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I, Nicholas Schoepnner, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture (Master of).

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Rebirth: Natural Architecture for Urban Humanity

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Rebirth
Natural Architecture for Urban Humanity

A thesis submitted to the
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in the College of Design, Architecture, Art and Planning

by

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Abstract

Urban humans have accepted a role in false realities brought on by an unsustainable flux in technological advances that has left the natural world as a backdrop to life as opposed to the main source of it. Greater awareness about the benefits of temporarily removing ourselves from our over-indulgence in technology and becoming reintroduced with our natural surroundings will begin to balance our lifestyles holistically as opposed to linearly. Creating a Natural Architecture for Urban Humanity will form culturally significant spaces for personal reflection through nature in an urban setting, resulting in a complete release from the urban fabric for short periods of time.

This thesis explores the role of the natural environment on the psyche of the urban human through a series of enlightenment spaces that draw on Heideggerian philosophical concepts and Semperian technique. These spaces will not just immerse the urban human within a world they are unaccustomed to, but rather educate them through multiple opportunities on the benefits of this temporary release from technology, culminating in a greater connection to nature that can begin to retake its position within urban centers. Situated in Washington D.C., Natural Architecture for Urban Humanity begins to implement its program alongside the National Park Service and will focus heavily on engaging the urban human in a location with which they are familiar while providing experiences never before considered in an urban setting.
Preface

This thesis did not spawn from observations seen from afar, but rather from personal experience in the benefits of interacting with nature in its raw form. Since childhood, I have had the fortune of living without running water and electricity for a couple weeks every summer while vacationing at my family cabin in Wisconsin. This forces me to become more in-tune with my surrounding environment and listen to its cues about what I should and should not be doing. For instance, when the sun was beating down midday, I had no choice but to stay indoors and cool my core temperature. But as soon as it cooled down slightly, I was back outside gathering wood for the cold nights or preparing food for the upcoming meals. My actions and those actions of my family were directly influenced by the vast natural environment that surrounded us. There seemed to be a dance of sorts between nature and humans that was everlasting and ever-changing, creating a beautiful marriage between two entities never meant to be separated.

To my parents who have always supported and believed in me.

To my friends who have pushed me to achieve more.
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Rebirth
Natural Architecture for Urban Humanity

By: Nicholas Schoeppner
Introduction

Since the earliest humans roamed the Earth, there has always been a need to not just survive, but thrive as well. These early societies required basic needs such as water, food and shelter. They often sought the latter in caves and natural land formations. As the population grew and curiosity increased, they began to seek refuge along waterways such as lakes and rivers. This garnered the need for manmade shelters with which they could dwell and become protected from predators and intense weather. These early humans began constructing these shelters based on knowledge they had gained from generations prior, which blossomed from an understanding of the natural environment. Walls and roofs were made from nearby trees, while wall coverings and roofing was made from the leaves and needles of those trees. They were built in a way that could easily be discarded and built anew should the need arise to change locations. Even when a desire for more permanent dwellings arose in ancient civilizations, the use of local stone and earthworks carved within the landscape was the predominant method of construction. Beyond simple stone or wood construction with later shelters, a reliance and understanding of the natural environment was crucial to a civilizations survival.

This sense of place within the natural context remained the norm for thousands of years until the invention of artificial indoor heating and cooling during the Industrial Revolution in the late 18th and early 19th centuries. Rapid Industrialization began a trend that would ultimately lead to an entire population’s reliance on technology with little thought given to their surrounding natural environment. Nature all of a sudden became a slight annoyance as we travel from one controlled environment to the next, as opposed to a meaningful coexistence that required adaptation to changing trends in our surroundings.
This thesis project proposes a public dwelling that reintroduces the urban human to the natural environment in Washington D.C. that will provide opportunities for enlightenment into the benefits of nature that have been lost over the past two hundred years. Washington D.C. provides the perfect backdrop for this proposal as it is rich in world culture, human interaction and urbanism that successfully intertwine for an effective modern metropolis. The area itself is surrounded by vast woodlands a short drive away, waiting to embrace the citizens of urban D.C. with open arms stretched out for the enjoyment of all who pay it a visit.

The current status quo has stifled this desire to the point of non-existence; not because it isn’t inherent in who we are, but because the exposure to such environments has been pushed to the back of the mind with little thought reserved for outdoor activities. We have been trained through a lifelong of marketing and comforts that are taken for granted, that simply getting an education, working your whole life, and retiring as a productive member of society is all that is required to have a fulfilled and meaningful life.

To begin the discussion about reintroducing the urban human within the natural environment, we must first take a look at all the pieces involved. Obviously the urban human is a main player, so what exactly is the role of this group within the context of the thesis? Secondly, what aspects of the natural environment are trying to be shown to these humans? After defining the full interaction of the urban human, we must then look at how the idea of shelter comes into play. To begin with this, basic necessities in relation to human survival shall be determined alongside historical and current trends in society. Furthering this discussion will be Heidegger’s philosophical ideas and techniques.
developed by Semper alongside their beliefs about nature’s role in architecture and our everyday lives. Combining their concepts along with the goals of this thesis will create the idea of the ‘Power of Four.’ The Power of Four is constructed through an appropriate integration of Semper’s four elements of architecture and Heidegger’s fourfold. This is then combined pertinently with my four pieces of program that provide instances for a proper amount of personal enlightenment gained through a seamless reintroduction within the natural environment, achieving a cohesive thesis as a benchmark for future programs of similar intent.
Chapter 01

Power of Four
Power of Four

Introduction

The number 4. Why does this number carry such significance with human existence? Is it instilled in us to enjoy this number or is it borne out of years of life’s experiences? Let us just think about its simplicity yet abundance in the lives of every human on Earth. There are four seasons, four winds, four cardinal directions, four elements of nature. In Biblical circles, the first humans Adam and Eve lived in Paradise with four rivers arranged in the four arms of the cross coexistent with four infernal regions, seas and sacred mountains. Instilled in them by God were also the four Cardinal virtues of wisdom, justice, courage and moderation. Beyond this, the fourth day of God’s creation is the sun, moon and stars which were created to help humans keep track of time, which just so happens to be what our species commonly believes to be the 4th dimension of reality after the point, line, plane and space. A more scientific approach has the number four rooted well not just with previously
mentioned instances but also mathematics and biology. Literal study of the number four has us realize that it is the smallest composite number, smallest squared prime, is rooted in the duodecimal and vigesimal systems, creates the four-sided plane figure which is of important significance to mathematics. The study of honeybees and primordial hominids has determined that biological creatures at their core instinctual level can recognize no more than four objects at a time without requiring the need to count. Astronomically, our home, Planet Earth, is the fourth celestial object from the center of our solar system after the Sun, Mercury and Venus. These aren’t just coincidences, but rather moments of history and belief our race has accepted into our everyday lives.

Two theoreticians have summarized the importance of the number four perhaps better than anyone in history; Gottfried Semper and Martin Heidegger. Semper discusses the Four Elements of Architecture and how a human’s dwelling can be simplified to just these categories and Heidegger discusses the Fourfold, a more encompassing theory about all life as a relation between Earth and Sky, Mortals and Divinities.
Semper’s Four Elements of Architecture categorizes all human dwellings throughout history into four basic elements: the Mound, the Hearth, the Enclosure and the Roof. Semper considers the Hearth as the most important of the four elements because it is the center of all life. “It formed the sacred focus around which the whole took order and shape...it is the moral elements of architecture. Around it were grouped the three other elements, the protecting negations or defenders of the hearth’s flame against the three hostile elements of nature.” The three elements of nature he is referring to could mean water, air and earth with fire as a non-factor since it is contained within the hearth. Since water can wash away, air can blow away, and earth can shake away the very foundations of a building, the proper amount of care should be taken in constructing these other elements of architecture to protect the Hearth.
The first is to create a proper foundation for the Hearth to sit on in the Mound. The Mound is what lifts the Hearth and other elements off the ground in order to give proper prominence to the dwelling as an important feature in human history while simultaneously providing further protection from the bare earth and its inherent dangers of predators, destructive insects and rodents, and natural disasters.
The Enclosure is the next natural progression in the protection of the Hearth. Other than the obvious necessity for protection against air (destructive winds in this case), the Enclosure began as an artistic expression in simply separating enclosed spaces with carpets and mats as wall fitter (Wandbereiter). Semper defends this by describing tribes in early human history as applying their “budding artistic instinct to the braiding and weaving of mats and covers (even when they still go around completely naked).”

He recognizes that the wildest tribes are familiar with the hedge-fence, the crudest wickerwork and the most primitive enclosure made from tree branches. The point Semper keeps trying to make here is that humans throughout history in whatever stage of development they are in, seem to be capable of developing not just protection in their enclosures, but decoration consistent with the particular society’s abilities and beliefs that raise the enclosure to a higher place of importance within the community.
The final element of architecture is the Roof, which Semper believes must have been predominant since all domestic life evolved under its protective embrace as opposed to “free life in nature full of toil and struggle.” The Roof completed the protection of the Hearth from all forms of precipitation while only allowing daylight to enter freely through holes in the Roof or Enclosure. “Roofs developed as free and symmetrical groupings, with a roof over each main part of the structure, or as multistory buildings...characteristics of this type of building were always its irregularity, a sloping roof, multistory construction, and interior illumination by windows set in the outer walls.” The Roof essentially acted as the beacon to give importance to a particular building amongst the growing sea of human dwellings. For instance, more care and hierarchy may be given to the Town Hall as the center of that society whereas the peasants hut may have a simple straw covered thatching over the interior spaces. This is not to say that the Roof still isn’t the most important element in the peasants hut, simply that the idea of scale and grandeur is different than the center of local government.
While Semper focuses on the history of humanity in terms of his Four Elements of Architecture, Martin Heidegger takes a more philosophical approach by thinking of connections between Earth and Sky, and Mortals and Divinities. To fully understand his idea of the Fourfold, Heidegger first had to realize the true meaning of the word ‘free’ within human history. Once discovered, he created the hypothesis of the Fourfold and described it as follows. “The Earth is the serving bearer, blossoming and fruiting, spreading out in rock and water, rising up into plant and animal.” Essentially, anything except for Mortals that dwells beneath the sky is considered to be of the Earth.
The Sky is the “vaulting path of the sun, the course of the changing moon, the wandering glitter of the stars, the year’s seasons and their changes, the light and dusk of the day, the gloom and glow of night, the clemency and inclemency of the weather, the drifting clouds and blue depth of the ether.” Heidegger’s description here is of anything natural that directly affects us that does not already occur within the Earth. This is not necessarily a description of a divine world, but rather of our sense of place within a larger context outside of our current understanding.
The Divinities are “the beckoning messengers of the godhead. Out of the holy sway of the godhead, the god appears in the presence or withdraws into his concealment.” This element of the fourfold is literally speaking about the unseen presence of a greater power than we can commonly describe. Heidegger is not necessarily speaking in a religious context, but rather recognizing that a force beyond a human’s comprehension is at play and that the godhead he speaks of is man’s best concept of how it is having an effect on our species, whether it is laid out before our eyes or hidden under layers of unforeseen discovery.
The Mortals are “the human beings. They are called mortals because they can die. To die means to be capable of death as death. Only man dies, and indeed continually, as long as he remains on earth, under the sky, before the divinities.”

Heidegger sees human beings or mortals as the only element of the fourfold that can actively occupy all three other elements simultaneously. Mortals are the essence of the word ‘free’ that Heidegger discusses to mean sparing and preserving.
Heidegger believes that Mortals saving the Earth, receiving the Sky and awaiting the Divinities, is what preserves the fourfold. He theorizes that “dwelling preserves the fourfold by bringing the presencing of the fourfold into things.” This occupation of staying within things is the mechanism that keeps the fourfold working in unison similar to the way the gear keeps the clock accurately keeping time. So it becomes Mortals that are the most important element in the fourfold. Without mortals, the system would be thrown off-balance and a dormant world would be in place just waiting for something to make it come alive and realize its true potential.
Chapter 02

Who is the Urban Human?
Who is the Urban Human?

Human beings were not inherently adapted to life in a metropolis, so why is most of western civilization’s population living this way? Have we lost all primordial instinct or has it just taken a backseat to modern comforts that spawned a society worried about what they want rather than what they need? Modern society in the United States dictates that we ignore generations of knowledge relating to the value of things we now take for granted. This ignorant bliss opens the door for an over-stressed and over-worked population that as a whole sees the dollar as the most important aspect of our lives. The value should be placed in reflection of mind and body that garners connections with other humans and the natural world as opposed to connections with things and the artificial.
In order to understand the problem with this way of living, we must first look to a few pieces of literature surrounding this topic. The first is a book called A Path for Kindred Spirits by Robert McCullough that discusses Benton MacKay and the creation of the Appalachian Trail. MacKay not only saw it as a recreational park, but also as a “battle line against encroaching civilization and capitalism.” He believed that nature could provide sanctuary for urban populations through self-sustaining, non-industrialized communities reconnected after an unnatural separation from urban sprawl. Essentially, he believed the Appalachian Trail could become a bridge between disassociated urban centers.

“There would be a chance to catch a breath, to study the dynamic forces of nature and the possibilities of shifting to them the burdens now carried on the backs of men. The reposeful study of these forces should provide a broad gauged enlightened approach to the problems of industry. Industry would come to be seen in its true perspective - as a means in life and not as an end in itself”
- Benton MacKay
In *Architecture: The Natural and the Manmade* by Vincent Scully, he compares our cities to the natural landscape in America, describing the skyscrapers as mountains and the streets between them as the Grand Canyon. In his opinion, without even realizing we are doing it, we are modeling our urban centers after our natural environment, so why not embrace it?

“Indeed, the relationship of manmade structures to the natural world offers, in my view at least, the richest and most valuable physical and intellectual experience that architecture can show, and it is the one that has been most neglected by Western architectural critics and historians. There are many reasons for this. Foremost among them, perhaps, is the blindness of the contemporary urban world to everything that is not itself, to nature most of all.”

- Vincent Scully
Christophe Girot cites the ancient Greeks as purveyors of reason when discussing architecture and nature in Change of Nature. He mentions how the ancient Greeks saw nature as a sacred entity that should remain “virginal and untouched.” Modern society has evolved this to simply mean “sustainable” and “green” which are simply political hot-button keywords that have no real meaning beyond a plaque on the side of a building. Girot discusses how this rapid acceptance of such a way of thinking has unfortunate consequences of creating superficial ideals that “remain painfully detached from any palpable cultural specificity with regards to nature.”

“Each place must have its own story. Therefore, it makes no sense to replicate urban models from elsewhere, when the inherent qualities of a site lay fallow.”
- Christophe Girot
James Wines shoots down the whole notion of the sustainable movement all together by disconnecting it with nature in his book *Green Architecture*. He talks about how the machines and technology that recent architecture is based on cannot sustain the “sustainable” ideals that modern designers possess. Just putting some green roofs and PV panels on a building will not make it in tune with nature any more than the building next to it. Yes, it will use less energy and contribute less to the overall use of products and materials, but it will only become a mask of nature and not the true essence of what needs to occur in architectural designs.

“It is precisely this content-deprived, technologically driven, and environmentally irresponsible resistance to change that is at the basis of most regressive architectural thinking today.”
- James Wines
As we look further into our current way of living beyond our buildings connection or disconnect with nature and dive into our daily routine, we see that Americans are working more hours per day and spending less time with the people closest to them or simply relaxing. This has detrimental effects to the overall health of our bodies and minds. Multiple recent studies by the *Los Angeles Times, American Scientific, Newsroom, The Marietta Daily Journal* and *The New York Times* all seem to come to the same conclusion: that downtime is an essential part of being more productive members of society while also restoring many health benefits lost in front of a screen throughout the day. Even a simple 15 minute break during working hours has substantial benefits on our moods and focus. Our brains are not designed to be constantly worked, they require downtime in a similar sense required by our bodies. Think of it in terms of running. If we were to try to push our bodies to do a full sprint for miles on end, we might literally die from exhaustion. However if we were to sprint for short distances with short breaks between, we would be able to arrive at our destination relatively unharmed. So why should we treat our minds any differently?

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*Napping can be more effective than caffeine in enhancing memory and learning.*

- *Behavioural Brain Research*

*In Japan, napping at work is often viewed as a sign that a person is committed to one’s job.*

- *BBC*

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**Current Status-quo**

| Hours per day in selected activities, employed parents age 25-54 of children under 10 |
| Working | 8.7 |
| Sleeping | 7.7 |
| Leisure and sports | 2.5 |
| Caring for others | 1.3 |
| Household activities | 1.1 |
| Eating and drinking | 1.0 |
| Organizational/civic/relig. activities | 0.2 |

[13] Graph showing how working parents spend their day

[14] Over-stressed

[15] Over-worked

**Desired Status-quo**

[16] Google sleep pods

[17] Mandatory yoga at work
Constantly pushing ourselves to meet a deadline created by us can be detrimental and should be a reversible habit. We see this way of thinking occurring in some work environments such as Google or AOL with designated sleep pods for their employees. If two of the largest companies in history have begun to realize the benefits of temporarily unplugging from the digital world, then what is stopping the rest of our society from following suit?

So how does this all relate to the original question, who is the Urban Human? The Urban Human is the status quo of modern societal tendencies harboring an over-reliance on technology when a more holistic approach of self-reliance through exposure to the natural environment is key to our happiness and well-being. A study of architecture that embodies nature to accommodate the Urban Human is the next logical step in our progression towards a more fulfilled lifestyle.
Chapter 03

Nature’s Influence on Architecture
To best answer the question of how nature has influenced architecture as separate from urban architecture placed within a natural setting, a study into previous designs will be a good jumping off point. The first example that drives this idea home is the House in Balsthal by Pascal Flammer Architect. This project concentrates on different ways of perceiving the landscape surrounding the actual structure. For instance, the first floor is recessed a couple of feet into the Earth to give the user a parallel view with the low-lying vegetation while the timber construction places the building within its context of the surrounding woodland.
Connecting with nature through architecture should not forget about the user of the space. Olson Kundig Architects realized this with their design of the Sol-Duc Cabin. The client in this case wanted a simple fishing cabin for the weekends and summer months that could be easily secured when not in use. The cabin is raised up on stilts to maximize views outward into the nearby forest while providing sanctuary from yearly flooding in the area. OKA did not stop at simply providing nice views however, they wanted the user to have complete control of their interior as well as exterior environment. With help from a series of cranks and pulleys, the user can completely shut-out the outside world for privacy, security or intimacy. The movable wall covers the expansive glass that faces the woods but does not interfere with the oversized balcony, so the user is not completely shut off from nature even when closed.
The goal of Schwartz Besnosoff + SO Architecture was to, “create an open, absorbent, breathing building – the type of building that communicates with the environment, and not a closed structure with fences and a guard... to offer Jerusalem an airy urbanity, a break from the physical and symbolic density.” They accomplished this with the implementation of small courtyards easily accessible throughout the interior program, nature walks through marshes and ponds, and outdoor activities with feature walls that incorporate as much of the natural world as possible. These concepts when unified under one roof create a sense of place with opportunities for a gathering of the masses.
Nature’s influence on architecture is not and should not be limited to buildings, but must expand to include the landscape that occupies the larger context of the space. This in fact may be the most important aspect of the design in order to fully root the Urban Human within the natural landscape. A key example of revitalizing an urban waterfront is the Seattle Central Waterfront design by James Corner Field Operations. This 1.5 mile stretch of waterfront was transformed from the typical philosophy of terminating urban landscape by allowing it to simply end when it got to the water’s edge into a cultivated natural destination for the city’s inhabitants. With multiple opportunities for public interaction or private meditation, the new waterfront activates every scale of the design from individual to global.
An interesting blend from the urban landscape to the natural waterfront is Lotus Lake Park by Integrated Planning and Design Inc. Situated between a large commercial thoroughfare and a high-speed rail corridor, the park offers opportunities for education about the natural world through a series of walks through the marshes, interactive features and sweeping vistas. The need for minimal facilities for the comfort of the users was also needed, so the designers took it upon themselves to not overwhelm the landscape with an overbearing structure. Instead, the minimal building not only remains open to the sky, but perforates its façade to further minimize its impact on the surrounding area, creating a unique design that blends well with the plant life.
A framework plan for Northerly Island re-envisions 91 acres on Chicago’s lakefront, returning the land to public open space and ecological attractions. With its proposed amphitheater, landscape, and reef, the island’s activities are focused on making connections to the outdoors and expanding educational opportunities synergistic with the adjacent Museum Campus.
These six precedents have opened the discussion on whether nature or architecture should have a greater influence on our daily lives. The answer reveals itself when the user is added into the equation. When this occurs, not only is comfort an important element, but the user experience becomes a dominant aspect of the design. So when the goal is to develop a lasting relationship between the Urban Human and the natural landscape, nature begins to take precedence while architecture becomes a backdrop to simply relay comfort to the user. This is not to say that the two cannot relate seamlessly to one another, in fact it is important that they do so in order to avoid an awkward and disjointed experience.
Chapter 04

Four Scales of Design
Four Scales of Design

Grand schemes and righteous gestures will only go so far in a design. One can cite precedents and reputable sources all day, but how it is implemented in the design is what turns fantasy into reality. The previous examples of design touch on multiple areas of design at varying scales, which can become confusing when trying to implement concepts into the final product. Using the idea of the Power of Four and these works as a foundation, the first facet of my thesis will be the question of scale. Who will be occupying the space will become just as important as how many and in what sense. There seems to be four scales that will clearly define the design and achieve the transformation from concept to reality. Those are the individual, family, cultural and global scales. Each deserves a place in the final design and each has different wants and needs.
The most simple of the four scales is individual and possibly the easiest to comprehend for the majority of users. We have all been alone walking through a park or along a waterway or even just at night in our beds to know what it means to have time for self-reflection, devoid of outside distractions. My design will allow for spaces designated for the individual’s use any time of day secluded from the vastness of space and other users nearby on the site.
The family scale looks at how small groups of individuals would interact with the site. Multiple opportunities for semi-secluded/semi-public gathering spaces must be offered throughout the site with varying levels of interaction between humans and the surrounding landscape to create a healthy mix of both. These areas will be less about self-reflection and more about connecting with a user’s close group of friends/coworkers/family.
The cultural scale is the public connection to the immediate surrounding urban landscape. How can the design blend seamlessly from this urban character to the more natural environment desired for the design. The key to the success of this thesis will hinge on a person’s willingness to enter the space in the first place. That is this scale’s most important job, to create desire for future visitors. Inviting entrances and a sneak peak at sweeping views from outside the actual design will be integrated into the access points.
A common misconception about global scale with this type of project is one that becomes a destination for visitors from other states and countries, similar to Yellowstone National Park or the Statue of Liberty. However, this is not the case when it comes to my thesis design; global in this instance is a connection to the outside world once actually in the space. While some instances within the site will be introverted, the majority of the perimeter of the site should be looking outward, almost forward to the future of the area. Instead of creating a cul-de-sac that only looks upon your immediate neighbors, the goal is to create a looking glass that overlooks vast horizons of distant places not yet discovered by many who visit the site, but someday might be if they so desire.
Chapter 05

Site Research
Site Research

Vegetation

Reconnecting with nature cannot be achieved without a deep knowledge of native and common plants that make up the area. Despite their original origin in the world, these plants have found their way into the forefront of DC’s native plant registrar. From 100’ trees to crawling vines, the following list of plants was chosen for the design based on their abundance in the area as well as their ability to naturally draw friendly birds and insects to their loving embrace.

Tree Statistics Courtesy of:
Wisteria Landscapers - http://www.wisterialandscapers.com/plant-list/trees
Cal Poly Urban Forest Ecosystems Institute - http://selectree.calpoly.edu/

*Note - Yoshino Cherry Trees have a heavy presence in Washington D.C. but are not pictured on this map.

### Prunus × yedoensis | Yoshino Flowering Cherry

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Moderate, moist soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>PRU</td>
</tr>
<tr>
<td>Type</td>
<td>Deciduous</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>35 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>35 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Furrowed or Smooth</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Dark Grey or Light Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Pink or White, Fragrant</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>40 to 150 years</td>
</tr>
</tbody>
</table>

### Acer Buergerianum | Trident Maple

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Eastern China and Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Temperate, moist soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>ACE</td>
</tr>
<tr>
<td>Type</td>
<td>Deciduous</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>25 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>25 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Flaky</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Light Green or Light Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Yellow-Green with Samara Fruit</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>50 - 150 years</td>
</tr>
</tbody>
</table>
### Populus Nigra | Black Poplar, Lombardy Poplar

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Europe, Southwest and Central Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Mild, wet or dry soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>POP</td>
</tr>
<tr>
<td>Type</td>
<td>Deciduous</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>100 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>30 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Furrowed or Ridged</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Dark Grey or Light Green</td>
</tr>
<tr>
<td>Flowers</td>
<td>Inconspicuous</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring or Winter</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>40 to 150 years</td>
</tr>
</tbody>
</table>

### Nothofagus Dombeyi | Southern Beech

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Southern Chile and Argentina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Moderate, moist soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>NOT</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>65 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>15 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Furrowed, Scaly or Smooth</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Dark Grey or Dark Brown</td>
</tr>
<tr>
<td>Flowers</td>
<td>Inconspicuous</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>24 - 36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>50 to 150 years</td>
</tr>
</tbody>
</table>
### Acer Platanoides | Crimson King Norway Maple

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Eastern and Central Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Drought tolerant, Moist well drained soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>ACE</td>
</tr>
<tr>
<td>Type</td>
<td>Deciduous</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>65 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>50 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Fissured</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Dark Brown or Dark Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Green or Yellow</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>50 - 150 years</td>
</tr>
</tbody>
</table>

### Malus Floribunda Profusion | Japanese Flowering Crabapple

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Japan and East Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Moderate, moist soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>MAL</td>
</tr>
<tr>
<td>Type</td>
<td>Deciduous</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>25 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>20 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Scaly</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Light Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Pink, Red or White, Fragrant</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>24 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>50 to 150 years</td>
</tr>
</tbody>
</table>
Natural Architecture for Urban Humanity

**Acacia Binervata | Two-Veined Hickory**

- **Native Region**: Southeast Australia
- **Climate**: Wet or dry forest, sandy or basaltic soils
- **Plant ID Abbreviation**: ACA
- **Type**: Deciduous
- **Maximum Height**: 33 feet
- **Maximum Canopy Width**: 17 feet
- **Bark Texture**: Smooth or Rough
- **Bark Color**: Grey-black or Grey-brown
- **Flowers**: Pale Yellow to White
- **Flowering Period**: August - November
- **Growth Rate**: Fast
- **Longevity**: More than 15 years

**Populus Alba | White Poplar, Silverleaf Popular**

- **Native Region**: Europe
- **Climate**: Temperate, Wet to dry soil
- **Plant ID Abbreviation**: POP
- **Type**: Deciduous
- **Maximum Height**: 65 feet
- **Maximum Canopy Width**: 15 feet
- **Bark Texture**: Furrowed or Smooth
- **Bark Color**: Black or Light Grey
- **Flowers**: Inconspicuous
- **Flowering Period**: Spring or Winter
- **Growth Rate**: 36 inches per season
- **Longevity**: 40 to 150 years
### Acer Buergerianum | Trident Maple

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Eastern China and Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Temperate, moist soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>ACE</td>
</tr>
<tr>
<td>Type</td>
<td>Deciduous</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>25 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>25 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Flaky</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Light Green or Light Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Yellow-Green with Samara Fruit</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>50 - 150 years</td>
</tr>
</tbody>
</table>

### Casuarina Cunninghamiana | River She-Oak, Beefwood

<table>
<thead>
<tr>
<th>Native Region</th>
<th>North and Northeastern Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Wet to dry soil, drought tolerant</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>CAS</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>70 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>30 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Fissured</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Dark Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Inconspicuous</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Fall</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>24 - 36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>50 - 150 years</td>
</tr>
</tbody>
</table>
Quercus Fagaceae | Northern Red Oak

- **Native Region**: Eastern North America
- **Climate**: Moist soil
- **Plant ID Abbreviation**: QURU
- **Type**: Deciduous
- **Maximum Height**: 90 feet
- **Maximum Canopy Width**: 60 feet
- **Bark Texture**: Ridges and Shallow Furrows, Fissured
- **Bark Color**: Dark Grey or Dark-Brown
- **Flowers**: Yellow-green
- **Flowering Period**: Spring
- **Growth Rate**: 24 - 36 inches per season
- **Longevity**: Greater than 150 years

Quercus Robur | English Oak

- **Native Region**: Europe, Northern Africa and West Asia
- **Climate**: Moderate, moist to dry soil
- **Plant ID Abbreviation**: QUE
- **Type**: Deciduous
- **Maximum Height**: 120 feet
- **Maximum Canopy Width**: 80 feet
- **Bark Texture**: Fissured
- **Bark Color**: Dark Grey or Dark Brown
- **Flowers**: Inconspicuous
- **Flowering Period**: Spring
- **Growth Rate**: 36 inches per season
- **Longevity**: Greater than 150 years
**Allamanda Cathartica** | Golden Trumpet

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Central and South America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Tropical, acidic or sand soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>ALL</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>20 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>6 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Milky Latex</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Medium Brown</td>
</tr>
<tr>
<td>Flowers</td>
<td>Large, Yellow, Tubular</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Seasonal Bloom, year round</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Fast</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Berberis Darwinii** | Darwin’s Barberry

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Southern Chile and Argentina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Moist, shady woodland, drought tolerant</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>BER</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>12 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>6 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Thorny</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Brown</td>
</tr>
<tr>
<td>Flowers</td>
<td>Orange</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Medium</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
### Callistemon Citrinus | Crimson or Lemon Bottlebrush

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Southeastern Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Moist to dry soil, drought tolerant</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>CAL</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>25 feet</td>
</tr>
<tr>
<td>Maximum Canopy Width</td>
<td>25 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Exfoliating or Striated</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Light-Green or Light-Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Red</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring or Summer</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per season</td>
</tr>
<tr>
<td>Longevity</td>
<td>40 - 150 years</td>
</tr>
</tbody>
</table>

### Cortaderia Selloana | Pampas Grass

<table>
<thead>
<tr>
<th>Native Region</th>
<th>South America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Temperate</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>COR</td>
</tr>
<tr>
<td>Type</td>
<td>Ornamental Grass</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>12 feet</td>
</tr>
<tr>
<td>Maximum Spread Width</td>
<td>6 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>N/A</td>
</tr>
<tr>
<td>Bark Color</td>
<td>N/A</td>
</tr>
<tr>
<td>Flowers</td>
<td>Silver White</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>August to February</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Fast</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
<tr>
<td>Native Region</td>
<td>South Africa</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Climate</td>
<td>Well-drained, rocky or sandy soil</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>CAR</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen, Perennial</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>6 inches</td>
</tr>
<tr>
<td>Maximum Horizontal Growth</td>
<td>165 feet</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Exfoliating or Striated</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Light-Green or Light-Grey</td>
</tr>
<tr>
<td>Flowers</td>
<td>Yellow or Light Pink</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring or Summer</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>36 inches per year horizontally</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Chamaecereus Silvestri** | Peanut Cactus

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Argentina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Cold, Hardy to 20 degrees</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>CHA</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>6 inches</td>
</tr>
<tr>
<td>Maximum Spread Width</td>
<td>12 inches</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>Cacti</td>
</tr>
<tr>
<td>Bark Color</td>
<td>Green</td>
</tr>
<tr>
<td>Flowers</td>
<td>Orange</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Late Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Varies by Climate</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

**Carpobrotus Edulis** | Iceplant, Sour Fig
### Erica Multiflora | Mediterranean Heath

<table>
<thead>
<tr>
<th>Native Region</th>
<th>Mediterranean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Temperate, acidic soils</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>ERI</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen Shrub</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>5 feet</td>
</tr>
<tr>
<td>Maximum Spread Width</td>
<td>Unknown</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>N/A</td>
</tr>
<tr>
<td>Bark Color</td>
<td>N/A</td>
</tr>
<tr>
<td>Flowers</td>
<td>Lavender Pink</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Fast</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

### Erica Mediterranea | Biscay Heath

<table>
<thead>
<tr>
<th>Native Region</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>Temperate, acidic soils</td>
</tr>
<tr>
<td>Plant ID Abbreviation</td>
<td>ERI</td>
</tr>
<tr>
<td>Type</td>
<td>Evergreen Shrub</td>
</tr>
<tr>
<td>Maximum Height</td>
<td>5 feet</td>
</tr>
<tr>
<td>Maximum Spread Width</td>
<td>Unknown</td>
</tr>
<tr>
<td>Bark Texture</td>
<td>N/A</td>
</tr>
<tr>
<td>Bark Color</td>
<td>N/A</td>
</tr>
<tr>
<td>Flowers</td>
<td>Lavender Pink</td>
</tr>
<tr>
<td>Flowering Period</td>
<td>Spring</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Fast</td>
</tr>
<tr>
<td>Longevity</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
Fish and Birds

Aside from the vast array of plant species experienced on my site, there are 67 species of fish and at least 172 species that are accounted for in the Anacostia watershed.

There are 11 species of fish that are most important for the health of the river that can also legally be fished by humans with certain restrictions. One species in particular that is causing major issues in the area is the Snakehead Fish. It is an invasive species that is dessimating the native fish and bird population and has been given the go-ahead by multiple government organizations to eradicate them from the rivers at all cost.

The bird species that will most likely be seen in this area due to the trees, shrubs and other various vegetation shown are the six described in the following images.

Fish Statistics Courtesy of:

Bird Statistics Courtesy of:
<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Maximum Length</th>
<th>Maximum Weight</th>
<th>Common Weight</th>
<th>Color</th>
<th>Status</th>
<th>General Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ictalurus Punctatus</em></td>
<td>Channel Catfish</td>
<td>30 - 40 inches</td>
<td>40 - 50 pounds</td>
<td>10 - 20 pounds</td>
<td>Light blue to brownish-black</td>
<td>Resident Species</td>
<td>Compressed body with wide head</td>
</tr>
<tr>
<td><em>Alosa Mediocris</em></td>
<td>Hickory Shad</td>
<td>15 inches</td>
<td>8 pounds</td>
<td>3 - 5 pounds</td>
<td>Blueish-silver</td>
<td>Anadromous Species</td>
<td>Long projecting lower jaw</td>
</tr>
<tr>
<td><em>Micropterus Salmoides</em></td>
<td>Largemouth Bass</td>
<td>30 inches</td>
<td>25 pounds</td>
<td>2 - 6 pounds</td>
<td>Olive to dark green</td>
<td>Resident Species</td>
<td>Jaw extending to the back of the eye</td>
</tr>
<tr>
<td><em>Esox Iuclus</em></td>
<td>Northern Pike</td>
<td>52 inches</td>
<td>55 pounds</td>
<td>5 - 15 pounds</td>
<td>Yellow-green sides, dark green back</td>
<td>Resident Species</td>
<td>Many rows of canine-like teeth</td>
</tr>
</tbody>
</table>
**Perca Flavescens** | Yellow Perch

- **Maximum Length**: 10 inches
- **Maximum Weight**: 4 pounds
- **Common Weight**: 2 pounds
- **Color**: Brassy green to golden yellow
- **Status**: Resident Species
- **General Features**: Mouth extends behind middle of eye

**Esox Niger** | Chain Pickerel

- **Maximum Length**: 31 inches
- **Maximum Weight**: 4 pounds
- **Common Weight**: 2 pounds
- **Color**: Dark chain-like patterns on its sides
- **Status**: Resident Species
- **General Features**: Flat head, long snout

**Alosa Sapidissima** | American Shad

- **Maximum Length**: 30 inches
- **Maximum Weight**: 8 pounds
- **Common Weight**: 3 - 5 pounds
- **Color**: Silvery sides with light olive back
- **Status**: Anadromous Species
- **General Features**: Deeply forked tail

**Micropterus Dolomieui** | Smallmouth Bass

- **Maximum Length**: 24 inches
- **Maximum Weight**: 12 pounds
- **Common Weight**: 6 - 10 pounds
- **Color**: Dull golden-green with bronze overcast
- **Status**: Resident Species
- **General Features**: Two dorsal fins separated by a notch
**Snakehead fish** are difficult to eradicate due to their aggressive nature and ability to populate and spread. These fish are air-breathers and have the ability to migrate to other waters over land. Attempts to drain water sources where the species has been located failed due to its ability to bury itself in mud and survive for as long as several months. The Fish and Wildlife service has categorized the snakehead fish as injurious, and the Department of Natural Resources deemed it illegal since 2004 to import, transport, or introduce 29 species of the fish in Maryland.

If you fish in Maryland waters, you can help eliminate this invasive and aggressive species. The removal of the Snakehead fish will help AWS reach our goal of a swimmable and fishable river by working towards a stable ecosystem in the Anacostia River. If you think you have caught a Snakehead fish, do not release it. Instead collect it in a bag to dispose of later.

Source: http://www.anacostiaws.org/get-involved/recreation/fishing
<table>
<thead>
<tr>
<th>Ardea Alba</th>
<th>Great Egret</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Native Region</strong></td>
<td>North and South America</td>
</tr>
<tr>
<td><strong>Habitat</strong></td>
<td>Wetland, freshwater and saltwater</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>3.3 feet</td>
</tr>
<tr>
<td><strong>Wingspan</strong></td>
<td>52 - 67 inches</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>White</td>
</tr>
<tr>
<td><strong>Main Food</strong></td>
<td>Fish, frogs and other aquatic animals</td>
</tr>
<tr>
<td><strong>Hibernate</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phalacrocorax Auritus</th>
<th>Double-crested Cormorants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Native Region</strong></td>
<td>North America</td>
</tr>
<tr>
<td><strong>Habitat</strong></td>
<td>Freshwater and Saltwater</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>28 - 35 inches</td>
</tr>
<tr>
<td><strong>Wingspan</strong></td>
<td>45 - 48 inches</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Brown-black with yellow-orange face</td>
</tr>
<tr>
<td><strong>Main Food</strong></td>
<td>Small fish</td>
</tr>
<tr>
<td><strong>Hibernate</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ardea Herodias</th>
<th>Great Blue Heron</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Native Region</strong></td>
<td>North America</td>
</tr>
<tr>
<td><strong>Habitat</strong></td>
<td>Fresh and saltwater marshes, rivers, lakes</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>3.2 - 4.5 feet</td>
</tr>
<tr>
<td><strong>Wingspan</strong></td>
<td>5.5 - 6.6 feet</td>
</tr>
<tr>
<td><strong>Color</strong></td>
<td>Blue-grey with black stripe over the eye</td>
</tr>
<tr>
<td><strong>Main Food</strong></td>
<td>Mainly fish with shrimp, crabs and insects</td>
</tr>
<tr>
<td><strong>Hibernate</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>
Quiscalus Quiscula | Common Grackles

Native Region ........................................ North and South America
Habitat .................................................. Lawns, agricultural fields, city parks
Height ................................................... 11 - 13 inches
Wingspan ............................................... 14 - 18 inches
Color .................................................... Iridescent body, glossy purple heads
Main Food ............................................. Corn, insects, berries, grain, garbage
Hibernate ............................................. No

Mimus Polyglottos | Northern Mockingbird

Native Region ......................................... North America
Habitat .................................................. Backyards, parks, forest edges, open land
Height .................................................. 8 - 11 inches
Wingspan ............................................... 12 - 15 inches
Color .................................................... Grey-brown, pale breast, white wingbars
Main Food ............................................. Insects and fruits
Hibernate ............................................. No
Chapter 06

Reconnecting with Nature Through Architecture
Reconnecting with Nature Through Architecture

« Site Analysis

**Washington D.C.**

Established as Capital - July 16, 1790

Area - 68.3 square miles
   Land - 61.4 square miles
   Water - 6.9 square miles

Population - 646,449
   Density - 10,528/square mile

Congress commissioned George Washington to select a 100 square mile plot of land along the Potomac River

Washington turned the 100 mile square 45° to create a diamond in best utilize the ports of Georgetown, Maryland and Alexandria, Virginia.

[01] Washington D.C. Diagrammatic History
In 1847, Congress altered the border of D.C. to exclude Virginia due to their highly profitable slave trading in Alexandria that was strongly opposed in the nation’s Capital. The new plot is now 68 square miles.

With a population of over 602,000 citizens, D.C. is broken down into 18 zoning districts.

My site is in Zones 11 and 14, consisting of Park and low density waterfront-oriented commercial with Medium to High Density Apartment Houses to the North.
Site Relationships

[02] National landmark adjacencies
Site Materiality

01 - Bureau of Sewer Services Office
   Status: Vacant

02 - The Foundry Lofts | 1918
   Originally as the pattern/joiner shop

03 - The Lumber Shed Restaurants | 1930
   Originally lumber shed for the Navy Yard

Dashed line represents extent of proposed design

Anacostia River
[05] 3rd at River Street, Looking West-Northwest (July 17th, 2008)

[06] Looking at Sewage Department over Reflecting Pool (February 26th, 2012)

[07] 3rd at River Street, Looking West (August 6th, 2005)

[08] Overall of Site with Bridge and Sewage Department (February 26th, 2012)
[09] 3rd at River Street, Looking Southwest (July 17th, 2008)

[10] Bridge and Reflecting Pool (September 7th, 2010)


[12] Stairs descending to Reflecting Pool under bridge (September 7th, 2010)
4th at River Street, Looking Southeast (August 6th, 2005)

4th at River Street, Looking Southeast (December 3rd, 2011)

4th at River Street, Looking West-Southwest (October 29th, 2008)

Terraced Lawn East of Site along Anacostia Riverwalk (September 7th, 2010)
Aside from using Semperian techniques and Heideggerian philosophy, my main design strategy utilizes the purification of river water into safe, clean water that the general public can interact with. At the end of this purification lies a surface flow wetland that spawns the beginning of the purification of the land. A 2 acre succession forest to the north becomes the perfect beacon of a complete site transformation from a typical cultivated landscape into an unbounded natural experience.
Exposed Rocks
- Crabgrass
- Horseweed

Grasses and Weeds
- Ragweed
- Heath Aster

Herbaceous Plants
- Broomsedges
- Perennial Flowers

Shrub and Crops
- Pine
- Tulip Poplar

Young Forest
- White Oak
- Hickory

Mature Forest
- Beechwood
- Sugar Maple

Climax Forest

[20] Surface Flow Wetland

[21] Succession Forest Diagram
Succession Forest

Climax Forest
Beech | Sugar Maple | Poplar

Mature Forest
White Oak | Hickory | Cherry

Young Forest
Tulip Poplar | Bottlebrush

Shrubs with Crops
Barberry | Tomatoes | Lettuce

Mixed Herbaceous Plants
Fig | Mint | Peppers

Grasses and Weeds
Heath | Pampas | Cactus

Exposed Rocks
Lichen | Moss

Bare Ground
Permeable Pavers

Surface Flow Wetland
Lilly Pads | Aquatic Habitats

Base Elevation | Bridge
0'-0" | +0'-0"

+8'-0"
+6'-0"
+4'-0"
+3'-0"
+2'-0"
+1'-0"

Possibly 2-3 pages

[22] Section Through Site Showing Water Purification and Succession Forest Processes

Natural Architecture for Urban Humanity
Water Purification Process

River Water Intake
- Dual Pump with Level Control

Primary Settling Tank
- Remove Sludge | Use for Fertilization

Secondary Settling Tank
- Aerates Water | Removes Remaining Sludge

Rapid Sand Filtration
- Removes Large Pathogens

Slow Sand Filtration
- Removes All Remaining Pathogens
« Programming

When discussing program for a landscape design project, we must think back to when I discussed Semperian techniques and Heideggarean theory, now paired with the juxtaposition of water and land purification creating one unified design. These four concepts are clearly at the forefront of the user’s experience within my site, but there are multiple secondary and tertiary design strategies that must also be considered. Some, if not all of these programming elements can find their position in one of the four design strategies previously discussed heavily.
Semper | Four Elements
- Beach
- Anacostia Lawn
- Public Gathering Plaza
- Arch Bridge
- Living Walls
- Zen Space Beneath Arch Bridge
- Riparian Riverwalk

Heidegger | Fourfold
- Natural Growth Overlook
- Flight Bridge Overlook
- Arch Bridge Water Features
- Natural Filtration Swale

Water Purification Process
- Anacostia Riverwalk
- River Water Pump Station
- Fish Spawning Pool
- Fishing Training Platform
- Wetland

Succession Forest
- Free Growth Plant and Animal Habitat
- Forest Walk
- Urban/Natural Transition Space

[23] Programming Hierarchy Diagram
Design Implementation

The culmination of all previously stated research, theory, analysis, program and images is the design of my site. Drawing on inspiration and technique derived from a year of research and study, Shelter(ed) - Natural Architecture for Urban Humanity is a design that has potential to revive this area of Washington D.C. into a the natural metropolis that it once was. Understanding that the center of the United States government situated within its urban landscape is just one mile away, the site draws on experiences gathered from multiple visitations and studies of current users to the site.
Design Materials

[24] Concrete Panels

[25] Cast-in-place Concrete

[26] Stainless Steel

[27] Perforated Steel Panels

[28] Material Site Locations
Vegetation

Grass

Sand

Gravel and Boulders

Material Site Locations
Site Plan Key

01 - Anacostia River
02 - Free Growth Animal Habitat
03 - Lower Habitat Overlook
04 - Upper Habitat Overlook
05 - Beach
06 - Fish Spawning Pool
07 - Fishing/Sitting Platforms
08 - Riparian Riverwalk
09 - Anacostia Lawn
10 - Natural Filtration Swale
11 - Flight Overlook Bridge
12 - Public Gathering Plaza
13 - Land/Water Connection Monoliths
14 - Wetland
15 - Modified Boardwalk
16 - Arch Bridge
17 - Zen Space Beneath Bridge
18 - Arch Bridge Water Features

Water Purification Area
19 - Overlook Rock Garden
20 - River Water Pump Station
21 - Primary Settling Tank
22 - 2nd Settling Tank
23 - Rapid Sand Filtration
24 - Slow Sand Filtration

Succession Forest Area
25 - Bare Ground
26 - Exposed Rocks
27 - Grasses and Weeds
28 - Mixed Herbaceous Plants
29 - Shrubs with Crops
30 - Young Forest
31 - Mature Forest
32 - Climax Forest
Key Plan

Bird-eye View | Looking NW
Key Plan

Natural Growth Habitat Overlook Piers
Looking South From Succession Forest
Key Plan

Looking East From Flight Overlook Bridge
Key Plan

Water Purification Interaction
Public Gathering Plaza Showing Water and Vegetation Interaction
Endnotes


3) The Four Elements of Architecture. Gottfried Semper. Page 103. The weaving of branches led easily to weaving bast into mats and covers and then to weaving with plant fiber and so forth. The oldest ornaments either derived from entwining or knotting materials or were easily produced on the potter’s wheel with the finger on the soft clay.


6) Poetry, Language, Thought. Martin Heidegger. Page 149. The Old Saxon wuon, the Gothic wunian, like the old word bauen, means to remain, to stay in place. But the Gothic wunian says more distinctly how this remaining is experienced. Wunian means: to be at peace, to be brought to peace, to remain in peace. The word for peace, Friede, means the free, das Frye, and fry means: preserved from harm and danger, safeguarded…The fundamental character of dwelling is this sparing and preserving…we reflect that human beings consist in dwelling and, indeed, dwelling in the sense of the stay of mortals on the earth.


Works Cited

Print


—. Frank Lloyd Wright on Architecture, Edited by Frederick Gutheim. New York: Duell, Sloan & Pearce, Inc., 1941.


**Electronic**

100 year flood map - http://www.arcgis.com/home/webmap/viewer.html?webmap=639caddb19614293ba90ca09cf21c747


