal and interpret ecological phenomena, processes and relationships” (Brown, Harkness, Johnston, 1998).

Proponents of ERD recognized that landscape architecture alters and directs both cultural and ecological systems. Furthermore, they acknowledged landscape architects’ capacity to direct human experience and reveal, through design, aspects of ecology and culture. This integrated approach provides opportunity for people to place themselves in and as part of an interconnected socio-ecologic world, reinforcing the relationships between humans and the bio-geosphere.

In this thesis I explore phenomenological design as a method to reveal ecological systems and comment on the cultural systems impacting them. The intention is to reveal, through design, the cultural relevance of ecological imperatives at multiple spatial and temporal scales. In design, phenomenology is a method used to understand place as a gestalt of concrete, qualitative phenomena. Phenomenological design methods will be used to explore a series of eco-revelatory design interventions along a transect loop path. The interventions seek to translate seven process indices of the sedimentary rock cycle: weathering, erosion, transport, deposition, lithification, collision, and uplift. Seven Islands Wildlife Refuge (SIWR) is the site and lens with which I will explore these concepts over a period of three seasons. SIWR is an ecologically managed peninsula along the floodplain of the French Broad River in east Knox County, TN. The site provides an uncommon opportunity to explore a landscape that appears natural, but is managed for surrounding human development and habitat.

PREFACE

Many factors contribute to the story of Seven Islands Wildlife Refuge, but to me, the French Broad River and the ridges that transect the site are the elements that give character to the site. The topography of the site is typical of the East Tennessee Ridge and Valley Province, but there is something about the way the river transects the ridges that distills the ancient processes that formed this part of the continent.

If you look closely, it’s as though the site is inviting you to have a conversation about its past.

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CHAPTER I
INTRODUCTION

Introduction

Nature is dynamic, and the way we interpret nature is dynamic. Throughout history, our environments have shaped us and, in turn, we have shaped our environments. In the history of the landscape profession two divergent concepts of design emerged. In the historic Western garden tradition, such as the Gardens at Versailles, we see the importance of symbolic interpretation and human domination in the landscape (Figure 1). Landscapes in this tradition focused on symbolism, artfulness, and abstraction, revealing an innate desire to project meaning and order onto the environment. Conversely, designs by ecologically minded landscape architects such as Charles Elliot, Frederick Law Olmsted, and Ian McHarg took a different approach. These designers created works to foster function in natural systems and processes aesthetically (Figure 2). Many of these designed landscapes were so successful at mimicking natural landscapes they circumvented symbolic interpretation and were seen by the public as remnants of the natural environment in an urban setting. (Spirn, 1996)

Figure 1:
The Gardens at Versailles
Source: Wikimedia Commons

Figure 2: Lower Central Park
Source: Shankbone, 2008

Objective

As the human population grows, our demands on the environment continue to increase. People are disconnected from the ecological systems that support them both spatially and temporally, and this may lead to accelerated rates of environmental degradation. If we are to ensure a safe, healthy, and equitable future for all Earth's inhabitants, we need to make ecological imperatives a priority. One way to give priority to ecological imperatives is through environmental education and first hand experience of ecological processes.

Relating to the natural environment may be a difficult task for many people, as it may seem that ecological processes are imperceptible. However, landscape architects can serve as a translators between ecosystems and the public by layering cultural understanding into environmental processes. By revealing the environmental processes evident in everyday landscapes, landscape architects can play a key role in the development of ecological education and appreciation. The objective of this thesis is to propose an eco-revelatory design that can help restore a holistic view of people's relationship within broader environmental systems.

Structure of Thesis

This thesis consists of six chapters. In Chapter I basic information describing the premise and objective of the project is described. Chapter II provides background information on ecological imperatives, eco-revelatory design and phenomenology. Following is a discussion of phenomenology as a tool for designing and revealing ecology. Chapter II concludes with strategies used in this design of this project. Chapter III discusses the site selection process and the reasons SIWR was selected. An overview of the cultural history and site context of SIWR is also provided in Chapter III. Chapter IV describes the methods used in this project such as archival maps and unstructured interviews. Chapter V outlines the project narrative. Chapter V begins with a description of the sedimentary rock cycle and the tools used to understand the geomorphologic processes at work at SIWR. Chapter V also contains information on the transect as a tool for site inventory, analysis, and design. At the end of Chapter V is a description of the seven eco-revelatory design stations. The final chapter, Chapter VI, contains an assessment of the project and lists potential future studies generated by this thesis. The Appendix section contains information on case studies, a literature review, and site inventory and analysis documentation.

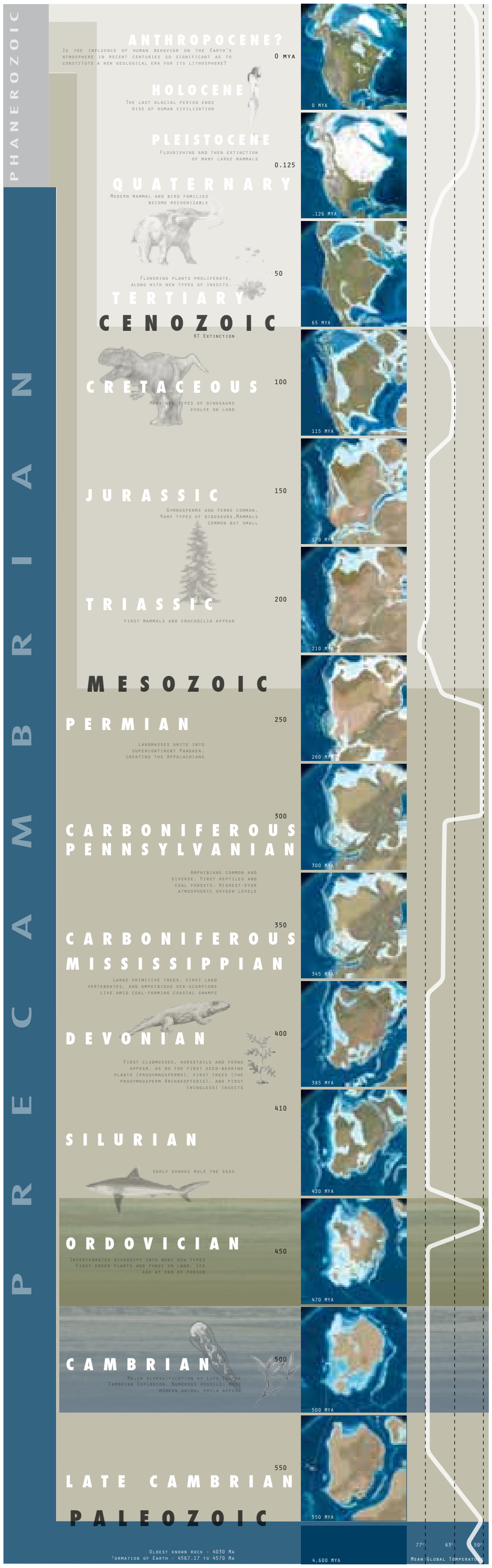


Figure 3: The Geologic Time Scale reveals the long process plate tectonics, global climate change and the effects on the evolution of life. Modern humans make their debut about 10,000 years ago, near the very top of the time scale. In this short amount of time we have caused extinctions that rival the end of the Cretaceous Period, when dinosaurs went extinct.

Source: Paleogeographic Maps: Blakey, 2012

CHAPTER II
BACKGROUND

This thesis explores the theory of eco-revelatory design (ERD) as a means to impart cultural relevance to ecological imperatives. This chapter begins with an overview of the importance of making ecological imperatives culturally relevant. Next, the theory of ERD will be explored as an approach for revealing and interpreting ecological phenomena, processes, and relationships. Phenomenological design will be explored as a method to reveal processes and create intimate landscape experiences. Finally, there will be an overview of design strategies for creating eco-revelatory landscapes.

Ecological Imperatives

The growth and spread of our species, *Homo sapiens sapiens*, has had a profound effect on the history of the earth. In the relatively short amount of time that modern humans have inhabited the earth, we have caused global extinctions that rival major extinctions found in the geologic fossil record. Paleontologist Niles Eldridge proposed that modern humans caused extinctions comparable in magnitude to those found in the Upper Ordovician, Upper Devonian, Permo-Triasic, Upper Triassic, as well as the Cretaceous-Tertiary extinction event that ended the reign of the non-avian dinosaurs (Figure 3). While the number of extinctions caused by modern humans in the last 10,000 years has yet to reach the scale of these five major extinction events, it is worth noting that all of the historic events were caused by impacts from extra-terrestrial objects or catastrophic geologic events. Never in the history of the earth has a single species been responsible for the extinction of millions of other species. (MacDonald, 2003)

As human populations and developments grow, our effects upon natural systems become profound. With a human population nearing seven-billion, increasing global climate change, and unprecedented resource consumption, an understanding of ecological imperatives is necessary.

For this thesis, ecological refers to all components of an ecosystem. The Millennium Ecosystem Assessment defines an ecosystem as “a dynamic complex of plant, animal, and microorganism communities and the nonliving environment interacting as a functional unit” (MEA, 2005). An imperative can be defined as an essential, crucial, or urgent thing of vital importance. Therefore, an ecological imperative could refer to any issue concerning the well-being of an ecosystem and the human well-being supported by an ecosystem. In sum, people are integral parts of ecosystems, our actions effect ecosystems, and ecosystem health is necessary for human well-being.

History and geography worked together to create the complex systems of life and the inorganic substrates that support all living organisms. People are not separate from ecosystems, but in the developed world, many may feel that way. In Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder, Richard Louv states: “today, kids are aware of the global threats to the environment, but their physical contact, their intimacy with nature, is fading (Louv, 2008). Louv’s statement could apply to adults as well. Studies show that the average American spends up to 25% less time outdoors than in 1987 (Pergams, 2008). In the same study, the authors state: “we don’t see how future generations, with less exploration of nature, will be as interested in conservation as past generations,” and this could lead to serious complications as the global human population continues to increase.

One way to give priority to ecological imperatives, is to imbue them with cultural relevance. Landscape architects can play a role by designing landscapes that give people a concrete experience of ecological processes. Through design, landscape architects can reveal processes and help the public learn about the natural world. Anchoring ecological imperatives in concrete experience, rather than remote, diffuse phenomena such as the ‘ozone layer,’ can lead to strong emotional and ethical values toward the environment. In this way, landscape architects can foster the development of ecological values in a burgeoning population.

Eco-Revelatory Design

In 1998 a group of practitioners and landscape scholars published a special issue of Landscape Journal (1998 v.17) as a catalogue and record of the exhibition Eco-Revelatory Design: Nature Constructed/Nature Revealed. Brenda Brown, Terry Harkness, and Douglas Johnston chaired the exhibition and served as guest editors of the journal. The proposal emerged as a reaction to the current context where a fissure between ecological design and design oriented toward an artistic aesthetic was evident. The advocates of eco-revelatory design (ERD) saw the inadequacies of purely ecological land planning in its lack of “explorations of transparency and interpretation,” as well as “representation, abstraction, and symbolism traditionally associated with gardens” (Brown et al, 1998). Likewise, they criticized the neglect of serious ecological issues in the landscapes focused on aesthetics, symbolism, and interpretation. Proponents of ERD propose that as the increasingly rapid transformation of the American landscape continues, “much need and potential exist for design that reveals and interprets ecological phenomenon, processes and relationships—what we are calling eco-revelatory design” (Brown et al, 1998). ERD offers a middle ground where the benefits of cultural understanding are layered onto ecological processes making them more visible, and visibility is the first step in giving priority.

The call for proposals highlights two key characteristics of ERD explored in this thesis. The first recognizes ERD as a tool for environmental education where the landscape acts as a medium for the transfer of knowledge, both through direct experience and interpretation. Landscape design can highlight features and processes and create a heightened sense of awareness and connection to the site. An important underlying assumption made here is “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 et al, 1998).

The second characteristic of ERD lies in the potential for landscape architects to explore new realms of creative ecological expression. In integrating the transparency, symbolism, representation, and abstraction of the traditional garden into ecological design, there lies a profound latent potential for landscape architects to express themselves as translators between ecological process and public awareness.

In a collection of essays on phenomenological ecology, David Seamon states: "social policy and environmental design often fail today because they are founded on the superficiality and forced contact of connection rather than on the depth and genuine contact of relationship." This sets the stage for design that strengthens the relationship between people and the environment, and makes ERD a timely and important endeavor for landscape architects. But how can designers achieve eco-revelation in their work? One way to attenuate people to environmental phenomena is through heightened sensual experience. In the following section, phenomenology is discussed as a tool for designing for the senses.

Phenomenology

Our body is both an object among objects and that which sees and touches them.
Maurice Merleau-Ponty (Langer, 1989)

Phenomenology developed as a philosophical tradition during the first half of the 20th century. Edmund Husserl, Martin Heidegger, Maurice Merleau-Ponty, and Jean-Paul Sartre contributed to the formation and advancement of the phenomenological tradition. These philosophers proposed phenomenology as a way to practice philosophy, as opposed to a system for structuring ideas. The philosophical practice of phenomenology consists of revealing the truth about phenomena by dispelling abstract notions about the phenomena beforehand. This is done in order to "describe phenomena, in the broadest sense as whatever appears in the manner in which it appears, that is as it manifests itself to consciousness, to the experiencer" (Moran, 2000). Hence, phenomenologists placed emphasis on the human senses and the subjective experience of the user.

Psychologists adopted phenomenology as a way to understand the human condition through inter-subjective experience. We perceive similar experiences though our senses, including seeing, hearing, touching, smelling, and tasting. We also experience activities such as walking or climbing. Dr. David Smith, a professor of Philosophy at Stanford states:

> "Conscious experiences have a unique feature: we experience them, we live through them or perform them. Other things in the world we may observe and engage. But we do not experience them, in the sense of living through or performing them. This experiential or first-person feature — that of being experienced — is an essential part of the nature or structure of conscious experience: as we say, "I see / think / desire / do …" (Smith, 2011).

The conscious experience of phenomena allows us to form relationships with our surroundings. When we say "I walked the path" or "I smelled the river" we form an internal relationship, or bond, with the environment. For example, West 8's Swamp Garden is a multi-sensory design experience (Figure 4). The Swamp Garden is designed as a contemplative space, where people feel the warmth of dappled sunlight, hear moss rustling in the wind, and smell brackish water. In this state of heightened sensual

Figure 4: Swamp Garden
West 8


Figure 5: Platform at Sweet Farm
http://www.branchplant.com


Figure 6: Bench placement at Sweet Farm
http://www.branchplant.com

experience, people form lasting memories and relationships with the site--the place becomes internalized and a part of the person's psyche (Larson, 2010). West 8's design amplifies the experience of the common phenomena found on site such as hanging moss and the reflection of the still water. Sweet Farm, a project by PLANT in Quebec, Canada takes a similar approach.

At Sweet Farm, a series of paths wind through a varied landscape, highlighting experiential moments along the way. Instead of celebrating long views and vistas, the path is designed to bring the typical features of the landscape into focus, encouraging the user to observe and contemplate the idiosyncrasies in the normal, everyday landscape. Designers from PLANT state that they did not wish to create designs about the site phenomena itself, but instead wished to create 'vehicles of perception' for park users (Cooper, 2003). For example, by allowing park users to climb into the tree canopy, the viewing platform creates a new vehicle for the perception of trees (Figure 5). Similarly, the bench placement encourages people to touch and closely observe the texture of tree bark, a common, but typically overlooked, forest phenomena (Figure 6).

Through our senses, we form concrete relationships, we reconciliate, with the world. These case studies reinforce that one way to foster genuine relationships with the environment is through phenomenological design--designing for the senses. With this understanding, phenomenology can be used as a method for eco-revelatory design.

PHENOMENOLOGY AS AN ECO-REVELATORY DESIGN TOOL

In *Genius Loci: Toward a Phenomenology of Architecture*, Christian Norberg-Schulz explores the phenomenology of place and the ways we understand place as a gestalt of concrete, qualitative phenomena. He posits that through understanding the unique phenomenology of specific places, one can dwell in meaningful reciprocation with the world. Describing a site's sky-earth relationship, as well as man-made and natural elements, Norberg-Schulz offers designers an understanding of the macro and micro-scale elements that structure a place and give it character (Figures 7,8). This can be adapted into a phenomenological site inventory and analysis aimed at identifying the character, or spirit, of the place.


Figure 7: Macro-scale character: Ridges and Valleys at SIWR


Figure 8: Micro-scale character: Layers of sedimentary rock and moss at SIWR

Once phenomena that impart spirit of place have been identified, designers can amplify the character of the site through phenomenological design. Juhani Pallasmaa states, “every touching experience of architecture is multi-sensory; qualities of matter, space and scale are measured equally by the eye, ear, nose, skin, tongue, skeleton and muscle” (Pallasmaa, 2005). Pallasmaa suggests designing for the ocular, auditory, orienting, olfactory, haptic, and gustatory senses as a means to heighten sensory experience (See Table 1).

Table 1: Six senses and examples of phenomena they reveal. Adapted from Pallasmaa 2005.

Sense	Revelatory of
Ocular	light/shadow, close/middle/far, color, mass/void
Auditory	direction, tranquil/loud, muffled/crisp
Orienting	sun angle, wind direction, time, wayfinding/landmark, above/below, on/under
Olfactory	earthen/atmospheric/fluvial
Haptic	texture, gravity, weight/lightness
Gustatory	evoke oral sensations (linked closely to olfactory and haptic)


Figure 9: Chänzeli along The Swiss Way
Image: Descombes, 1996

Design can also enhance the external experience of active senses such as walking or climbing. Likewise, gleaning from the psychological aspects of phenomenology, design can heighten internal experiences such as contemplation, perception, imagination, thought, emotion, and desire. For example, The Swiss Way, designed by George Descombes in 1991, is a section of a 35km long pathway the loop Lake Uri in Switzerland. The path is minimal, and reveals the often overlooked aspects of the landscape such as blades of grass, small streams, rocks and tree roots. The path focuses the entire body toward small details of the landscape, creating a sensory experience of the phenomena, but it also focuses on temporal aspects of landscape such as seasonality (Descombes, 1999). Descombes sited a large, circular metal structure, the Chänzeli near the center of the path (Figure 9). The Chänzeli positions the path users to a view of the landscape where seasonal changes can be observed. He states: “I believe that any environmental intervention is a creative cultural act that ought to be part of the history and future of the site and the lives of its occupants. It is not only terrain that changes with time but also the way people perceive it. This is why design is about ideas as much as it is concerned with material and space" (Descombes, 1999).

By appealing to the passive and active senses, as well as the internal, contemplative senses, landscape architects can create designs that initiate relationships between people and the environment. In the following section, strategies to implement this sort of phenomenological design are discussed.

Figure 10: Two landforms, Floodplain and Ridge at SIWR

REVEALING GEOMORPHOLOGY AT SIWR

A pebble polished by waves is pleasurable to the hand, not only because of its soothing shape, but because it expresses the slow process of its formation; a perfect pebble on the palm materializes duration, it is time turned into shape.

Juhani Pallasmaa (1996)

We may take landforms for granted, as if mountains, ridges, valleys, and rivers have always been and will always be. When taken from the perspective of geologic history, the shape of the land we see today is just a 'snapshot' in time along a continuous, ever changing geomorphology. James Hutton, considered the father of geology in England, eloquently stated that Earth's present day surface is "the ruin of former worlds." What former world does the landscape at SIWR represent?


Figure 11: Faulted limestone strata along the western shore of the French Broad adjacent to SIWR

The geomorphology of an area can reveal much about its past and strata of rock can be thought of as an archive containing layers of information about Earth's history. Geologic material can be thought of as the autobiography of a site. If read closely it can tell of past extinctions, volcanic eruptions, and ancient seas and forests. However, to many people, rocks may not be special, and they are passed by without second thought. Eco-revelatory design serves as a lens for reading the landscape's story. This thesis focuses upon revealing the story of the geomorphology, and specifically the sedimentary rock cycle at SIWR.

Design Strategies

The strategy for making eco-revelatory designs at SIWR has three steps. First, I performed an adaptation of Norberg-Schulz's phenomenological inventory and analysis. The inventory and analysis stage are an important part of the design strategy for this project, and are described with more depth in Chapter IV Methods. In considering the character, or spirit, of the place first, the design strategy responds to and references the specific site. The inventory and analysis was used to understand the processes that give character to the site. Once the processes that give character to the site were determined, I used Robert Thayer's four continua of eco-revelatory design to determine the conceptual method for revealing the processes on site. The design strategy then adopts Pallasmaa's use of design for the senses to reveal the process to park users.

The following sections outline the strategy for implementing phenomenological design that reveals ecological process at SIWR.

FOUR CONTINUA OF ECO-REVELATORY DESIGN

In the special issue of Landscape Journal, Robert Thayer outlines four continua that each of the projects in the catalog exhibit. The continua show the spectrum of eco-revelatory design concepts and offer a starting point for conceptual design.

CONTINUUM ONE: CONCRETE - ABSTRACT

Thayer states, "projects may reveal ecosystems by direct and rational means or by metaphor, symbol, and abstraction." The site inventory and analysis revealed geomorphology, and specifically the sedimentary rock cycle, as the primary process giving character to the site. Because many of the processes are evident in the landforms of the site, I chose to reveal the site processes in a direct way, making the design land closer to the "concrete" end of Thayer's continuum.

CONTINUUM TWO: REGENERATIVE - PASSIVE

Thayer continues to say that eco-revelatory designs can be "anchored by deliberate regeneration or healing of a disturbed ecosystem at one extreme, or at the other extreme, mere passive exposure of viewers or participants to some inner ecological structure or reality, whether that reality is ecologically dysfunctional or not." The goal of this project is to reveal the process of the sedimentary rock cycle to park users in order to educate them and help them form a relationship with an ecological process. This project falls at the passive end of Thayer's spectrum because the processes is revealed but not regenerated. However, I consider the design to be indirectly regenerative because it may help people make better decisions regarding the environment.

CONTINUUM THREE: NONHUMAN - HUMAN ECOSYSTEMS

Thayer goes on to say that ecosystems vary in degree of human impact, with some being highly impacted by human development and others where human activity is minor. The sedimentary rock cycle at SIWR is impacted by human development in various degrees. Some parts of the cycle, such as the process of collision, have not been affected by human activity, while other processes, such as erosion, are highly impacted by human development.

Figure 12: The formation of soil from weathered rocks and decomposing organic materials can take hundreds of years.

CONTINUUM FOUR: VISIBLE - INVISIBLE ECOSYSTEMS

The fourth of Thayer's continua deals with visible to invisible ecosystems. He states that some ecosystems are visible to human perception and that "their properties and dynamics can be easily 'read' or sensed through typical landscape means." However, "many other ecological phenomena are either too large, too small, too extensive, too complex, too fast, or too slow to be revealed by direct perceptual means" (Thayer, 1998). Of the seven processes that make up the sedimentary rock cycle, some take place at temporal and spatial scales that are easily perceived by humans. Aspects of the processes of weathering, erosion, transport, and deposition can be observed in a matter of minutes, while the processes of lithification, collision, and uplift may take millions of years. Even though some of the processes take place at human temporal and spatial scales, they tend to go unnoticed by the public. Hence, this

Figure 13: Uncovered soil can erode in a matter of minutes.

project falls into the category of revealing an invisible process.

The continua offer a theoretical starting point for design, but a method for making design decisions that aid in the revelation of process is necessary. The following section outlines the strategy for designing to reveal the sedimentary rock cycle to the senses.

STRATEGY FOR ECO-REVELATORY DESIGN

The following list outlines the strategy for creating designs eco-revelatory of the sedimentary rock cycle at SIWR.

1. Phenomenological Site Inventory and Analysis
    - Determine phenomena already present on site through direct experience
    - Distill phenomena that give spirit of place to the site
    - Locate places on site where these phenomena can be readily sensed
2. Design stations that reveal the process to the senses
    - Collect evidence of the process. Because this design is revelatory of the sedimentary rock cycle, geologic materials and their locations and orientations are used as indices of the process.
    - Organize or Rearrange the indices of the process (geologic materials) so that park users can begin to see the process within the larger landscape.
    - Defamiliarize the materials. The act of giving order to the process indices makes them seem out of place, it defamiliarizes them.
    - Focus the body and senses toward the process. Defamiliarization of a material draws attention to the process and the entire body (all the senses) can be focused on the process.
    - Reveal. Attenuating people’s focus on the process leads to revelation of the sedimentary rock cycle.

CHAPTER III
SITE SELECTION

Initially, I thought a site close to an urban center would be the best place to explore this thesis topic. To reveal something about a site's ecology I needed an audience, and an urban site would provide that. However, many large urban open spaces are post-industrial and would require substantial amounts of remediation before eco-revelatory design could be explored. If the intent is to reveal something about ecology, it would complicate the project if ecological remediation was required first. For the goals of this thesis, the ideal site would have a dedicated user group and would not require the design to focus on direct ecological remediation. With these criteria in mind, SIWR seemed to be an ideal site to explore concepts of ERD. However, two other sites were considered first.

General Shale Brick Factory

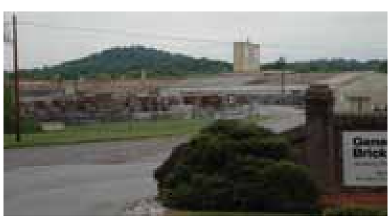


Figure 14: General Shale Site
knoxnews.com

The vacant General Shale brick factory site is in close proximity to Downtown Knoxville and the University of Tennessee Campus, but like most large, available spaces in urban areas, it would require extensive remediation before other design concepts could be explored. The site is approximately 44 acres and contains a vacant brick factory (Figure 14). With multiple metal warehouses, industrial debris, and the majority of the site covered in concrete, this site was not appropriate for this thesis inquiry.

Lakeshore Park

A second potential site was Lakeshore Park located 5.5 miles west of downtown Knoxville. Lakeshore park is approximately 175 acres and is currently used as a public park with ball fields, a greenway trail, and ample open space (Figure 15). The site is located along the Tennessee River on the former grounds of the Lakeshore Mental Health Institute. A municipal wastewater treatment facility is located at the southern tip of the park. While the pre-existing program of this site would have been interesting to interface with, the wastewater treatment facility would have become the focus of the project. In order to focus on eco-revelatory design, Lakeshore Park was eliminated as a potential for study

Figure 15: Lakeshore Park
Citydata.com

Figure 16: Proximity of Lakeshore Park and General Shale Factory to Downtown Knoxville and the University of Tennessee Campus. Background Image: Google Maps

Figure 17:
SIWR Peninsula looking north
Image Source: Schacher, 2004

Seven Islands Wildlife Refuge

Seven Islands Wildlife Refuge (SIWR) is a 360 acre wildlife sanctuary located on a peninsula along the French Broad River (Figure 17). It is located about 20 miles east of downtown Knoxville on the eastern edge of Knox County (Figure 19). The site contains a floodplain meadow, a small constructed wetland, several wooded bluffs, and an upland pond. The site hosts over 150 species of birds and 50 species of fish. SIWR has an existing rich and complex ecology, and it is an important area to protect for future generations of different rare plant and animal species. It is also an important resource for human enjoyment (Legacy Parks, 2012).

CULTURAL HISTORY

Figure 18: Old tobacco barn near the southern tip of the peninsula at SIWR

The Lower French Broad River corridor has a long cultural history. According to a report by the Knoxville Knox County Metropolitan Planning Commission, the French Broad's floodplain has served as the site of several seasonal campgrounds and agricultural zones for Native Americans for at least 12,000 years. During the last two centuries, the French Broad River corridor has been an important agricultural and river transportation corridor for the Knoxville area (MPC, 2003). In the early 1940's, the Tennessee Valley Authority (TVA) constructed Douglas Dam seventeen river miles upstream from the site. After the completion of the dam, commercial river transport subsided.

The decline in agricultural profitability in East Tennessee led to the abandonment of many of the large tracts of productive farmland once numerous in the area. SIWR formed when an agricultural tract was donated to the Knox County Parks and Recreation Department. The formation of the Seven Islands Foundation, a non-profit land conservancy, led to the creation of the wildlife refuge, which has become an important destination in the Knoxville/ Knox County park system. The goal of SIWR is to establish a public access park with walking trails and wildlife observation. SIWR is an important center for ecological research groups and is currently undergoing restoration of fallowed agricultural fields in some areas. Knox County Parks and the Legacy Parks Foundation manage the land.

SITE CONTEXT

The northern part of the property features low ridges once used as agricultural fields. This area is now undergoing restoration from fallowed fields to native warm season grass meadows. The floodplain is in a similar condition, with large crop fields undergoing conversion to native grass meadows. The wooded knoll has been separated from the larger ridge on the western shore of the French Broad River by the eroding force of the river. The knoll is forested with medium aged canopy trees and is generally free of invasive plants. The riverine areas are also undergoing restoration, with a riparian buffer strip being reintroduced (Figure 20). Due to the various landforms, proximity to the river, and past land uses, there are at least 25 vegetative cover types harboring unique plant communities at SIWR (See Appendix C: Vegetative Cover Map).

Figure 19: Location of SIWR in relation to Downtown Knoxville and Douglas Dam
Background Image: Google Maps

Figure 20: SIWR context
Background Image: Google Maps

CHAPTER IV
PROJECT METHODS

This chapter outlines methods used to perform the project. A variety of established methods for landscape inquiry were used. Site inventory was done over the course of multiple site visits and through analysis of archival maps. Information was gained through unstructured interviews with University of Tennessee professors. To analyze the site, a series of transects were established. Once established, the transects were used to photograph the site.

Site Experiences

I began site visits in mid-September 2011, and made weekly trips through April 2012. During the initial site visits, I gained an understanding of the site. After several visits on land, the site and adjacent western shore were observed from the French Broad River by kayak.

I observed the site in fall, winter, and spring at all times of the day and under various weather conditions. During the visits I walked, took photographs, and sketched. I documented many excellent places to observe landforms, plants, wildlife, and landscape processes.

Figure 21:
Warm season grasses rustling in the wind during the first site visit in late September 2011

Figure 23:
SIWR was observed via Kayak on October 22. 2011

Figure 22:
The meadow on the foggy, frosty morning of February 7, 2012.

Figure 24:
Observing metamorphic pebbles along the shore on April 2, 2012

Archival Maps

I used several map types to enhance my understanding of the site and the processes that shaped it. I obtained historic and contemporary USGS Topographic Maps for the Boyds Creek Quadrangle from the University of Tennessee Map Library. I also used a USGS Geologic Survey Map from the same quadrangle to develop my understanding of the subsurface geology on site.

Satellite images from Google Maps were useful in identifying the parallel bands of ridges and valleys that make up the landscape in East Tennessee. Furthermore, I compiled images from Ron Blakey's website on global paleogeography to reconstruct the geologic history of the region (Blakey, 2012). The compiled images were then compared to a USGS map showing the age of subsurface geologic material and present day topography of the North American continent (Figure 24).

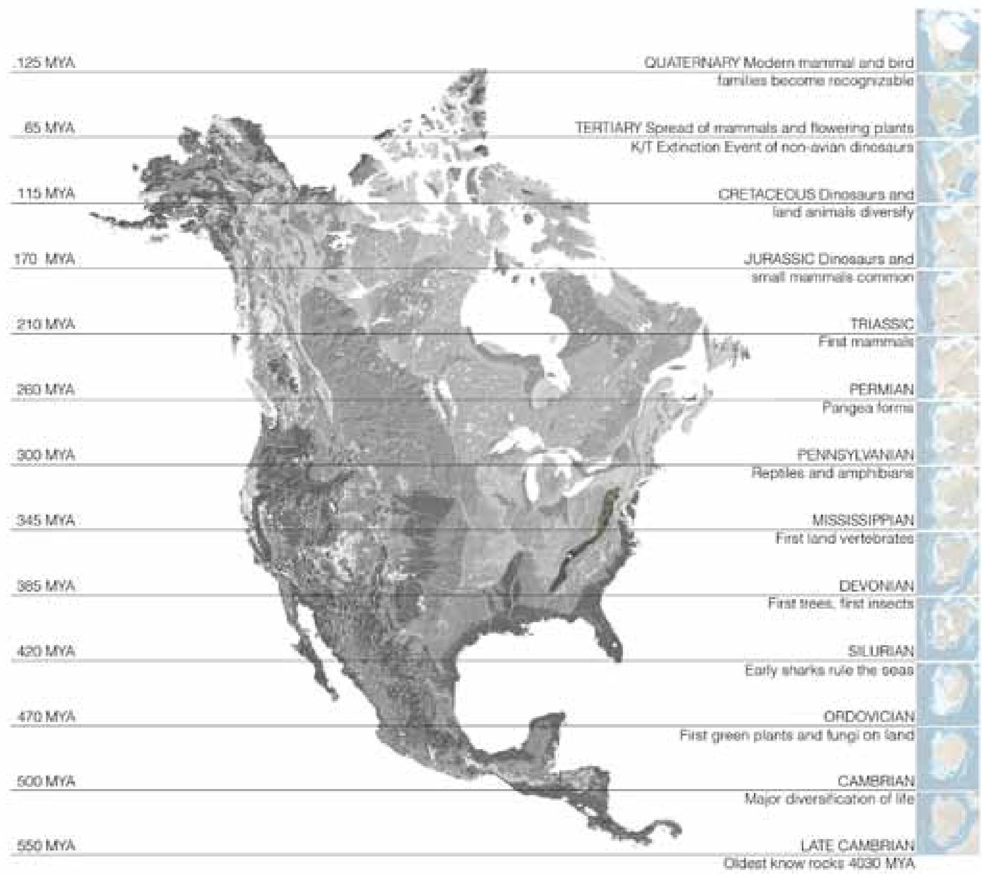


Figure 25: Time and Topography.
North American Topography map: USGS. Paleogoegraphic maps: Ron Blakey 2012.

Unstructured Interviews

After I established a basic understanding of the site, I met with Dr. Sally Horn, a geography professor at the University of Tennessee. During the Spring 2012 semester I took Dr. Horn's biogeography class, and many of the concepts from her lectures were incorporated into this thesis. Dr. Horn suggested I meet with Professor Robert Hatcher in the geology department to answer some specific questions on the geologic formation of this region.

I brought maps, photographs, and rock samples collected on site to Professor Hatcher. He helped me identify the rock types and pointed me to literature on the geologic formation of the Ridge and Valley Province (Figures 26-29). He also gave me an overview of different rock types found in this region and explained their formation.

I also met with Nora Hassel, the land manager at SIWR; and, we discussed goals and preferences for establishing new walking trails on site.

Figure 26: Rome Formation photographed in Robert Hatcher's office on 2/13/12

Figure 27: Holston Marble e photographed in Robert Hatcher's office on 2/13/12

Figure 28: Limestone photographed in Robert Hatcher's office on 2/13/12

Figure 29: Metamorphic river conglomerate photographed in Robert Hatcher's office on 2/13/12

Transect

A transect is a tool used by geographers to observe and measure change across a landscape. Transects generally consist of a path marked at regular intervals where observations are made. The transect can be a straight line, a curved line, or laid out as a grid. Three transects were established on site to detect changes in the landscape (Figure 30).

The River Transect parallels the eastern shore of the French Broad River. It begins near the southern tip of the peninsula and follows the shore to the northern boundary of the site. This transect is used for identifying fluvial processes in the landscape. The Ridge Transect follows the crest of the wooded knoll south of the parking area and continues across the floodplain in alignment with the larger ridge. Walking this transect one can observe changes related to elevated landforms and the effects of slope. The Fault Line Transect begins at a large rock outcrop and marks the location of a fault line that crosses the site. This transect can be used to observe changes due to plate tectonics and settling.

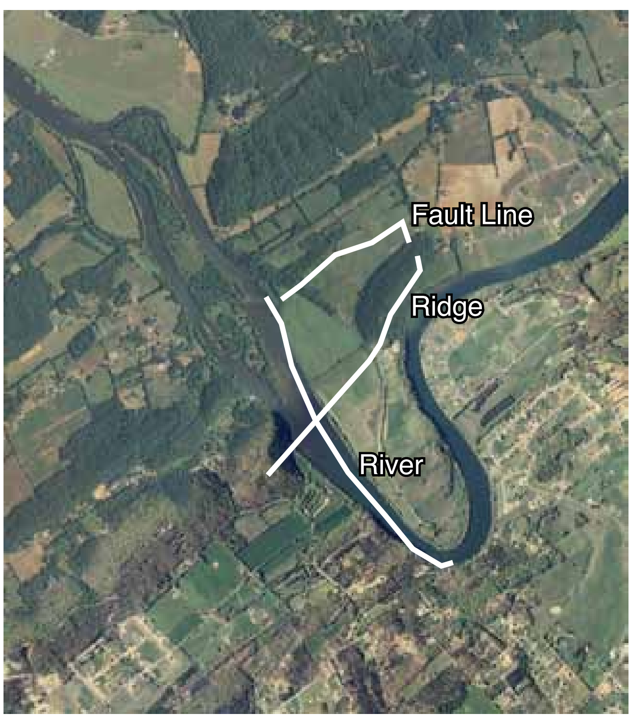


Figure 30: River, Ridge, and Fault LineTransects
Background Image: Google Maps

Photo Inventory

I used the transects as a tool for observing physical change in the landscape as well as seasonal change over a period of three seasons. The changes were documented in a photo inventory (Figures 31-32). The inventory was guided initially by what drew my attention, and care was taken to photograph phenomenon in a way that captured the experience of the site from a phenomenological perspective. After several photo inventories were made, patterns began to emerge and the series of processes that led to the patterns became clear.


Figure 31: Photographs taken along the Ridge Transect


Figure 32: Photographs taken along the River Transect

CHAPTER V
PROJECT NARRATIVE

Chapter IV describes methods for obtaining information about the site. This chapter documents the narrative of the design as it evolved from three separate transects to a loop path. This chapter describes the series seven of eco-revelatory stations located along the loop that reveal the sedimentary rock cycle.

The Sedimentary Rock Cycle

The site's phenomena are indices of many ecological processes. However, the site inventory and analysis revealed the sedimentary rock cycle as the group of processes that most defined the site to me. Synthesizing information about the transects from site visits, maps, interviews, and the photo inventory, I was able to deduce that the landscape at SIWR is a "snapshot" in time of the sedimentary rock cycle. The sedimentary rock cycle is comprised of seven processes (Figure 33). The movement of tectonic plates results in collision, which can lead to the uplift of rock. Once rock has been elevated, the weathering process begins. Forces of gravity combined with biological and chemical weathering agents, such as tree roots and rain water, begin to break the elevated rocks into smaller constituents. Wind and water are forces of erosion that transport the smaller rock constituents to an area where they are deposited. Once deposited, layers of material accumulate. Given enough time and pressure, the layers are lithified into stone strata and the sedimentary cycle can begin again.

In order to understand the spatial and temporal impacts of this cycle, I used a framework that included the study of geologic time, the formation of the Ridge and Valley Province, and the formation of the ridges and the river at SIWR.

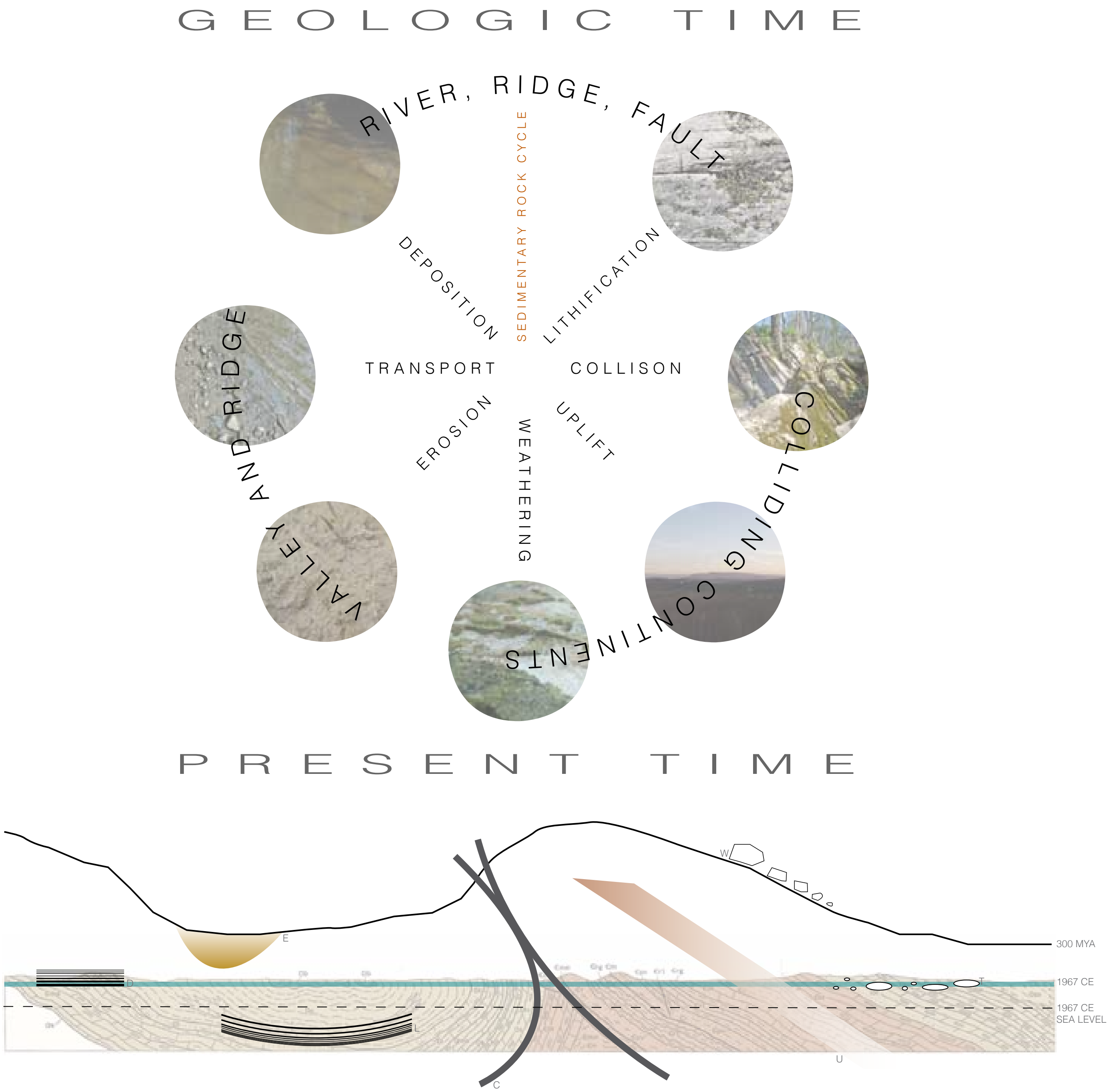


Figure 33: The Sedimentary Rock Cycle is an index of geologic time that can be perceived in present day phenomena

GEOLOGIC TIME

The study of plate tectonics and resulting land formations through geologic time was conducted by comparing maps of North American paleogeography to present day maps of North American topography. (Figure 25).

VALLEY AND RIDGE PROVINCE FORMATION

I gleaned information from geologic time and plate tectonics to show the result of colliding continental plates, oscillating world temperatures and sea levels, and ancient marine fauna (Figure 34). I learned that the collision of Gondwana and Laurentia during the Appalachian Orogeny drove the formation of the Ridge and Valley ahead of it (Hatcher, 2010).

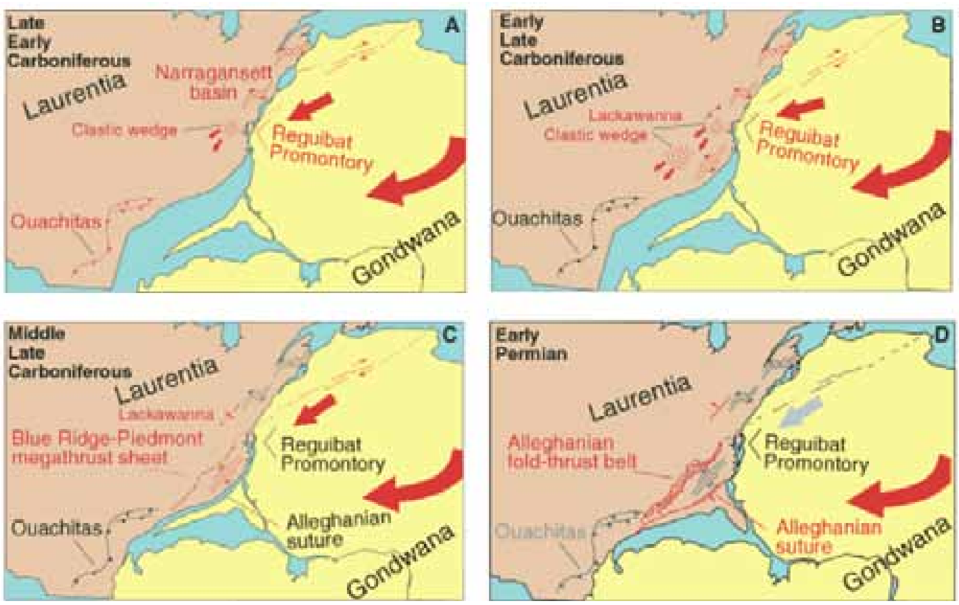


Figure 34: Early Carboniferous to Early Permian Plate Tectonics (Hatcher, 2010).

RIVER AND RIDGE

For this study, I researched the geomorphology of the French Broad River, Bays Mountain and the adjacent ridges (Figure 35). I learned that the geologic parent material of ridges, locations of fault lines, and the geologic section reinforce that the topography of present day SIWR is an index of past plate tectonic processes and colliding continents (Hatcher, 2010).

Figure 35: Geologic parent material of ridges, locations of fault lines, and a geologic section reinforce that the topography of present day SIWR is an index of past plate tectonic processes and colliding continents.
Background Image: Google Maps
Geologic Map and Section, Hardeman, 1967

The Transects

The transects served as the initial means of uncovering the story of the landscape at SIWR. Once the transects were established and documented, I synthesized information described in Chapter IV to create a walking path linking the transects into a loop. This section describes the processes shaping the individual transects in detail.

THE RIDGE TRANSECT


Figure 36: The Ridge Transect
Source: Google Maps


Figure 37: Walking up the ridge


Figure 38: Clearing in the trees and view to sky

The Ridge Transect follows the northern end of Bays Mountain and a remnant of this ridge that has been separated by the French Broad River and its floodplain (Figure 36). The Ridge Transect is accessible adjacent from the parking area. To begin this walk, one first ascends the steep, northwestern facing slope. The transect then turns southwest following the ridge top (Figure 37). The topography is less steep along the crest of the ridge, and large stands of Beech, Hickory, Maple, Pine, and Oak are abundant. Many uprooted trees along the ridge top are evidence of strong winds. About 150' from the southwestern bend in the path, there is a level, circular clearing in the trees about fifty feet in diameter. The clearing frames a view of the sky (Figure 38). Views to the southeast show the river valley and rural development with the Appalachian Mountains and foothills in the distance. Looking northwest there are views of the parallel meadow valley and adjacent ridge. Near the highest point of the ridge small outcrops of Rome Formation are numerous (Figure 39). Formed during the Cambrian Period, Rome Formation is the oldest subsurface geologic material on the SIWR site. Rome Formation, as well as the other geologic parent material at SIWR, is sedimentary and formed during the Cambrian and Ordovician Periods between 550 and 435 million years ago. During these periods, present day East Tennessee was under a shallow, epicontinental sea. Calcium deposits that precipitated out of this ancient sea formed layers on the continental crust, and over the ages became lithified into the limestones, shales, and sandstones typical of the Valley and Ridge Province we see today. The northwest exposure and upward angle of the sedimentary outcrop strata reveal the intense forces that shaped the Ridge and Valley Province during a series of orogenies, or mountain building events. Beginning with the Grenville Orogen (about one billion years ago) repeated forces from colliding continental plates, subsequent rifting, and uplift from subducting oceanic plates off the Eastern coast produced the “rumpled carpet” that is known as the Ridge and Valley Province. The ridge tops are generally composed of sandstone, a major component of Rome Formation, which is less prone to erosion. The valleys are composed of the newer, Ordovician Period limestones and shales, which typically erode much faster than sandstone and produce rich, fertile soils. The Rome Formation outcrop is evidence


Figure 39: Rome Formation near ridge top

of these ancient and powerful tectonic events, that thrust the older Cambrian Period strata over the younger Ordovician Period strata (Hatcher, 2010). The entire site, with its parallel steep, rocky ridges, and rolling, fertile valleys tells the story of its own formation (Figure 35).

THE RIVER TRANSECT


Figure 40: The River Transect
Source: Google Maps


Figure 41: Young riparian forests


Figure 42: Metamorphic pebbles in the freshly tilled soil

The River Transect parallels the French Broad River and intersects the Ridge Transect about midway (Figure 40). The southernmost end of the transect lies at the tip of peninsula, where young forests replace fallow agricultural fields (Figure 41). This area is in the floodplain; evidenced by the dark, productive, alluvial soils. Freshly tilled earth reveals pebbles of metamorphic rock (Figure 42). These pebbles speak to the origin of the French Broad River and tell us about the topography of the Appalachian Mountains.

The French Broad River presently flows 213 miles from Transylvania County, North Carolina, westward across the Appalachian Mountains to the state of Tennessee. Because the river flows across the mountains, instead of draining east toward the coast, we know that the current topography of the mountains rose after the river formed its westward drainage. The stories of the French Broad River and the Valley and Ridge Province are closely intertwined, with the river slowly and steadily eroding its course through a rising topography. The metamorphic pebbles in the soil have been carried to SIWR by the French Broad River from the Appalachian Mountains, where metamorphic rock is an abundant in the subsurface geology. SIWR's namesake islands are composed of accumulations of these pebbles, but several relatively recent factors have drastically changed the islands, and the floodplain.

The French Broad Corridor has a long history of human use. The floodplains have served as seasonal encampments for Native Americans as far back as 12,000 B.C. and within the last 150 years as permanent agricultural settlements (MPC, 2003). Agricultural practices in the past 150 years, such as clear-cutting the alluvial forests and tilling the soil, have contributed to increased erosion rates, resulting in more sediment in the river. This sediment is changing the morphology of the river channel, as well as the islands at SIWR. Deposits of silt and clay sediment have led to seven small islands coagulating into two large islands (this was speculated by R. Hatcher during his unstructured interview on 2/13/12). This is a physical, directly visible effect of the sediment, but its effects on aquatic wildlife, while not as visible, are still strongly felt. Another recent influence in the story is the Douglas Hydroelectric Dam. Built in the early 1940's, the dam now regulates the flow of the French Broad, preventing the seasonal floods that replenished the floodplains with layers of alluvium. The dam also acts as a barrier, preventing metamorphic rock from the mountains from entering the river below the dam. Any metamorphic

Figure 43: Erosion along shoreline due to removal of riparian plants

Figure 44: Fine texture of alluvial soil on the floodplain

rock at SIWR was deposited before the dam was built in 1942. The combination of increased sediment from agricultural practices and the regulatory control of the dam, have changed the geography of SIWR in the past 150 years at a vastly accelerated rate.

Figure 45:
The Fault Line Transect
Source: Google Maps

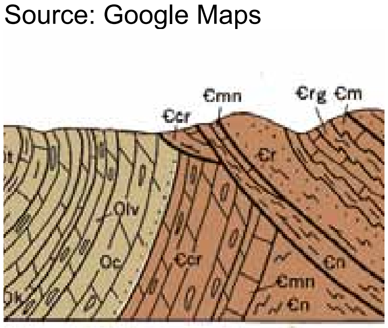


Figure 46:
The Fault Line Section
Source: Hardeman, 1967

Figure 47: Rock outcrop along the Fault Line Transect

THE FAULT LINE TRANSECT

The Fault Line Transect follows one of several faults that run northeast to southwest across the site (Figure 45). Pressure from thrusting strata of sedimentary rock caused the bands of parallel faulting, and the subsequent ridges and valleys in this region. In most areas faulting caused rock strata from the same geologic period to be thrust over and under each other; however, along some faults, rocks from older geologic periods have been pushed over younger rock material (Figure 46). This fault line marks the location where Cambrian Period strata and Ordovician Period strata collided and formed a rock outcrop. Without carbon dating it is difficult to tell whether the rocks on either side of this outcrop are of different geologic period in origin. However, their proximity to the fault line suggests that they might represent the two different periods.

The transect begins at the rock outcrop where oolitic limestone is abundant (Figure 47). Oolitic limestone is composed of oolites, small spheres of sand and shell that have been coated in layers of calcium carbonate (Figure 48). Calcium carbonate precipitates out of oceans and collects on the ocean floor (jmu.edu, 2012). The oolitic limestone is direct evidence that these rocks formed millions of years ago when this part of Tennessee was under a shallow sea. The fault line continues beyond the outcrop into a narrow forest cove. The fault is evident as a shallow swale that is vegetated with herbaceous understory plants (Figure 49).

Figure 48: Oolitic limestone found near the Fault Line rock outcrop

Figure 49: Shallow wooded cove along the Fault Line rock outcrop

The transects allowed me to locate places in the landscape where each process in the cycle was evident. Along the Ridge Transect, I observed the *weathering* process. Walking the River Transect, I could see the processes of *erosion*, *transport*, and *deposition*. Just north of the Fault Line Transect, I observed the outcome of the *lithification* process in a large rock wall. The fault line rock outcrop pointed to the process of *collision* and the view from the top of the ridge along the fault transect was an effect of the process of *uplift*. All of these processes are linked in the sedimentary rock cycle. The next step in the design process was to link the three separate transects into one loop that revealed the cycle to park users.

FROM 3 TRANSECTS TO ONE LOOP

The existing entrance to SIWR is located at the northeast tip of the wooded knoll. There is an existing gravel parking area here along the property line of the site that will remain as the primary entrance to the site. In order for the seven processes of the sedimentary rock cycle to be observed in order, the loop path begins just south of the parking area at

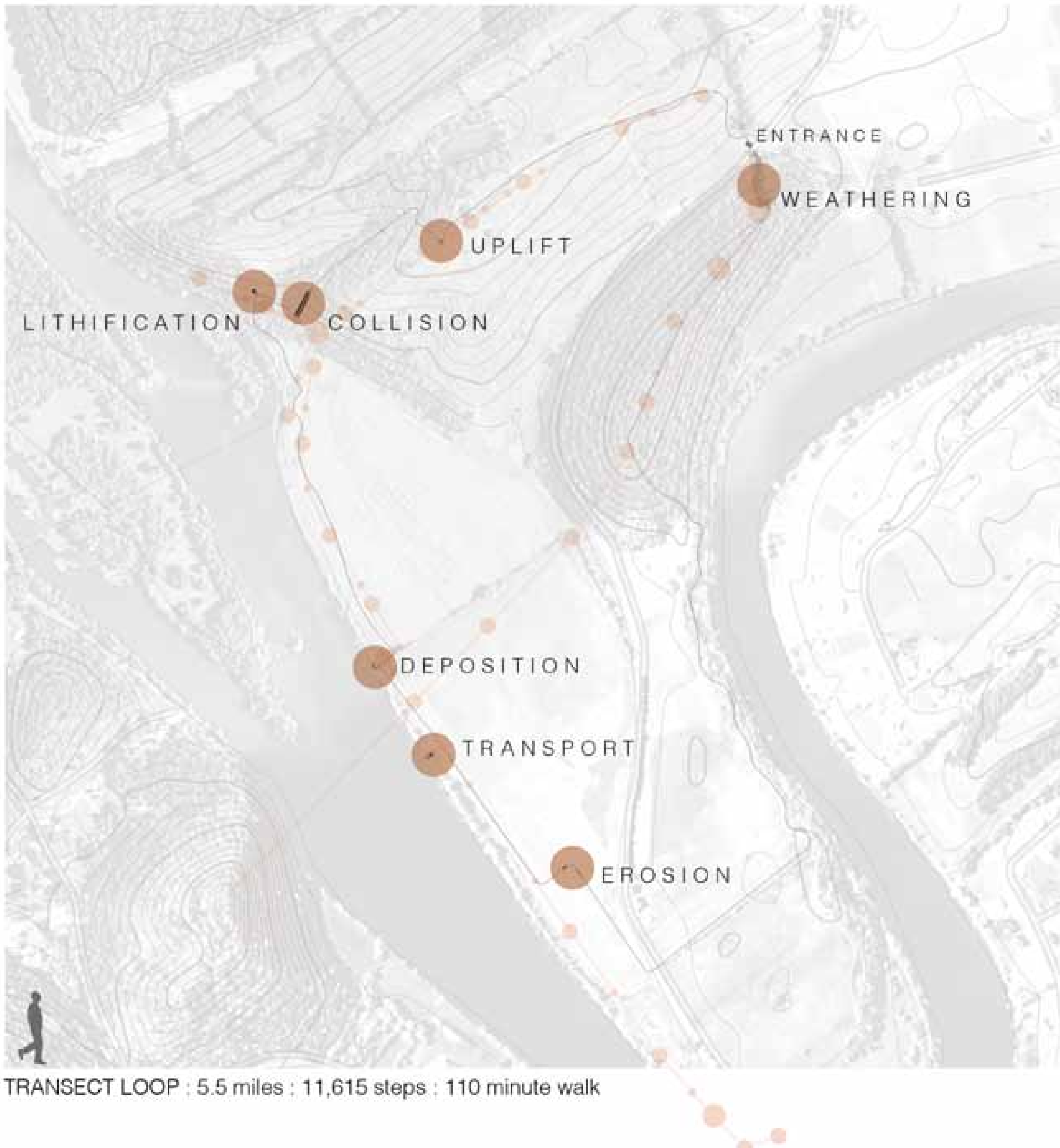


Figure 50: Three transects (in orange) merged to create one loop (black dashed line). Along the loop are seven stations revealing the sedimentary rock cycle: weathering, erosion, transport, deposition, lithification, collision, and uplift.
Background Image Source: Google Maps

the base of the wooded knoll (Figure 50). The path leads the park user up the slope, where the weathering process is observed (Figure 51). The path follows the ridge top to its southern most point where a view of the ridge on the western side of the river is visible across the floodplain (Figure 52). The path then turns southeast and winds down the slope to an existing path that follows the river. The path turns west toward the floodplain at an old hedgerow. Near the center of the floodplain, the path turns northeast to parallel the river. From this perspective, the wooded knoll and the adjacent ridge are seen as two separated pieces of the same ridge. Here, the park user can see the eroding capability of the river, as it carved a water gap separating the wooded knoll from the remainder of the ridge to the southwest (Figure 53). The path turns to the west again taking the park user to the river bank. Moving northwest and further downstream, metamorphic pebbles lie along the river bank indicating the process of transport (Figure 54). Further downstream, near the southern tip of the first island, there is a small semi-circular mud bank where the shoreline has been undercut by the flowing water (Figure 55). The river water flow is controlled by the Douglas Dam, and evidence of rising and falling water elevations are evident along the mud bank where sediment deposits have been left behind.

Figure 51: *Weathering* rock

Figure 52: View west across floodplains to ridge

Figure 53: *Erosion*. The river eroded through the ridge to create the floodplain

Figure 54: *Transport* Metamorphic pebbles transported to SIWR by the river

Figure 55: *Deposition*. Undercut mud river bank


Figure 56: *Lithification*. Northwest angled rock wall


Figure 57: *Collision*. Northwest angled rock outcrop at fault


Figure 58: *Uplift*. Parallel ridges in the distance

Walking further downstream, park users cross a small bridge over a drainage swale and encounter a large northwest angled rock wall near the northern boundary of the site (Figure 56). This wall of stone, along with all the other rock material on site, is an index of the lithification process. However, the sheer mass of this wall in the landscape portrays the gravity and weight of stone and the time required for lithification to occur. The path then turns southeast and takes users to the fault line outcrop (Figure 57). Similar to the stone wall, the outcrop is angled to the northwest, and is evidence of the tectonic collision of the African Plate and its forces pushing geologic material to the toward the northwest (Hatcher, 2010). Near the highest point of the ridge adjacent to the fault line transect, the view south across the site to the mountains in the distance is an index of the parallel bands of uplifted ridges and sunken valleys (Figure 58).

Walking the transects as a loop leads the park user to each of these process indices in the order they occur in the sedimentary rock cycle.

Framework for Design: Eco-Revelation and Phenomenological Design Methods

In this section I outline the conceptual framework for the process of eco-revelation. The site's geologic phenomena (both micro and macro scale; i.e. a pebble, a ridge) are snapshots of the landscape in process. Based on these findings, I wanted to explore ways to design a choreographed experience to reveal the place, time, and process along the loop path at SIWR.


Figure 59: Marking the site; creating a boundary

The framework for designing consists of three steps. The first step is performing the phenomenological site inventory and analysis. This is accomplished through the methods outlined in Chapter IV. The next step is distilling the processes that led to the site's spirit of place, and this is accomplished through documentation of the transects. The third step involves designing for a momentary (snapshot) of place, time, and process.

To begin the design phase, the locations for the seven processes of the sedimentary rock cycle were identified using existing elements found on site, such as lines of force, fields of energy, boundary elements, gates and entries, landmarks, directional elements, traces of processes, and revelatory elements such as the oolitic limestone found at the fault line outcrop. Once the locations for each process were located I delineated the boundary for each design using existing elements on site such as tree gaps or rock formations (Figure 59). This set the stage for the eco-revelatory designs.

After locating the sites and defining the boundaries, the next step is to introduce a designed element that defamiliarizes the process. For each of the seven processes I inserted elements that heightened or disrupted the familiar experience of place, time, and space. This was done to bring attention to the process and to re-attenuate the park users attention to the process. This re-attenuation is what leads to the process of revelation. The re-attenuated experience of place leads the park user to a revelatory experience of place and process, placing the observer in the continuum of time, space, and place (steps above adapted from TWMM and VSF site walk on 3/25/2012).

Transect Loop and Sedimentary Rock Cycle Station Design

OVERVIEW

The program developed for this project is a walking path with a series of stations that reveal the sedimentary rock cycle. The stations translate the seven process indices of the sedimentary rock cycle: weathering, erosion, transport, deposition, lithification, collision, and uplift. The program was developed with the goals of The Seven Islands Foundation in mind, and the design creates an educational experience to heighten park users' understanding and awareness of the site. The path and stations construct a narrative using landscape processes. The intention is to reveal, through design, the cultural relevance of ecological imperatives at multiple spatial and temporal scales.

Figure 60: Sandstone/ Shale

Figure 61: Limestone

Figure 62: Metamorphic Pebbles

Figure 63: Weathered Steel

In keeping with the goals of the wildlife refuge, care was taken in the development of the program to make as little impact on the site as possible. The main materials used are stones native to the site and little to no invasive methods are required for many of the stations (Figures 60-62). Steel is used in some places throughout the stations to represent time (Figure 63). For example, in the erosion station, steel retaining walls form a cut that represents the amount of erosion that could happen in the future, resulting in a lower floodplain elevation.

Sedimentary Rock Cycle Stations

The following sections reveal the phenomenal experience of the Sedimentary Rock Cycle Stations from my own perspective. The story begins with the Weathering Station and ends with the Uplift Station. For each station there is also an explanation of the design strategy that includes the ways I used collection, organization, and defamiliarization to focus the senses and create an eco-revelatory experience.

WEATHERING STATION

When I arrive at the site I am in a valley, and the loop path begins just to the right of the parking court. As I begin the path my body adjusts to walking up the steep slope by leaning slightly forward. As I lean forward and look down, I see small limestone rocks interspersed in the dark, leafy soil. The sound of leaves crunching under my feet is interrupted as I step onto a steel plate laid across the path. The steel is engraved with the word *soil*. When I stand on the plate, I wonder what it is there for--it seems out of place. I look up the slope for a clue and see more steel plates at regular intervals. The plates say *pebble, stone, outcrop, ridge*. I also see limestone rocks of progressively larger size emerging from the forest floor. I continue climbing the slope, and the narrowing path and increasing steepness of terrain force my body to lean forward even more. Looking down at the progressively larger stones and steel plates, with legs burning, the forces of gravity and weathering appear.

COLLECT

Limestone rocks of various sizes are collected from the forest floor.

ORGANIZE

The rocks arrangement shows the gradual progression from soil and pebbles at the base of the slope to large limestone outcrops at the top.

DEFAMILIARIZE

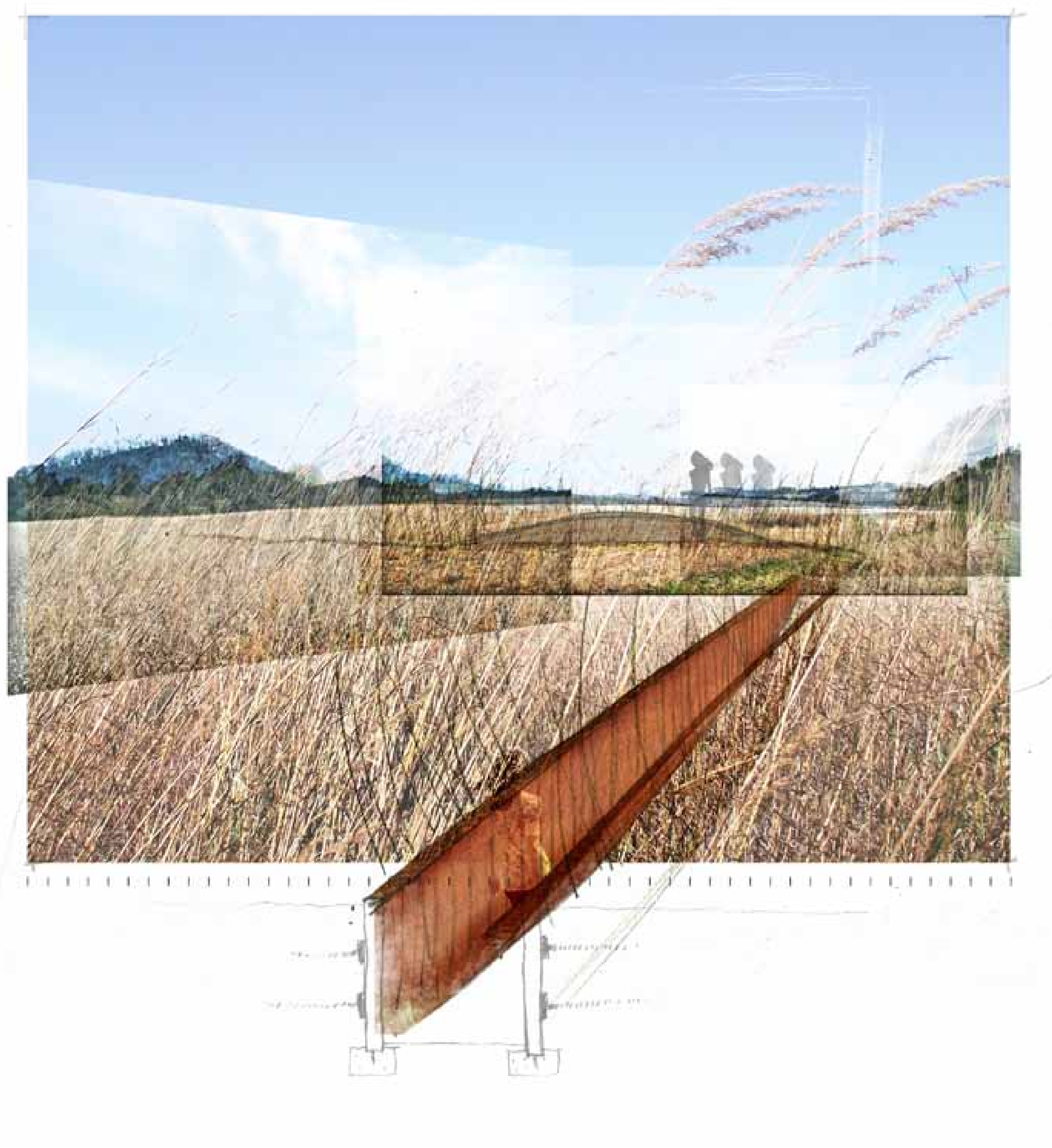
Steel plates inscribed with reference events segment the path, dividing the walk into periods of time correlated to the time needed in this climate region for limestone outcrops to weather to soil.

FOCUS

The steepness of slope and narrowness of path focuses the motor movement of the body. The progression of stone sizes, and steel plates focus the vision and internal sense of questioning. The alternating sounds of leaves crunching while on the path and silence while on the steel plates heightens the sense of hearing making the Weathering Station a multi-sensory experience.

REVEAL

From soil at the bottom of the slope to limestone outcrops at the top, the process of weathering appears to the park user.



EROSION STATION

On this segment of path I am walking north toward a gap in the ridges. The path gradually sinks down into the ground as two steel retaining walls hold back the floodplain. As I walk between the walls, warmth radiates off the steel and the sound of bugs and grasses blowing in the wind on either side of my head draws my attention to the ground plane. As I look at the grasses, I see the ridges beyond, but from here, in the ground, they seem much higher. I realize I am standing in a man-made erosion channel and that I am eye-level with a future elevation of the floodplain. As I move out of the cut, a berm perpendicular to the cut provides a spot for me to rest and enjoy the cool breeze blowing down the valley.

COLLECT

Soil is cut and collected from the floodplain in an accelerated rate of man-made erosion. The cut is made in the direction of the river’s flow.

ORGANIZE

The cut soil is placed perpendicular to the cut to form a berm. The berm is parallel to the ridges beyond.

DEFAMILIARIZE

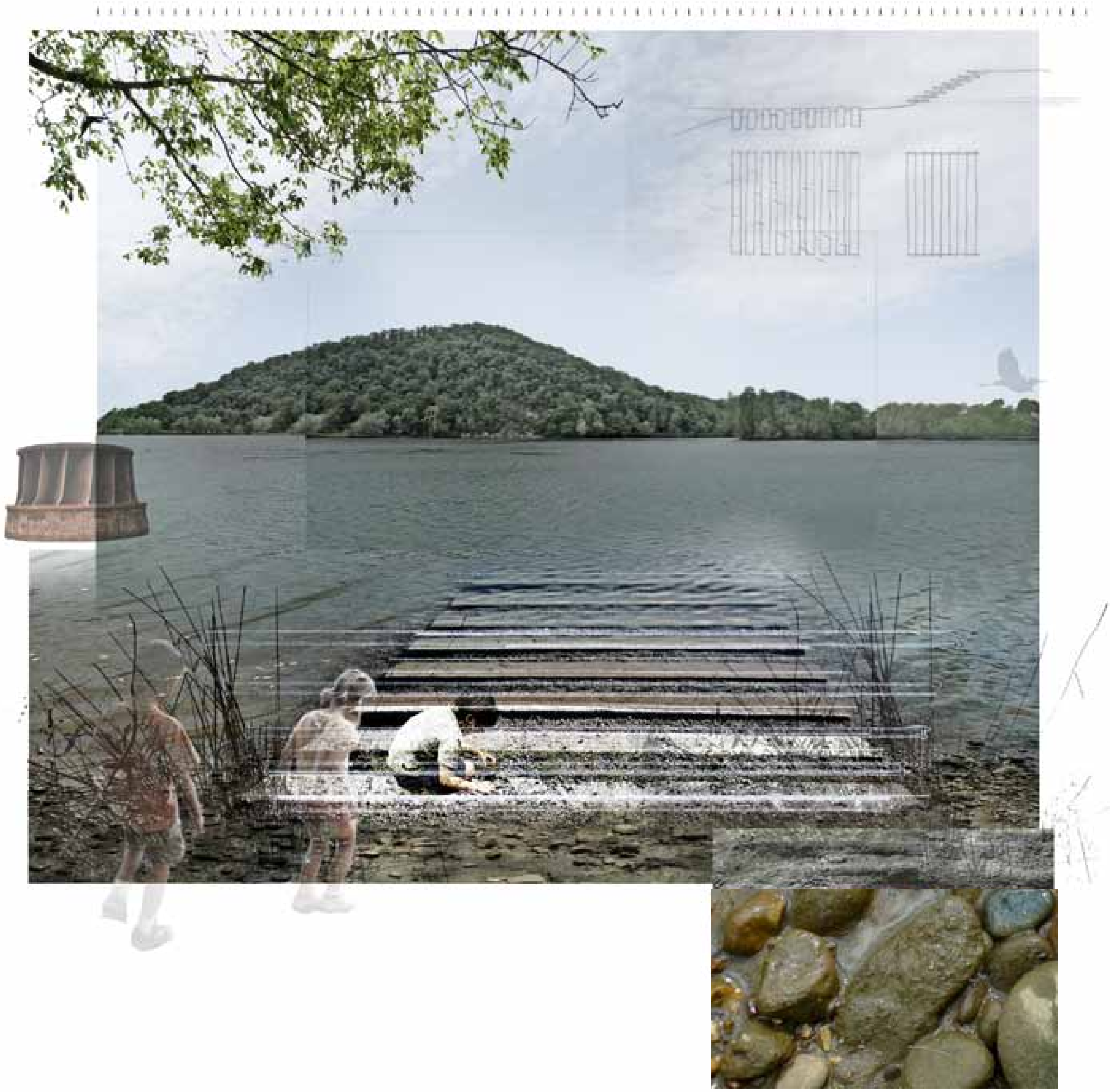
Steel retaining walls allow the user to enter the earth, placing them at eye level with the future elevation of the floodplain. The berm seems out of place in the otherwise flat floodplain.

FOCUS

Walking down into the cut ground amplifies the height of the ridges rising in the distance. The heat radiating off the steel walls stimulates the sense of touch and hints at the high temperatures within Earth. The sound of rustling grasses at ear height makes the user aware of the ground plane. As the path turns by the berm, winds blowing from the west through the valleys and over the river heighten the tactile experience of moving from a warm space to cool space.

REVEAL

The act of walking into Earth and seeing the future level of the floodplain reveals the slow process of erosion on this site.



TRANSPORT STATION

At 2pm I noticed steel steps with images of turbines engraved on them leading down into the river. Now, a few hours later, the water level is lower and the steps lead down to the river bank. I notice on every other step decreasing numbers of turbines are engraved, and I realize that the steps correspond to the number of turbines open upstream at Douglas Dam. On the river bank, there are small round pebbles scattered about and nestled between large slabs of limestone. The different textures of rock help me see that the pebbles are metamorphic in nature. The river transported the pebbles here from the mountains. The limestone slabs were transported here by people from the surrounding landscape.

COLLECT

I crouch down to collect metamorphic pebbles along the riverbank and between slabs of limestone.

ORGANIZE

Steel steps aligned with the fluctuating heights of the river water take users down to the river bank. Vertical limestone slabs inlaid into the bank disappear into the river and create troughs for metamorphic pebbles to collect in. The smoothness of the pebbles is amplified when placed next to the rough limestone strata.

DEFAMILIARIZE

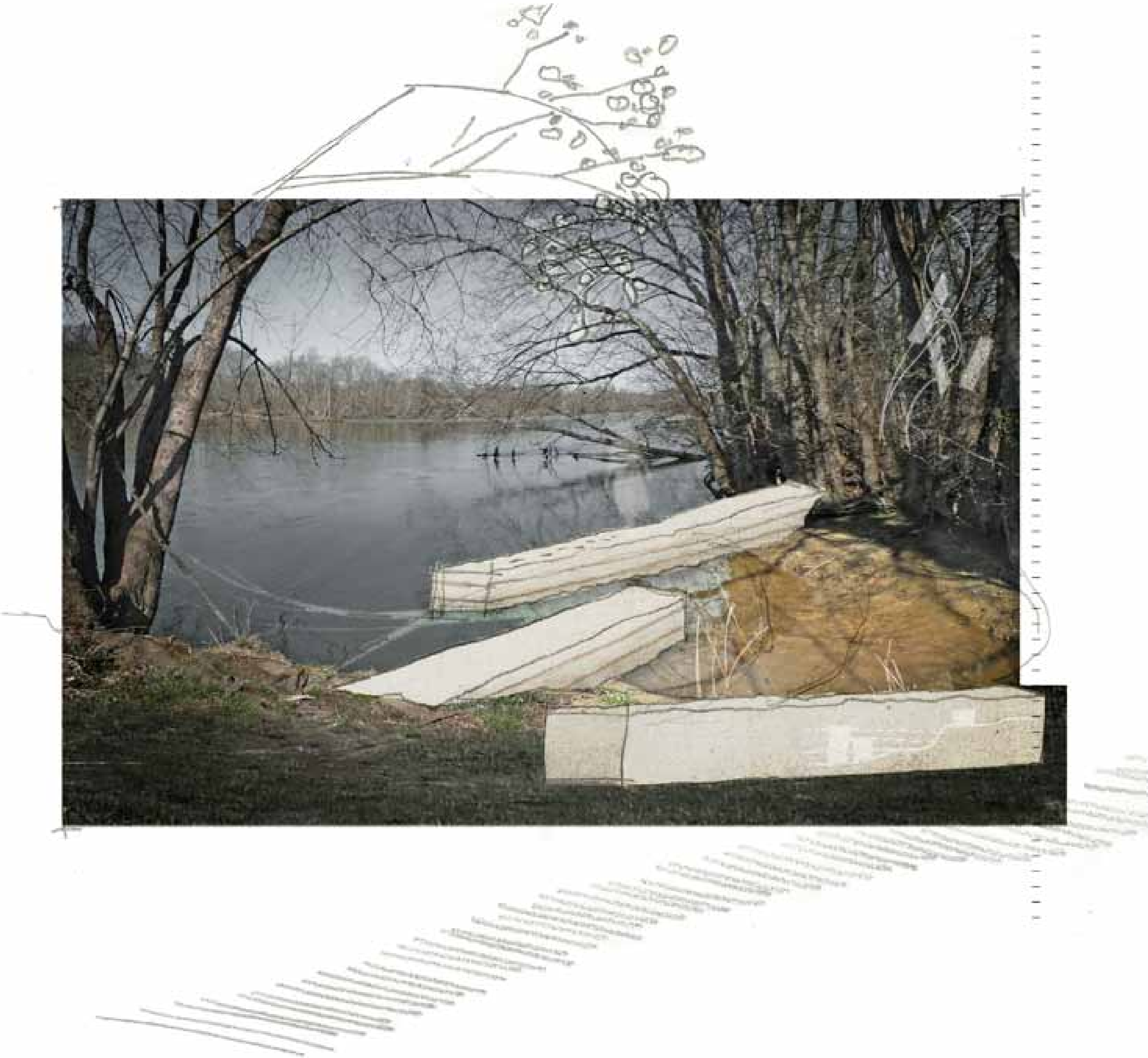
The steel steps lead into water when multiple dam turbines are open, making the observer wonder where they lead. When the turbines are closed, lower water levels reveal the river bank, pebbles, and limestone slabs. The slabs are an unfamiliar sight along the riverbank, and as they recede into the water they invite the park user to wade into the river.

FOCUS

Whether the steps lead to water or river bank, curiosity is engaged. Feeling inclined to compare materials, the park user must bend down, to touch the rocks. From this position the smell of the river becomes more intense. The limestone slabs invite the user to take their shoes off and wade into the river. The contrasting textures of smooth pebbles and striated limestone focus the haptic experience.

REVEAL

The contrasting textures of pebbles flowing between limestone slabs reveals the process of transport.



DEPOSITION STATION

As I approach the Deposition Station I see that the water level is very low. The smell and glisten of the muddy bank is inviting, so I walk out onto the weir for a closer look. As I take off my shoes and hang my feet off the weir onto the smooth mud, I see the tree roots along the bank that were exposed by the eroding force of the river. I leave my shoes on the weir and walk across the mud to inspect the roots. My feet sink into the mud letting me know that it had been recently deposited--it had not had time yet to harden. A few hours later, the muddy bank was a pool of water, and I knew my footprints would be covered by a new layer of deposited sediment.

COLLECT

Sediment is collected behind concrete weirs.

ORGANIZE

Two concrete weirs intercept river water as it flows downstream. The water enters the pool formed by the eroded river bank, but the weirs prevent it from leaving. The water swirls and settles allowing the sediment to precipitate onto the river bank. In time, the sediment deposits will increase to fill in the eroded cut.

DEFAMILIARIZE

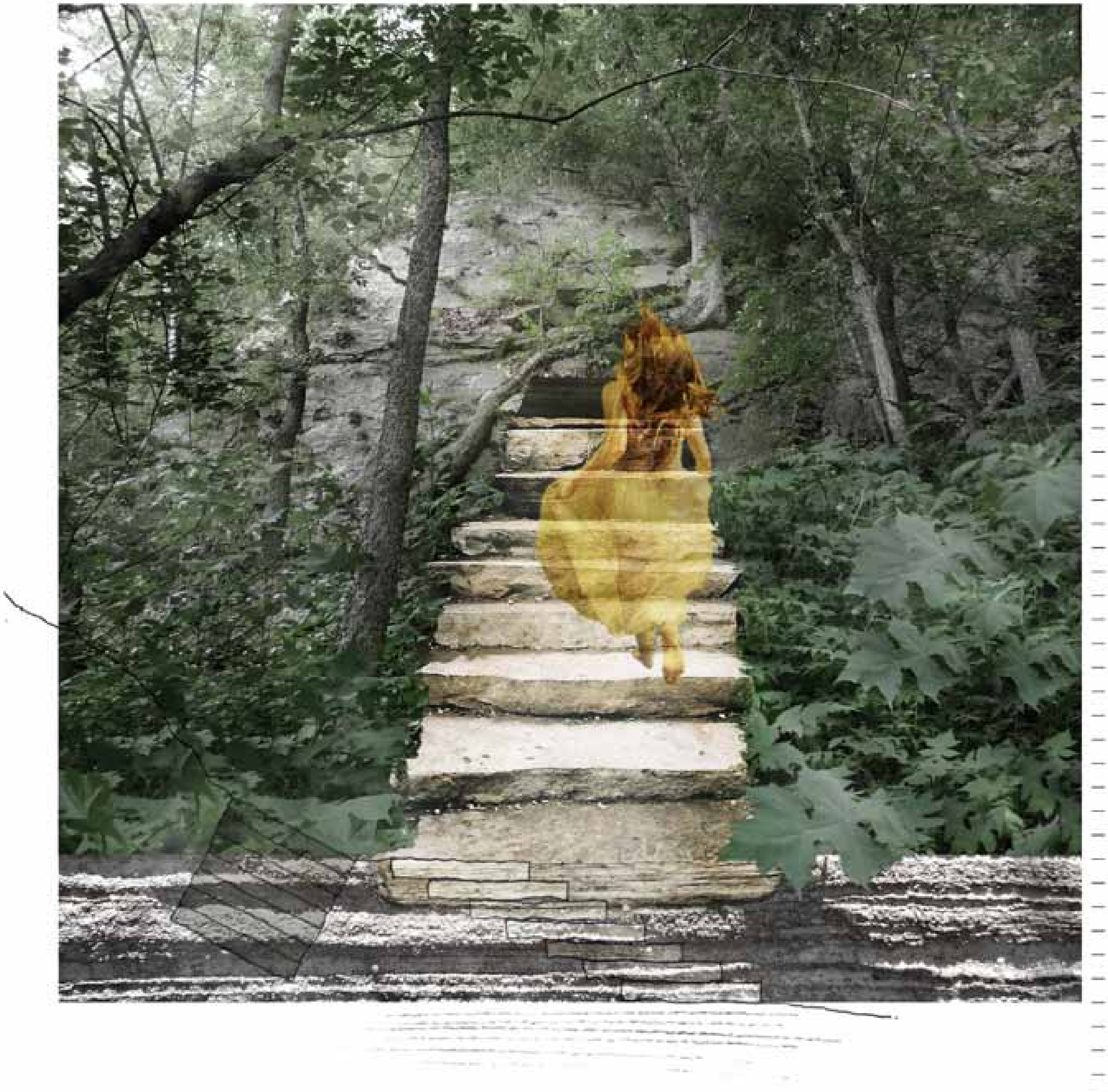
As the user approaches this station, the concrete bench draws their attention. The concrete weirs are unfamiliar to this area. Steel plates in the concrete at regular intervals and act as a gauge to measure the amount of sediment deposited.

FOCUS

The sound of water flowing into the pool and swirling attenuates the user the flow of water. From the vantage point of the bench, the steel layers in the weirs come into focus. The cool shade from the trees invites the user to sit for a while and watch the water levels rise and drop. The smell of wet earth rises up from the pool inviting the user to walk out onto the weir and put their feet in the water or mud.

REVEAL

Watching the water levels rise and fall and the layers of deposited sediment grow reveals the process of sediment being deposited by the river.



LITHIFICATION STATION

Walking along the path through the forest I come to a large rock wall. A set of steps lead up to the wall, and as I follow them, I notice the rock making up the steps seems to be composed of thousands of smaller steps. When I get to the top, I see a hole in the shape of a cube. The same layers of “steps” make up the rock in the hole, but they are angled to the northwest. I realize the stone steps are made from rock removed from this hole. I want to the see the rock layers more closely, so I climb into the hole. It is dark, cool, and musty. Within the hole, surrounded by rock I sense the enormous density of rock. Remembering the loose mud I just walked through, I realize the layers making up this rock used to be soft and pliable as mud. Millions of years of pressure and weight turned mud into stone, and in a matter of days humans turned stone into steps.

COLLECT

Limestone slabs are collected from a rock wall.

ORGANIZE

Slabs of limestone are cut from a northwest angled rock wall and placed horizontally as steps. In this horizontal position the strata are reoriented to the position they were in when the layers of sediment became lithified.

DEFAMILIARIZE

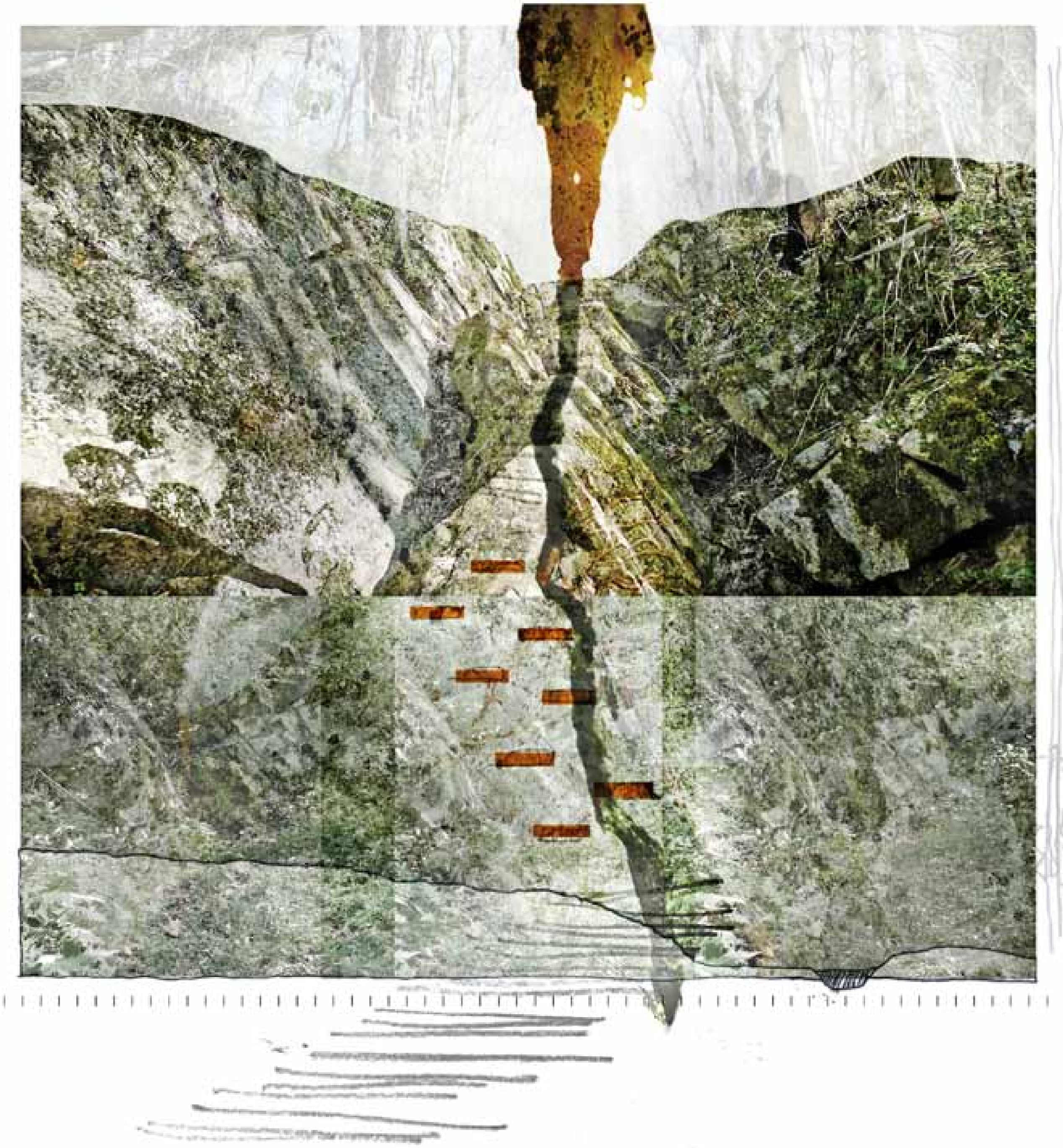
The stone steps are unfamiliar in the densely vegetated forest landscape. The steps lead to the hole from which they were cut. The hole, a 3.5’ by 3.5’ cube, stands out on the face of the rock wall. The hole is dark and the leaves collecting in the bottom smell earthy.

FOCUS

The horizontal strata of the limestone steps contrast with the northwest angle of the strata revealed in the hole they were cut from. The afternoon sun shining from the west through the tree canopy is just enough to graze the top few inches of strata in the hole. The depth and darkness of the hole draws users to kneel down and take a close look at the stone.

REVEAL

The comparison of the horizontal strata of the steps with the angled strata within the hole attenuates the park user to the layers of compressed, hardened sediment revealing the process of lithification.



COLLISION STATION

Walking further along the path, I come to a segment paved with limestone slabs. The slabs lead to a large limestone outcrop with steel steps inlaid into the rock. The steps suggest climbing, so I begin and reach out to the adjacent rock for support. The rock feels cool and smooth, and as I look closely I notice it is composed of thousands of small spheres. The rock outcrop is composed of three large slabs angled to the northwest. Realizing this, I remember the previous Lithification Station and its northwest angled rock strata. All the rock formations on the site seem to be angled this way, so I realize that something must have thrust the rocks from their horizontal position. Perhaps what I am walking along is a fault line, a result of an ancient collision that forced ancient rocks to the surface of the earth.

COLLECT

Oolitic limestone (formed from marine sediments) is collected from the forest floor to form a path along the fault line.

ORGANIZE

The oolitic limestone is organized along the fault line on either side of a large limestone outcrop. Steel steps inlay the outcrop so that the park user can climb the outcrop and remain on the fault line. The outcrop is the visible portion of the fault, but the limestone path reveals the fault line as it traverses the site.

DEFAMILIARIZE

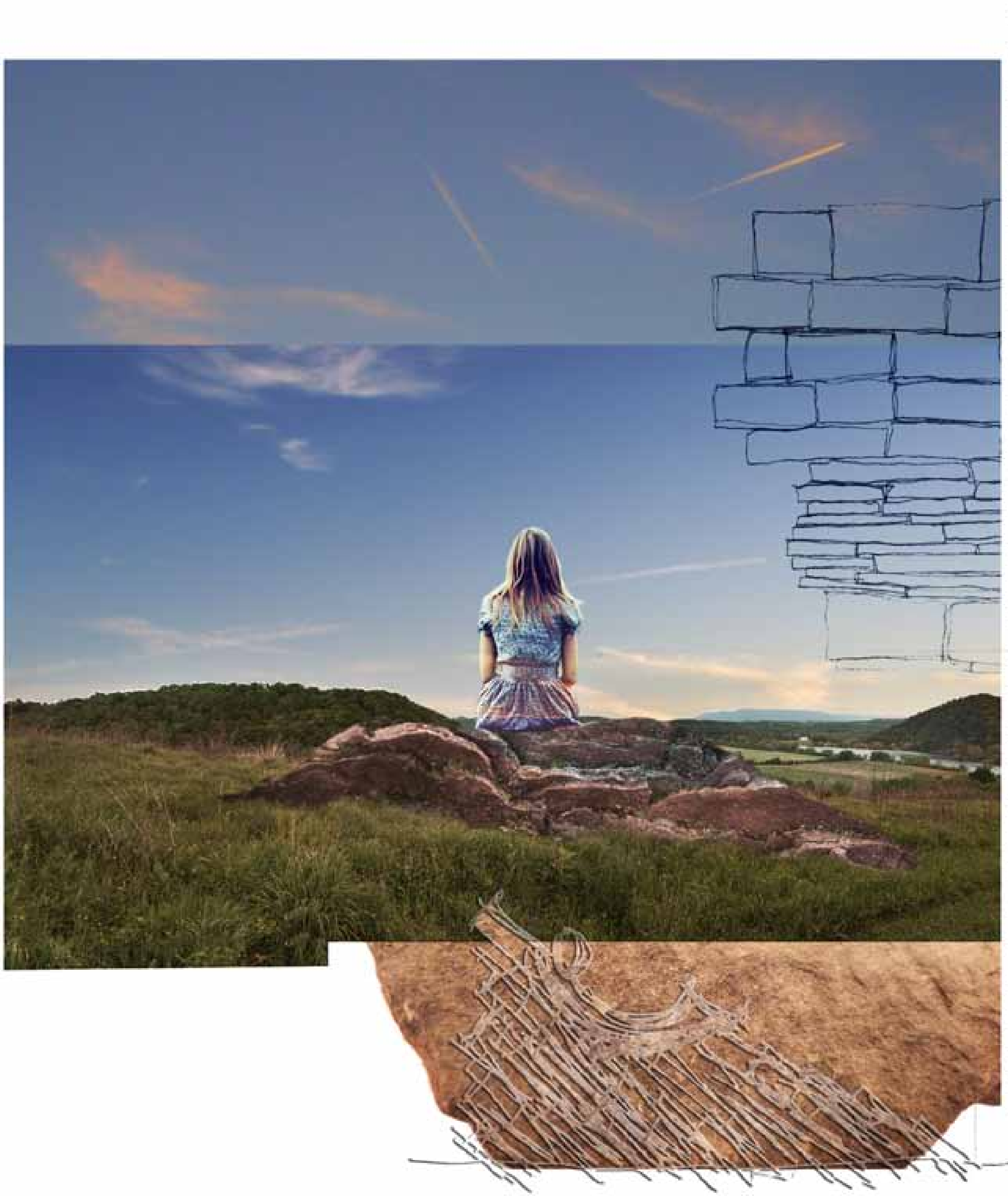
The linear limestone path is unfamiliar in the woods, and the steel steps in the outcrop draw attention to the rock.

FOCUS

As the user walks along the limestone path, they wonder why it follows the linear swale up the hill. The placement of the small steel steps in the rock outcrop force the user to climb up the rock and reach out to the adjacent rock for support. Touching the cool, smooth limestone and spongy mosses, the park user looks closer at the composition of the rock. They see that the rock is made up of thousands of small spheres.

REVEAL

The small spheres making up the limestone outcrop also compose the limestone path. The length of the fault line is clad in oolitic limestone, revealing the fault created by colliding continents that thrust this ancient stone to the surface.



UPLIFT STATION

The limestone path of the collision station leads me to a ridgetop where a red shale rock outcrop confronts me. As I approach I see the amazing view to the mountains in the south. Looking closely at the outcrop, I realize it was constructed by people. The layers of stone angle in the same direction as the lithification and collision stations, but there is a concave relief in the stones that looks like a good place to sit. I climb into the bowl and begin to think as my eyes gaze into the distance and the wind blows against my face. I can experience this view because I am on an elevated topography. The rocks I am sitting on are sheets of sedimentary stone extruded from the ridge revealing the northwest angle of the ridge’s subsurface geology.

COLLECT

Shale and sandstone rocks are collected to form a bench.

ORGANIZE

The rocks stack in a northwest angle revealing the direction of collision and the subsequent uplift. The lower rocks are partially buried so that the bench structure connects with the subsurface geology.

DEFAMILIARIZE

The jagged rock bench seems unfamiliar on the rolling hill top, however these rocks would have been exposed millions of years ago when the geologic substrate was first thrust to the surface.

FOCUS

The bench facilitates climbing up into a concave seat. From this uplifted perspective long views to the ridges south of the site are revealed. Sandstone cradles the user as they contemplate the seven stations and the revelatory experiences and new relationships they have just made.

REVEAL

The extrusion creates a bench that uplifts the body, and, as the final station, creates a space to contemplate the processes encountered.

CHAPTER VI
ASSESSMENT AND FUTURE STUDIES

The intention of this project is to create an educational experience linking the body to the site. This project uses landscape processes, such as the sedimentary rock cycle, to craft a narrative that park users may chose to experience through a guided, open narrative. It is the hope that this designed experience, can foster a relationship between people and the landscape. Furthermore, in revealing the story of the landscape, the project could affect peoples' future decisions regarding the land. This chapter focuses on assessing the success of the project and potential future studies.

Assessment and Future Studies

Over the course of two semesters and various reviews and critiques several questions have been raised by committee members, guest reviewers, classmates, and by me. I feel that the following five questions need clarification and further thought.

1. Why go through the trouble to reveal the site's geomorphology? Why not reveal something in dire need of remediation?

In choosing SIWR as my site, I made a conscious decision to forgo direct ecological regeneration as an end to my eco-revelatory design elements. SIWR is currently undergoing ecological restoration; transitioning from an old farmstead to a wildlife refuge managed for habitat. Instead of remediating a degraded ecology, I hope my design proposal can help restore a holistic view of people's relationship within broader environmental systems. There are many places that desperately need ecological restoration, but there are many more that have yet to be spoiled. My tactic is to (very hopefully) create an experience that will positively influence people's future decisions regarding our environment. My wish is to attenuate park users to expanded ideas of time, place, and process while creating intimate spaces where they feel connected to the landscape. In these spaces, and along the paths between them, I hope people will begin to feel less alienated from the world of natural phenomena, and I hope it will make them care more.

2. Why not reveal other aspects of ecology, such as plant and animal life, or even the entire ecosystem?

The goal of this thesis was to explore geomorphology as process. I chose geomorphology for two reasons. First, the initial site visits left me with the desire to understand more about the landforms on site. The combination of the floodplain, the ridges and valleys, and the proximity of the river piqued my interest. Once I began researching the reasons the landforms existed in their present form, I realized that the plant and animal life at SIWR was a result. I came to realize that in a sense, revealing the geomorphology of a site is the first step in revealing the life of a site. Potential future studies that would be beneficial may include expanding the ideas discovered in this project to a eco-revelatory design of the entire site's ecosystem. This information could serve as valuable experiential enrichment and outreach for SIWR.

The second reason has to do with public knowledge. I believe many people feel alienated from geologic processes. The aim of the project is to educate people about an often overlooked, but fascinating, landscape process.

3. Is photography the best method you could use to perform a phenomenological site inventory and analysis?

I think that photography served its purpose well for this project, however, I would like to explore video recording and sound recording for future phenomenolgical studies.

4. Is it possible to reveal geomorphology (or any environmental system) with design only?

George Descombes states, "the essential difficulty of landscape intervention is how to make certain forces conspicuous and, hence, how to make new forms, to create new feelings and associations" (Descombes 1999). I think this quote sums up my feelings on the process of revealing geomorphology at SIWR. For me, the most difficult part of the design process was striking a balance between making enough impact for people to take note while not destroying the process. I think any design is revelatory of something. If you are designing with rock as a material, then you are revealing rock. But if you can design with process as a material, then perhaps you can reveal process. This is subjective and much of the success of revelation will depend on the disposition of the park user.

5. Can eco-revelatory design lead to a shift in environmental values?

Designers from PLANT state “We need to engage people in the perception of the landscape in order to create future stewards of the land. By directing the ways in which people perceive the place – see, smell, and hear (the landscape) is brought into focus” (Cooper 2003). I think the merit of eco-revelatory design is that it can help people see the landscape. Many peoples’ experience of the environment is looking at it from an office or car window. The first step in shifting environmental values, is helping people see the thing that needs protecting.

I would consider this project successful if, for some, learning about the geologic processes that formed SIWR led to further study of the earth and its processes. For those people, I hope that learning more about the earth leads to better decisions about the choices we are currently making, as these choices have profound effects on the earth many years into the future. For others, I would consider the project successful if it makes a walk through the park a little more enjoyable because you are now more aware of the processes that shape the earth, and perhaps you can see yourself as part of the continuous story of time and life.

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APPENDIX

APPENDIX A
CASE STUDIES

THE SWISS PATH
GENEVA, SWITZERLAND, 1991, GEORGE DESCOMBES


Path along The Swiss Way
Image Source: www.onthesnow.com

"My main interest ... moves from the trace at one moment - as memorial - to the recognition of changes in time and future potential. Consequently, I believe that both buildings and designed landscapes must not only make the passing of time visible but also make this passage effecting of further potential" (Descombes, 1999).

DESIGN CONCEPTS

In the Swiss path, Descombes employed minimal interventions to amplify the user's subjective experience and interpretation of the landscape. The design includes an earthen path that varies in width in response to landscape elements. The path is oriented to bring the user to specific views, both of dramatic landscape vistas and often overlooked aspects of the site such as gnarled tree roots. Descombes also makes a point to clarify past human and natural interventions, along the path. To leave a mark of today's activity, he sited a large, circular metal structure, the Chanzeli near the center of the path. The Chanzeli positions the path users to a view of the landscape where seasonal changes can be observed.

WALL AT STORM KING SCULPTURE PARK
NEW YORK 1997-1998, ANDY GOLDSWORTHY

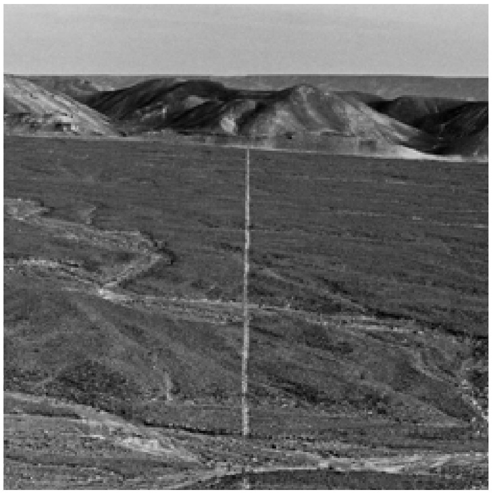
Stormking Wall at pond
Image Source: flikr user dicksoto

"The idea of stone flowing links the magmatic origins of the land's geology, the glaciers; fragmentation and transport of boulders and people's long history of shepherding loose stones into functional structures" (Baker, 2000).

DESIGN CONCEPTS

At Storm King Park, Goldsworthy defamiliarizes materials and draws attention to the temporal affects of natural and human interactions with the land. Goldsworthy gathered rocks from the grounds of the site to build the 700-meter long wall. The wall is built near the foundation of a previous stone wall that existed on site. The new wall meanders though the woods down to the water, where it submerges out of view. The original wall was built in a straight line as an agricultural boundary along the edge of a crop field. Goldsworthy's wall pays homage to the agricultural stone wall, but is built in response to the forest that succeeded the crop field. By wrapping the wall around the trees, Goldsworthy called attention to the interactions between agriculture and the built environment, the growth of the trees, and the time scales that encompass both human and natural landscape changes.

WALKING A LINE
PERU 1972, RICHARD LONG



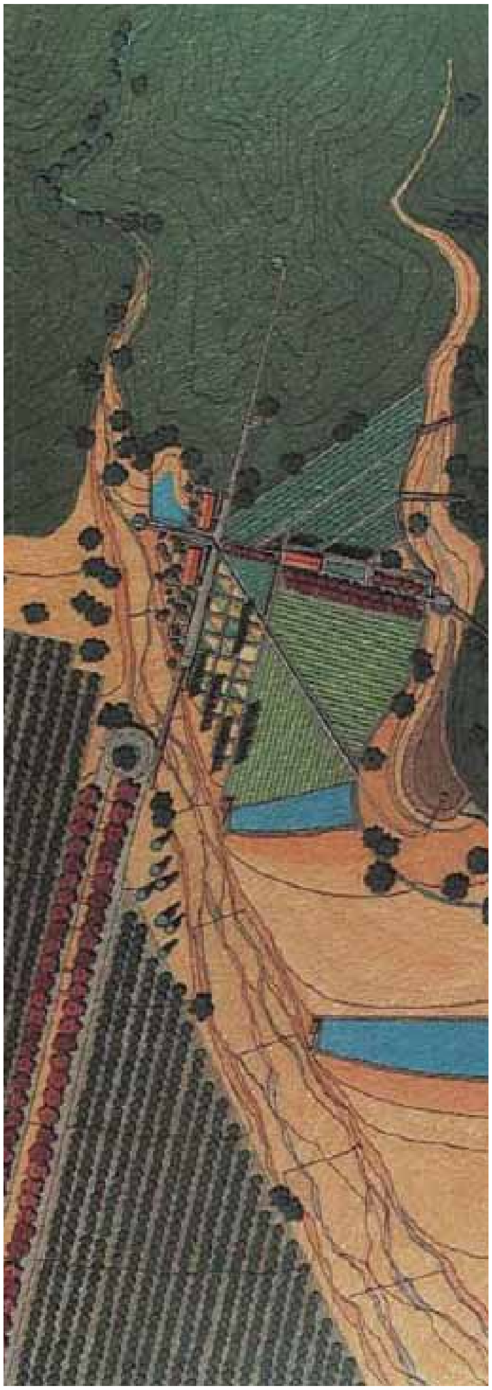
Walking a Line
Image Source: www.richardlong.org/

"In the nature of things: Art about mobility, lightness and freedom. Simple creative acts of walking and marking about place, locality, time, distance and measurement. Works using raw materials and my human scale in the reality of landscapes" (Long, 2012).

DESIGN CONCEPTS

Walking a Line in Peru was completed in 1972 on one of the markings of the Nazca Plain made centuries earlier. Long employed defamiliarization of materials, in this case white stones, drawing attention to the temporal affects of natural and human interactions with the land. Long is known for his delicate impact on the land, creating art that sometimes lasted only long enough to be photographed. In many of his works, he simply walks a line repeatedly to leave a path of foot marks.

FOOTHILL MOUNTAIN OBSERVATORY
SIERRA MADRA, CALIFORNIA (DATE?), TERRY HARKNESS


Site plan
Image Source: Harnkness, 1998

"The Foothills Mountain Observatory is a landscape observatory. It provides a lens, an experiential window onto the landscape of Southern California. The park is designed to focus the observation and experience of natural and cultural processes at a local scale--water and flood, mountain building and mass erosion, seasonal drought and fire on the one hand, and human labor; harvest and wealth, misuse and care on the other" (Harkness, 1998).

DESIGN CONCEPTS

Harkness' organizational strategy incorporates contrast and comparison, intersection and edge, proximity and overlook to reveal the regional landscape's continuity and its changing expression.

MACKINNON WOODS
ONTARIO, CANADA 2001, MARY CATHERINE KILCOYNE

Conceptual site plan
Image Source: Kilcoyne, 2001

"Through the medium of the architectural intervention, this work explores a shift in perception so as to register landscapes in flux at a level of intimacy" (Kilcoyne, 2004).

DESIGN CONCEPTS

The MacKinnon Woods projects involves three measures of observing change in the landscape. First is reading change through the use of a transect and benchmark. Second is translating change in terms of plant and animal phenology. Third is registering change using architectural interventions as translators of change in the landscape.

Spring roon in spring, summer, and winter
Image Source: Kilcoyne, 2001

APPENDIX B
LITERATURE REVIEW

SPIRN, A. 1995. CONSTRUCTING NATURE: THE LEGACY OF FREDERICK LAW OLMSTED.

Anne Spirn proposes in her essay that the potential of Frederick Law Olmsted's (1822-1903) legacy has not been fully explored and realized because his projects have either been forgotten or misunderstood. She posits that the majority of his built work has been underutilized as a precedent in contemporary landscape architecture because it is seen as the preservation of wilderness or natural areas and not as human constructed landscape systems. She begins her essay with an overview of Olmsted's vision for landscape architecture and then relates four case studies that outline the evolution of Olmsted's work. She concludes with a section devoted to "reclaiming" Olmsted's vision and what it conceptually means to "reconstruct nature."

Spirn begins by acknowledging that today few people recognize Olmsted's work as "built landscapes." (91) She suspects that most people believe places like New York's Central Park and the Boston Fens are areas of preserved natural features, not constructed landscapes. She charges Olmsted's artfulness and skill at emulating natural landscape features with the confusion, and goes on to state that many subsequent works of landscape architecture are invisible to the public because of the "natural style" that Olmsted used and that was, subsequently, so prolifically imitated by other landscape architects. Spirn suggests "many landmarks of landscape architecture are assumed to be works of nature or felicitous, serendipitous products of culture. This blindness prevents their appreciation as artful answers to knotty questions of conflicting environmental values and competing purposes." (91) For these reasons she suggests that Olmsted's work needs to be examined and reclaimed.

The first case study she outlines is that of Yosemite. Olmsted's involvement with Yosemite began when he was asked by Congress to chair a commission put in place to determine the best use for the tract of wild land the Federal Government had set aside in 1864 "for public use, resort, and recreation." (92) In his report he recommended that the Federal Government take measure to ensure "free enjoyment" for all citizens to prevent Yosemite, and places like it, from becoming "rich men's parks." (91) He also called for the preservation of the area's scenic qualities through careful layout and placement of roads, buildings, and trails. In this sense, Olmsted wanted to limit the "intrusion of 'artificial construction'" in the landscape, as he believed strongly in the beneficial power of natural scenery. Spirn calls attention to Olmsted's position on obscuring "artificial constructions" and raises the question of how to reconcile the infrastructure needed to provide access to tourists visiting Yosemite without destroying what they came to see. (94) She implies the irony that Olmsted's "concealment of the artifice of his intervention permits the misconception that places like Yosemite are not designed and managed." (95)

The next case study Spirn explores is Niagara Falls, which she believes is reflective of the changing cultural meanings of natural areas through time. While Niagara Falls was a popular tourist destination in the early nineteenth century, by the mid-nineteenth century its flow had been diminished by upstream industries and the approach to the falls was littered with factories. Olmsted became involved in 1879 as part of a campaign to "establish Niagara Falls as a public reservation and restore its scenic qualities." (95) To shed light on the changing cultural attitudes toward nature, Spirn outlines the course of action taken by New York State in dealing with the falls. In 1887 Olmsted and his partner Calvert Vaux were hired to design a plan for the Niagara public reservation. During this time the popular view was that God created nature and that it could be framed by people, but not constructed by people. (98) In 1926 the state appointed a board to "determine how the vanished beauty of Niagara Falls might be restored." (97) Here, the common view was that of a "progressive union of nature and culture." (98) Finally, in 1967 a board was appointed "to investigate measures necessary to preserve or enhance the beauty of the falls." (98) At this time in American history there was a sense of guilt over the human effects on nature, and nature (not just natural scenery) was becoming something worthy of protection.

Spirn then turns to a study of the Biltmore forest to explore the implications of protecting and managing nature. At Biltmore, Olmsted found an opportunity to establish America's first managed forest. Gifford Pinchot was hired to work under Olmsted's supervision, and together they formed a conservation policy at Biltmore proving that "trees could be cut and the forest preserved at one and the same time." (100) Furthermore, in her final case study, Spirn explores Olmsted's continued invention of novel landscape constructions. Olmsted's work at the Boston Fens and Riverway were, as far as Spirn can tell, the first attempt to construct wetlands anywhere. (104) The Fens were designed as a complete landscape system to "accommodate the movement of people, the flow of water, and the removal of waste" in a highly urbanized area. (104) She states, "today these works are admired, but are widely assumed to be preserved bits of nature in the city, rather than places that were designed and built." (104)

To conclude, Spirn relates that Olmsted's work was successful in that it took into account the physical and biological processes of the natural world and applied them in novel ways to constructed landscapes. However, where Olmsted failed was in the disguise of his artifice as “natural.” In this way, Olmsted prevented his landscapes from being rightly seen as human artifice. Spirn maintains that “landscapes blur the boundaries between the human and the nonhuman” and that “calling some landscapes “natural” or “artificial” or “cultural” ignores the fact that landscapes are never wholly one or the other.” (111) She posits that this sort of dualistic thinking fosters the conceptualization of humanity as a contaminator of nature, and “prevents us from appreciating the potential beneficial effects we might have” when dealing with degraded landscapes. (111) In this sense, Olmsted’s work offers a precedent to emulate but not to imitate. Spirn suggests we “employ and celebrate the physical and biological processes that connect human and nonhuman nature but not always copy the outward appearance of natural features, not always try to conceal the design.” (112) In so doing, she suggests, we will be more likely to recognize the human role in designed landscapes and this will foster a reckoning with the “human values we inevitably project upon such places.” (112)

Assessment:

I think Olmsted’s attempts at responsible landscape management were so successful at mimicking natural processes and sceneries that his ideas actually backfired. His work along the Boston Riverway became seen as the preservation of natural wetlands and forest, not as the reclamation of contaminated lands for a functional and aesthetically beautiful park in the city. To be able to recognize the human hand in the design and construction of the Fens and Riverway (or any other constructed landscape of this sort) would have added a social and cultural aspect to the project that would force people to celebrate the union of humanity and natural process. By forcing people to confront this union, Olmsted could have created a much more “visible” profession for landscape architects. I think this will be the great challenge for our generation of landscape architects.

WESTLEY, F., CARPENTER, S., BROCK, W., HOLLING, C.S., GUNDERSON, L. 2002. WHY SYSTEMS OF PEOPLE AND NATURE ARE NOT JUST SOCIAL AND ECOLOGICAL SYSTEMS.

In this essay the authors seek to reveal the possible differences and similarities of social systems and ecosystems. They propose this in order to indicate the degree to which the systems are different and should be treated as separate entities or, on the other hand, similar and "the extent to which we can use conceptual frameworks to bridge the differences and explore interlocking theoretical and action frameworks." (104) The authors explore two main questions. The first originates with ecologists: "Why are systems of people and nature not just ecosystems?" The second is based in the social sciences: "Why are systems of people and nature not just a type of social system?" (104) The authors point out that from the ecologist's perspective people are seen as one species among many, and that the nature-culture split is arbitrary. In a contrasting view, the social scientist would argue that humans have changed nature to such a degree that it exists only as a human construct. These differing views are explored in light of four themes that help guide the comparison of the systems: abstraction, reflexivity, forward-looking behaviors, and externalization and technologic development.

The authors begin by outlining the "dimensions of organization and behavior" they propose as the basis of their scientific inquiry. (105) They begin with ecosystems, defining them as "places on earth that consist of biotic components (life) and abiotic or physical components [that] act in such a way that a dynamic set of processes produces a complex and diverse set of structures." (105-106) They continue to say that the "interaction is described as self-organizing—that is, structure and processes mutually reinforce each other." (106) The authors explain that understanding space and time scales as dimensions of ecosystems is critical because "they provide the basis from which theory can be generated and hypothesis can be derived and tested." (106) The authors then describe the dimensions from which social systems can be scientifically investigated. They define a social system as "any group of people who interact long enough to create a shared set of understandings, norms, or routines to integrate action, and established patterns of dominance and resource allocation." (107) They continue to describe social systems as ranging in size (from as small as a family to as large as a nation) depending on "how boundaries are drawn," and point to three key similarities between ecosystems and social systems: "they must be oriented toward certain goals or objectives, they must create mechanisms for integration and adaption, and they must create mechanisms for self-reproduction." (107) While ecosystems and social systems have the previously mentioned spatial and temporal similarities they differ in that social systems have the ability to construct symbols. This ability to signify provides the foundation of social systems and distinguishes them from ecosystems.

The authors begin their exploration of the human capacity for construction with a discussion of “abstraction.” They explain that humans are “sense-making animals” and that “through the use of communication, language, and symbols they collectively invent and reinvent” their world and act in accordance with their ascribed meanings as though they were reality. (108) They stress the importance of this notion due to the implications it has for insulating the human experience from the physical world. The authors believe this is the most important aspect of abstraction for comparison to ecosystems because “the social systems ability to shape and then be shaped by structures of signification allows human systems to divorce themselves to some degree from space and time, the critical organizing dimensions of ecosystems.” (108-109)

The next section discusses reflexivity as an aspect of social systems. Here the authors see reflexivity in social systems as the ability to maintain notions of integrity and identity while dealing with change in the system. The authors suggest, “under conditions of modernity and postmodernity this reflexivity is increasing, intensifying the potential for cross-scale disturbances.” (111-112) In other words, the human ability to construct meaning drives the process of increased cross-scale disturbances while simultaneously maintaining the social systems integrity. The authors then point to a key assumption—that humans have great difficulty solving problems that cross multiple time scales. They contrast this with an ecosystem’s imbricate array of self-organizing features that allow for flexible reactions to disturbances over varying temporal and spatial scales.

In the following two sections the authors discuss the social system aspects of forward-looking behavior and technology. The authors outline the key differences that the capacity for forward-looking behavior creates between ecosystems and social systems. They relate that while “in ecosystems, the rate of response to an opportunity would be limited by dispersal rate, numerical response of predators, or rate of adaption… in social systems, the responses are instantaneous.” (114) This is due to the unique human ability to link information about the future to the present. In addition to forward-thinking behavior, social systems depend on human technology. The authors suggest that technologic advancements tend to create complexity in social systems, while there exists no parallel for increased complexity in ecosystems. The authors also point to the linear logic technological advancements are often based on, and the limited scales at which technological solutions are aimed. They warn that the effect of linear, single scale thinking can have detrimental effects at other scales and “result in the erosion of resilience.” (118)

To summarize, the authors propose that in order to move past the postmodern perspectives of social systems and ecosystems we must thoroughly understand and examine the dimensions that a system's patterns and processes are studied with. They state, in ecosystems the "key dimensions are space and time," and while these dimensions also apply to social systems, a third dimension, "symbolic construction" or "meaning" must be added. They offer that this third dimension "helps to explain the fundamental lack of responsiveness or adaptability to environmental signals that characterize much of natural resource management" today, and taking into account the human ability to construct meaning will allow a better understanding of the unique human ability to have such a vast impact, both in time and space, on the natural environment. (119)

Assessment: I liked this article because as a student of landscape architecture I am often confronted with the ambiguities of these two systems. As a designer of places that encompass the needs of both social systems and ecosystems, it is very helpful to clarify and distinguish where there are similarities and differences in terms of the components, patterns, and processes. After reading this I think I will start looking for more of the parallel dimensions of the two systems as places where there can be "crossover" design elements that benefit both socially and ecologically at the same time.

GENIUS LOCI: TOWARD A PHENOMENOLOGY OF ARCHITECTURE
NORBERG-SCHULZ. 1979

One of the first architects to adopt phenomenology as a design method was Christian Norberg-Schulz. In Genius Loci: Toward a Phenomenology of Architecture Norberg-Schulz explores the phenomenology of place and the ways in which we can come to understand place as a gestalt of concrete, qualitative phenomena. He posits that only through understanding the unique phenomenology of specific places one can dwell in meaningful reciprocation with the world. He contests that "phenomenologists have been mainly concerned with ontology, psychology, ethics and to some extent aesthetics, and have given relatively little attention to the phenomenology of the daily environment." (NS p8) The neglect of the "daily environment" in which life occurs is manifest in the "functional approach" to design. From a functionalist perspective, daily acts such as cooking or gardening are treated as universally similar functions of life. As such, when designing places for these activities, specific cultural and environmental requirements are not taken into account. Norberg-Schulz proposes a phenomenological approach where general, abstract situations (i.e. kitchen, yard) become concrete places with inherent meaning, places where dwelling may occur.

To begin, Norberg-Schulz distinguishes between places in the natural world and the manmade parts of the environment. To better understand natural places, he turns to the philosophy of Heidegger and his concepts of earth, sky, world, and dwelling. Heidegger refers to the earth as the "serving bearer, blossoming and fruiting, spreading out in rock and water, rising up into plant and animal…" and the sky as "the vaulting path of the sun, the course of the changing moon, the glitter of the stars, the year's seasons, the light and dusk of day, the gloom and glow of night, the clemency and inclemency of the weather, the drifting clouds and blue depth of the ether." (10) While it may seem trivial to make a distinction between earth and sky, when we consider Heidegger's definition of dwelling "the way in which you are and I am, the way in which we humans are on the earth," reveals the importance of this distinction: to be on the earth is to be under the sky. In this sense, what is between the earth and the sky is the world, and for Heidegger "the world is the house in which mortals dwell." (10) In other words, the world becomes an inside, and mortals dwell within this natural place. Norberg-Schulz explains, "nature forms an extended comprehensive totality, a 'place', which according to local circumstances has a particular identity. This identity, or 'spirit', may be described by means of the concrete, 'qualitative' terms Heidegger uses to characterize earth and sky, and has to take this fundamental distinction as its point of departure. In this way we might arrive at an existentially relevant understanding of landscape…"; an understanding that is purged of the unquestioned acceptance of the everyday world. (10) Norberg-Schulz continues noting that within the landscape there are subordinate places defined by distinct spatial arrangements and characters. Furthermore, the landscape contains natural objects, such as a tree, that condense the meaning of the natural environment. In other words, by bringing together, by gathering, elements of the earth (soil) and the sky (wind), making them concrete and visible, the tree manifests and condenses the meaning of the natural world.

Furthermore, Norberg-Schulz explains that the man-made elements of the environment also act as concentrations of the world. He quotes Heidegger saying, "buildings bring the earth as the inhabited landscape close to man, and at the same time place the closeness of neighbourly dwelling under the expanse of the sky" (10) In this way, man-made features transform the natural landscape into a cultural landscape. When these elements are thoughtfully and organically related to their environment, the serve as focal points where cultural meaning can reveal and explain the natural world.

Norberg-Schulz posits that the distinctions between natural and man-made places (landscape and settlement) as well as the distinction between earth and sky (horizontal and vertical) are key elements composing the structure of places. While these distinctions can be classified as orienting features of the environment, Norberg-Schulz points to character as a third, particularly important distinction of a place. He states, "character is determined by how things are, and gives our investigation a basis in the concrete phenomena of our everyday life-world." (10) He believes that in order to fully come to terms with the character of a place is to recognize its genius loci, or spirit of place. Only with this recognition humans are able to dwell in the world.

LARSON, K. 2010. AN INTEGRATED THEORETICAL APPROACH TO UNDERSTANDING THE SOCIOCULTURAL BASIS OF MULTIDIMENSIONAL ENVIRONMENTAL ATTITUDES.

Main Points: Author Kelli Larson's intent is to formulate a conceptual framework that can be used as a basis for the comparison and assessment of multifaceted attitudes on environmental perspectives. Using this conceptual framework, she proposes to enhance the conceptual clarity and comparability of previous theoretical scholarship on human attitudes toward the environment. Larson believes that the "complexity of multifaceted judgments and the multiplicity of approaches" have led to ambiguity in prior research on the evaluation of human attitudes and value judgments. (899) In order to provide a clear approach for assessing environmental attitudes in a variety of different sociocultural contexts, Larson develops a framework that examines three primary attitude objects (goals, entities, and strategies) that are evaluated during human value judgment decisions concerning the environment and natural resources. Larson corresponds the attitude objects to the cognitive hierarchy of human judgments, and in so doing provides a clear basis for assessing human value judgments on the primary attitude objects.

Larson begins with an examination of the conceptualization of environmental attitudes. She states that while attitudes can be simply defined as "positive or negative judgments about an object or phenomena," attitudes about the environment are complex and multidimensional. (899) She utilizes the cognitive hierarchy model to explain the relationship between cognitive, affective, and conative attitudes. The cognitive hierarchy model associates cognitive attitudes to abstract personal beliefs and truths. Affective attitudes and conative attitudes are associated with evaluative judgments, and encompass emotional judgments and behavioral intentions, respectively. Larson's framework places emphasis on the influence of abstract cognitive attitudes on value judgments that, in turn, influence the concrete actions concerning environmental decisions. For example, deep beliefs (cognitive attitudes) may lead to personal judgments (affective attitudes) about the entities involved with environmental governance, and, therefore will likely influence the level of involvement and actions (conative attitudes) taken by individuals.

Larson recognizes that the combination of goals, entities, and strategies value judgments are examined against are "virtually infinite" when applied to the circumstances brought about by context-dependant environmental issues. Because environmental concerns are place specific, and because local context can significantly influence attitudes, it may seem prohibitive to institute a standardized framework for assessment of value judgment. Larson argues, however, that "comparable research approaches aid in generalizing empirical findings about the nature and structure of attitudes broadly," and that these findings can inform a framework that evaluates attitudes in diverse settings.

Larson proposes an integrated theoretical approach drawing from cultural theory, value-belief-norm theory, and the cognitive hierarchy model. Her framework engages the integrative perspective by "hierarchically structuring attitude objects along dimensions of social, ecological, and political values and beliefs" (901). She employs a general-to-specific method proposing that relatively few core values are the basis for increasingly more evaluative judgments and actions. In other words, "core values define what is important to people generally while providing a foundation on which attitudes are based" (901). Larson proposes that certain abstract core values are adopted by individuals leading to patterns of basic beliefs, or value orientations. Value orientations, which she posits as relatively concrete attitudes, directly influence people's concrete actions. Therefore, value orientations act as mediators between people's core values and their concrete actions. Furthermore, scholarship contrasting the New Ecological Paradigm (NEP) and the traditional dominant social paradigm (DSP) has illustrated that there are distinct dimensions to worldviews. For example, the NEP and DSP can be distinguished by their respective tendencies toward biocentrism or anthropocentrism, respectively. This example of "common core value orientations reflect culturally shard beliefs, or ecological worldviews, that influence more specific environmental attitudes" (902). Integrating the cognitive hierarchy model and cultural theory creates a framework that informs the conceptualization of attitudes, and "emphasizes how political orientations combine with social and ecological values and beliefs to determine the dimensions along which attitudes vary and therefore should be evaluated" (902).

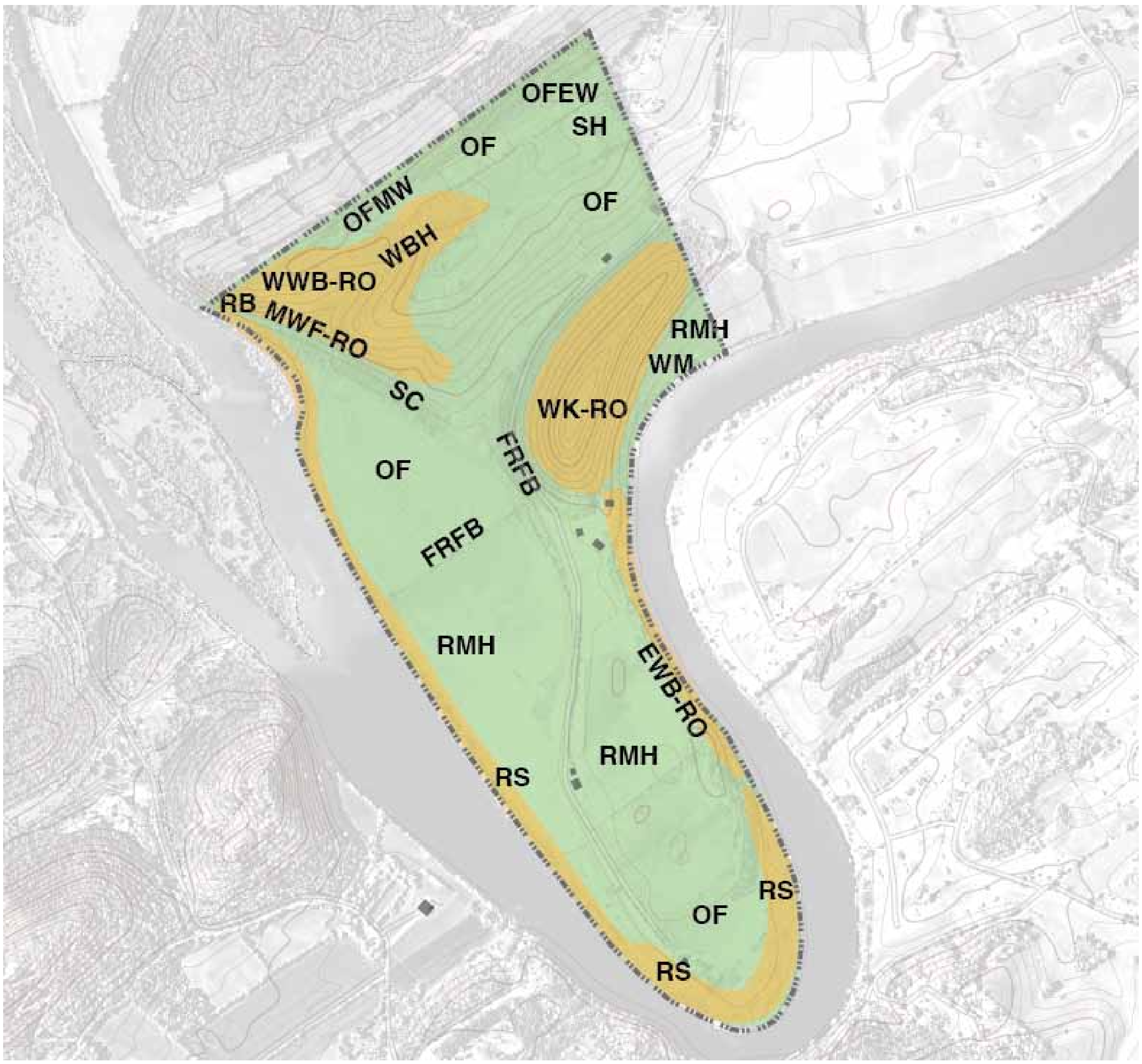
Larson continues to give a detailed description of the framework, which is visually depicted as a cognitive hierarchy triangle diagram with one of the three attitude objects in each corner. The triangle is organized from generalized to specific, with "goals" at the tip of the triangle corresponding with the most generalized dimensions of socioecological values and value orientations. Derived from "goals", and their associated core values, are "entities" and "strategies", which correspond with more specific sociopolitical beliefs. Furthermore, each of the primary attitude objects is organized as a Venn diagram to show the interrelatedness of value judgments and attitudes among "distinct yet related phenomena" (904). The primary attitude objects are further organized as quadrants arranged along two axes delineating the sociocultural dimensions on which value judgments are based. Thus, "the framework is oriented toward assessing attitudes about various natural resource domains and targets, potentially involving an array of intersecting goals (ends), entities (actors), and strategies (means)," and can be used to foster understanding of how people's beliefs combine with their abstract core values and value orientations to bias their attitudes and actions. (904)

In conclusion, Larson suggests that future studies should focus on gathering more empirical data on the "particular sociocultural basis of attitudinal dimensions," so that better assessments can be made regarding the "social acceptability and political feasibility of resource management regimes in specific situations" (905). Also, she acknowledges that the previous scholarship the framework is based on is targeted at US and other western, developed countries' tendencies. She argues, however, that because the core attitude objects are largely relevant to natural resource management regardless of context, the framework is applicable to a broad range of site-specific environmental resource management regimes.

Assessment: I found this article to be extremely informative. Larson's conceptual framework is aimed at clarifying, while simultaneously integrating, multiple theories for understanding the sociocultural basis of people's environmental attitudes. The correlations she is able to draw between cultural theory and the cognitive hierarchy model are very helpful, and the visual diagram depicting that correlation has clarified notions that have been vague to me up to this point. My only criticism is that I'm not convinced that this framework could be applied to non-western, developing countries as readily as Larson proposes. She states that "people's attitudes are central to developing socially acceptable and effective natural resource management regimes," and I while I agree that goals, entities, and strategies are fairly universal objects when considering environmental resource management, I don't believe that people's values and attitudes in contexts other than that in which her framework has been developed can be assessed based on this framework with out substantial modification or testing. (898)

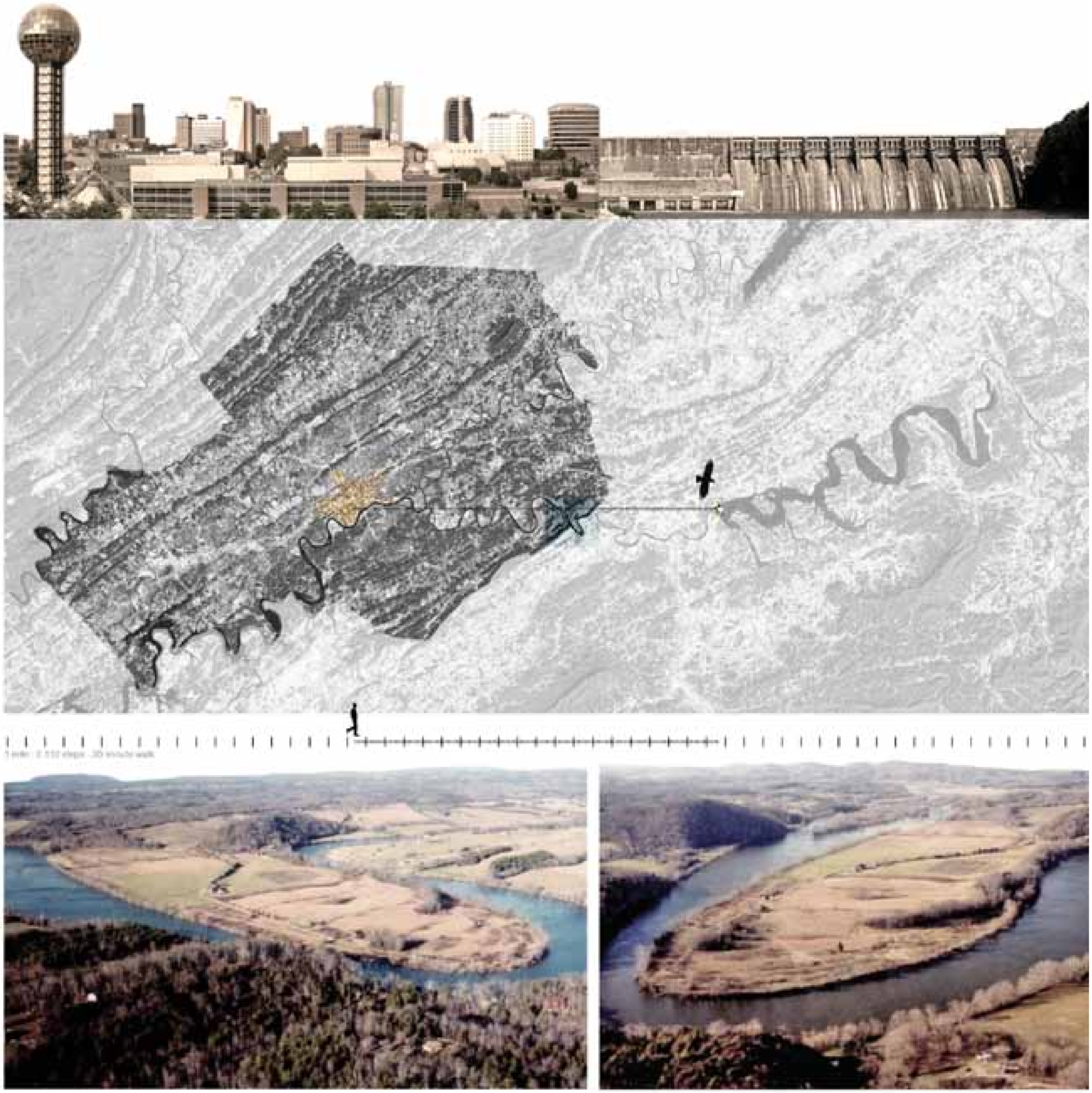
APPENDIX C
SITE ANALYSIS

Vegetative Cover Types. Early Successional Habitats in green. Woodland Habitats in orange.
Adapted from Schacher, 2001.
Background Image Source: Google Maps



Vegetative Cover Types
Adapted from Schacher, 2001.

Early Successional Habitats	
(RMH)	Regularly Mowed Fescue Hayfields
(WM)	Wet Meadow
(OF)	Fallow, Irregularly Maintained, Grasslands-Old Fields with minimal encroachment of Woody Species
(OFMW)	Fallow, Irregularly Maintained Old Fields, with moderate encroachment of Woody Species
(OFEW)	Fallow, Old Fields with extensive encroachment of Woody Species
(FRFB)	Woody-Herbaceous Fencerows, Tree Lines, Field Borders and Road Rights-of-way
(SH)	Upland Sinkhole
(SC)	Intermittent, Blue-lined Stream Corridor
Woodland Habitats	
(WK-RO)	Wooded Knob with Rock Outcrops
(RS)	Low-lying Riparian Shoreline along French Broad River
(EWB-RO)	Steep, Wooded Bluff along Eastern Shoreline of French Broad River with Rock Outcrops
(MWF-RO)	Wooded Finger Mid-point toward Steep Bluff at Western Shoreline of French Broad River, with Rock Outcrops
(RB)	Rock Bluff and Base of Rock Bluff Along Western Shoreline of French Broad River
(WWB-RO)	Ridge-top Woodland to Steep Bluff at Western Shoreline of French Broad River, with Rock Outcrops
(WBH)	Woodland in Broad Hollow
(WUP)	Ephemeral Stream Drainage, West from Upland Pond



Regional Location Map
Background Image Source: Google Maps
Downtown Knoxville Image Source: citydata.com
Douglas Dam Image Source: TVA
SIWR Aerial Image Source: Schacher, 2004

Phenomenological Inventory Photos

Site Experiments

The design process outlined in the previous section was tested on site with common materials such as landscape marking tape, construction flags, and a 100’ tape measure.

I began by marking the location of the path. Next, I collected stones to build a small scale model of the eco-revelatory design. This helped me understand the different stone types found on site and the way each reacted to construction. I built scaled models along the path, took notes, sketched, and photographed. I then extrapolated the scale model to full scale using marking tape and construction flags. The example shown here was the original location for the Uplift Station. Similar experiments were performed for all seven stations.


Marking the transect


Small scale model and notes


Extrapolation to full scale


Photo Documentation

VITA

Valerie S. Friedmann is from Knoxville, Tennessee where she has been pursuing her Master's Degree in Landscape Architecture from the University of Tennessee. She earned a B.S. in Landscape Design and Construction from the same institution in 2007. Valerie has been active in the Tennessee State Chapter and Student Chapter of the American Society of Landscape Architects (ALSA). She served as Student Representative to the State ASLA Executive Committee and President of the student Chapter during the 2011-2012 academic year. Valerie has also been active with the New Norris House, an award winning model home and landscape designed and built by students. Valerie is honored to be the 2011-2012 recipient of the ARCC/King Student Medal for Excellence in Architectural + Environmental Design Research at the University of Tennessee. She was also awarded the Landscape Architecture Faculty award for Excellence in Leadership, Gamma Sigma Delta Honor Society of Agriculture Graduate Student Award, and she earned an East Tennessee ASLA Student General Design Award of Merit in 2011. Valerie is a member of Tau Sigma Delta Architecture Honor Fraternity.

After graduation, Valerie hopes to advance her career in academia while pursuing licensure as a landscape architect. Long term goals include working abroad and giving back to the profession by educating future generations of landscape architects in the artful stewardship of our land and water.