

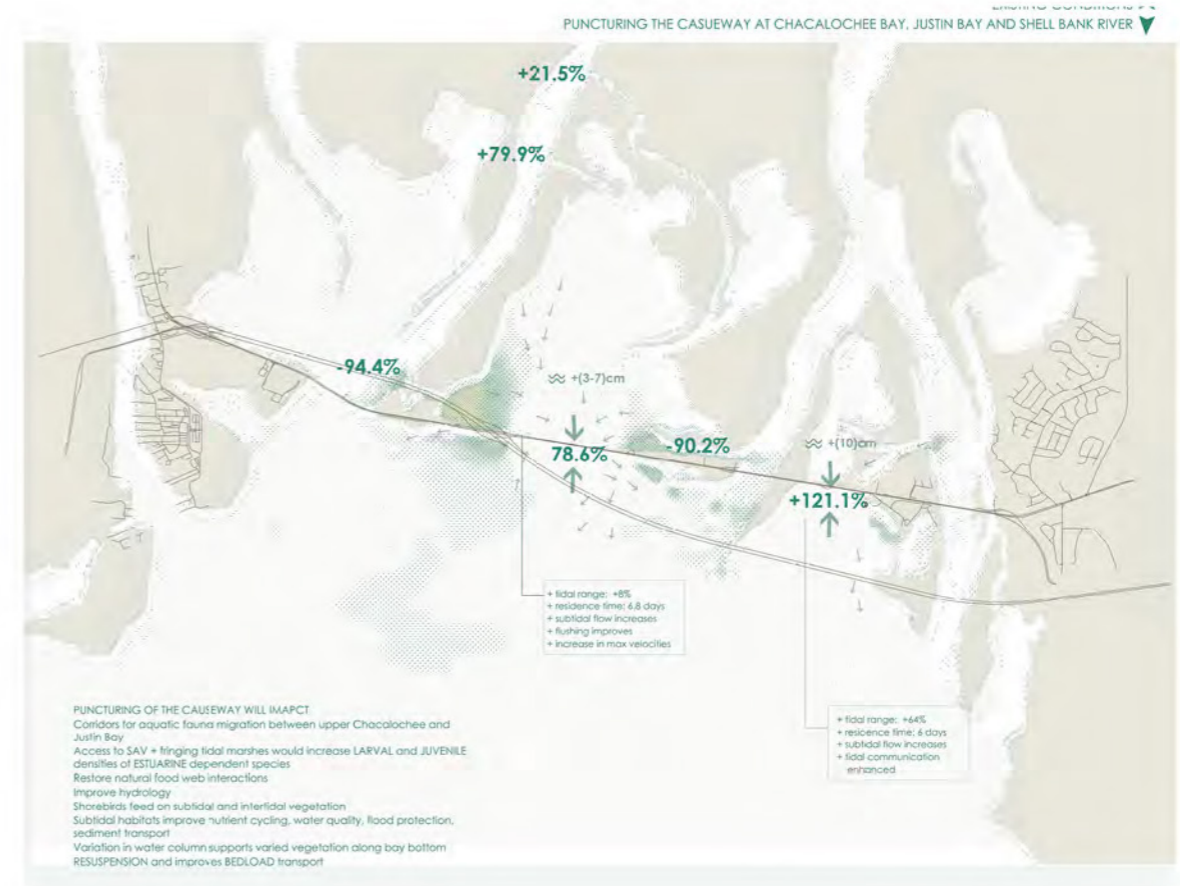
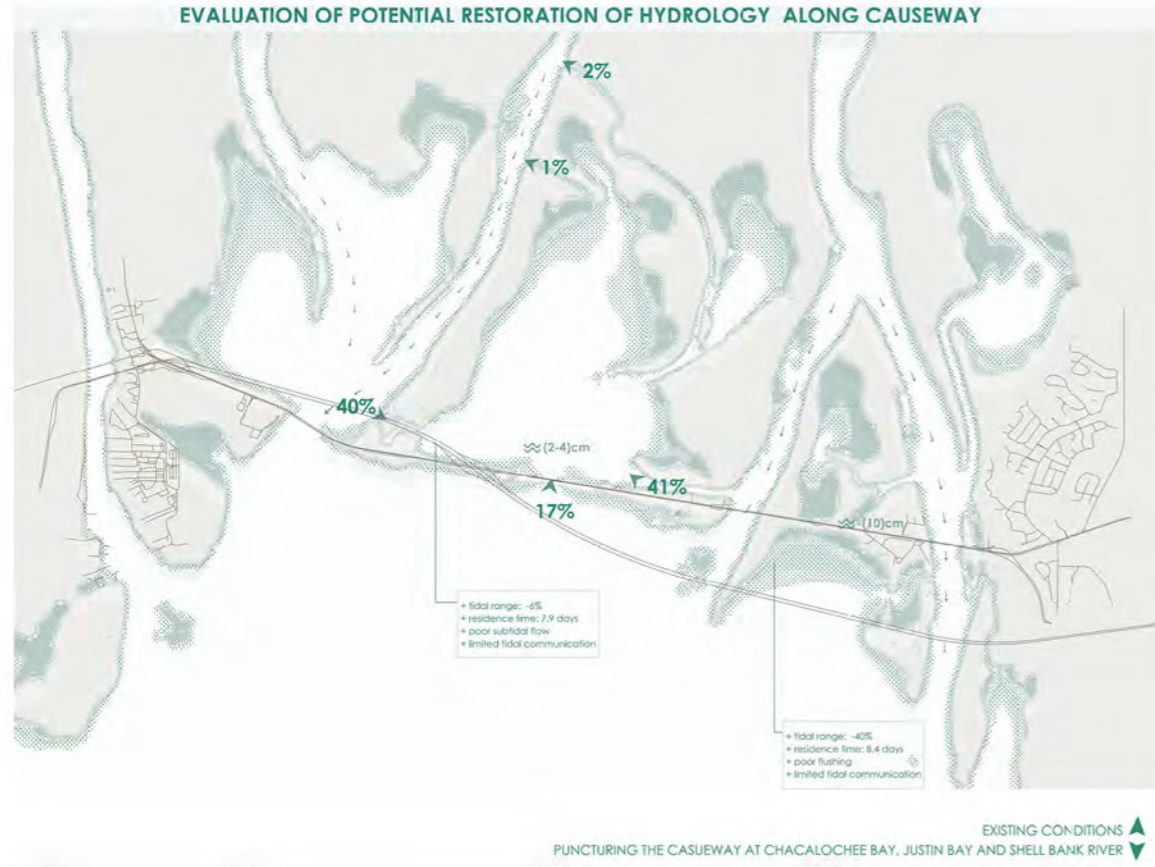


BATTLESHIP PARKWAY

Jaspuneet Kaur

Radhika Shenoy

Battleship Parkway, commonly referred to as the "Causeway", is a 7-mile long causeway that carries US 90 and US 98 eastbound across Mobile Bay from the Bankhead Tunnel on Blakeley Island in Mobile, Alabama to Spanish Fort, Alabama. Constructed in 1926, this busy piece of infrastructure connects Mobile County to Baldwin County across the Bay. At the time the Causeway was constructed, filling the marsh areas was preferred over the construction of an elevated roadway due to technological and funding limitations. Large areas of open water/marsh habitat were filled with dredged material in certain locations in order to provide a base for the roadway. As a result, the constructed land impeded flow between areas north and south of the Causeway and interrupted natural processes of the delta system and estuary. This has created a barrier between the Delta and Mobile Bay with the exception of four narrow channel openings currently existing in the Causeway. While some species depend on Battleship Parkway for nesting and feedings, it acts as a barrier to several others. This proposal aims at restoring some of the hydrological and sediment cycles in the bay by implementing certain design strategies on and throughout the causeway. It also uses the Causeway to help educate its visitors/users about the dynamic forces like Sea Level rise, and habitat loss that effect the Bay.



HYDROLOGY OF THE MOBILE BAY

Coastal Alabama has a dynamic hydrological system. The north end of Mobile Bay, where the Mobile and Tensaw rivers flow into the bay is a good example of this complexity. The mixing of brackish water from the south bay and freshwater from the Mobile-Tensaw River Delta, along with a combination of forces like wind, tides, sea level rise, hurricanes make the Mobile Bay an ever-changing,

complex ecosystem. The Bay also has an average shallow depth of 10 feet thereby creating varied micro-climate required to support the diverse flora and fauna found in the Bay.

EXISTING HYDROLOGY

The Alabama Department of Conservation and Natural Resource's (ADCNR), Investigation of Restoration of Hydrology on Mobile Bay Causeway focuses on three conceptual Causeway restoration locations as indicated on the maps above. These locations include Choccolatta Bay, Justins Bay, and Shellbank River. Creating openings in these spots have been studied to have significantly improved the hydrology of the bay.



THE CAUSEWAY - HABITAT

Mobile Bay's coastal communities will be substantially affected with the predicted sea level rise which are in the range of 18-59 cm for the next 80 years. The vulnerability of social, ecological and infrastructural entities along the coast is further increased by storm surges and precipitation. Mobile Bay has a broad range of transportation modes, including highways, airports,

transit, marine ports and oil and gas pipelines. One such example of low-lying coastal infrastructure that is vulnerable is the Battleship Parkway, a causeway that connects Mobile County to Baldwin County.

CAUSEWAY AS HABITAT

(Following page)

Alabama Red Bellied Cooters, Gulf Sturgeon, Alabama Shad, Piping Plover are only a few out of the many species that will be at risk when the sea level rises. Presence of submerged aquatic vegetation (SAV) – macrophytes along the causeway make it the preferred habitat for most species.

gulf sturgeon
[*acipenser oxyrinchus desotoi*]



gulf sturgeon
[*acipenser oxyrinchus desotoi*]



alabama red-bellied turtle
[*pseudemys alabamaensis*]



why does gulf sturgeon matter

Acipenser means sturgeon
Oxyrinchus means sharp snout
Desotoi honors Hernando de Soto
The Gulf sturgeon traces its ancestry back 200 million years
appearance: not much has changed (dinosaur age)

decline
overfishing, throughout most of the 20th century
construction of water control structures, such as dams and "sills", mostly after 1950, exacerbated habitat loss
dredging
groundwater extraction
irrigation
flow alterations
poor water quality
contaminants, from industrial sources



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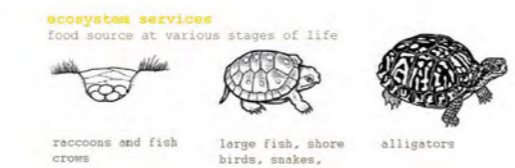
why does the red cooter matter

was named the Alabama state reptile by the Alabama Legislature in 1990
brought to the Southeast by enslaved peoples from the West African nation of Mali



range
is restricted to the Mobile-Tensaw River Delta in Mobile and Baldwin counties adjacent to Mobile Bay
exclusively in the Mobile-Tensaw Delta
rarely found north of Interstate 65

major rivers and tributaries of the Mobile Bay, Bayou La Batre, Fowl, Dog, Fish, Magnolia and Bon Secour rivers.



characteristics
lifecycle, habits, and needs

weight:
up to 200 pounds (90 kg)

length:
4-8 feet (1-2.5 m)

appearance:
color, special features
primitive fish
characterized by bony plates, or "scutes," and a hard, extended snout

lifespan:
20-25 years on average, but can live up to 60 years

diets:
brachiopods, mollusks, worms, and crustaceans

habitat:
they migrate into rivers to spawn in the spring

Gulf sturgeon
have no teeth
They are bottom feeders and will skin the muddy bottom for food



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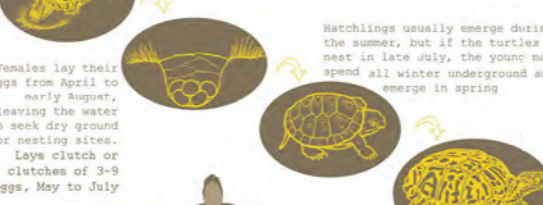
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characteristics
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In late spring and early summer, females select nesting sites in sandy soil, usually within 100 yards of a pond.
Warmth from the sun and temperature conditions can affect the sex ratio of hatchlings;
cool nests = more males
warm nests = more females.



The Alabama red-bellied turtle is named for the color of its bottom shell, or plastron, which can range from pale yellow to dark red but is most often orange to light red. The upper shell, or carapace, may be greenish to dark brown or black with red, orange, or yellow markings along the sides.

males = 12"
females = 15"

hatching = 1.5"
male = 12"
female = 15"

FEEDING HABITS: Herbaceous feeding on submergent aquatic macrophytes, such as hydrilla, brushy pondweed, eel-grass, arrowhead, and mud plantain.

habitat
nest

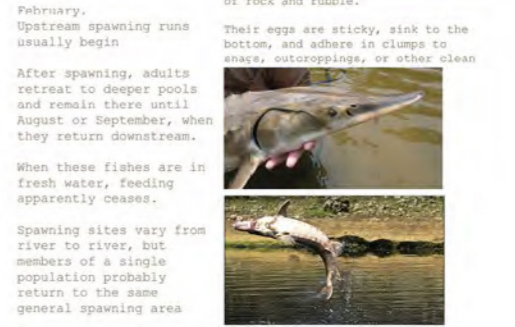
From November through January individuals reside in estuaries and near shores, where they feed on amphipods, isopods, midges, crabs, and shrimp.

February. Upstream spawning runs usually begin

After spawning, adults retreat to deeper pools and remain there until August or September, when they return downstream.

When these fishes are in fresh water, feeding apparently ceases.

Spawning sites vary from river to river, but members of a single population probably return to the same general spawning area



habitat
nest

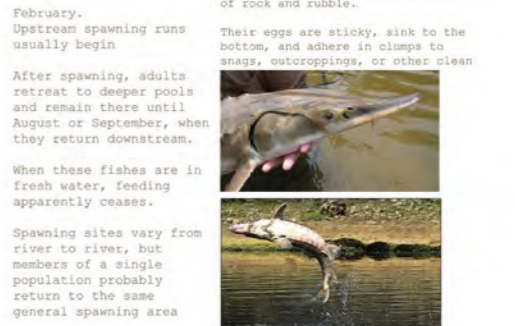
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habitat
nest

River mouth/tidal river
Terrestrial Habitat: Sand/dune

Special Habitat Factors:
Benthic, Burrowing in or using soil, Fallen log/debris

Habitat Comments:
Most abundant in quiet backwaters of upper Mobile Bay in areas with dense submerged vegetation - macrophytes

in water generally 1-2 m deep; also in river channels; occurs only as a straggler in brackish water and salt marsh areas of lower Mobile Bay

habitat prerequisites
amphibian vegetation for sustaining

sandy or loamy soils for nesting

delicate substrates at an adequate profundity for hibernation.





THE CAUSEWAY - TRANSPORTATION

The causeway is an active mode of transportation and recreation for people residing in Baldwin and Mobile counties and also a critical habitat for several species of plants, fish, animals, amphibians, reptiles and migratory birds. It is a piece of infrastructure that is valuable from both a cultural and ecological perspective.

- DEMOLISHED BUILDING
- VOLLEYBALL COURT
- PARKING
- FISHING
- WAR MEMORIAL
- FAST FOOD
- WILDLIFE CONSERVATION
- BOATING DOCK
- MUSIC
- SEAFOOD RESTAURANT
- RADIO TOWER
- AUTO REPAIR
- BAR
- HIKING
- STATE PARK
- INSTITUTION
- CAMPING



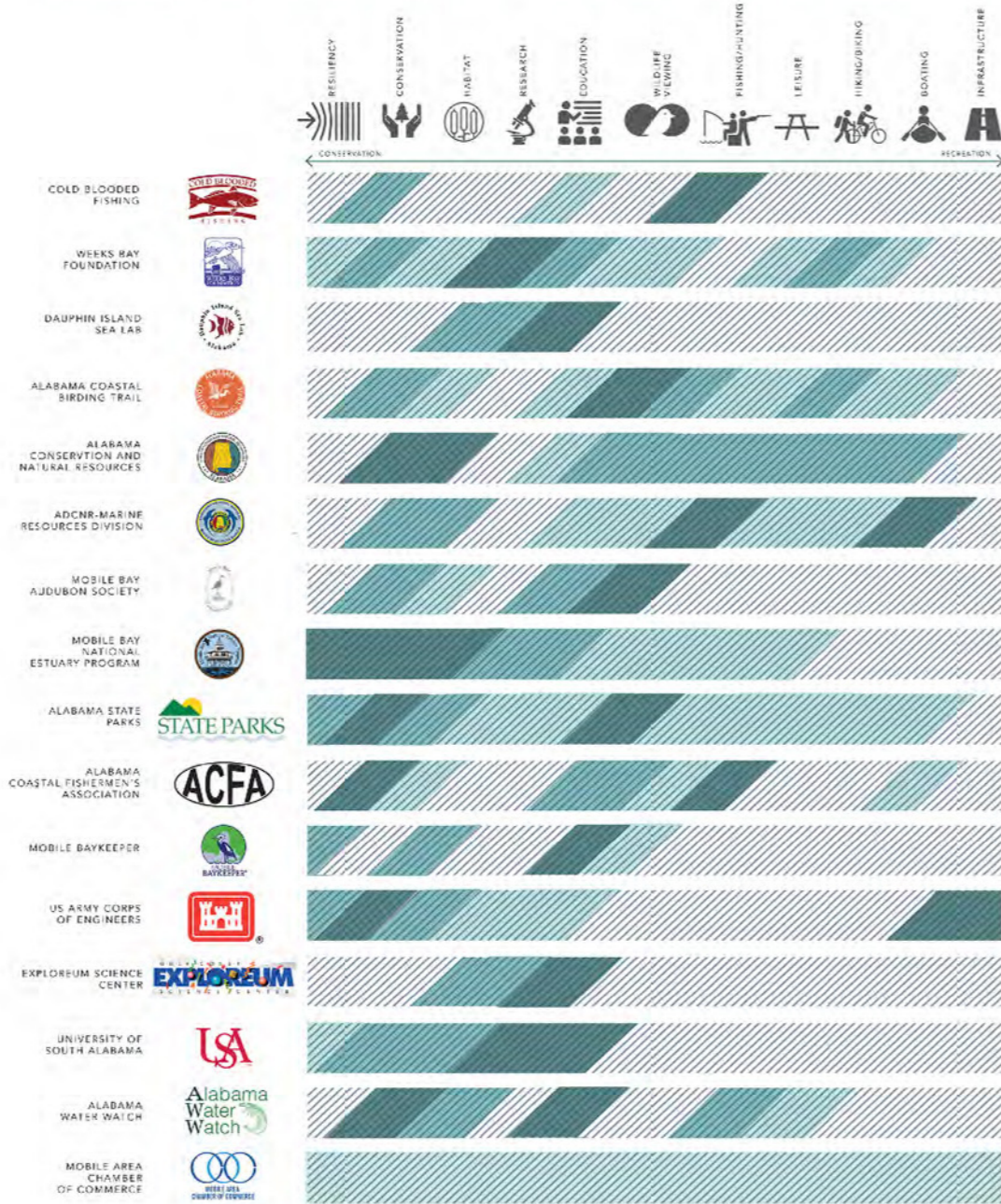
THE PROPOSAL

Our proposal looks at a series of strategies, that will educate people and change with the dynamics of the bay. While revealing sea level rise is one goal of the project, another is to conserve the species that depend on the causeway. These strategies include both designs that stretch across the entire length of the causeway and design strategies that

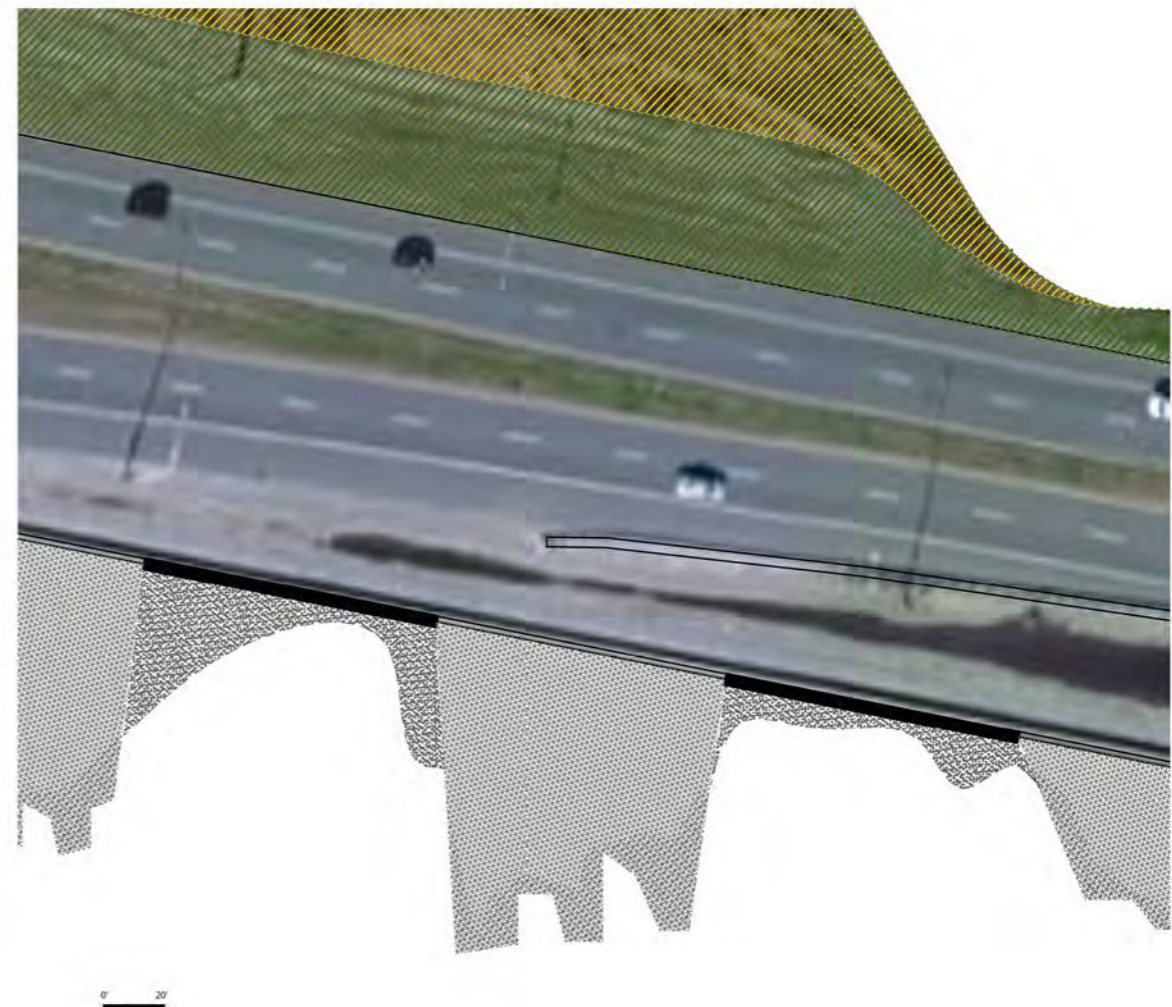
may be repeated at intervals through out the causeway. This proposal aims to leverage the position of the causeway to educate people about complex problems ensued by global environmental changes. By facilitating the causeway for potential changes, it will act as a gauge that can measure changes in the sea level. Designing the causeway as a host for recreational activities

like fishing, kayaking, bird-watching, and walking trail sets up conditions for public to engage. This association with infrastructure will make the intricate issues of sea level rise, flooding, as well as migration, spawning, and nesting of species in the bay tangible to the community.

POTENTIAL FRIENDS OF THE LIVING CAUSEWAY



EDUCATION AND ENGAGEMENT
 Potential organizations that can be involved in making the causeway an engaging experience. Education plays a huge role in designing for change in the Mobile bay,



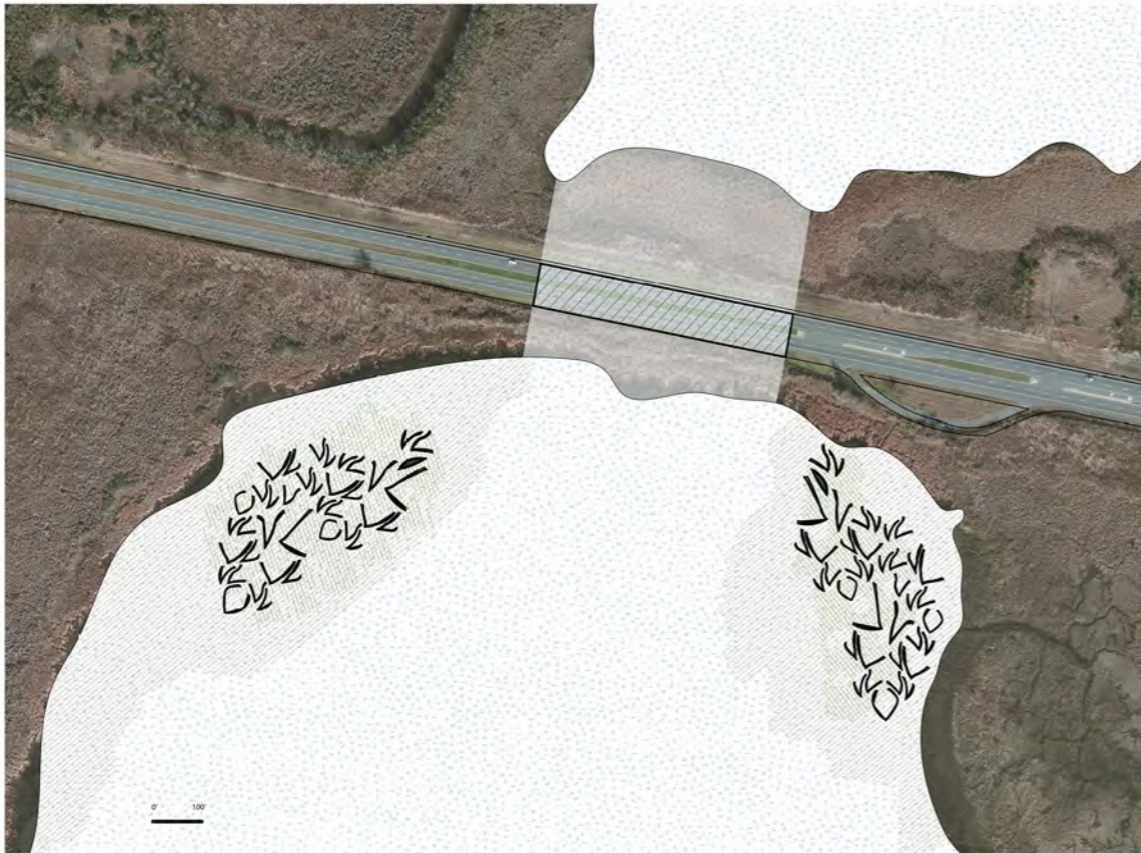
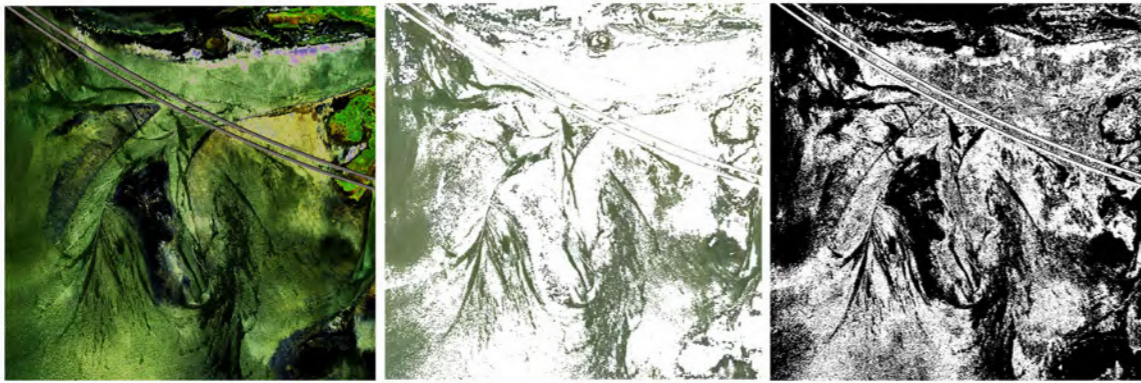
PROTOTYPES THAT ARE REPLICATED AT INTERVALS ALONG THE CAUSEWAY

This proposal also analyzes the change in peoples perception of the causeway over time. Designs like the proposed marsh rooms, breaking bulkheads, guano stakes and baffles are relatable to the human scale and help people perceive large changes in the bay in smaller scales of spaces.



BREAKING BULKHEADS

The edges of the causeway are currently lined with rip-rap and bulkhead. Converting some of these hard edges to softer edges as a widening strategy can increase marsh migration habitat as sea-level rises. These spaces are also designed to be recreational hot spots and a place where people can begin to interact more with the bay.



BAFFLES

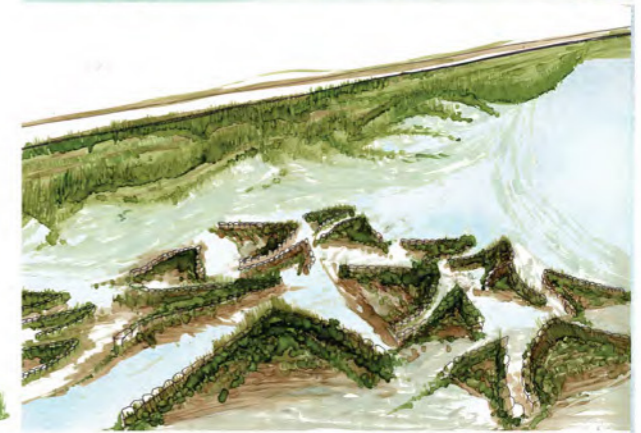
The baffles are designed and constructed by carefully analyzing the accretion patterns in the bay so that they begin to trap sediment thereby setting up a condition that can potentially offset the loss of SAV when the sea level rises.



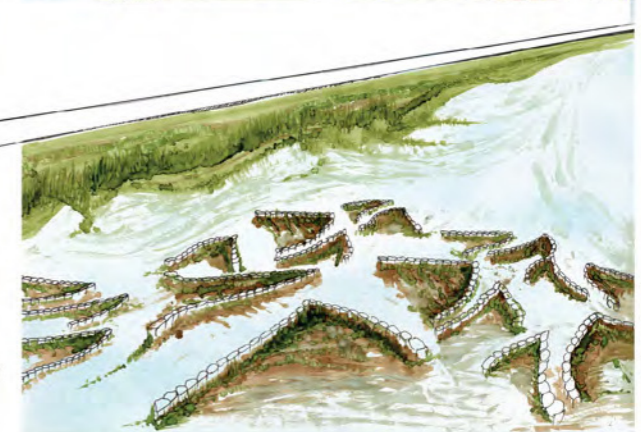
6'-0" sea level rise



4'-0" sea level rise



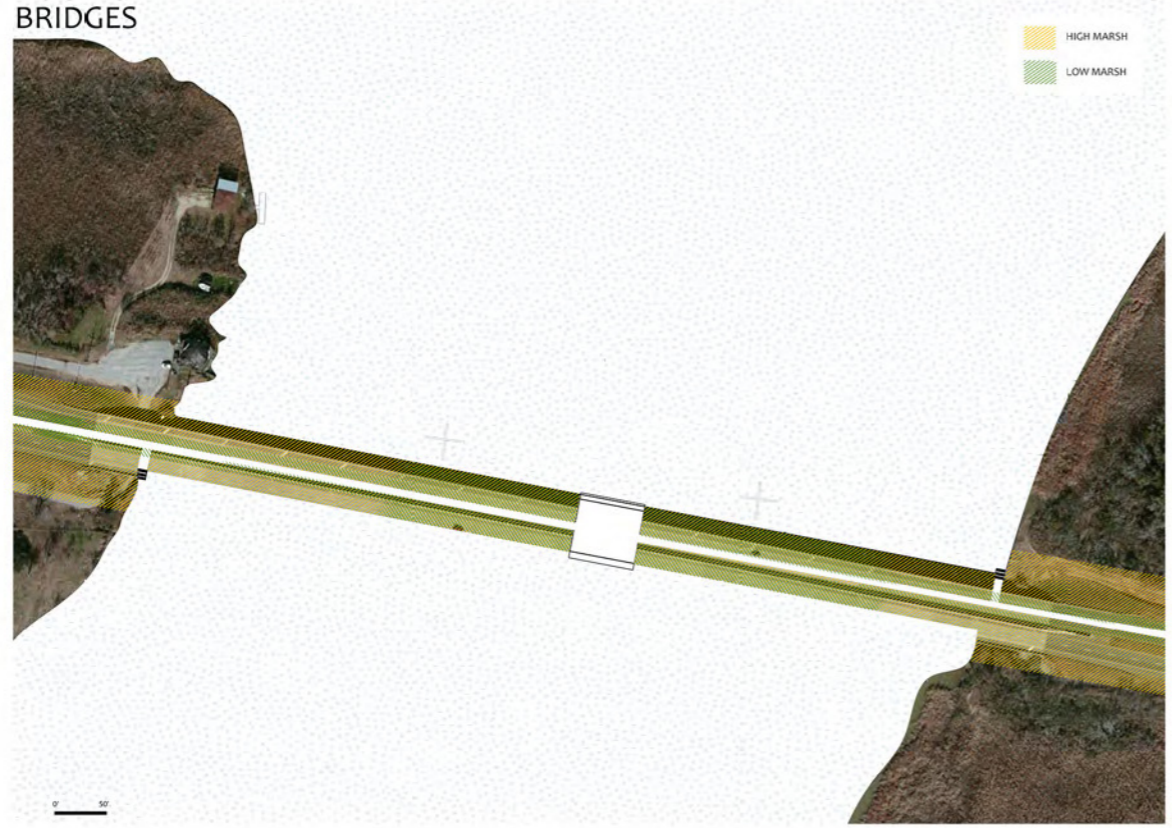
2'-0" sea level rise



existing

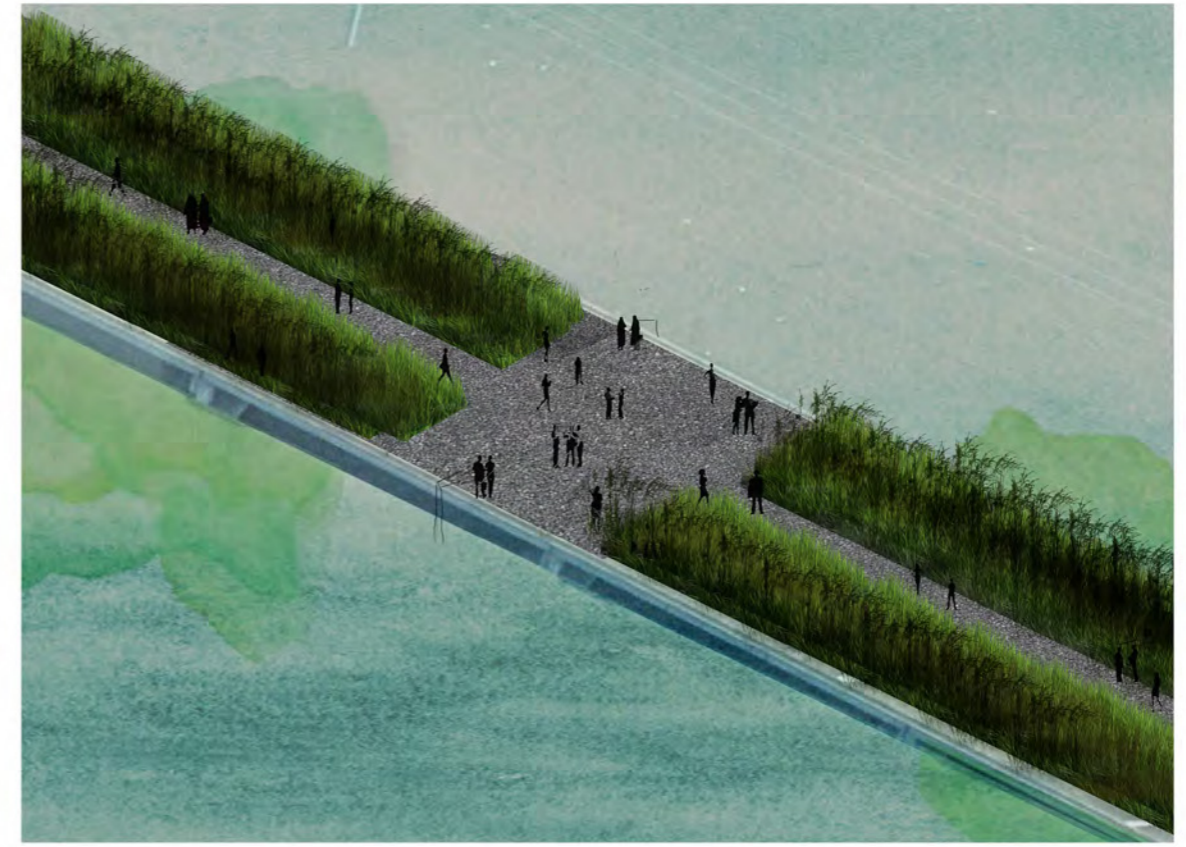


BRIDGES



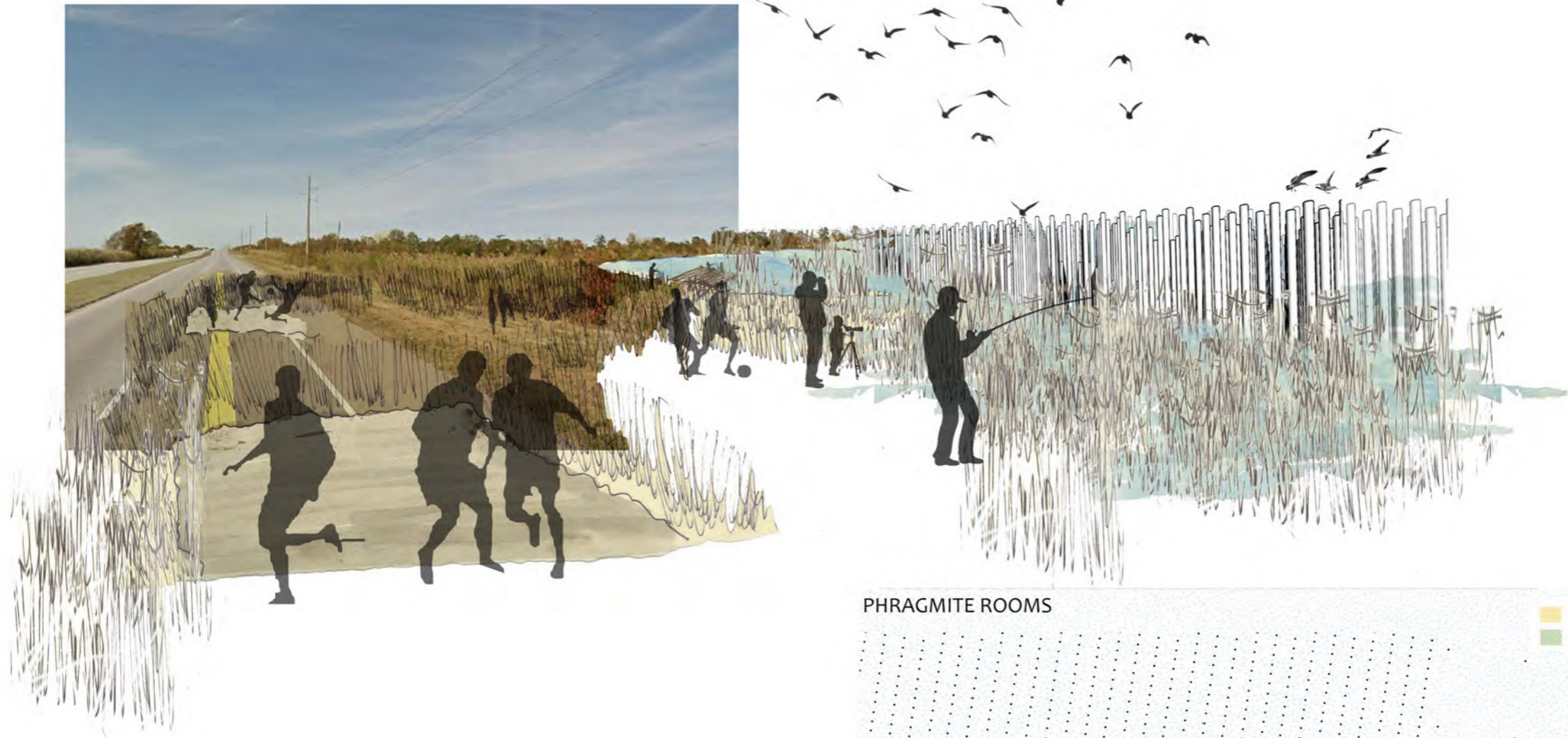
BRIDGES

With sea level reaching a height of 6'0" and when most of the causeway is submerged, bridges will be the places where marshes migrate.



BRIDGES FOR MIGRATION

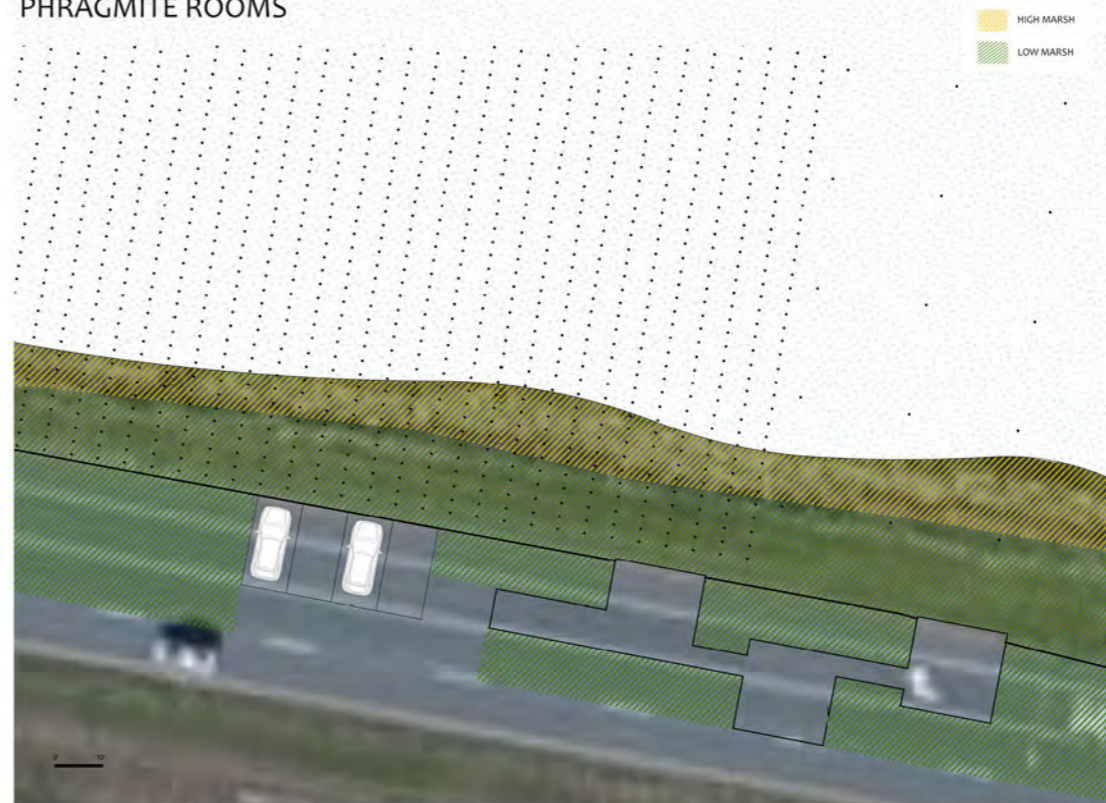
This perspective illustrates how some of the asphalt on the bridge can be maintained to create pockets of recreation amidst the migrating marsh habitat. This infrastructure is no more used for transportation, however it has other values. It is now used for habitat and recreation.

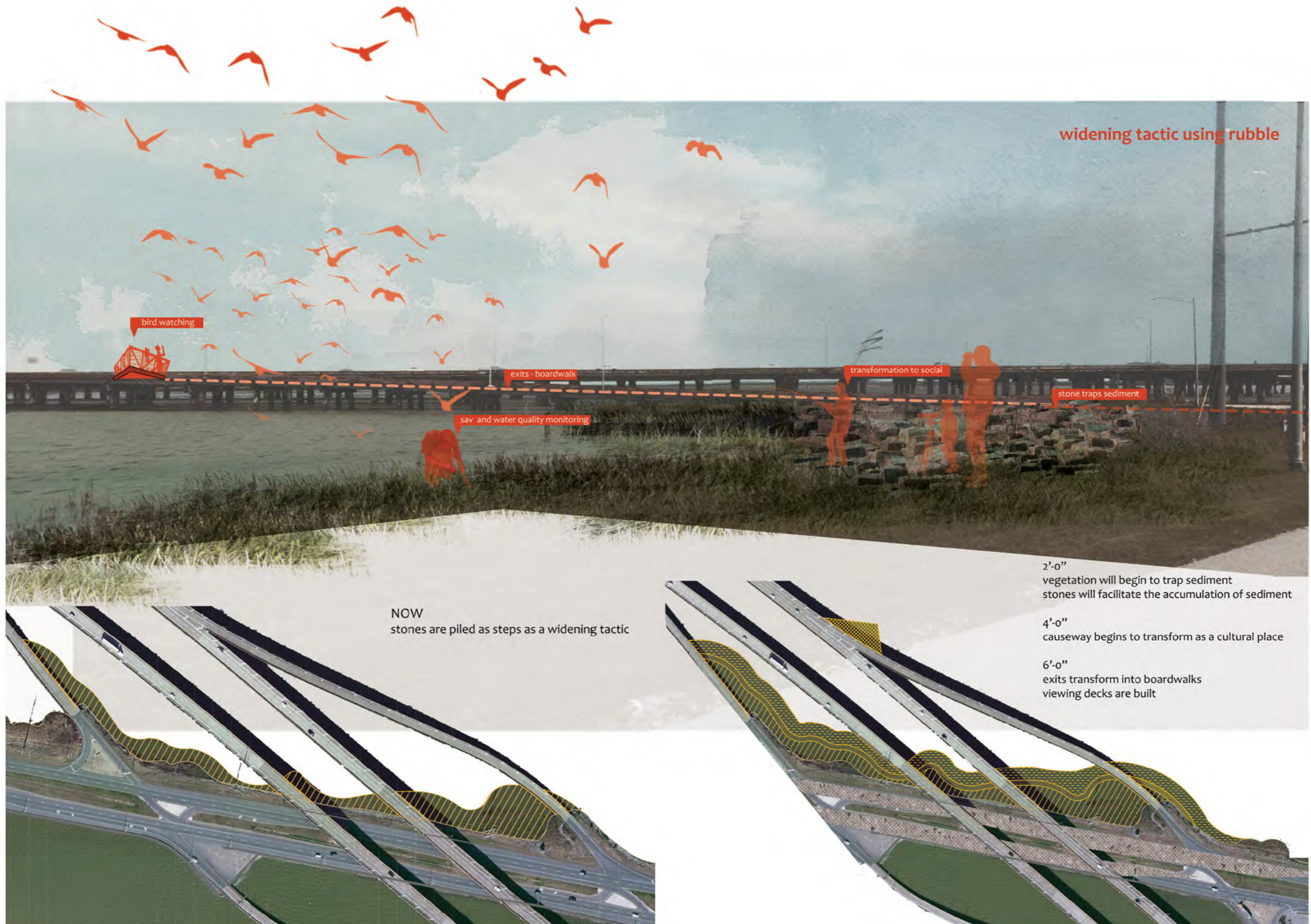


PHRAGMITE ROOMS

Asphalt on the roadways on the causeway are removed in parts to create rooms in which Phragmites can grow in. These rooms are designed to be comfortable for the human scale and are also designed to provide views of other strategies implemented on the causeway like the guano stakes.

PHRAGMITE ROOMS





widening tactic using rubble

bird watching

exits - boardwalk

transformation to social

stone traps sediment

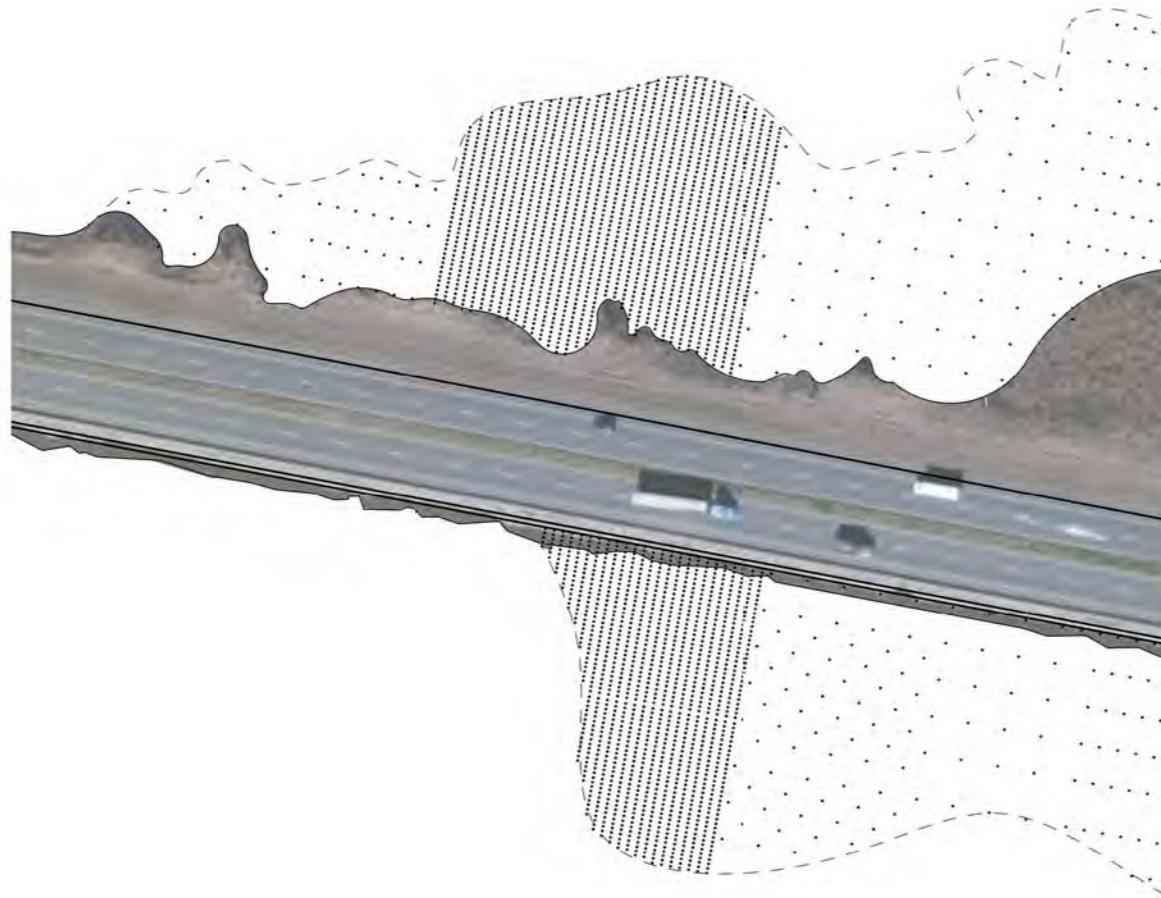
soil and water quality monitoring

NOW
stones are piled as steps as a widening tactic

2'-0"
vegetation will begin to trap sediment
stones will facilitate the accumulation of sediment

4'-0"
causeway begins to transform as a cultural place

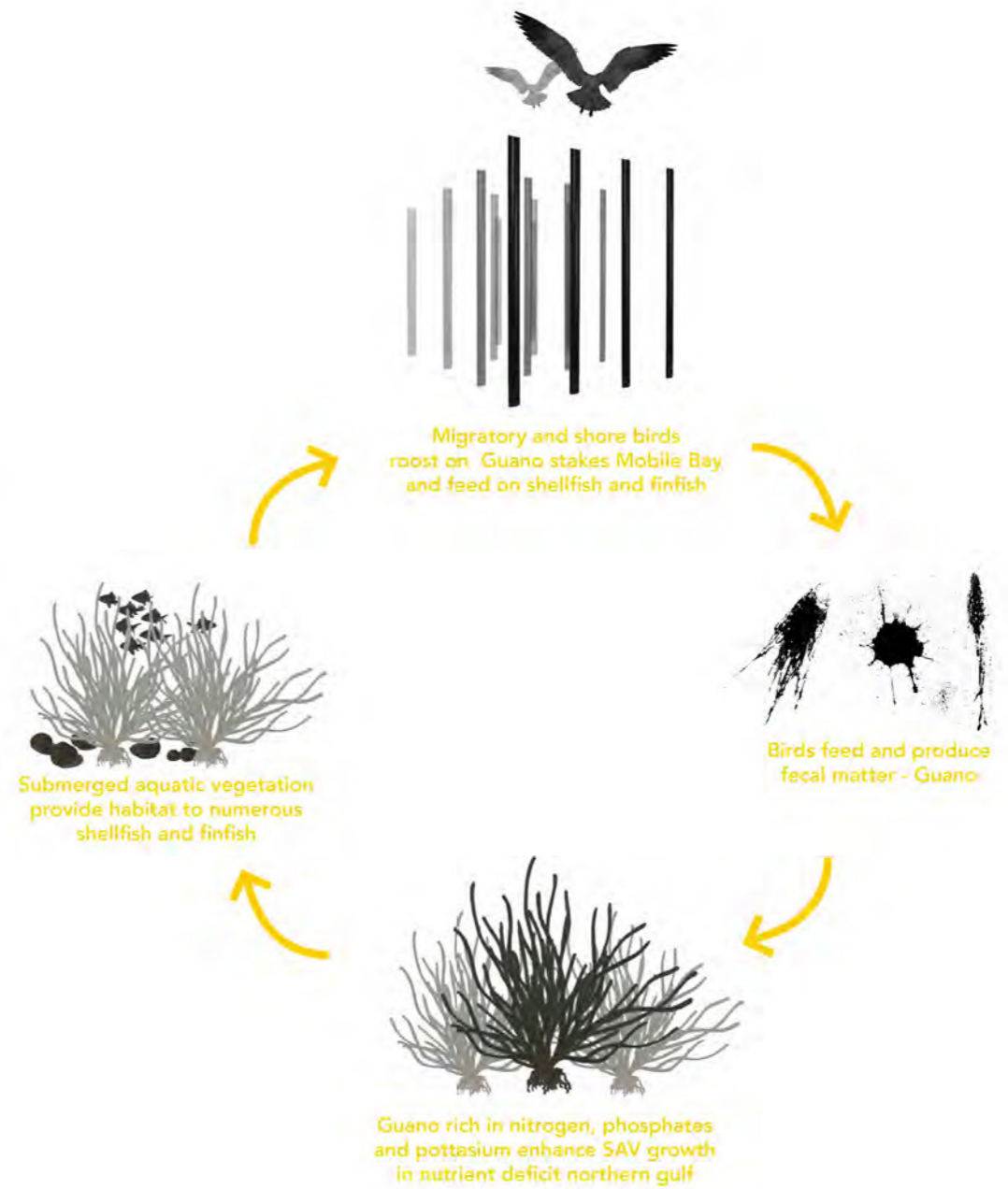
6'-0"
exits transform into boardwalks
viewing decks are built



0' 50'

GUANO STAKES TO PROMOTE SAV GROWTH

This strategy makes use of fecal matter from sea birds called guano to promote growth of submerged aquatic vegetation. Guano stakes will be placed in varying grids along the causeway to enhance spatial experience of kayakers and bird watchers.





GUANO STAKES - RECREATION

Apart from being beneficial for submerged aquatic vegetation, Guano stakes also support a wide range of recreational activities like kayaking, photography and bird watching.