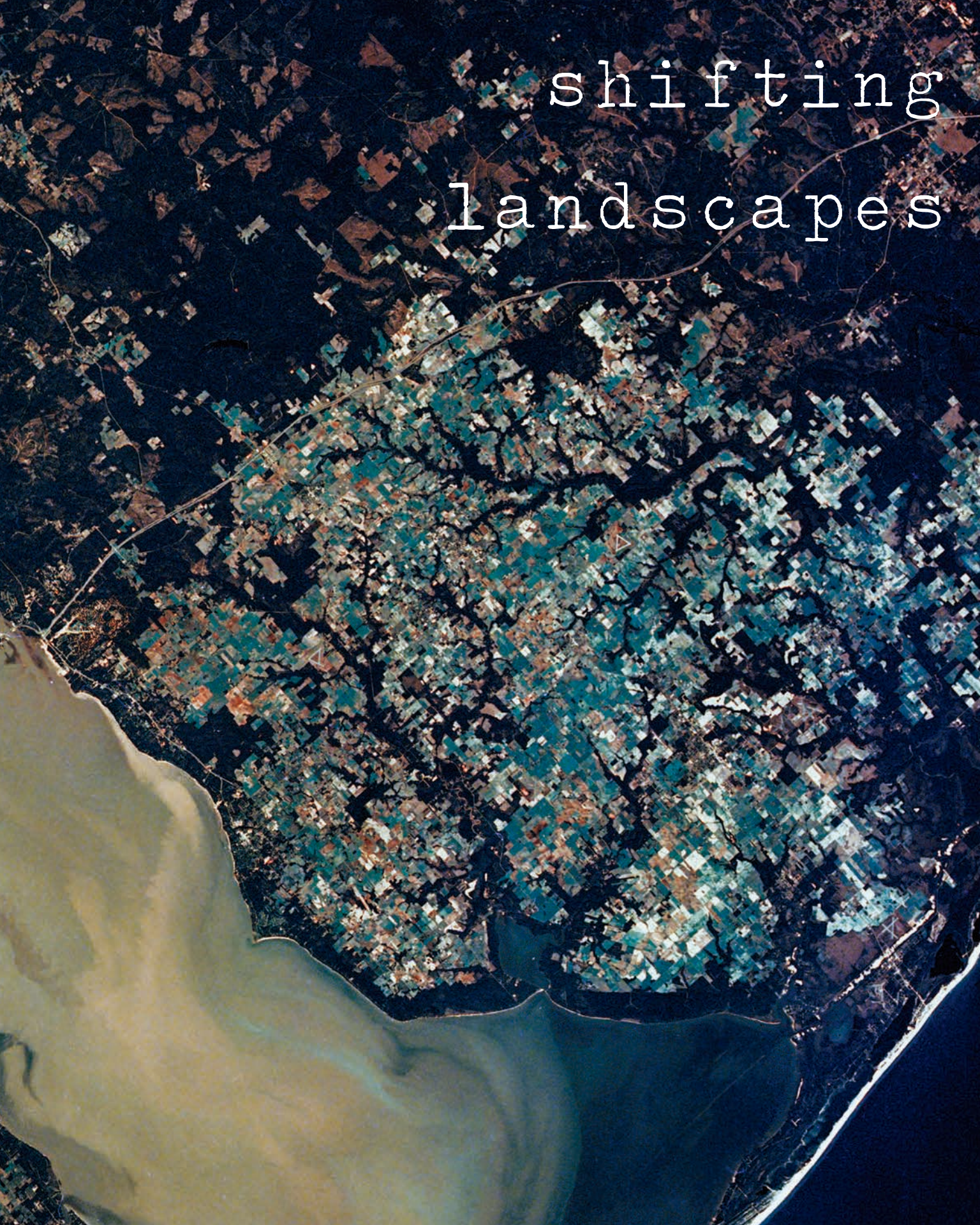

shifting
landscapes

dedication

To mom and dad,

Thank you for giving me this opportunity to learn more about what I love and always encouraging me to pursue my dreams. Forever grateful for your love and support.

ashley shorter
graduate thesis
masters of landscape architecture
auburn university
2016

how can a site design act as a datum to reveal landscape process?

abstract

Mobile Bay is a landscape that is experiencing distress from human manipulations, much like most coastal environments. The field of landscape architecture is attempting to tackle the issues by advocating for resilient communities, adapting development to the changes, and using different forms of mitigation from impacts. First the change in the perception of how the environment is a living thing that affects everything. The eco-revelatory design is used as an instrument to engage humans and plant and animal community. The intention is to reveal that humans and ecology are not separate entities but are interconnected.

The site chosen is a place that is used by the local community as a recreation area. The site was once a depressed forest but was converted by humans to a golf course. Now natural processes are taking over the location that was once a highly maintained landscape. Why did this happen? The local community may not fully understand why the locale has become a muddy terrain that can no longer support a golf course. The research question is attempting to create a site design that can act as a datum to reveal the landscape process.

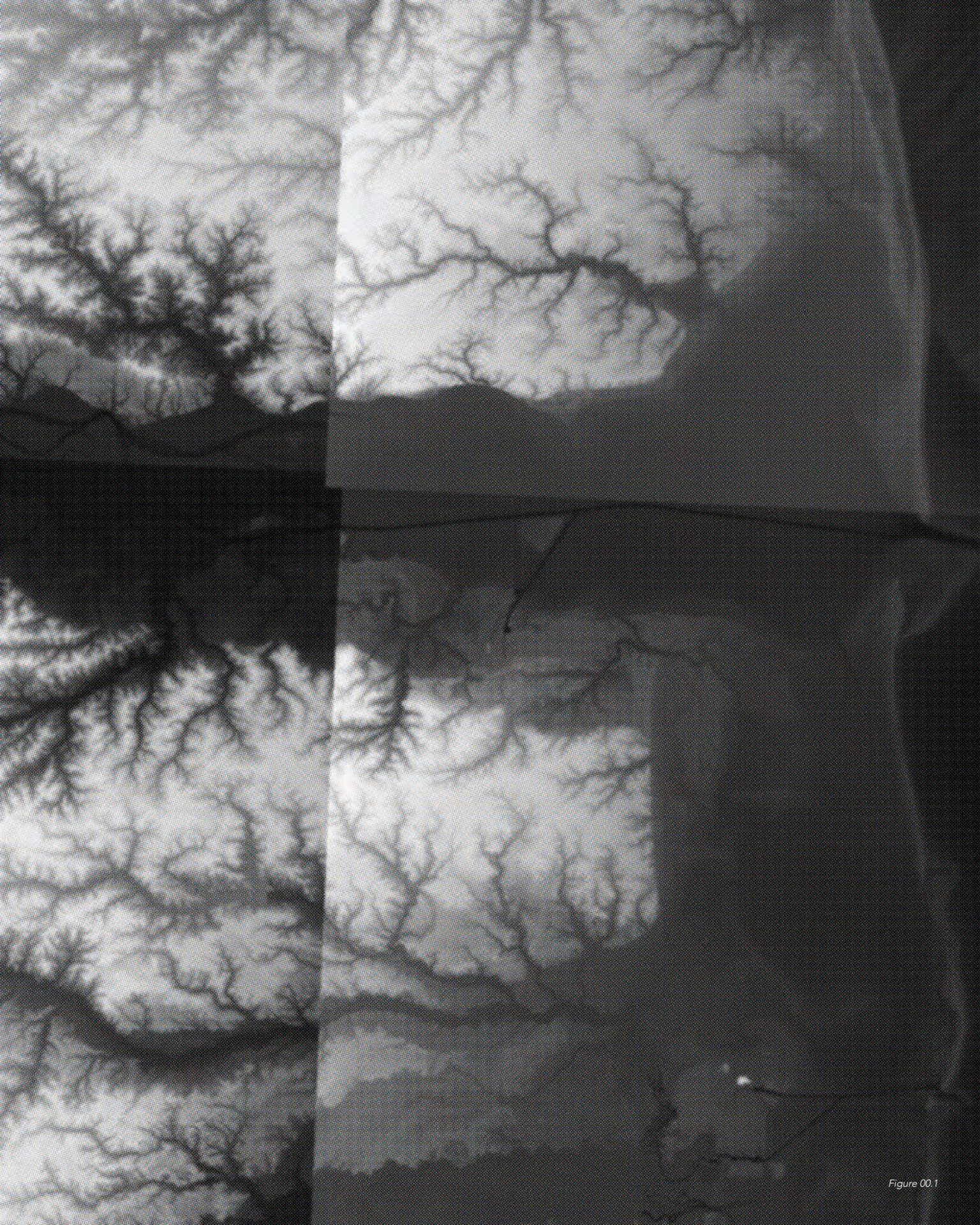
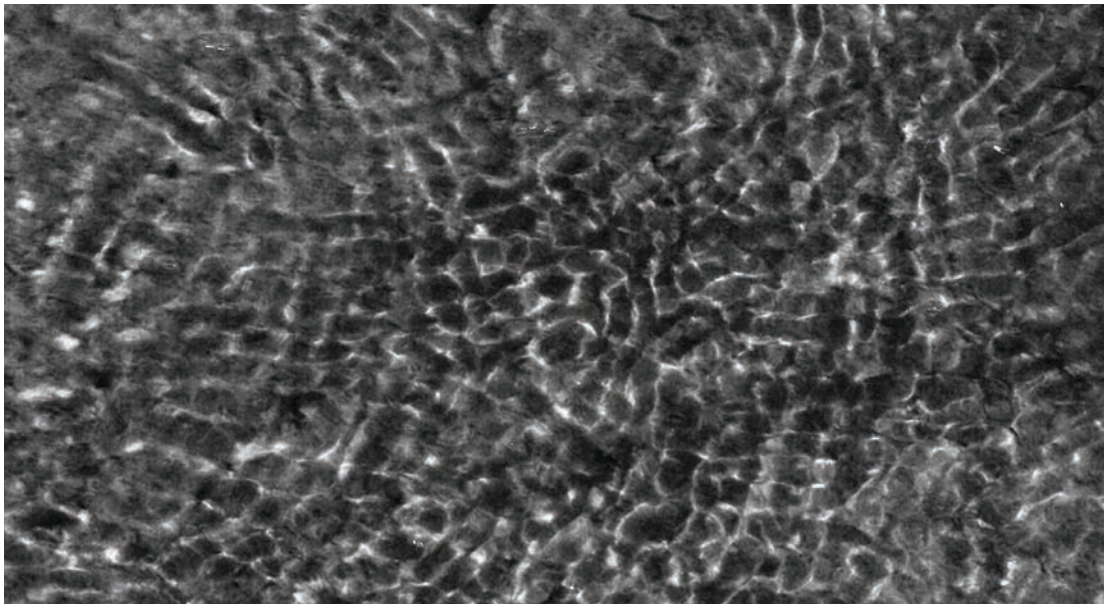


Figure 00.1

contents

Strategies of adaption and revealing ecological phenomenon in a highly manipulated landscape (by natural processes and human manipulation) is important to reveal the impacts for future generations.



01 situation

The late 19th century and most of the 20th-century technological innovations were escalating substantially without concern or knowledge of the environmental effects. After the Cuyahoga River caught on fire in 1969, everyone realized that what we release on the Earth's surface can have horrible ramifications on the environment. Soon after this instance the Clean Water Act was established to protect our surface water (Walls). Climate change has made an immense impact on the environment, and politicians, scientists, activists, designers, and citizens are trying to address and fix. Global temperature is expected to rise between 1 and 2 degrees before 2050. Likewise, the sea level rise will accelerate by 1 to 2 feet. (sealevel.climatecentral.org/). The changes are inevitable.

Shifting landscapes along the coast is a situation that has peaked the interest of landscape architects since the beginning of the profession. Coastal environments have been fluctuating at different rates over many years. In the past 30 years situations along the coast across the world have experienced more land lost and issues that affect the local people living in these areas (Draggan). Coastal change attributes to many different factors. Some can identify while others are harder to pinpoint the source. Examples attributed to the shifting landscape are the rise in sea level, increased development, and the natural process of the shifting sands (Draggan). The aerial images on the right depict the area of Fort Morgan (located where Mobile Bay and the Gulf of Mexico meet). These illustrations demonstrate a shifting landscape over the past 24 years (Byrnes, Griffee, and Osler). The edge of this area is made up of sand, so the current, waves, and the wind have a strong effect on this area even without looking at the human interventions impacts. These shifts led to questions of how is this land changing that much? Has it always been this way? A report by Mark Byrnes looked at how the areas of Fort Morgan and Dauphin Island have shifted since dredging began in the early 1900s (Byrnes, Griffee, and Osler). Further investigation of the dynamics of Mobile Bay needs to be discovered to be able to design for sites within this region.

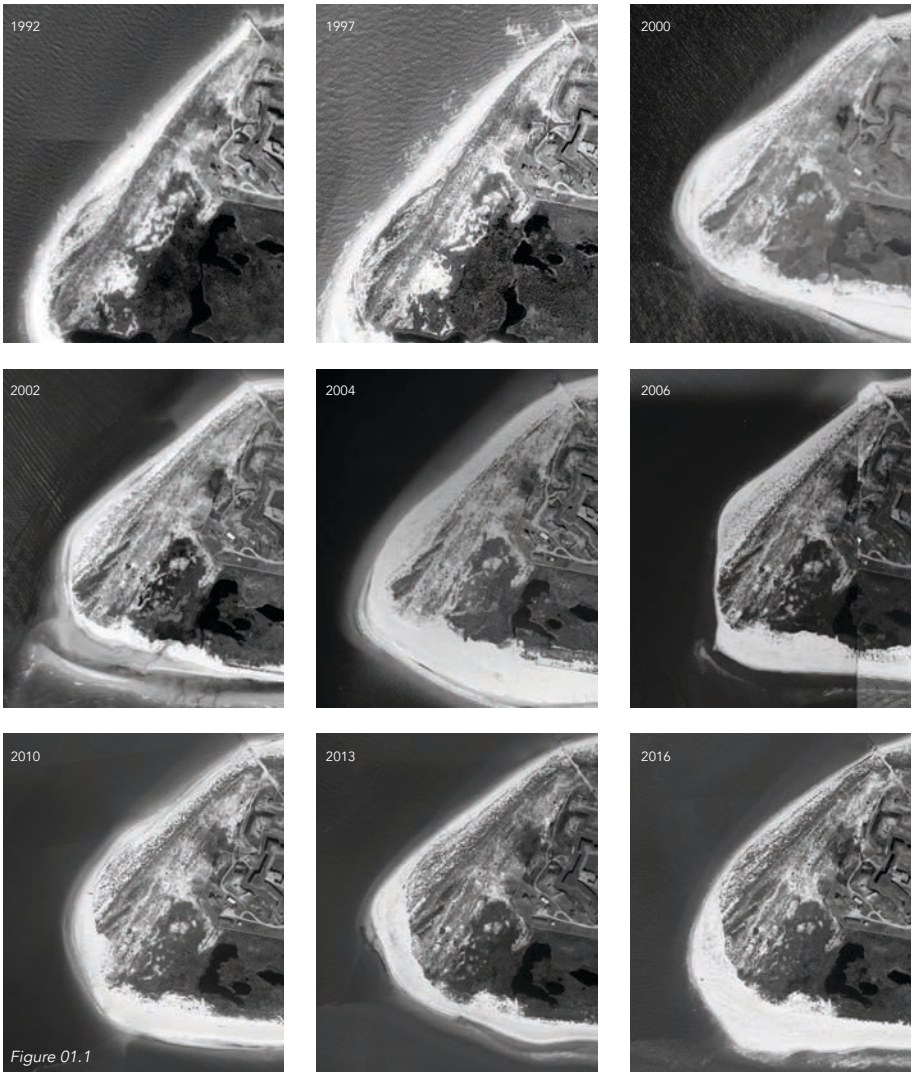


Figure 01.1

Figure 01.2

mobile bay

Around the world coastal areas are distressed from the implications from human influences on dynamic processes. Mobile Bay used in this case, as an exploring ground that has changed considerably since the rise of the industrialization. The area substantially has been impacted because it is a port city with lots of boat traffic. Dredging has been occurring here every two to three years since the 1840s (Byrnes, Berlinghoff, and Griffee). As technology and ship size advanced, so has the depth of dredging. Once the port was dredged 13 feet deep, but today it has more than tripled the depth causing stress on the entire system of Mobile Bay (Byrnes, Berlinghoff, and Griffee). The dramatic increase

in total suspended solids has in turn affected the oxygen levels within the bay. Low oxygen levels create a habitat that is unsuitable for oyster reefs and other fish species (Brynes, Berlinghoff, and Griffee). These factors aren't the only alterations that affect the bay. The Mobile Causeway, which is a road built at the confluence of the Mobile-Tensaw River, Alabama River, and the Mobile Bay, has changed the dynamics of the water movement and sediment flow of the bay. Engineering techniques are frequently used to protect developments. Unfortunately, this creates further problems for the areas that aren't protected, such as Bon Secour National Wildlife Refuge, which is home to many endangered wildlife species (Swann). These areas are located throughout the Bay region and manipulated significantly.

Since the 1970s, fifty percent of the wetland habitat that existed has been lost (Byrnes Berlinghoff, and Griffee). Many reasons affect this outcome: development, erosion from dredging, erosion from waves, erosion from wind, sea level rise, and other factors. Other elements that are experiencing change is the wildlife that occupies Mobile Bay. Increasing salinity and decreasing oxygen levels are disrupting the ecologies that dwell here. The oyster population has depreciated significantly because of increased water velocity levels, which has caused erosion and excess sediment in the bay (Bolte). Today, governments in the Mobile Bay area are working on restoring the oyster population along the coast (Swann). The increase in salinity is contributing to the erosion along the coast because plants that can't handle specific amounts of salinity will die which exposes the soil of the banks to erode away from the high velocity of the water currents. The chaotic shifting of the different elements of this landscape can't be quantified since there are unfamiliar changes that take place that haven't been documented or discovered yet. So, what is the landscape architects role for these situations?

current projects

Today, in landscape architecture there have been many different projects that deal with the phenomenon of natural processes. The profession has been moving to designs along the coast that look at how to adapt to sea level rise and promote resilience for the local communities that are experiencing these changes. From the different case studies that will look through you can deduce there is three central goals landscape architecture design for when looking at coastal situations that are attempting to prepare for sea level rise. The goals are resilience within the community, adaptation to the changes, and mitigation of further impacts on the land. The following two case studies provide general examples of landscape architecture projects occurring in the field today.

Figure 01.3

Figure 01.4

what can be added?

Rebuild by Design was a design competition put on by the Hurricane Sandy Recovery Task Force after the devastating impacts of Hurricane Sandy to the coast of New York, New Jersey, and Connecticut in 2012. The design competition's goal was to create a master plan that would address the issues of resilience in the community. The community would be able to adapt impacts from storm surges and the impending sea level rise (rebuildbydesign.org). The designer's participated in a long community outreach process to learn about the needs of the community during these tough times.

Located on the northernmost island of Japan, Hokkaido, there is a forest that is set aside to mitigate the impacts of the carbon footprint of nearby cities (http://www.danpearsonstudio.com). The area also acts as a barrier to alleviate the encounter of sea level rise to the areas surrounding it. The design claims to last a thousand years into the future with the function of mitigation.

Another way to look at the impacts of sea level rise is to create strategies for adoption and revealing ecological phenomenon in a highly manipulated landscape both by natural processes and human manipulation to expose the impacts for future generations. We need to change the perception of users of a site to question the motives of the designed landscape. Revealing to the users how coastal landscapes transform.

02 finding a site

Two factors that are the primary focus for researching a site that was experiencing the initial impacts of landscape processes influenced by human development and climate change: (1) sea level rise and (2) rise of salinity levels. There was a report done in Mobile Bay that suggested that salinity levels were surging in the bay due to dredging. During the periods of less flooding, the salt water would move up the dredged channels into the northern parts of the estuary (Vittor 10). Because saltwater is denser than freshwater, the salt water moves underneath the freshwater (Vittor). Evidence from the salt water monitoring systems within the bay validated this (Vittor 11). Then, the other factor was mapped from a website that used climate prediction data to estimate the sea level rise (http://ss2.climatecentral.org). Though these were the two factors focused on for the design tests, initial mapping began with quantifying other bay factors such as erosion, sedimentation, dredge spoils, wetlands, population density, population pressure, currents, oyster reefs, manatee sightings, and dredging zones.

All of these factors, including salinity levels and sea level, influence the shifting landscape that makes Mobile Bay. Salinity levels and sea level rise were chosen as the predominate factors because both are researched and documented well throughout the bay. Salinity levels determine what plant life and wildlife can exist in certain locations. Sea level rises chosen because of the impacts that it will make on the landscapes and the development of the bay. Looking for venues where these two factors encounter a site the soonest will be important to learn about how humans can adapt and live with these changes.

Figure 02.1

mobile bay

Some of the challenges Mobile Bay is facing are impacts from the dredging cycle. Dredging removes soil from the bottom of the bay and places the spoils alongside the dredged channel (Byrnes, Berlinghoff, and Griffee). These impacts have increased erosion along the coast because the soil is shifting back into the dredged channel. The dredging process is then repeated every two years to remove the sand that has also fallen into the pass (Byrnes, Berlinghoff, and Griffee). Salinity levels in the bay have also been affected by dredging. During periods of flooding, the salt water moves further up the dredged channel into the fresher waters of the Bay (Byrnes, Berlinghoff, and Griffee). Dredging impacted the plant and animal species negatively further up the Bay.

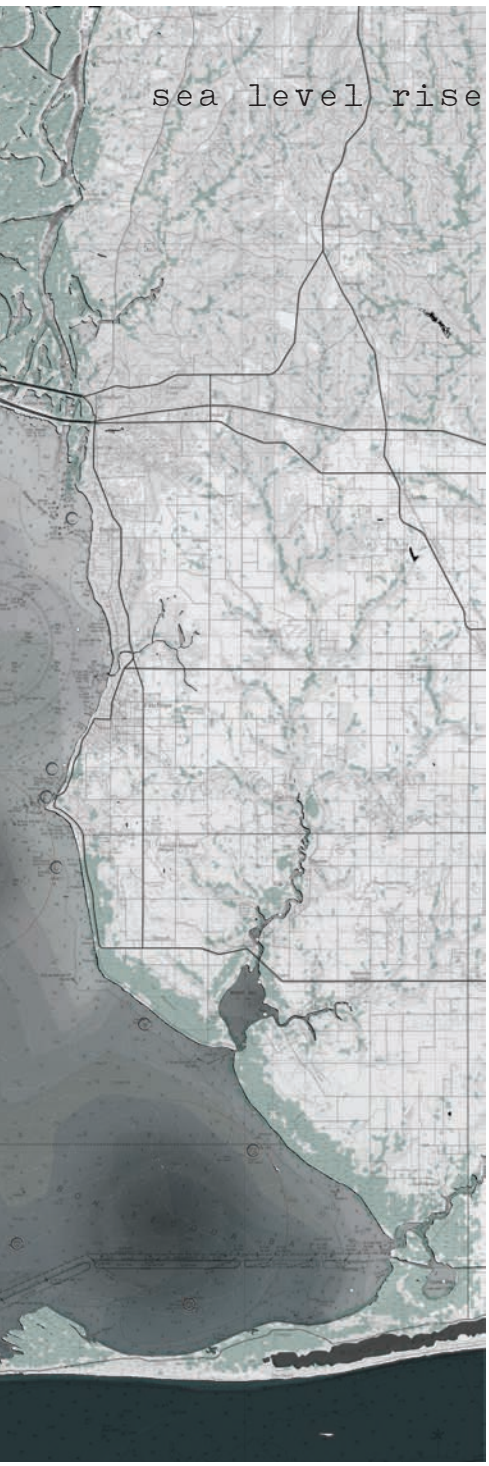
Figure 02.2

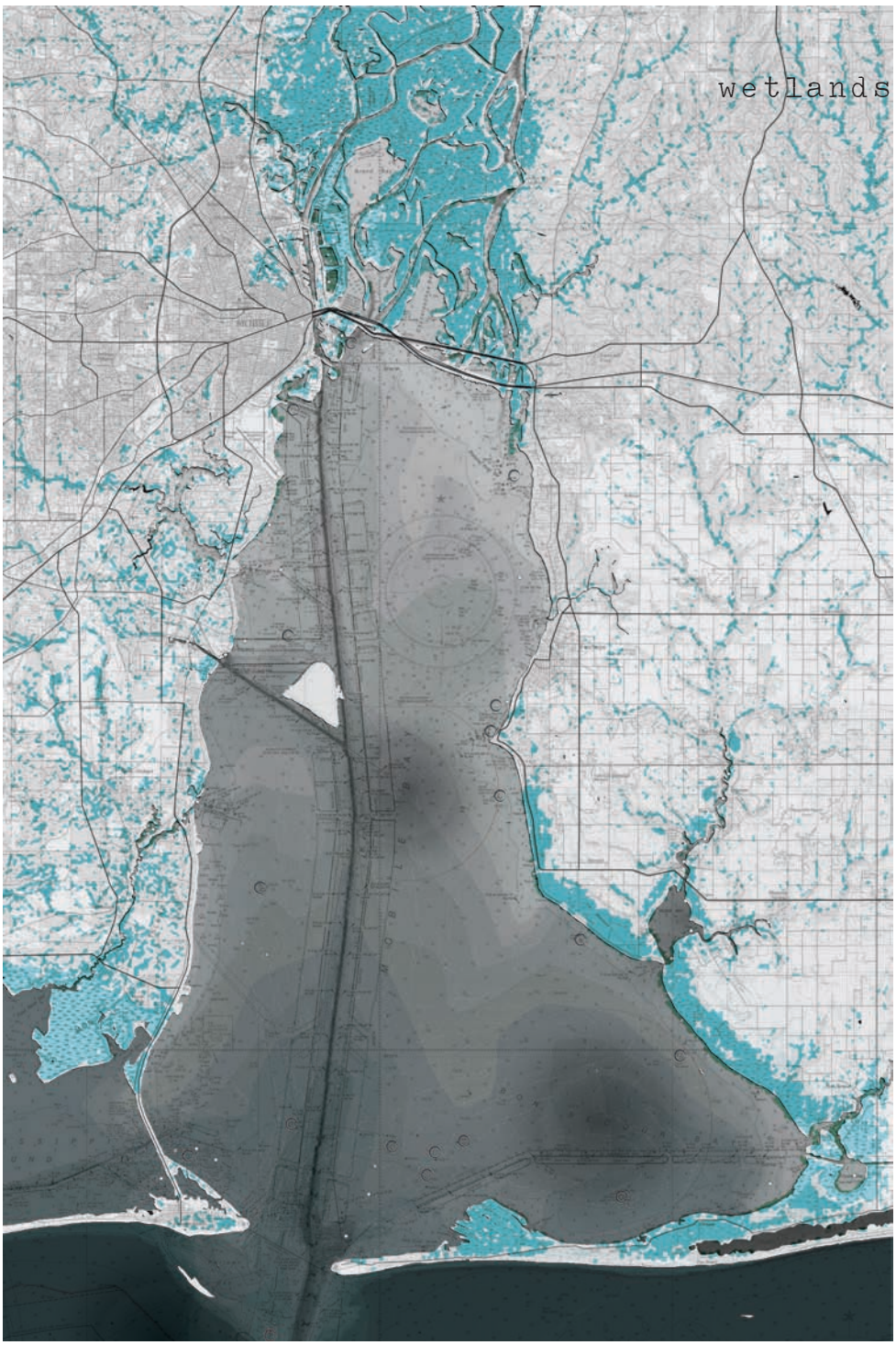
The changes that are created by the salinity levels shifting has pressured some species to move out of their normal habitat zones further up into the rivers and creeks of the watershed of Mobile Delta (Byrnes, Berlinghoff, and Griffee). The increase in manatee sightings over the past ten years has cumulated dramatically. Nearly 100 sightings were recorded from the early 1900s to 2006 while 100 sightings were documented just in 2007 (Byrnes, Berlinghoff, and Griffee). Other factors that have influenced the manatees moving further up into the Mobile Bay watershed, such as habitat of sea grass moving to different locations in the bay.

oyster reefs

and manatee sightings

To locate a site that is experiencing the substantial change now and in the future, the mapping future human population in the relationship with sea level rise and current wetland habitat was important. Further, Mobile Bay was researched to find an area that will experience a conflict with future human development and the current ecological habitat.


sea level rise


wetlands


population
density

There are many areas located in the city of Mobile that will be experiencing impacts with human development encroaching on wildlife and wetland habitat while also experiencing sea level rise. Learning how these communities are affected can help the populations of this area to understand the relationship of humans to ecological habitat.


MOBILE
Forest Park
Brookley Airport
Dog River Bridge
Theodore
Holmes Island
Spoil Area
Numerous scattered Oyster beds (see note B)
Fowl River
South Orchard
Bayview Corner
Dillmans Corner
Chacaloochee Bay
Polecat Bay
Dawson Bay
30°40'N

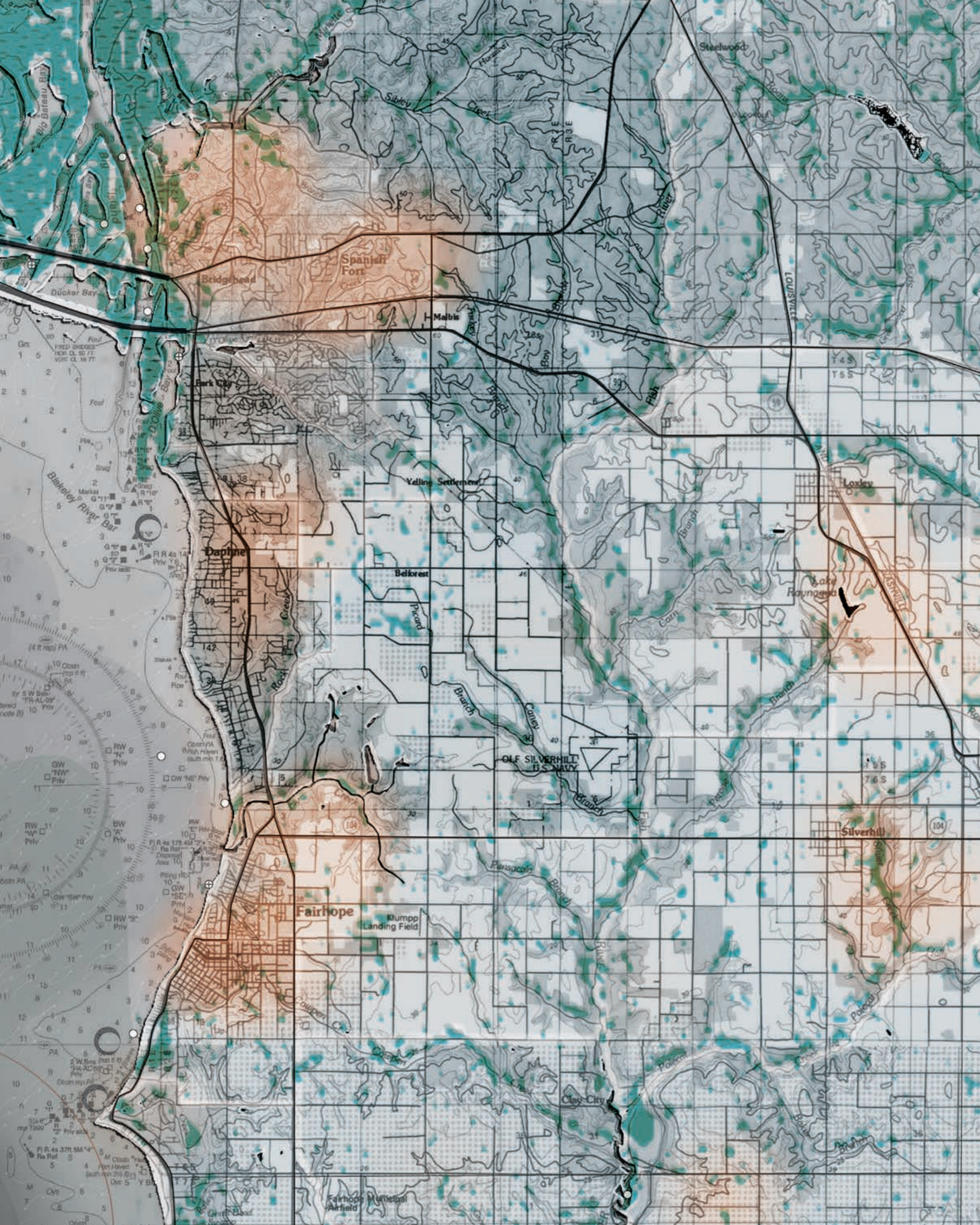

Steelwood
Sibley Creek
Spanish Fort
Bridgehead
Malbis
Park City
Blakeley River Bar
Yelling Settlement
Loxley
Daphne
Belforest
Lake Rayngeta
Rock Creek
OLF SILVERHILL U.S. NAVY
Silverhill
Fairhope
Klumpp Landing Field
Clay City
Fairhope Municipal Airfield
LOUISVILLE
T 4 S
T 5 S
T 6 S
R 2 E
R 3 E

Figure 02.3

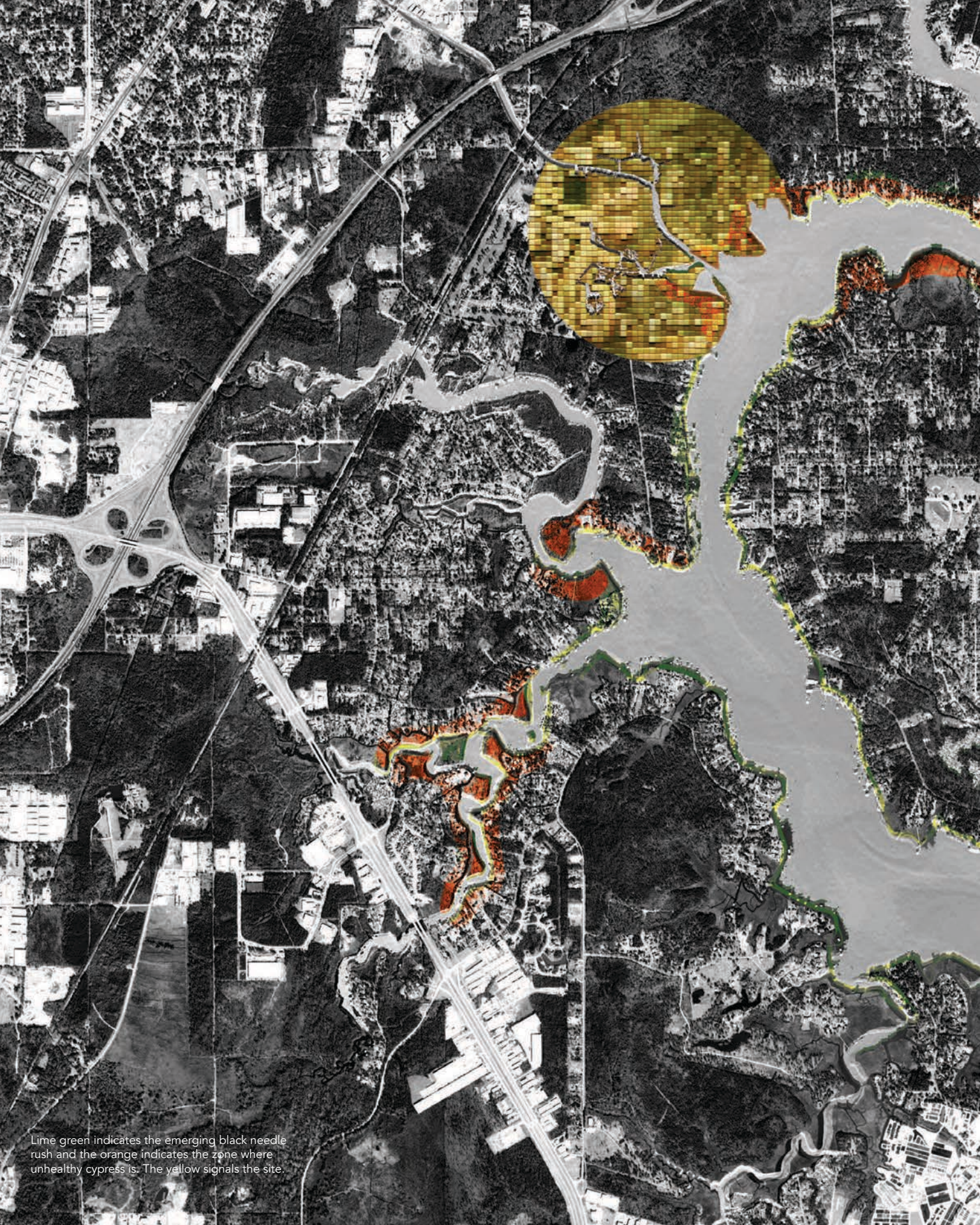
Different forms of soft infrastructure that act as habitats and buffers.

Figure 02.4

Oyster reefs acting as living shorelines that provide habitat for oysters will acting as a buffer for wave erosion.

shoreline infrastructure

Mobile Bay is affected by many different human manipulations that have impacted the dynamics of the bay. Shoreline infrastructure has implemented on almost 60 percent of the shores of Mobile Bay (Byrnes, Berlinghoff, and Griffee). There are many different types of seaside infrastructure from natural wetlands to hard sea walls. The types of infrastructure around the bay influence the impacts on the shorelines around it. Areas that aren't protected by coastline infrastructure experience greater erosion issues than areas protected. One of the criteria for picking a site to design is a landscape that isn't protected from shoreline infrastructure so that it experiences natural impacts.



Lime green indicates the emerging black needle rush and the orange indicates the zone where unhealthy cypress is. The yellow signals the site.

dog river ecotone

Viewing Mobile Bay holistically allowed one to see the hard-hitting issues of the bay, so zooming into a precise site was more useful to understand how the regional issues are affecting places at the ground level. Dog River located on the edge of the city of Mobile, with most of its upper watershed in the city affecting the health of the river. Two different reports by students in the Earth Sciences Department at the University of South Alabama that were used to evaluate salinity in Dog River and chose the locale.

One report by Logan Wheeler was setting up saltwater monitoring systems throughout Dog River and measuring the levels of salt water found in various locations along the river. The report concluded that during times of high tide, salt water would disperse unevenly further up the river and during low tide the salt water would remain closer to the end of the river and would spread out (Wheeler).

The other report by Hunter Griffin looked for physical evidence of salt-water intrusion by observing the health of bald cypress trees and the emergence of plant black needle rush. Cypress trees can't thrive in waters that have salinity levels greater than 2 ppt (parts per thousand), and black needle rush is an indicator species for higher levels of salt in water. The report found where these areas met and suggested that an ecotone was emerging in this scope (Griffin). Though the findings have other factors that influenced it, these reports were used to find the area of the final site. The site would be experiencing this transition of salt water and fresh water meeting.

selecting a site

Transition zones where the river bends and turns into smaller streams is where the ecotone of salinity levels found. The site chosen located near Moore Creek, which experiences large amounts of sedimentation from the city of Mobile's runoff during storm events (Byrnes, Berlinghoff, and Griffee). The area experiences many different impacts and changes from the encounters of natural phenomenon such as sea level rise, sedimentation, and rising salinity levels. The site itself is a completely manipulated landscape that had a small stream flowing through the site. Now, the stream has been dug out into a manmade channel that holds water. The land has been cut and filled with unknown soil to create a golf course, which was maintained with fertilizers and different forms of herbicides to keep the golf course in a manicured state. Over the past 50 years, different hurricanes and storms have caused problems with water build up on the golf course, which has left the golf course unusable. The abandoned golf course is experiencing emerging early successional plants. The site now functions for other types of informal recreation, such as fishing, social events, and mud riding and acts as a habitat for plant and animal species.

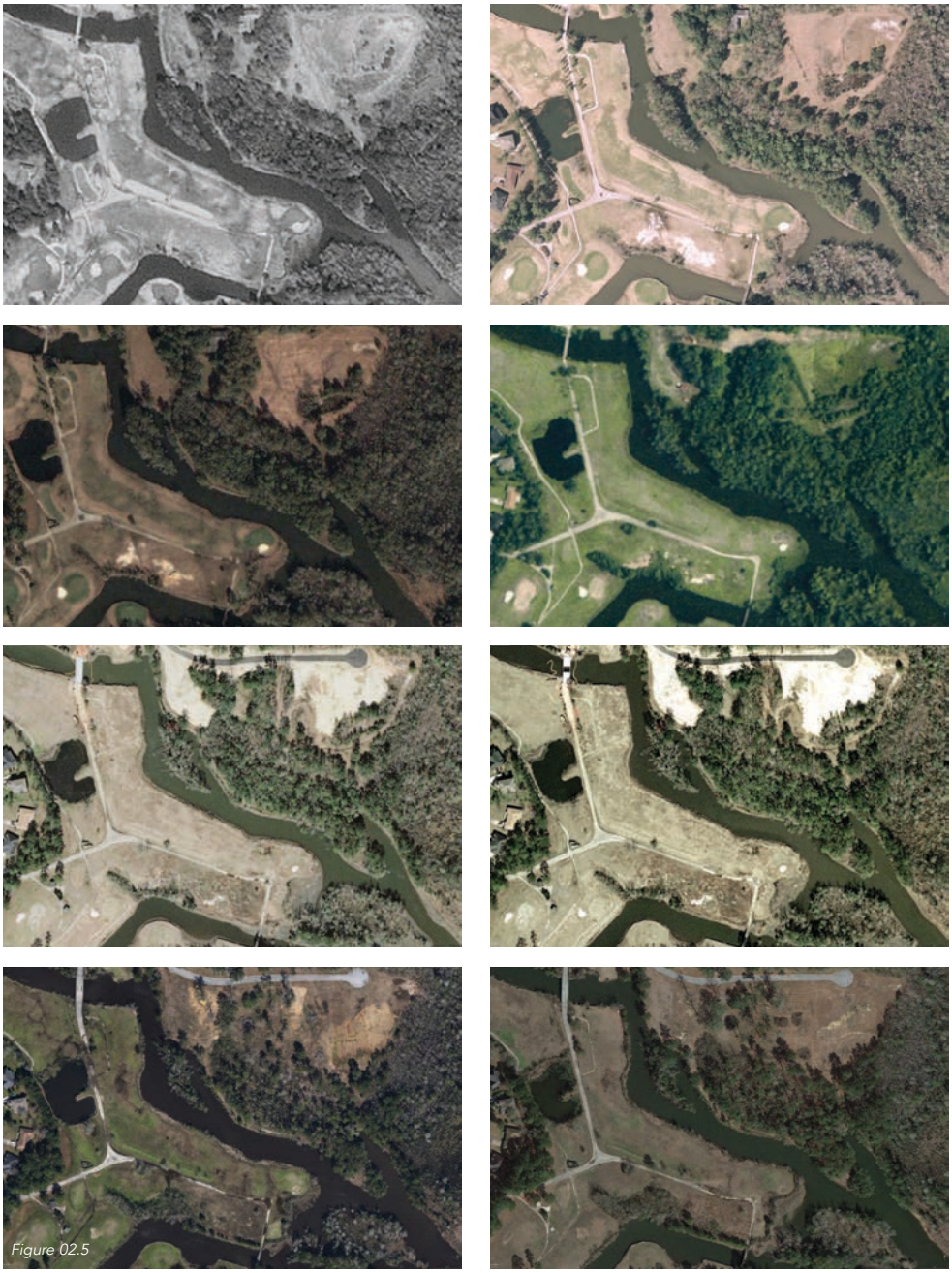


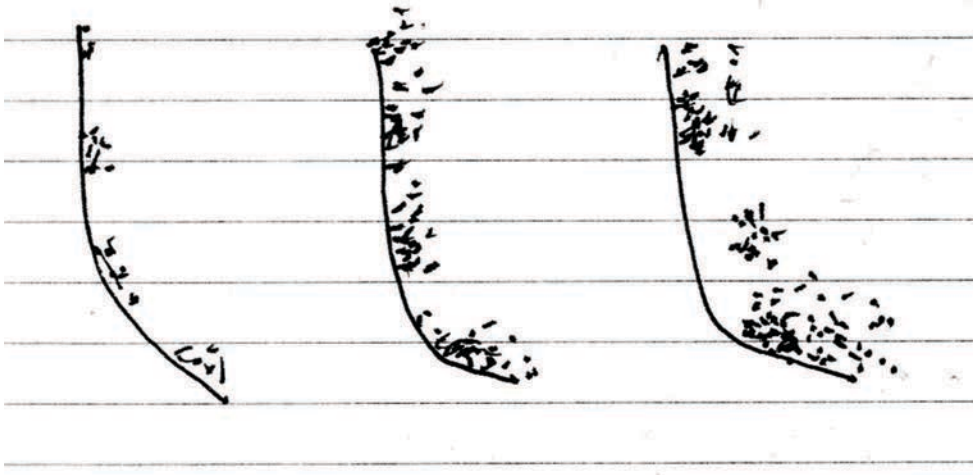
Figure 02.5

Aerials of the site over 13 years, during this time two different hurricanes changed the dynamic of the scene and the function of the locale for human use.

03 site investigation

Mentioned in the previous chapter the selected site is an abandoned golf course located where Moore Creek meets Dog River. Sea level rise and shifting salinity levels aren't always negative influences, and could create a landscape that is more diverse in plant and animal species. Currently, the abandoned golf course has a massive amount of people traversing the site during different times of the day. The area is experiencing excessive flooding, which because of the soil conditions it is regularly saturated and create a perfect environment for mud riding. The site is covered in circles from vehicles driving through the muddy landscape. Further, the site has created a community of people who need a place to fish. Fishing on the site occurs because of the location to the Dog River and the lack of heavy traffic from other boats fishing.

For a landscape architect, this site is a remarkable place of interaction between human and ecological interaction. The early succession starting here creates situations for animal habitat and food sources. This site could be a testing ground for landscape architecture to share the existing ecological system to individuals that come to this site for recreational purposes.



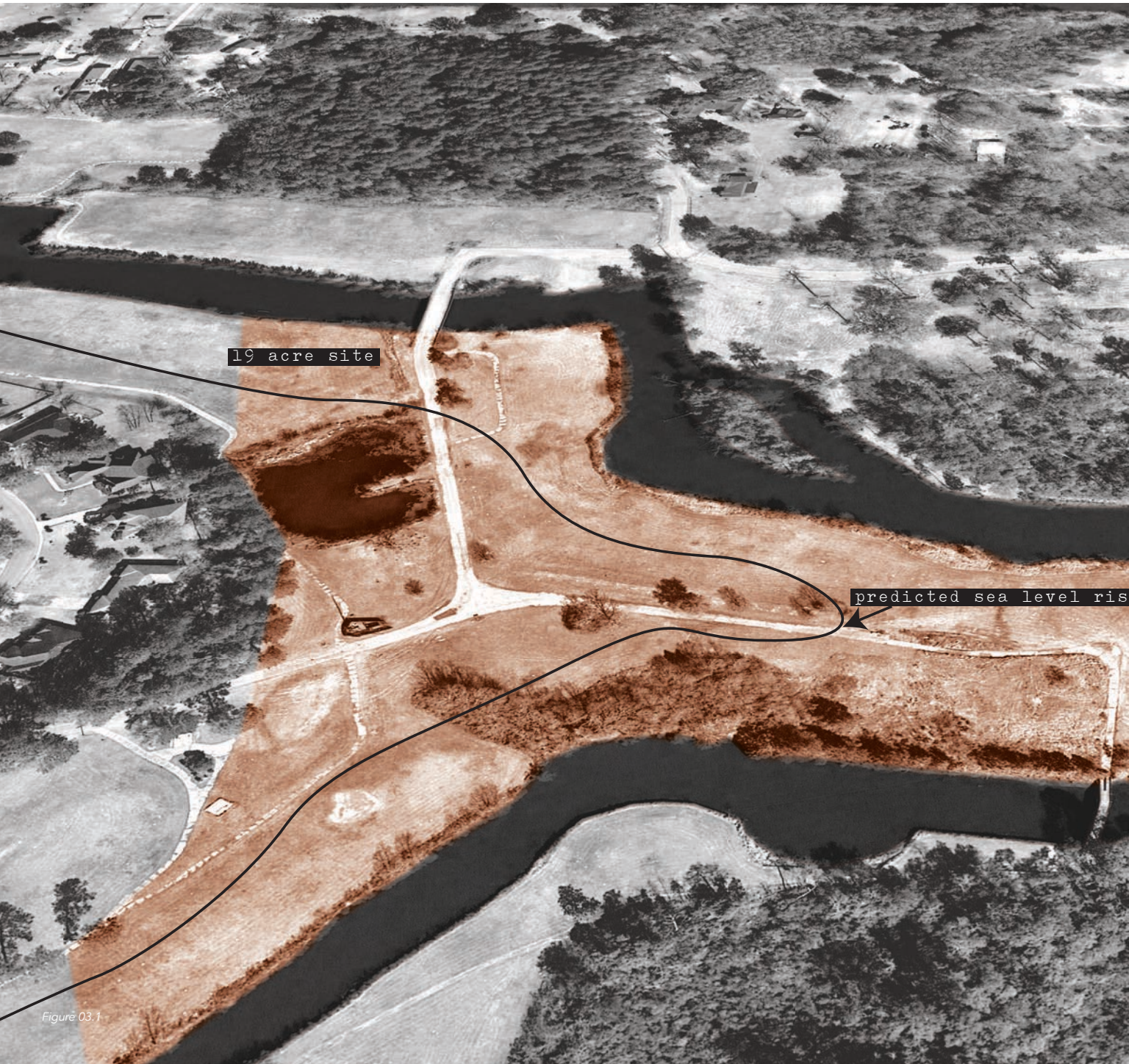
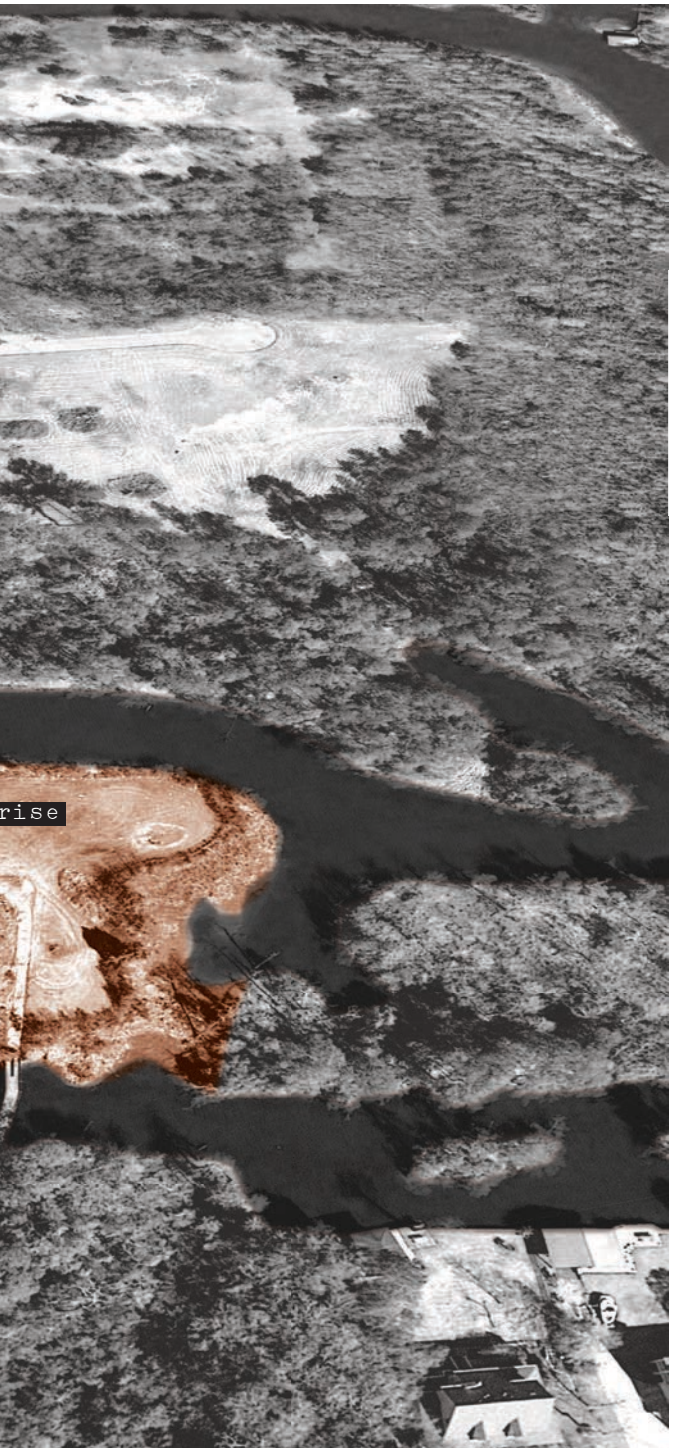
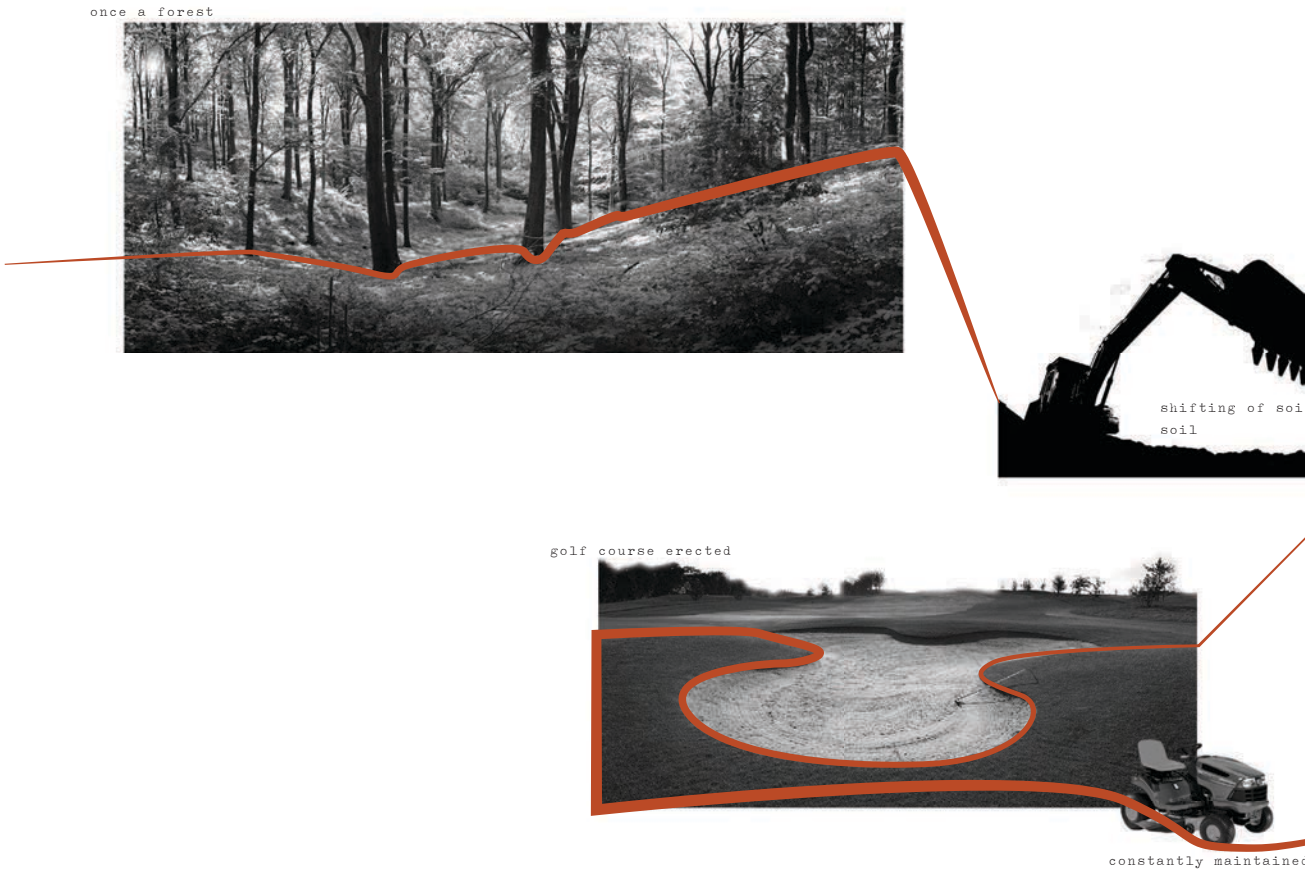


Figure 03.1



Located on the map is the 19-acre site that is located near a middle- class neighborhood and acts an unofficial community park where locals come to fish. You can see how in some areas, there were attempts to maintain the golf course manicured look; however as the site has shifted in recent years, succession is taking over. The line that runs through the site indicates the predicted sea level rise of 1.5' in the next 50 years. Sea level rise will impact this site will experience in the upcoming years.



The image the story of the site which before the location turned into a golf course it was a forest that had a small stream running through it. In the 1960s, according to aerials, a golf course was constructed on this site. Today the site is experiencing excess flooding which has led to the abandoning of the golf course. The will be shifting more after the effects of sea level rise.

ls and filling with new

new activities

abandoned golf course

sea level rise

1.5 feet by 2076

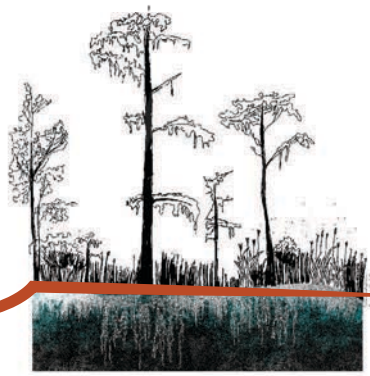
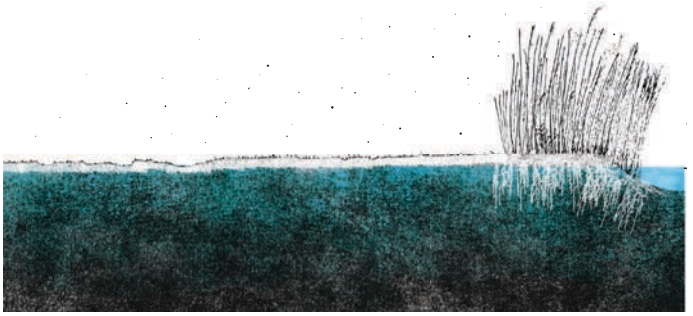
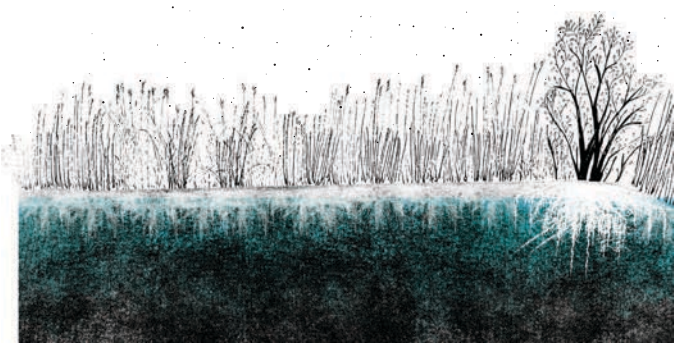


Figure 03.1 - 6

predicting site succession

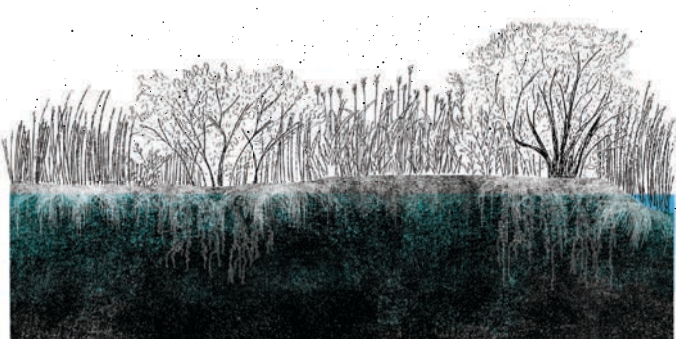
Salinity levels are changing, sea level rise, and succession there needed to be research done on how the site will react to the disturbances that have been forecasted to design for a site that will be experiencing dramatic change over time. Predicting the current site's succession over the next 60 years will aid the design of the situation by understanding what plant species can thrive here. Information about the conditions that the plants can live, germinate, and take hold will inform the predictions for the future ecology of the site.

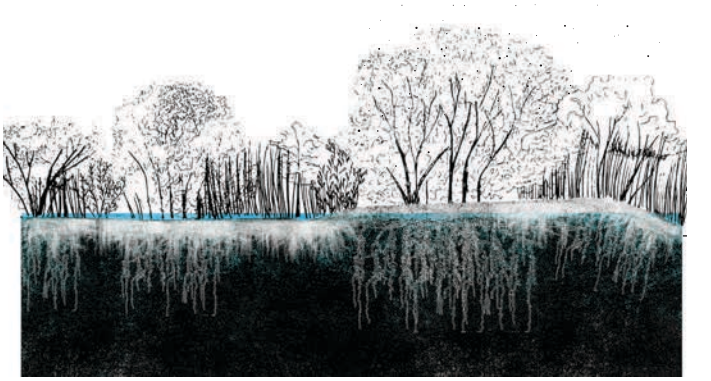


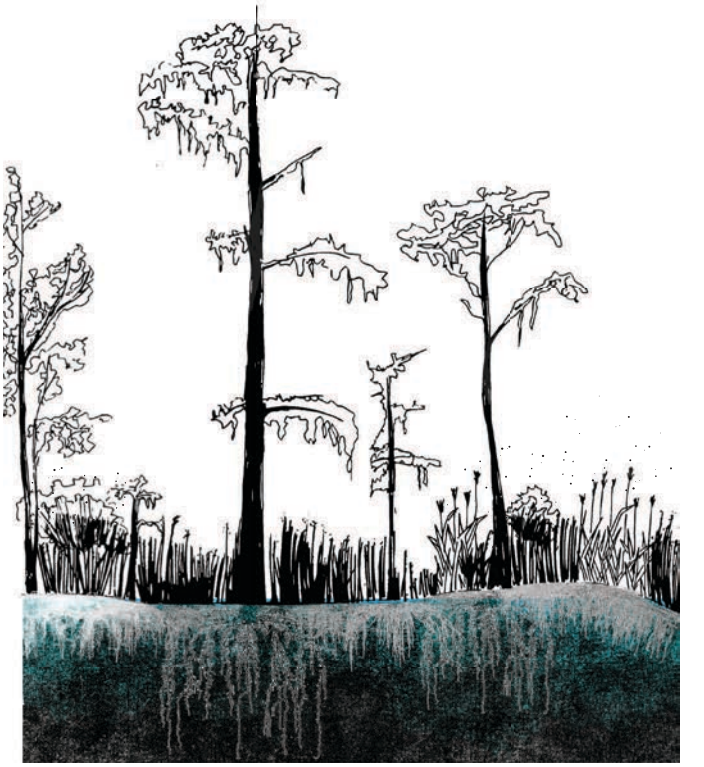


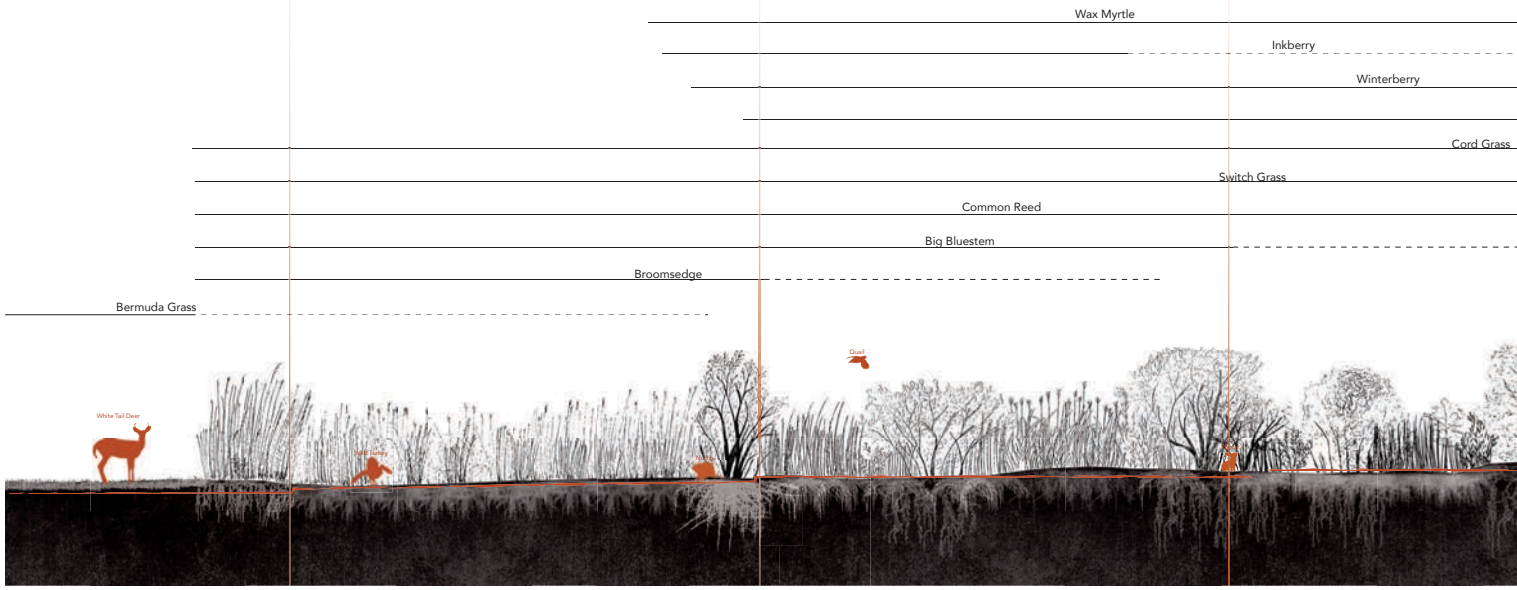
predicting plant life

The factors that will be used to test the plant life and the soil conditions will be a 1.5-foot sea level rise and a change in salinity levels from 1ppt to 4pt. Each of these factors will influence other conditions that could modify the ecology of the site. The existing soils information from Web Soils Survey online provided information on what types of plants would grow here. Remember a lot of the land was manipulated and other types of soils located on this site, so an account of existing vegetation was noted from a site visit to define further what plant life can exist here and what plants were emerging there. Information from the United States Department of Agriculture was also used to learn about the conditions that each plant needs to for survival and germination.

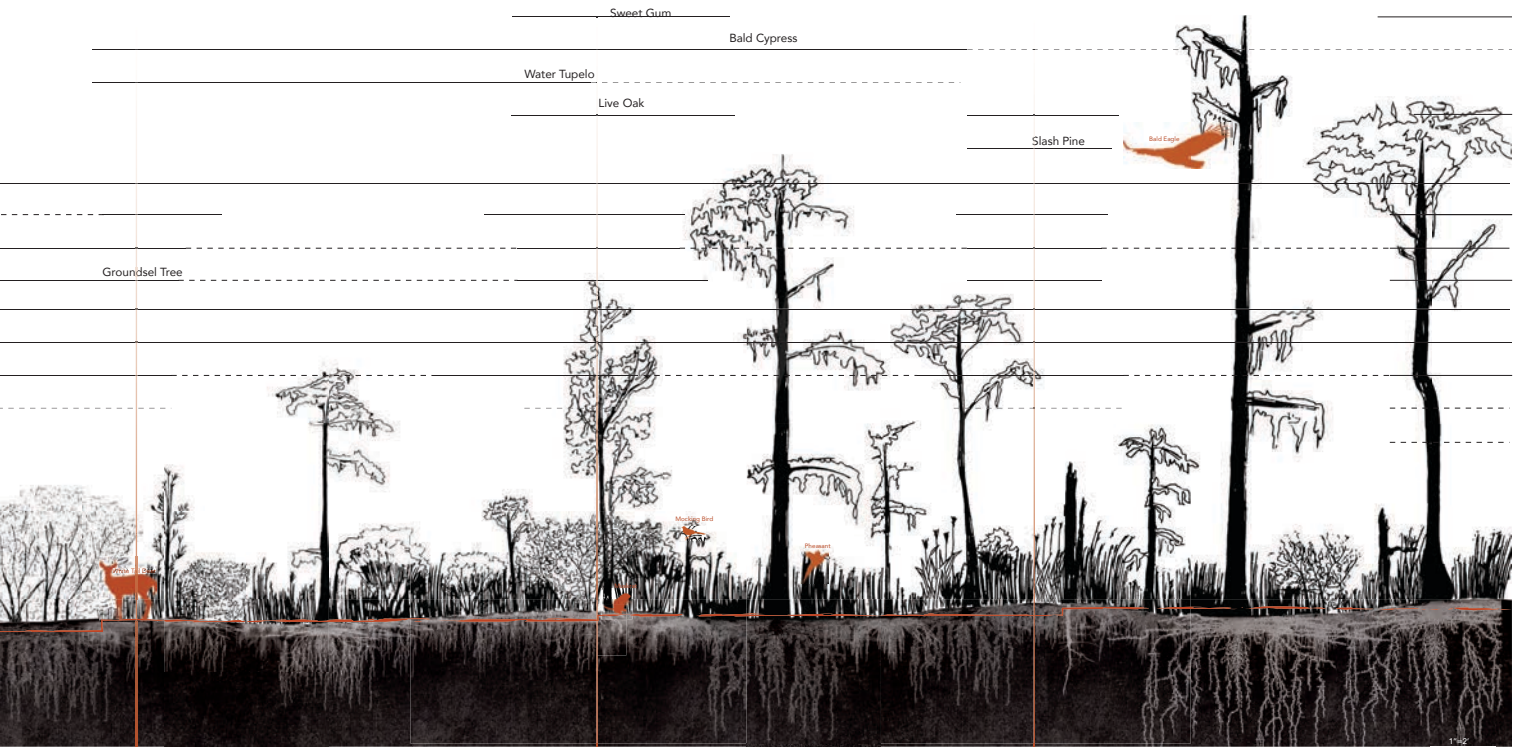








Creating the sections led to the realization that this landscape will not disappear after flooding. The landscape will change and shift into a different form along the edge of the water called the alluvial forest (Godfrey). The alluvial forest creates along the corner of a bank where the flowing waters will cause natural levees to build up over time (Godfrey). On the other side of the bank, there will be a flood zone that will be affected by flooding and that area will be incomparably affected by different plant life from sea level rise and salinity levels changing. The higher alluvial forest could have plants that thrive in drier location because of the lack of moisture in the soil, and since it is further away from the groundwater (Godfrey). The groundwater level on this site is directly level to the current water level, so the soil is saturated most times of the year. Because if the impacts of flooding the alluvial forest usually



experience trees falling into the streams because of disturbances and never will grow into a dense older forest (Godfrey). It isn't uncommon to see pine trees that have fallen into the waters along the edge of the stream.

Interesting findings of the long section was that the plants that would disappear at one point but would return once the alluvial forest builds up over time. The animal ecology of the site would influence the plant life by bringing in different seeds. How would this inform my design? The discoveries guided a design that would manipulate topography by creating a gradual slope that would reveal the different soil and water conditions associated with the plants that were planted in the location.

"personal observations and encounters in the most ordinary of landscapes can and will raise questions and issues routinely avoided by programmed educational and entertainment authorities."
stilgoe

04 theoretical framework

aims

- create a community awareness to the impacts of sea level rise and shifting salinity levels
- reveal the shifts by different forms of landscape intervention

There are places out there that are forgotten pieces of the urban fabric that humans are a part of every day but don't recognize it. There are places like abandoned golf courses, utility corridors, industrial parks, and abandoned landscapes that once or still serve as important bits of information to learn about the culture of an area. Exploring these areas can lead one asking the question of why is this landscape the way it is (Stilgoe)? In the book Outside Lies Magic, the author is encouraging people to go outside, explore, and learn (Stilgoe). This way of thinking about landscapes will be significant for the design in a later chapter because the site is in a place where people can only access it by foot or some form of a boat. The site is meant to be explored by society

Figure 04.1

eco_revelatory design

The fundamental theme of this project influences the idea of creating strategies of adoption and revealing ecological phenomenon in a highly manipulated landscape both by natural processes and human manipulation. The discovery led to looking at the theory of eco-revelatory design, which was written highly about in the Landscape Journal in 1997. The theory advocates to become more aware of ecological forces and to learn from natural processes. It is asking for the designer to harness the powers of natural processes and use that to reveal to the community that is using the existing landscape to understand what ecological forces are engaged. It most importantly trying to expose the relationships that humans have with ecology, and to understand that to co-exist together there needs to be a relationship that works together (Merchant). The partnership between man and nature must exist with equality about the needs of each other (Merchant). This theory can be used to help improve the health of a human community will still providing benefits ecologically.

Eco-revelatory is one instrument of design that can be used to reveal to local communities how humans have impacted the landscape. It doesn't necessarily mean that it will fix the problems with the site but rather calls attention to the changes (Merchant). Its goal is to reveal to provoke thought and interest in the revelation to the user. Eco-revelatory projects can still function whether or not the human community understands the reasoning of the design. Sometimes these schemes are unsuccessful integrating the human and ecological as a partnership (Merchant). For example, the West 8 design is made up of rows of black and white shells that are lined up near major highways near the coast. These shells act as a shoreline infrastructure that attracts different color birds to particular strips of colored shells (http://scenariojournal.com/article/laura-tepper). The project's goal of revealing this to the highway users hidden when the tides changed. One would have a hard time viewing the phenomenon while the shells were submerged.

This project's intention is to reveal the shifting nature of the site from the effects of sea level rise and shifting salinity levels over time by changing the form of the land. Hopefully, the design provokes thought about why these landscapes designed in such a way. The impacts on the plant life and the relationship to a monitoring system will help the user understand what natural processes are occurring that affect the local human and ecological habitats. By using the ideas mentioned earlier about creating a design that allows changing perception through exploration.

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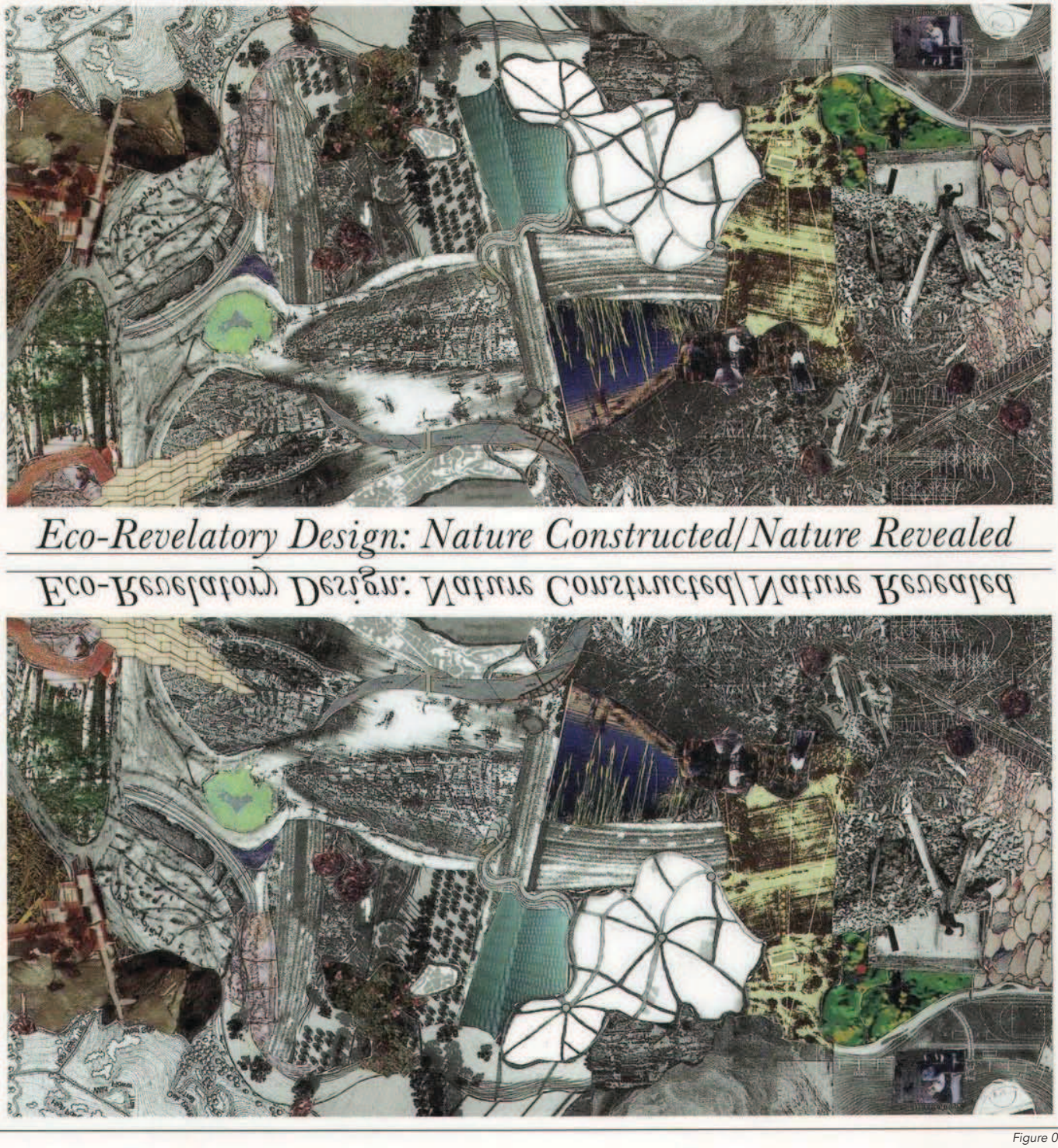


Eco-Revelatory Design: Nature Constructed/Nature Revealed

Figure 04.2

case study 1: parc de la villette

Parc de la Villette is a park in Paris that creates by the architects at Bernard Tschumi Architects. The project consisted of 25 different structures placed throughout the site in a grid form so you can relate that each structure is a part of the design (http://www.tschumi.com/projects/3/). Having an overall form that will guide you through the design will be vital for the upcoming design tests. Creating different situations that influence the layout of the design will be a way to reveal to the users that it is a testing ground for change.

Figure 04.3

case study 2: riverside park

Riverside Park by STOSS is a design that manipulates the contours of the land to create areas where sediment can build up, and emerging ecologies can grow with the flux of the water system. The design will change over time due to the placement of structures and whether or not the factors of flooding, sedimentation, water velocity, the wind, or storm power will shift the landscape to another form.

Figure 04.4

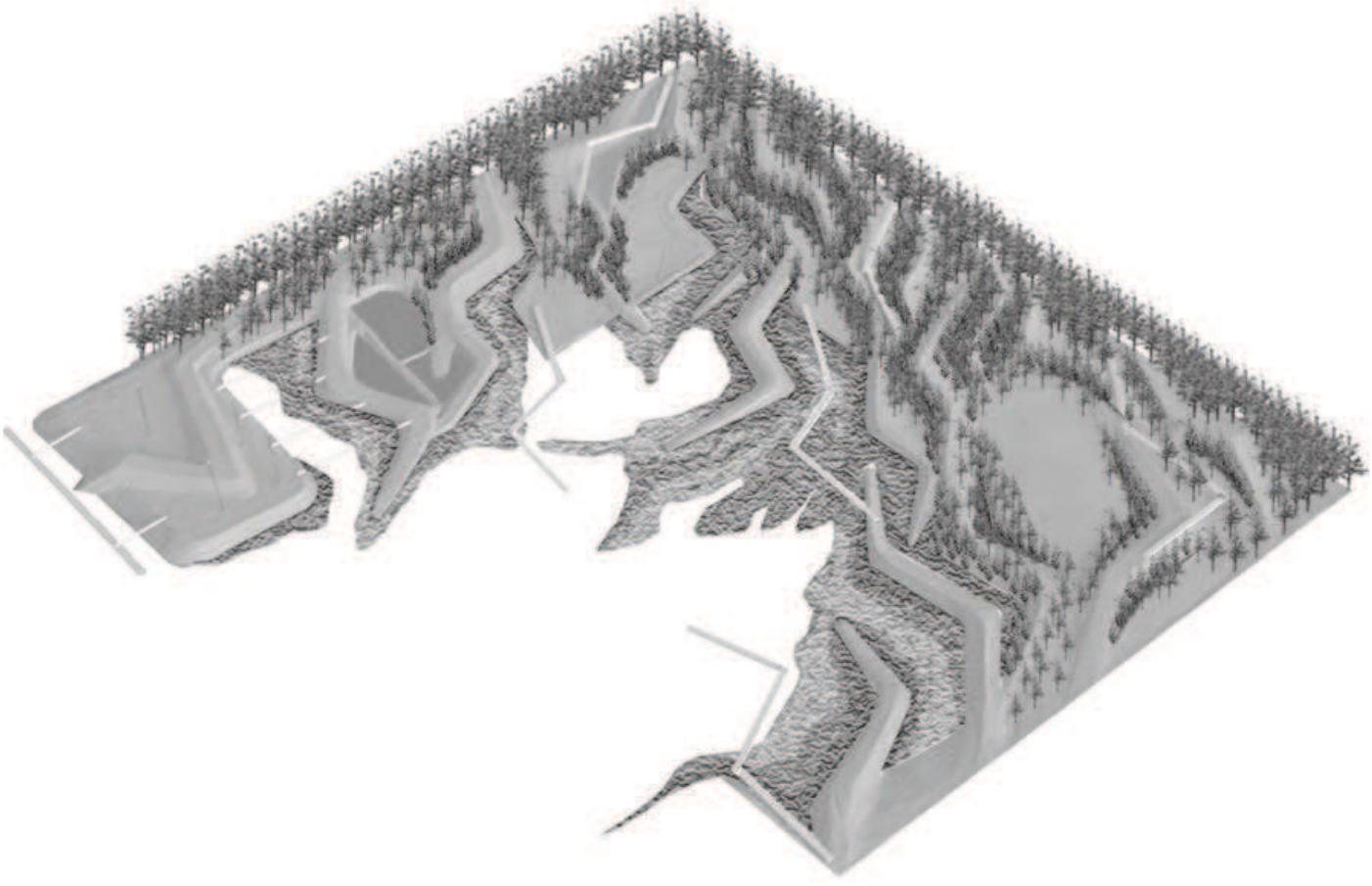


Figure 04.5

case study 3: bloedel reserve

Bloedel Reserve by Richard Haag is a design that reveals the dynamic changes that you don't see. Cutting a piece of the ground in such as way that would expose the groundwater table beneath the surface. The rise of the water table was revealed to engage the user in the unseen elements of the landscape. Creating a design that employs invisible elements and time will create curiosity for the users to question the meaning of the scheme.

Figure 04.6

evaluations

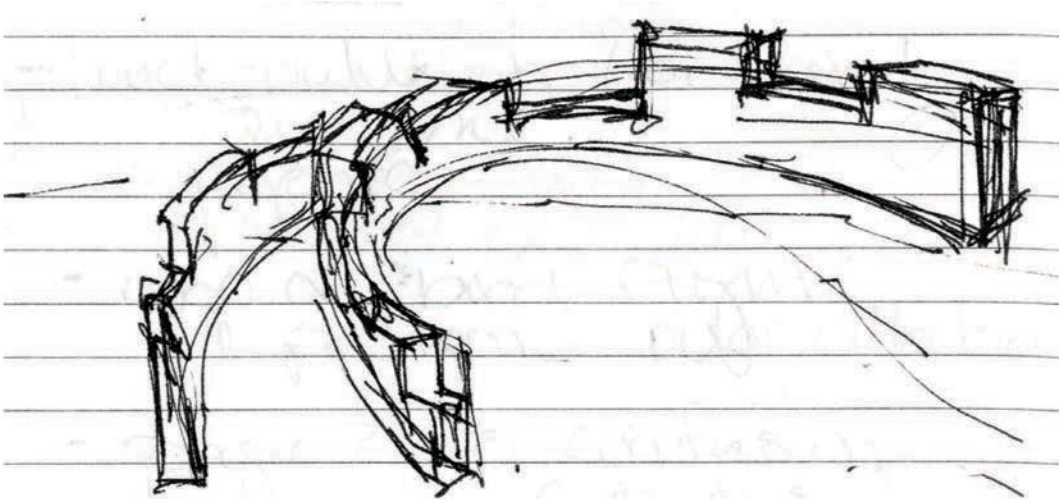
By using existing ecologies, succession, and emerging vegetation to create a testing ground for reactions to different factors of climate change and human influences on the Bay water system. The change of the form over time and the plant life will create a dialogue between the people who use this site and the successional growth. The theories behind the designs from the case studies will be useful for the design research process. The phenomenon on the site will act as a datum for the different manipulations. How the plants will react to the changes should be revealed and understood with the proper design insertions. The eco-revelatory design will be the guiding force behind the design that pushes for thought provoking design that could allow for one to register the change.

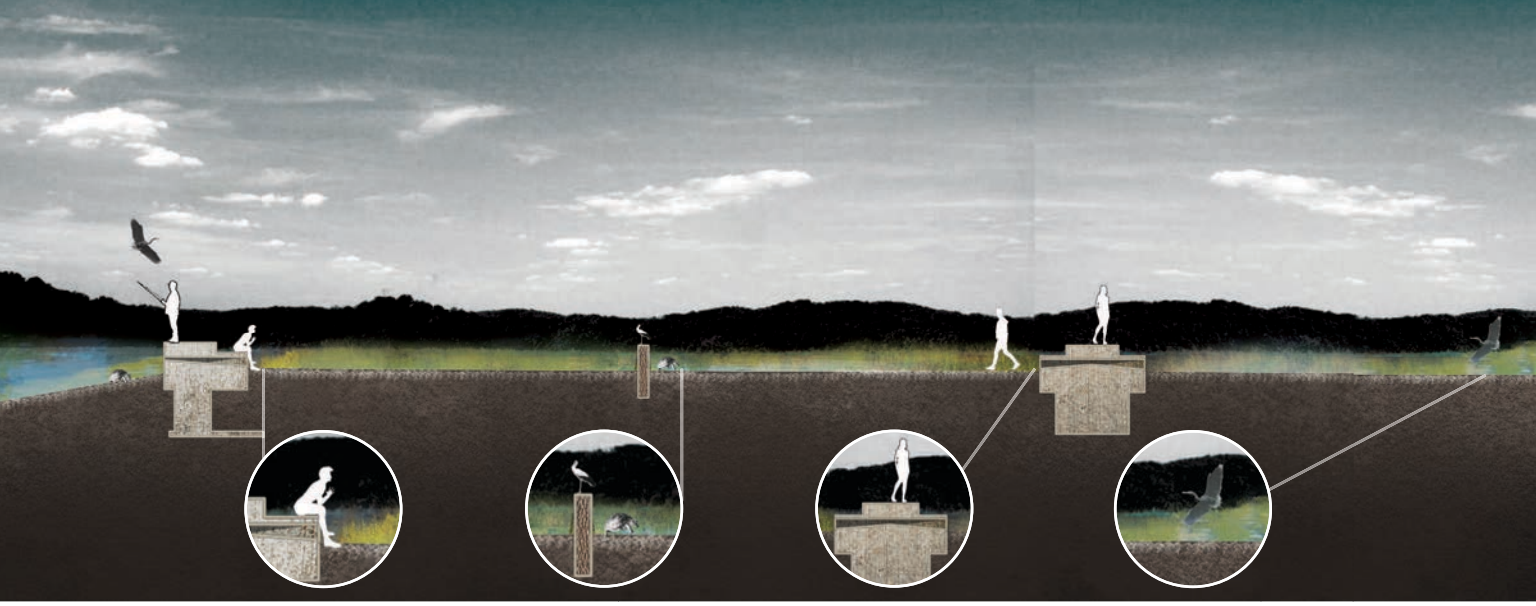
how can a site design act as a datum to reveal landscape process?

05 design explorations

For the design explorations three main themes that were used in the designs that revealed the nature of the site shifting. The three schemes were using infrastructure to direct sedimentation build up, manipulating the landscape to unveil the dynamics of the site, and using plant species living conditions to reveal the change in the natural processes affecting the site. The aims for each of the projects were similar; they were to create a community awareness of the factors that are changing the site and to engage the processes in such a way that it would reveal an aspect of the situation that you wouldn't normal see on the surface.

The projects were about revealing an invisible force that affects the ecological habitat and human community every day. The site selected was perfect for such a revelation because of the processes of rising sea level and salinity levels were already affecting this area. Also, people move through this site a lot for recreation purposes so they are the community that will be effected by the change in these coastal locations. Revealing what will happen in the impending future is important for the future of designs along the coast. This project acts as a revelation that isn't fixing or changing the effects on the land, but it is about learning from the changes.



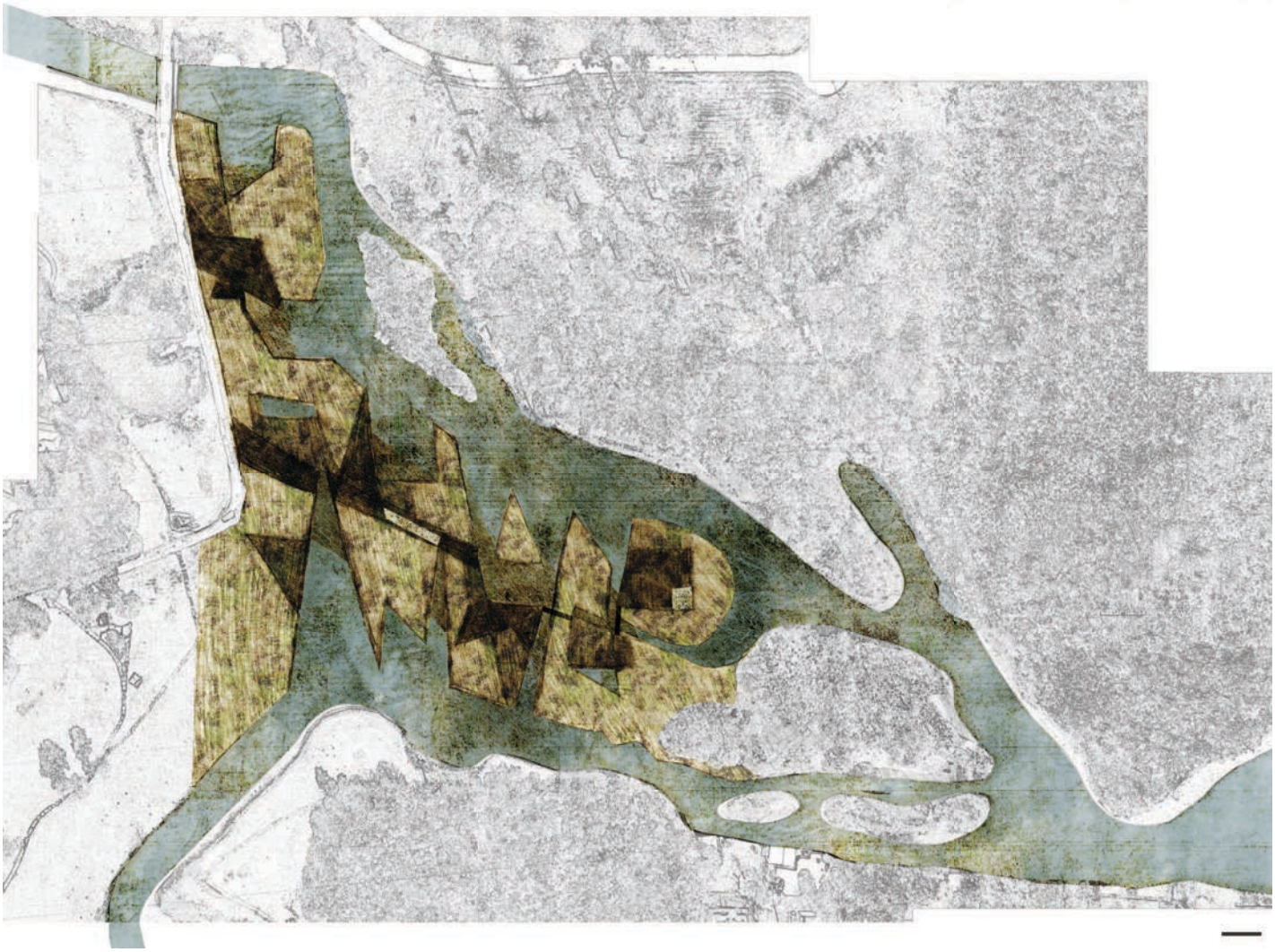


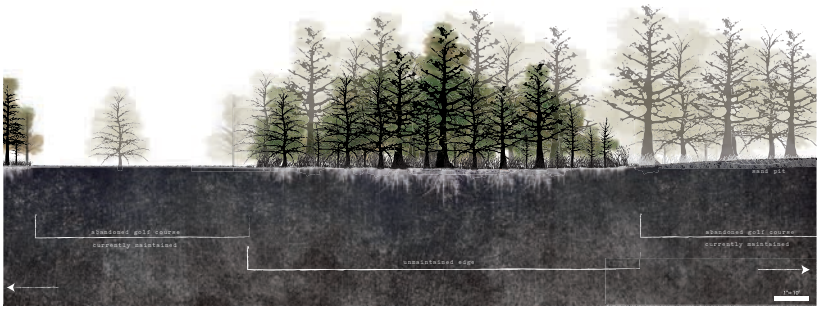
design test 01

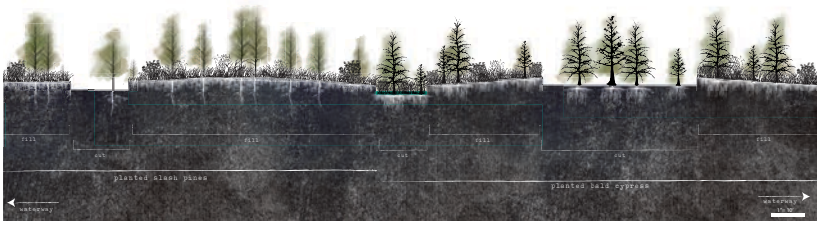
The location of the first design will be in a different spot than the following two schemes, because of the attention to the excess amount of sediment that flows from the city of Mobile into Moore Creek. The entire watershed of Moore Creek falls within the city limits of Mobile, AL. Because the watershed is in a highly developed area, the stream experiences high sediment loads during the year and especially during times of flooding. It was designed to capture sediment in precise locations within the Moore Creek to build up the soil and allow wetlands to emerge. There would be forms that would surface or disappear in relationship to the level of the water. These forms would constantly be shifting because of sea level rise and the amount of sediment build up. Unfortunately, this design didn't account for the water velocity that was quite high because Moore Creek is in a concrete culvert in the city. A concrete enclosed stream causes the water to flow quicker through the site and sediment build up may channel in the creek more, rather than slowly settle down and building up habitats.

design test 02

The location moved for the next two design tests to the abandoned golf course because the site for the first one was within a sensitive area that was hard to access and didn't involve both the human community and the ecological community engaging. The design focused on cutting and filling land in different forms that would change the dynamics of the site while revealing the change in groundwater levels by cuts of earth. This design was intended to return to the wild. Unfortunately, this wouldn't involve the community learning about the changes throughout the process of the scheme shifting, and so the revelatory aspect of the design would be lost. The design needed to have a pronounced form that wouldn't disappear from many floods To have success in the change of perception for users.




abandoned golf course
currently maintained
unmaintained edge
abandoned golf course
currently maintained
sand pit


fill
cut
fill
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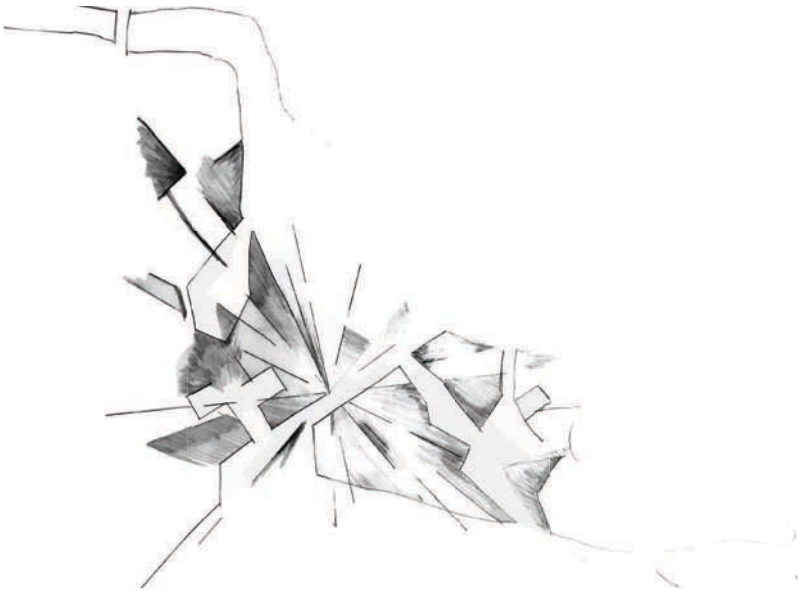
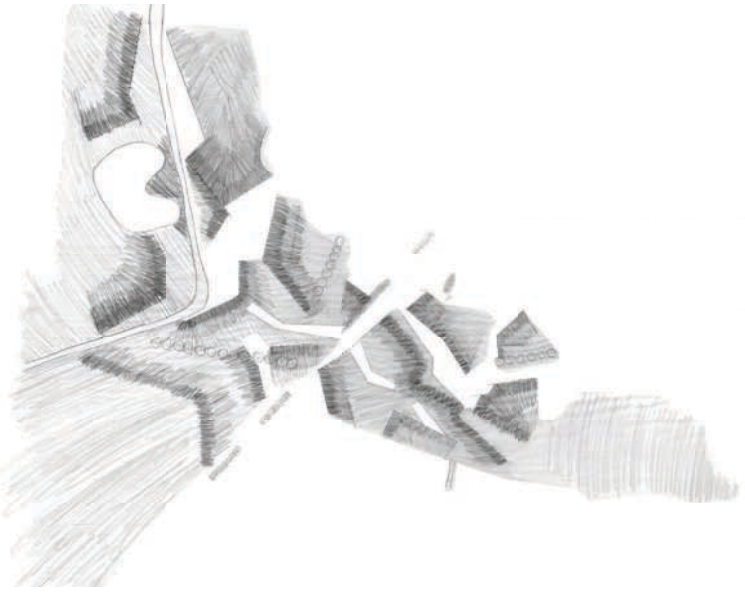
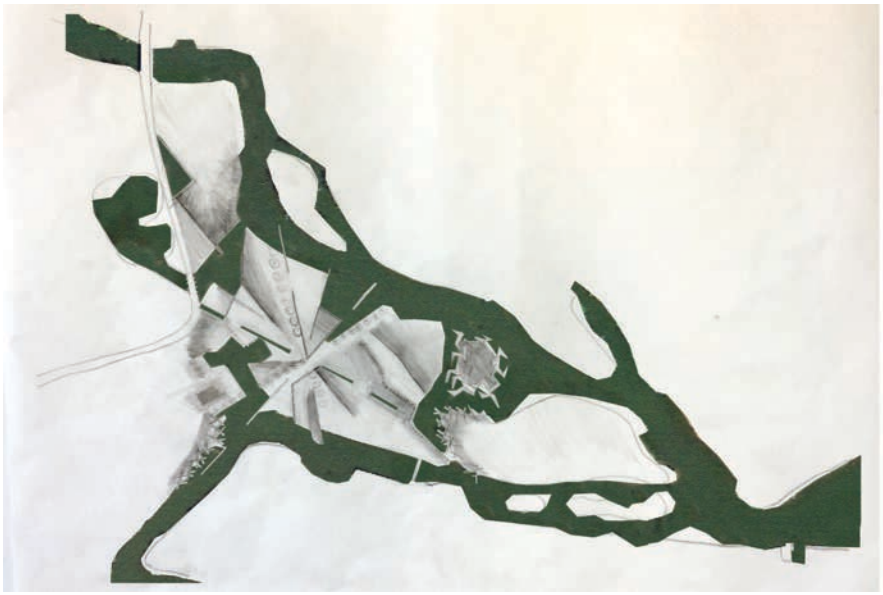
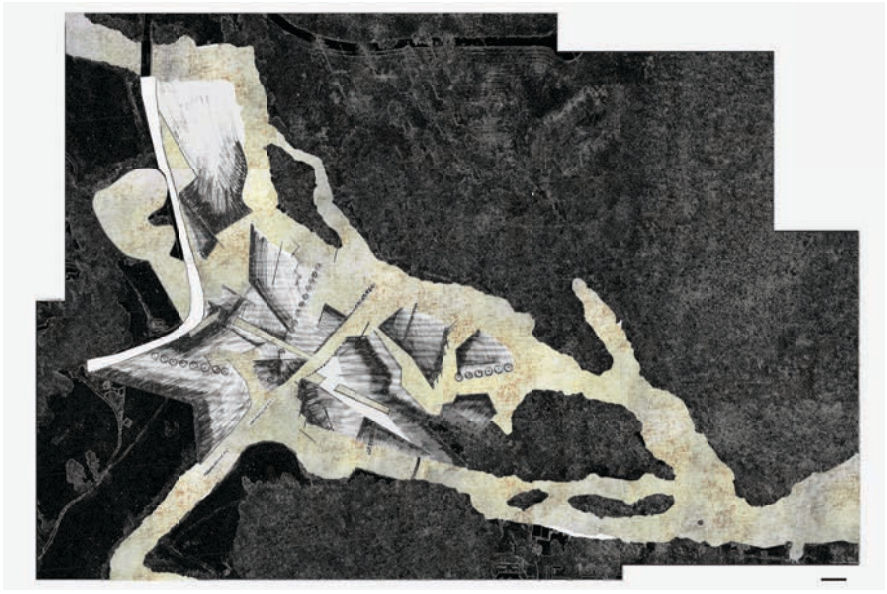
planted slash pines
planted bald cypress
waterway
waterway









final design

The final design iteration influenced by the case studies that were mentioned in the previous chapter (04 Theoretical Framework). Pushing to create a design that was an eco-revelatory design that used natural processes to change the perspective of what is happening globally on a local scale. As mentioned before, sea level rise is a global phenomenon that affects all the areas along the coast, and so understanding the impacts of that situation was chosen to reveal to the local community. Salinity levels rise a local situation that is increased by dredging and development that doesn't consider the ecological systems that it effects.

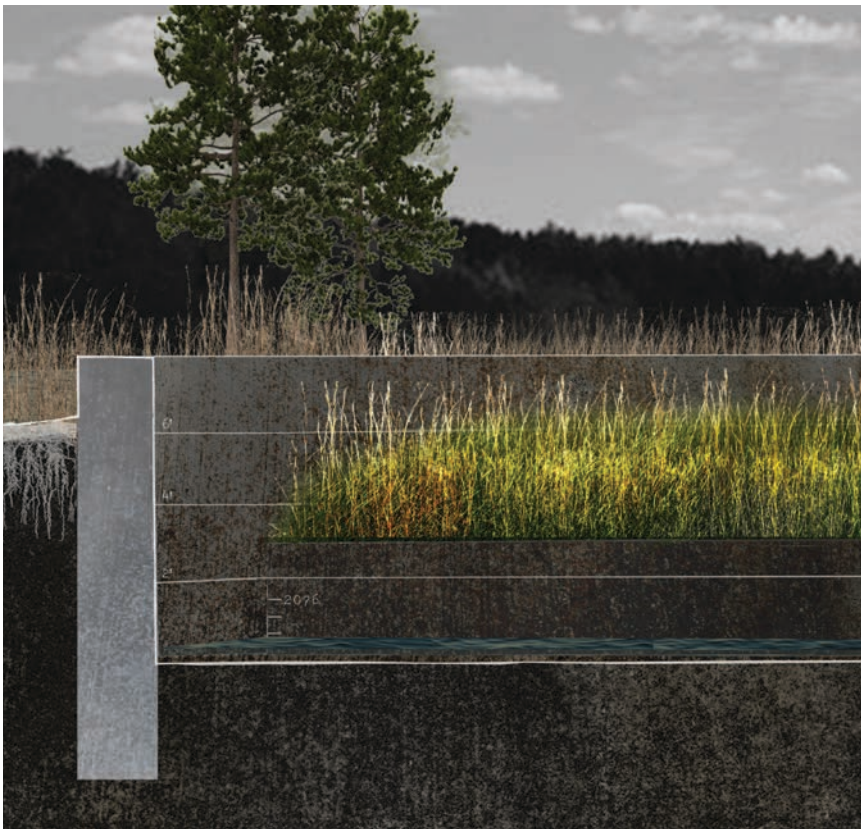


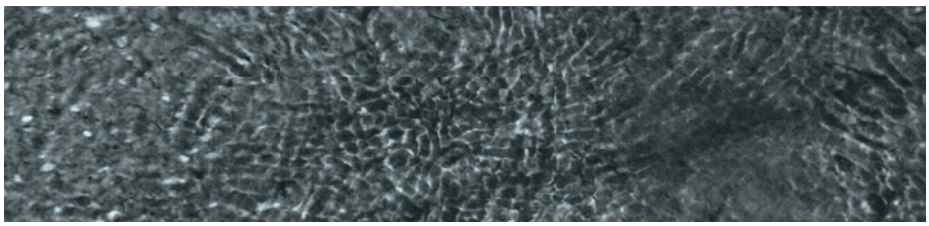
Figure 05.1

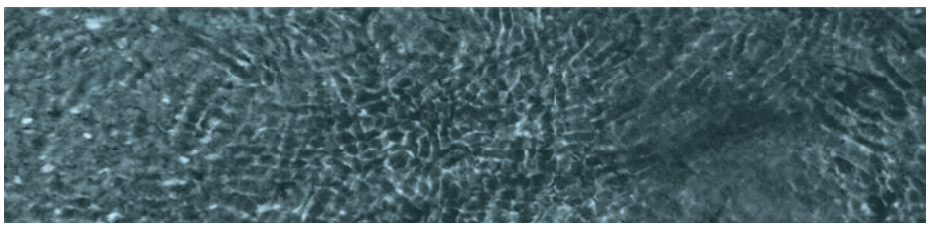
salt water monitoring

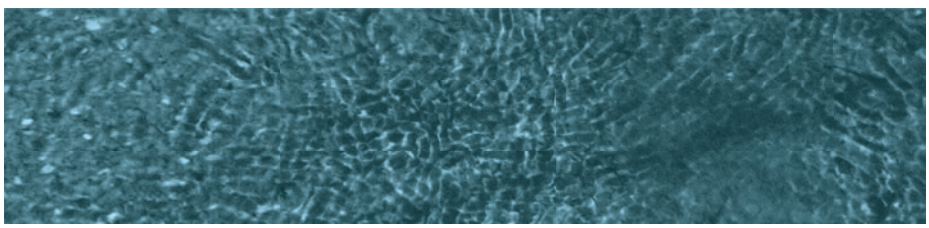
Incorporated within the design will be monitoring systems for salt in the water. The design located near areas that have alleys of different types of trees that will line up a slope, which will experience the amount of salt in the water at different levels. Because of the salt monitors throughout the site, you will be able to relate the dying of some trees to the levels of salinity in the water. Other areas you can look at what plants can thrive in saltier waters. The levels of salt in the water will be different because of the relationship to the Dog River and whether or not it will move up the stream that far.

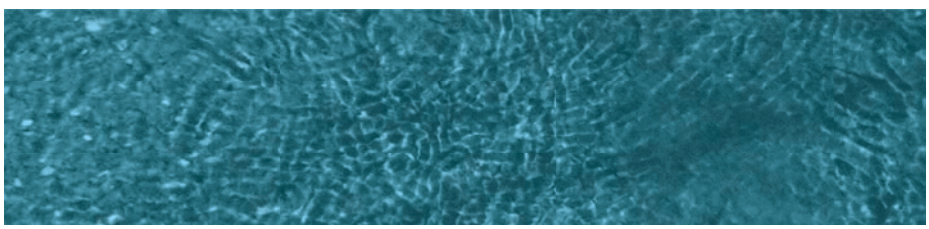
sea level rise monitoring

To reveal the water levels and to understand the predicted sea level change in relationship to the current water levels where the land is filled in particular areas; it will be held together by a dark concrete wall that will act as a monitoring system. The walls will have a date written on them where the water levels will be in 2076 when the sea levels rise 1.5 feet. People would come to the site by boat can see the changes in water level when looking at the walls that have marked with past water heights. To compare the existing water levels to the past, there will be an app that you can access from a QR code on the walls.





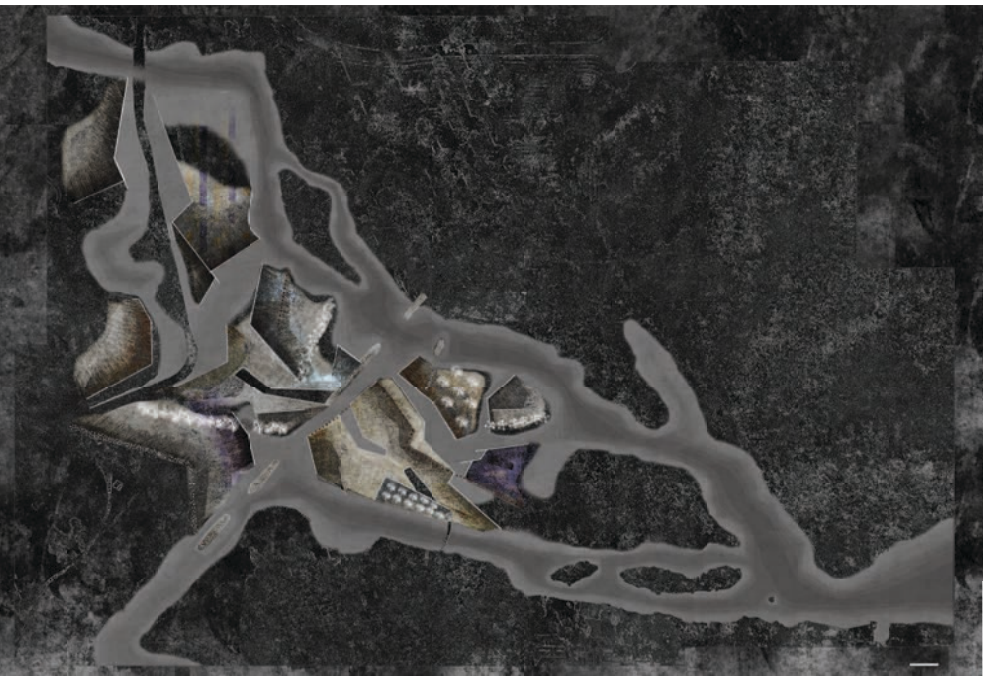




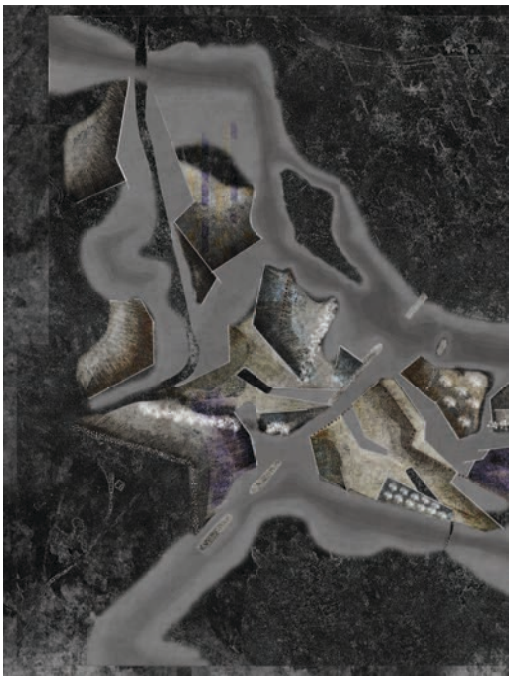
site design

The plan displayed is of the design when first created. There will be different areas that will be a monoculture of multiple variations of grasses that would test whether or not that can thrive in the newly manipulated landscape. Alleys of trees would be planted that have different levels of salt and water tolerances. The planting will create an environment of changing ecologies that would be thriving or dying.

year 10



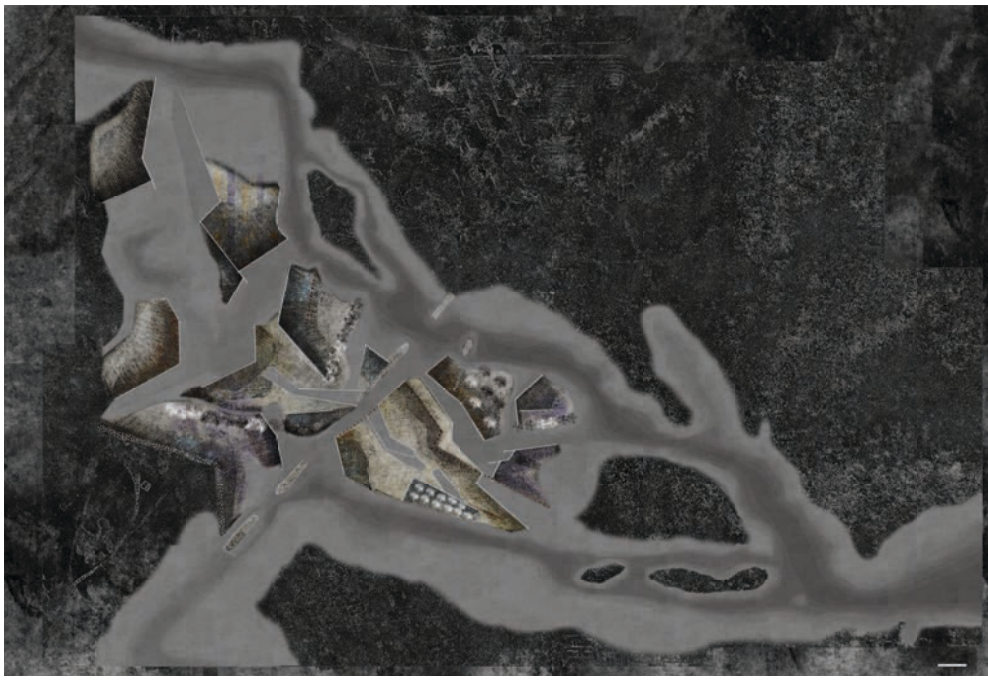
year 30



As the phenomenon change over time so will the form of the landscape. The plants will disappear when conditions aren't favorable for them to survive. There will be moments where the bare soil will be revealed because the plant that was planted there couldn't thrive in the new conditions. There will be labels that would indicate what type of plant was once there. Different tree species will disappear because of unfavorable conditions.

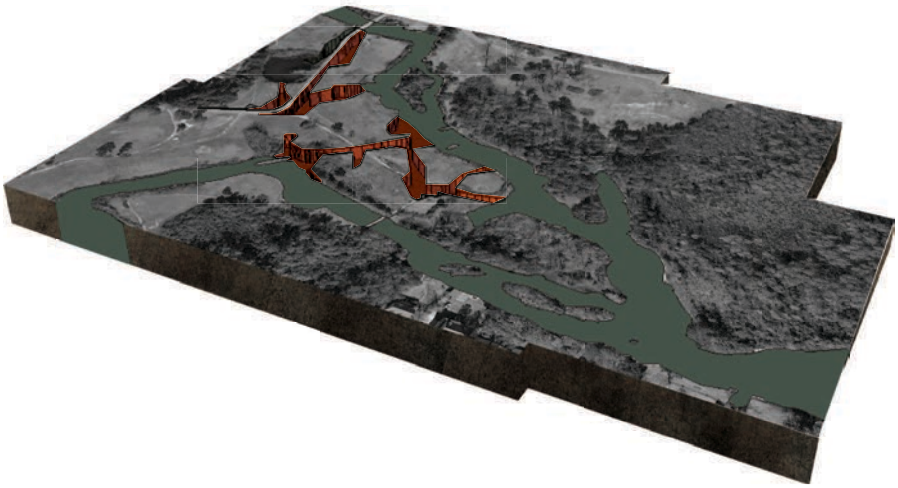
Over the period of 60 years, the landscape will transform into a spectacle that cannot be accessed by foot because of the rising sea level. The walls once acted as paths to walk on to get from one part of the site to the other, but will disappear when the sea level rises, and so will access to walking the site. The result of the location will be a place where canoes, kayaks, and boats can come and explore the site. There is a canoeing

year 60

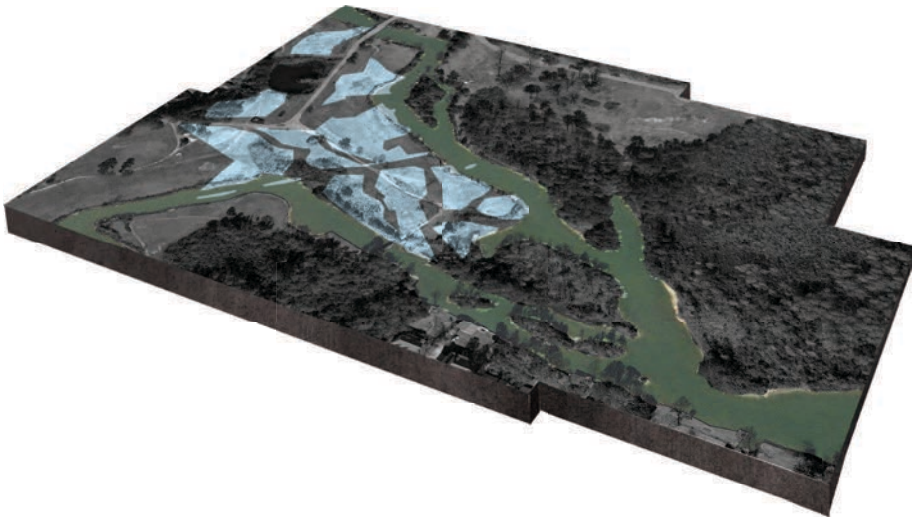


landing further up Dog River were people rent canoes and ride up and down the river and explore. This community will be able to come through this site and learn about how these natural processes are influencing Mobile Bay.

cut



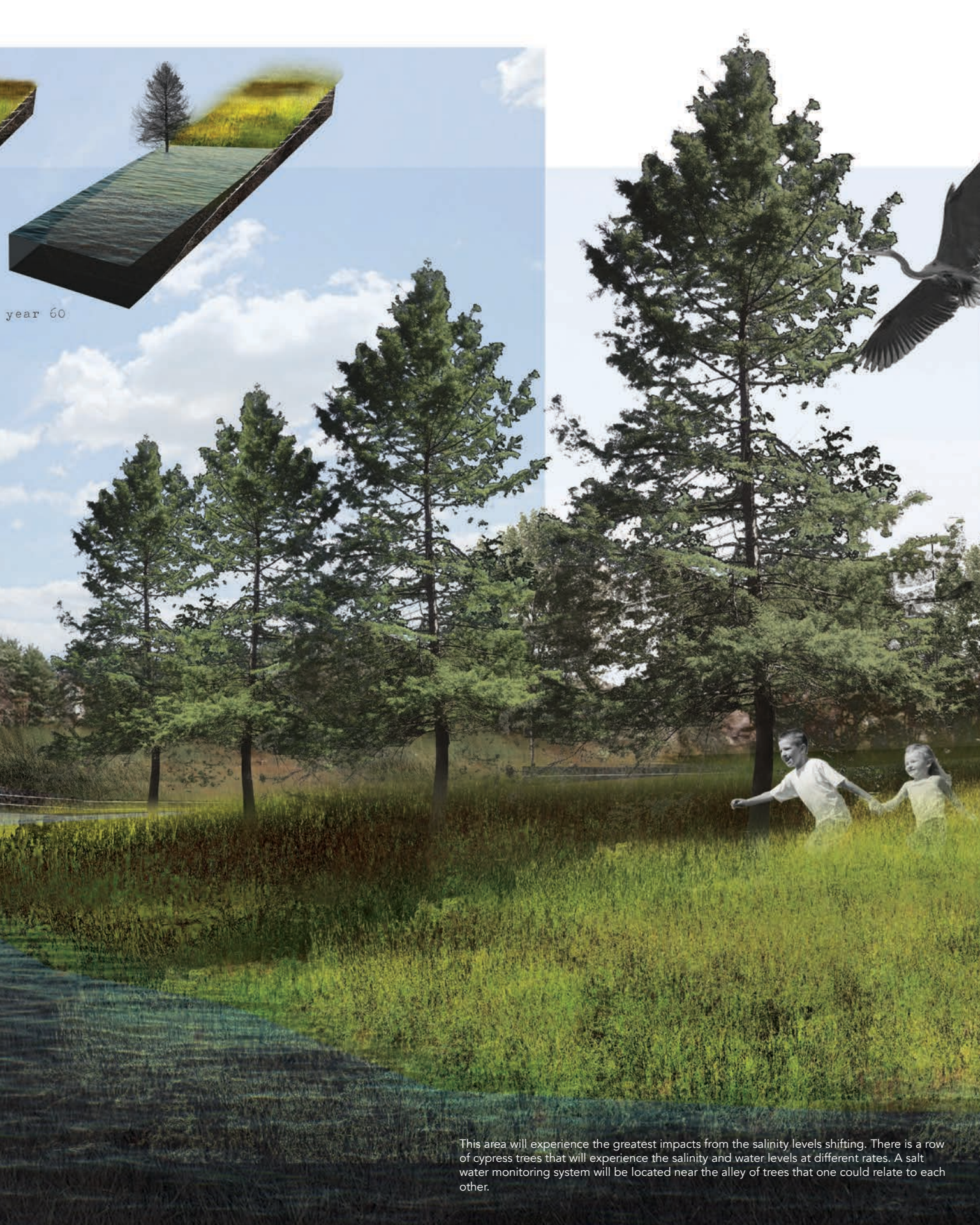
fill



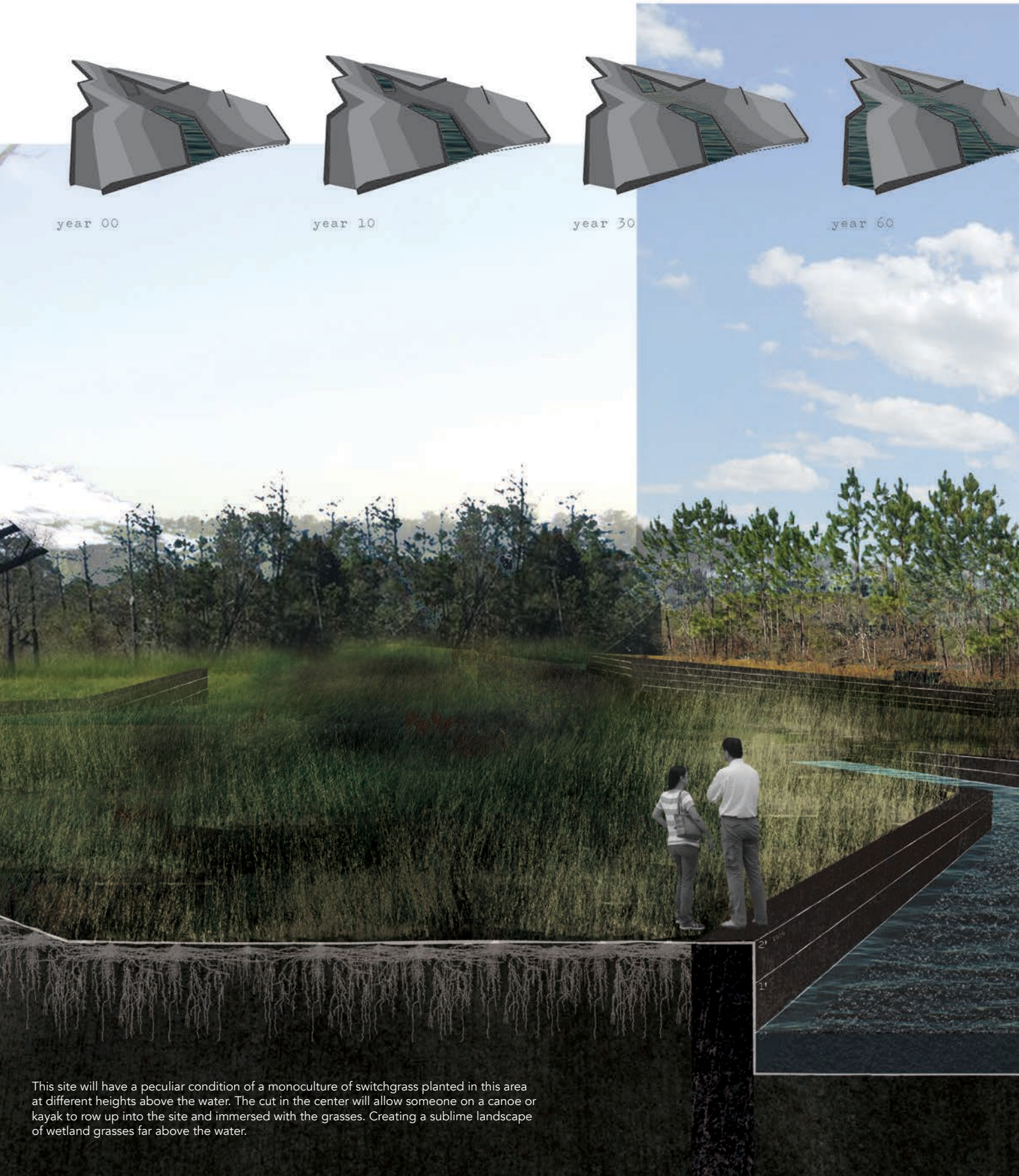
The design of the site relies on the cut and filling of the already manipulated soil. These manipulations of the land will create a gradual slope in some places from the water to the highest point of 6 feet. As the water level rises the water would gradually rise along the slope. In other areas, there would be a concrete wall that is holding the fill and you can look at the water level high on the wall. The cut outs will be throughout the site, which will create microclimates for some plants to be able to thrive in the new conditions. The cut through the center of the landscape that connected one stream to the other because this is how the site was reacting to the floods where there was a small emephermal stream would flow across the side and connect the two neighboring streams.

Cutting and filling is a substantial disturbance that will affect the stream health from the excess sediment that will enter the stream. With the changing natural processes, there will be a shifting of the landscape that will return to a disappearing landscape of the forest. With these manipulations, there will be a learning attempt to help the community understand our relationship with nature and how much we affect what is around us.

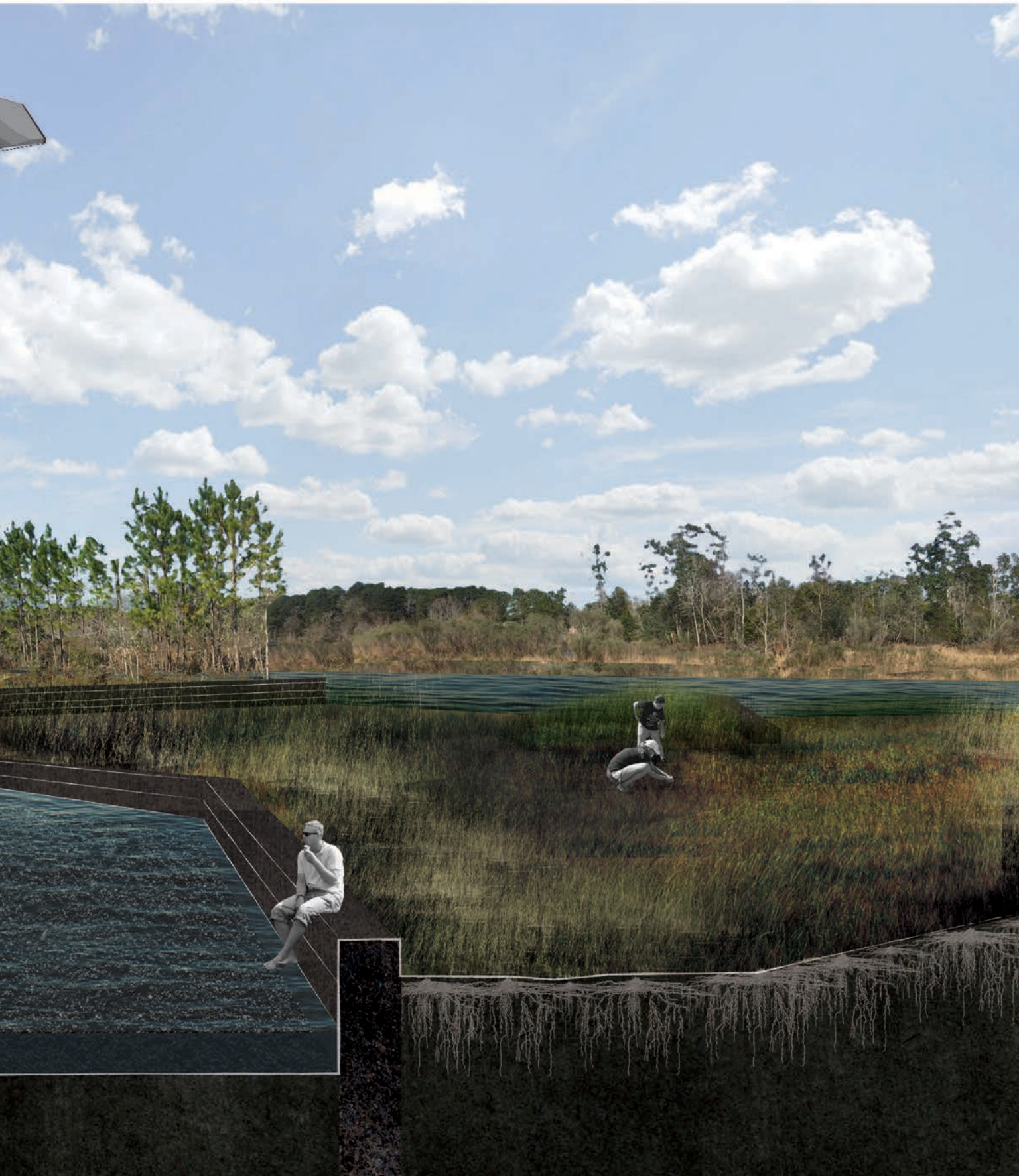

year 00
year 10
year 30

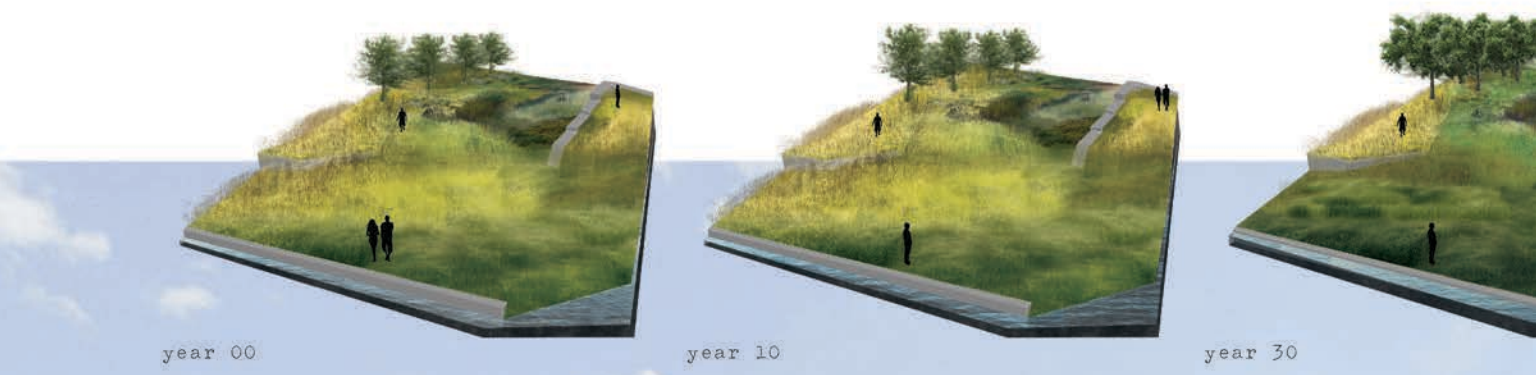


This area will experience the greatest impacts from the salinity levels shifting. There is a row of cypress trees that will experience the salinity and water levels at different rates. A salt water monitoring system will be located near the alley of trees that one could relate to each other.



This site will have a peculiar condition of a monoculture of switchgrass planted in this area at different heights above the water. The cut in the center will allow someone on a canoe or kayak to row up into the site and immersed with the grasses. Creating a sublime landscape of wetland grasses far above the water.

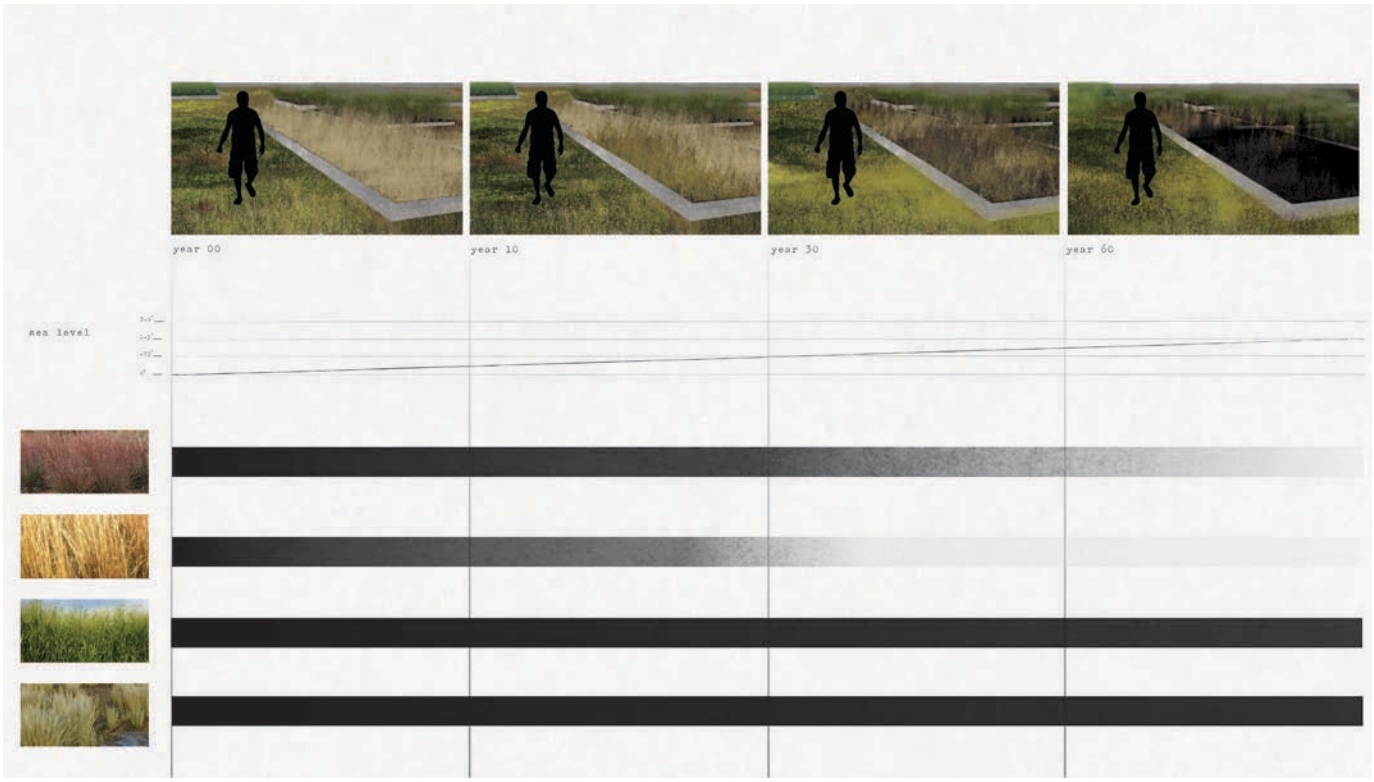




This part of the design will change a lot from year to year when the water levels rise you will not be able to walk onto the site because parts of the wall will be underwater and make the site inaccessible to users walking. The trees located in this section of the site are unable to survive in constantly flooded conditions.

year 60

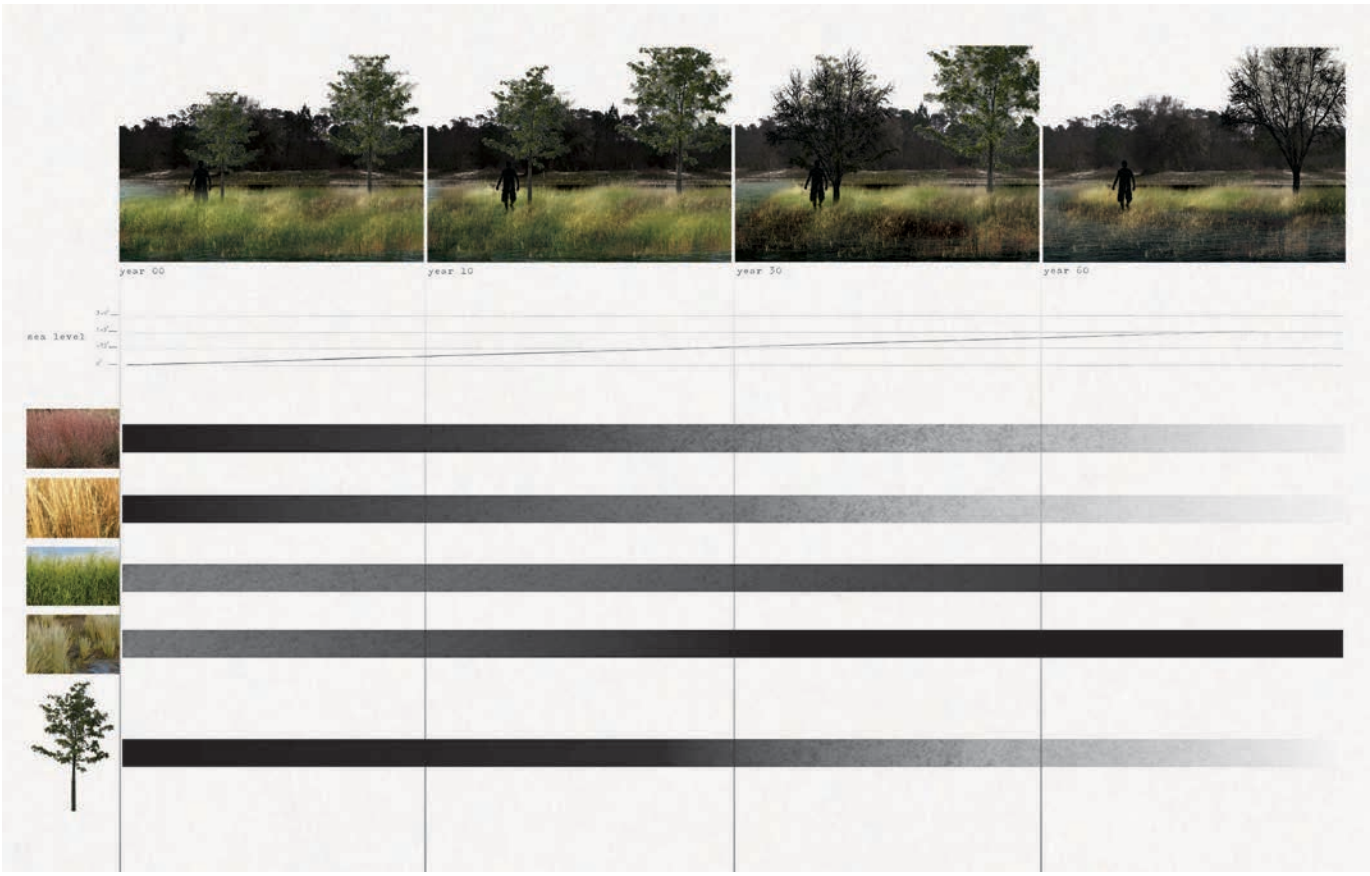
diagram 1



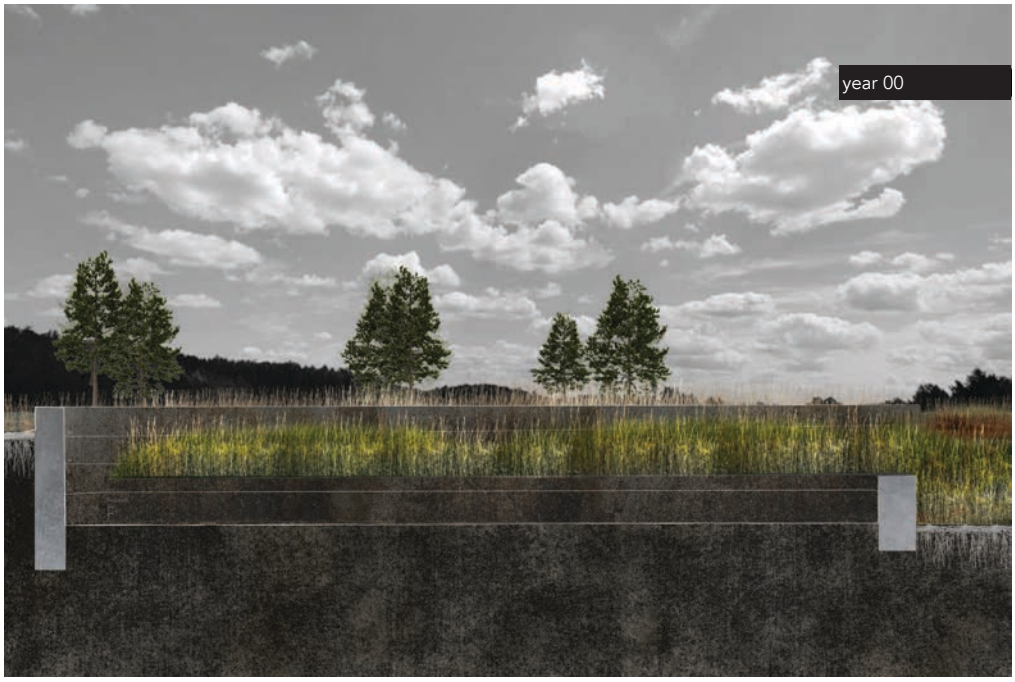
Located in the northern part of the site there will be striations of different types of grasses that will be planted in plant bed like areas that will be maintained to only have that variety of grass within the plant bed. Over time when the water levels merge into these plant beds, some of the plants will be able to handle the conditions while others will disappear. The grasses that couldn't handle saturation or flooded soils will vacate from the beds, and the beds will be just exposed soil, and maintained as such. Expose soil will reveal what plants can live in what conditions.

This end of the site will have Sweet Gum trees planted in a row that will be exposed to flooding. Because sweet gum can live during extended periods of flooding, the trees will be able to thrive in this condition. However, if the salinity levels rise too much, the trees will die and not be able to inhabitant this area. The grasses below will change because of these conditions, so over time, the sweet gum tree will be engulfed in different habitats that will reflect the adaptability of this tree species.

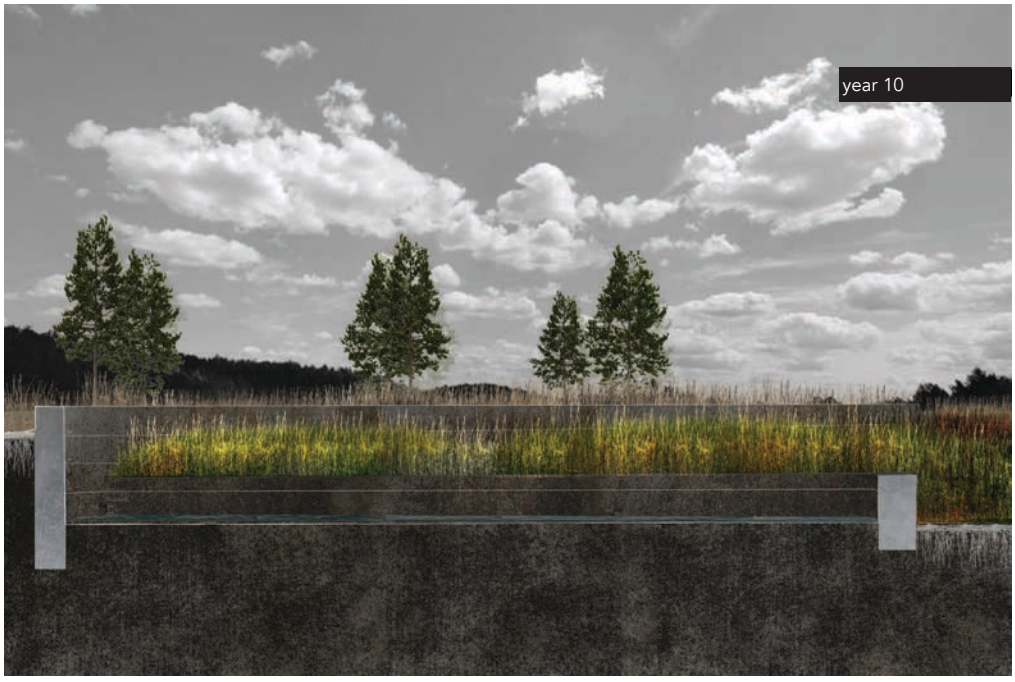
diagram 2



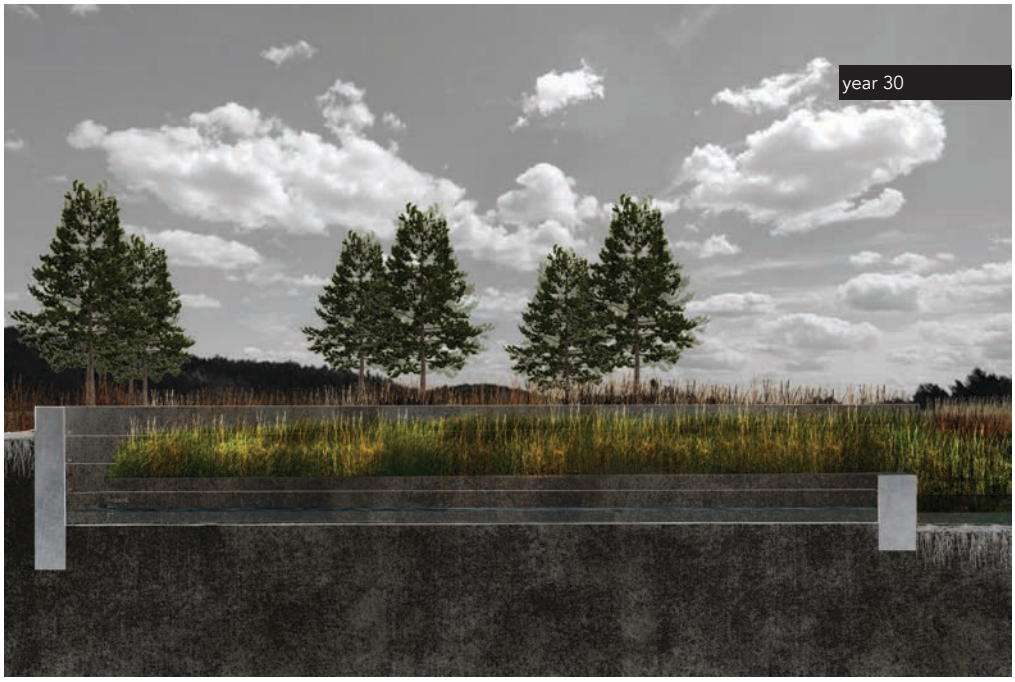
water level change



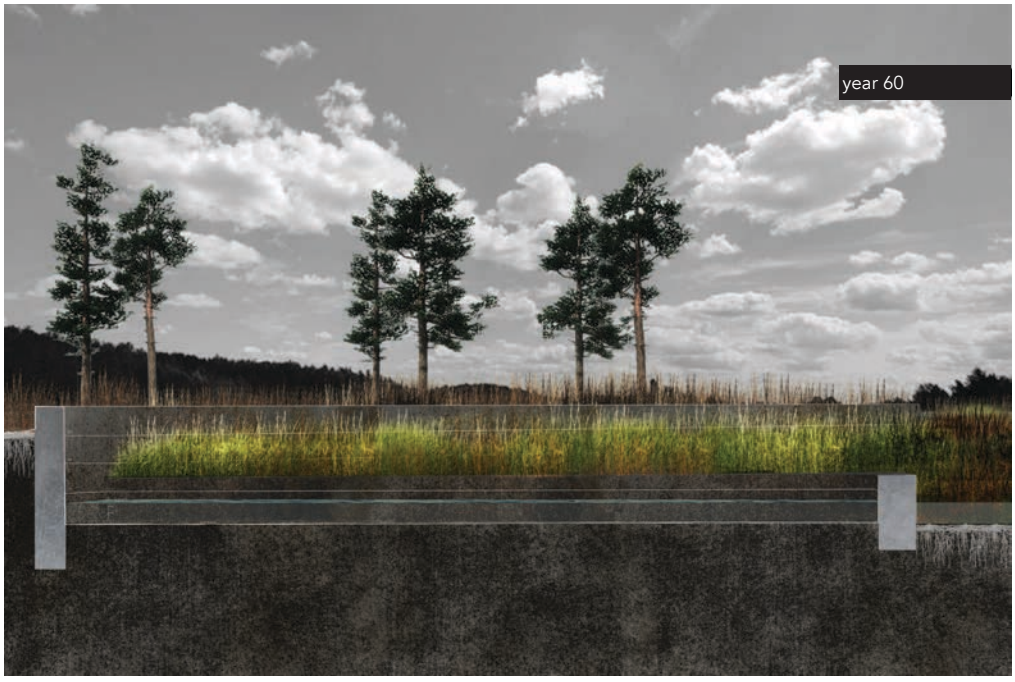
At the beginning of the design implementation, this area will not have any water within the walls.



Year 10 the water levels will rise within the walls, which will reflect the ground water level in a relationship with the conditions of the site before it was constructed.



Year 30 the water levels will reach almost a foot, and part of the site will be underwater and unable to navigate the site by foot.



After 60 years the landscape will become a place of islands that can only be accessed by water. The water levels will reflect the height of the predicted sea level in 2076.

06 reflections

Limitations

Revealing the Change to Different Users

The design's main goal is to expose the aspects of the shifting landscape and to create community awareness to the changes of the landscape. Some limits of the design are if one would only visit the site once the designs intention could lose. The design is limited to the community that uses it during different times of the year to fish or to hang out. Reaching out to the park in the northern part of Dog River will be vital for the site to unfolded past the residents neighboring the design.

Factors Other Than Salinity and Sea Level Rise

Exploring the site may become gargantuan because sedimentation rates have not been taken at this site, so it is unknown how the sharp edges of the design will be affected by the build up of sediment. If sea level rises exceeds 6 feet the site will lose, but so shall the neighboring communities. The design is limited to only two natural processes that are occurring, but many factors are influencing the site and other dynamic forces that can't be quantified influence the individual factors.

Eco-Revelatory Design

The complexities of these different natural processes are sometimes too complicated to reveal in an accurate way. The change in salinity levels may influence by other factors than just dredging. The interpretations could misconstrue, and there needs to be more research done for a successful eco-revelatory design.

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Figure 00.1 - USGS satellite imaginary. (http://topotools.cr.usgs.gov/coned/mobile_bay.php)

Figure 01.1 - Nine images from Google Earth. Each image represents a different year starting from left to right 1992, 1997, 2000, 2002, 2004, 2006, 2010, 2013, and 2015.

Figure 01.2 - NASA SkyLab 4. (http://spaceflight.nasa.gov/gallery/images/skylab/skylab4/html/sl4-92-300.html)

Figure 01.3 - Rebuild by Design. (http://inhabitat.com/nyc/rebuild-by-design-competition-unveils-shortlist-of-proposals-for-a-resilient-post-sandy-world/)

Figure 01.4 - Dan Pearson Studio. (http://www.danpearsonstudio.com/#/selected-works/commercial/millennium-forest/)

Figure 02.1 - Kari Goodnough/Bloomberg. (http://www.bloomberg.com/news/articles/2014-05-12/alabama-avoids-preparing-for-rising-seas-menacing-mobile)

Figure 02.2 - Pages 28 - 37 images used based of USGS topography maps.

Figure 02.3 - Erika Nortemann/TNC. 9http://coastalresilience.org/our-approach/identify- solutions/coastal-defense/)

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Figure 02.5 - Eight images from Google Earth, each represents a different year starting from the top from left to right 1992, 2000, 2002, 2004, 2006, 2007, 2011, and 2015.

Figure 03.1 - Google Earth image.

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Figure 04.1 - Google Earth image. 2015

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Figure 04.6 - Joe Mabel. (https://commons.wikimedia.org/wiki/File:Bloedel_Reserve_19.jpg)

Figure 05.1 - (http://sea-birdcoastal.com/lobo)

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