Prosthetic Habitat of Renewal

Nikki Bennett

Division of Multi-disciplinary Design, University of Utah
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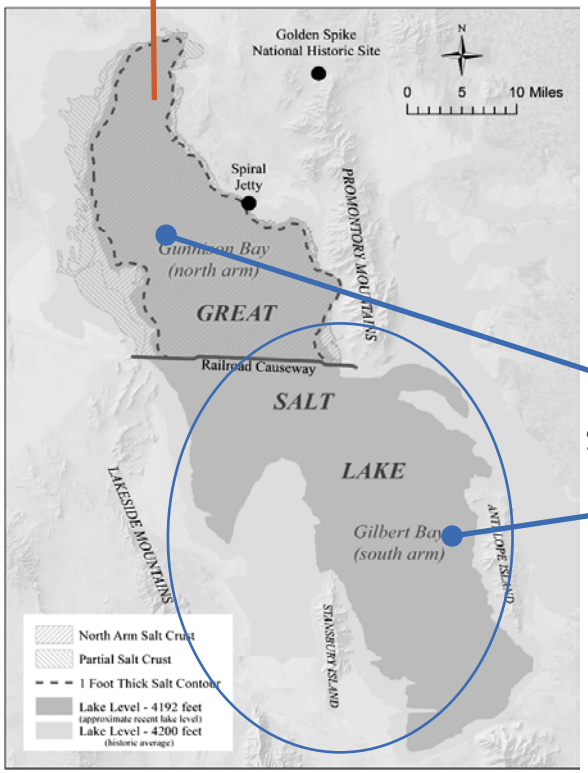
The following work was researched through the lens of commons. Commons being: Necessary resources for the (re)production and continuation of an ecosystem.

Water is diverted from going to The Great Salt Lake to be used for human needs in Salt Lake City and its surrounding areas.



By the year 2025 so much water will be diverted for other uses that
The South Arm salinity levels will reach 32%

The North Arm
Salinity Levels 2022: 32%

The South Arm
Salinity Levels 2022: 14%

The Great Salt Lake is a unique ecosystem to utah. It is fragile and small changes make big impacts. Brine Shrimp are a resource relied on in The Great Salt lake and they rely on the well-being of this ecosystem to survive.

Will we save the Great Salt Lake? The Nature Conservancy. (2021, July 13). Retrieved October 2, 2022, from https://www.nature.org/en-us/about-us/where-we-work/united-states/utah/tries-in-utah/will-we-save-the-great-salt-lake/

Through research this future scenario was created to frame the rest of the project.

In the year 2025 The Great Salt Lake will reach a salinity level of 32% making it impossible for Brine Shrimp to survive.

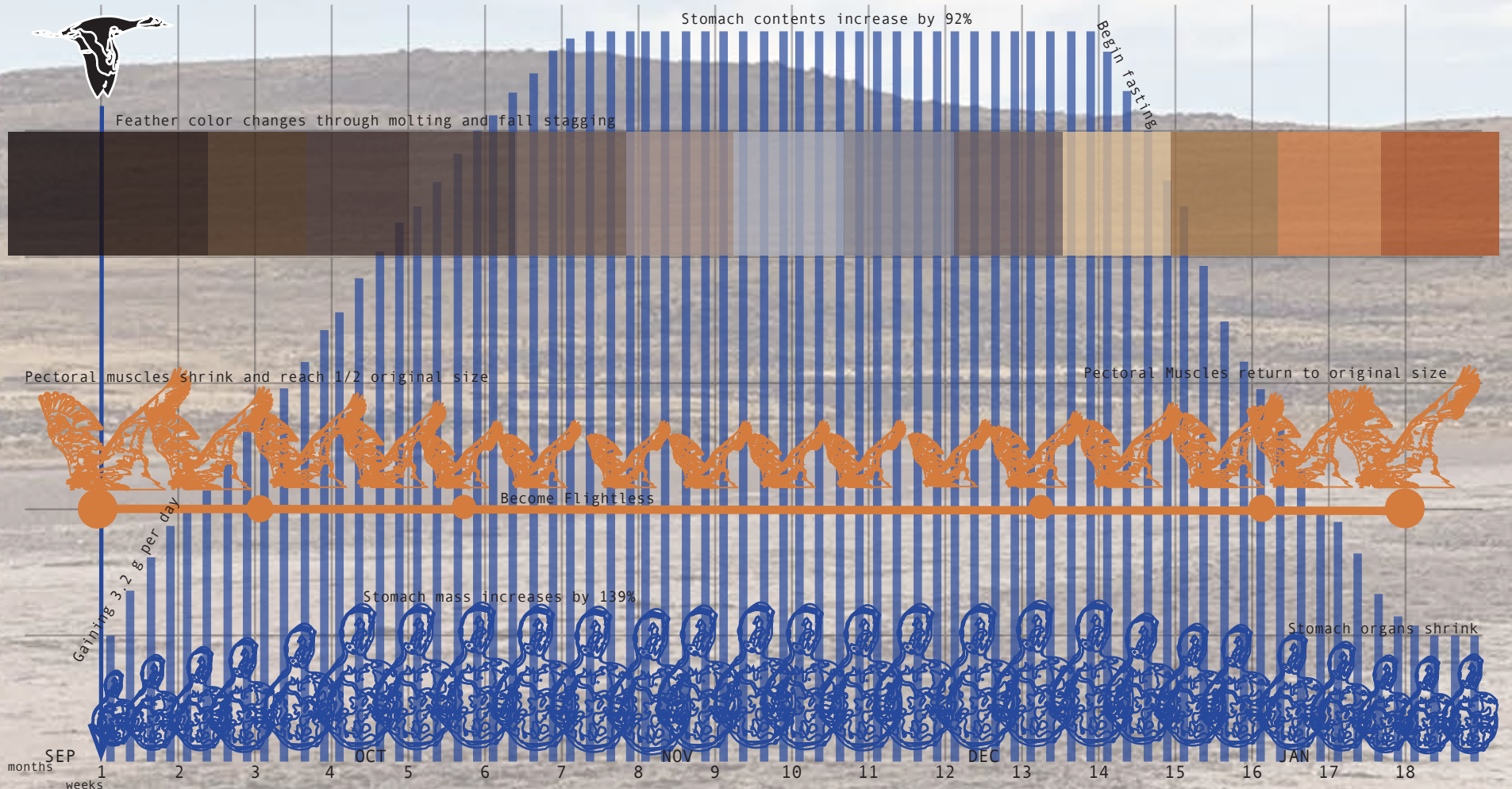
The Brine Shrimp are gone and I have estimated that 2 million Eared Grebes will arrive in September to feed on them.

With no food source and no way to leave they are stuck here.

Eared Grebe arrives at
The Great Salt Lake

Eared Grebe's are night flying birds which means that all of their migrations are made in one single night. Each fall they come to The Great Salt Lake for fall stagging. Over 90% of all Eared Grebes come here meaning that there are 3-5 million during each fall stagging period. While they are here they undergo some very unique changes. Eared Grebes become flightless for the duration of the fall stagging while their stomach organs expand to be able to take in 30,000 Brine Shrimp per day.

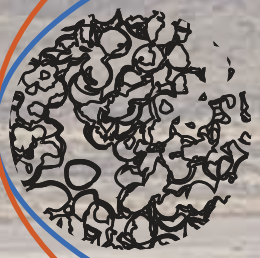
Jehl, Jr., J. R. (1997). Cyclical changes in body composition in the annual cycle and migration of the Eared Grebe Podiceps nigricollis. Journal of Avian Biology 28:132-142.



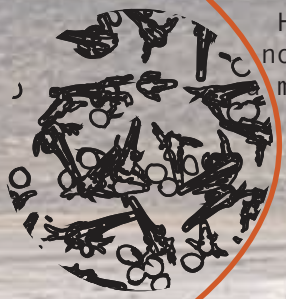
With salinity levels rising in the lake, Brine Shrimp are directly impacted. The preferred salinity level for Brine Shrimp is 18%, when it gets above that the shrimp have a more difficult time surviving.

Salinity levels above:
18%

Salinity levels below:
18%



Cysts: Able to survive in high salinity levels, cold weather, and are harvested then dried to be used around the world.



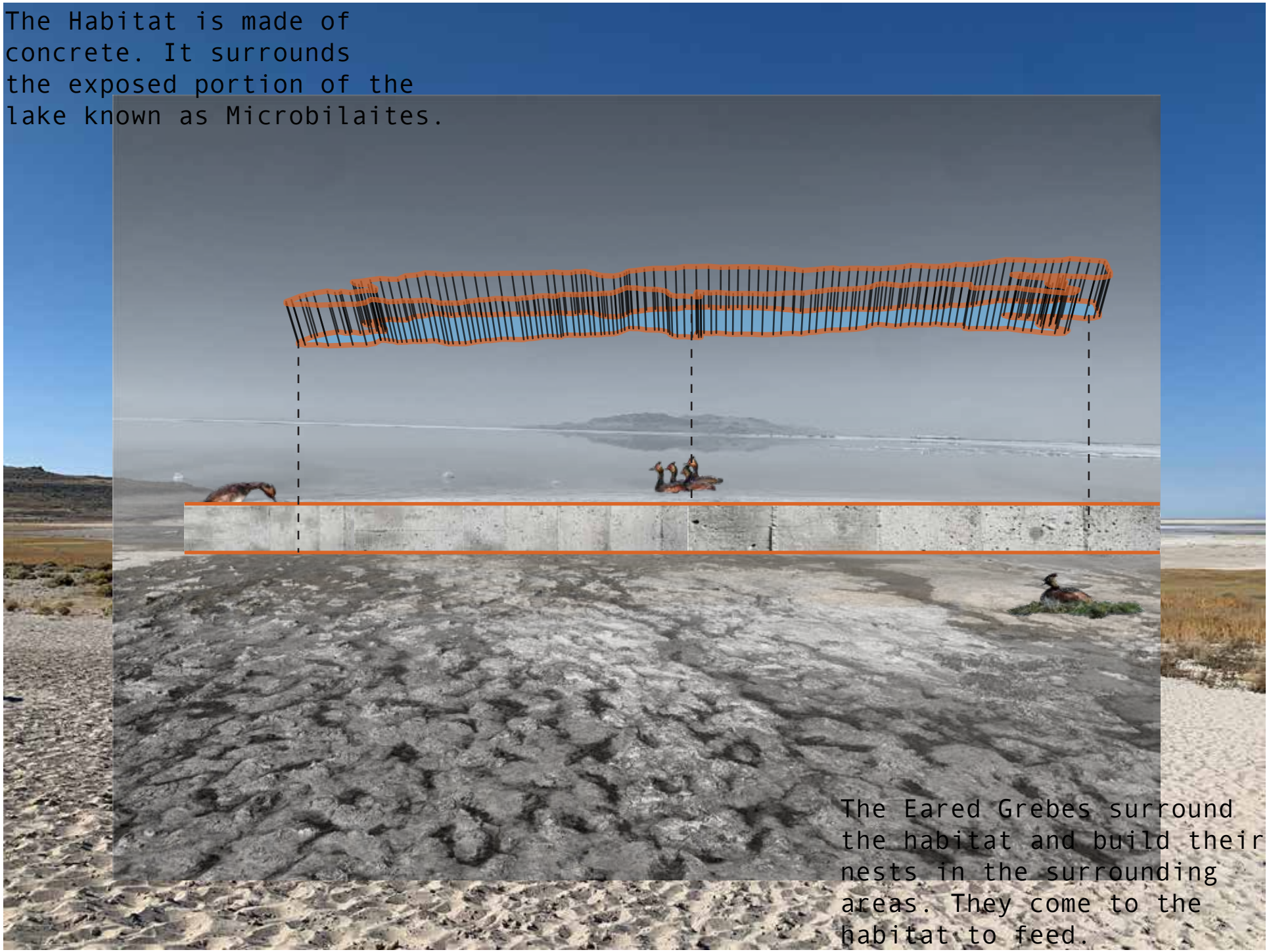
Hatchlings: Very small and do not hold a lot of nutrients. In more fragile state than Cysts.

Adult: Full of nutrients and able to reproduce Cysts.

To allow Eared Grebes to continue their usual fall stagging at The Great Salt Lake,
I have designed a Prosthetic Habitat
for Brine Shrimp.

This will enable them to survive in a lake with high salinity levels and allow Eared Grebes to continue their normal migration habits.

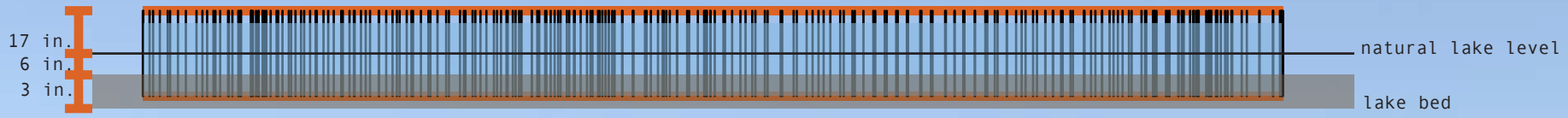
Prosthetic Habitat is defined as:
A temporary, human made enclosure to ensure the survival of Brine Shrimp.


The Habitat is made of concrete. It surrounds the exposed portion of the lake known as Microbilaites.
The Eared Grebes surround the habitat and build their nests in the surrounding areas. They come to the habitat to feed.

Prosthetic Habitat Ex. 01

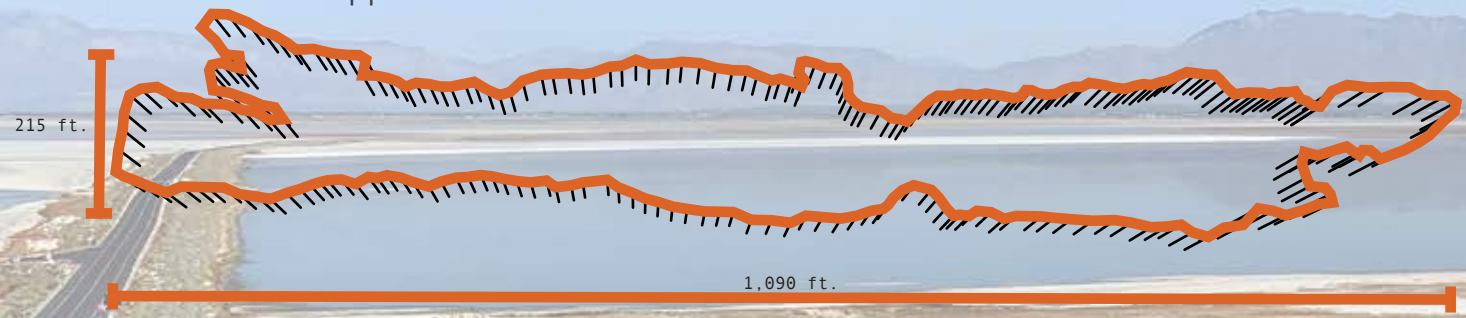
A lake within a lake.

The natural processes carried out in The Great Salt Lake are mimicked at a smaller scale to give Brine Shrimp a home natural.

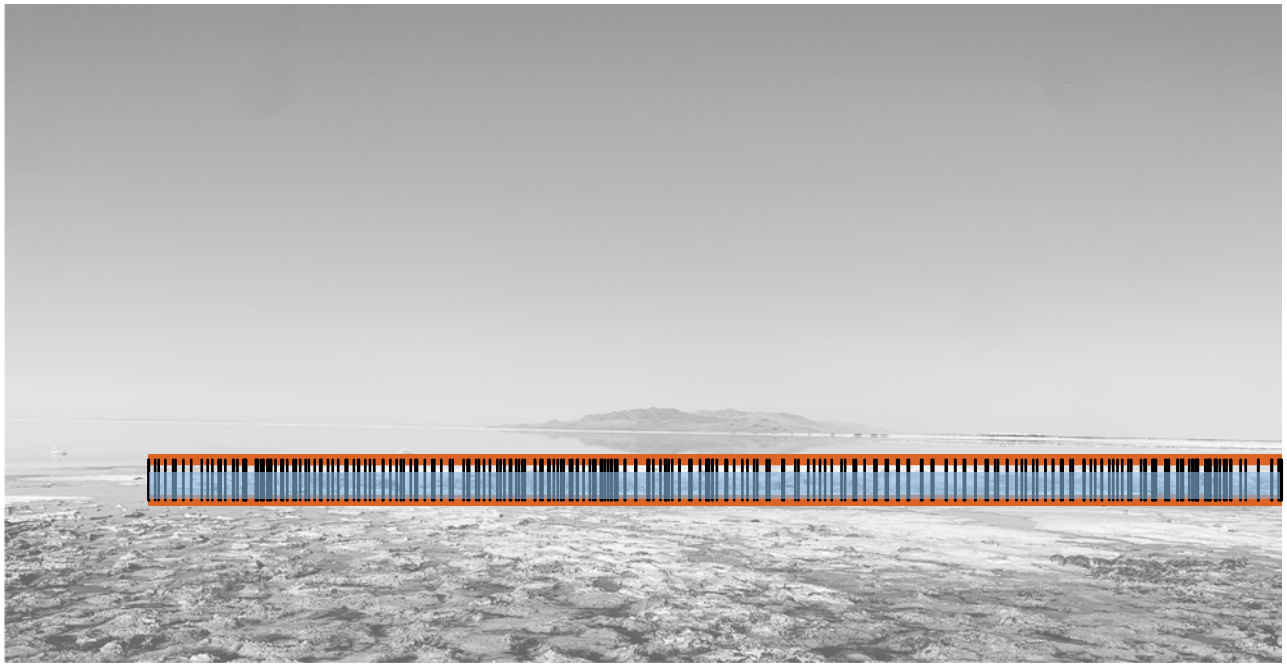


This is a human implemented system.
A temporary solution to a human caused problem.

These concrete structures will be placed around various microbialites and dug 3 inches down into the lake bed for structural support.

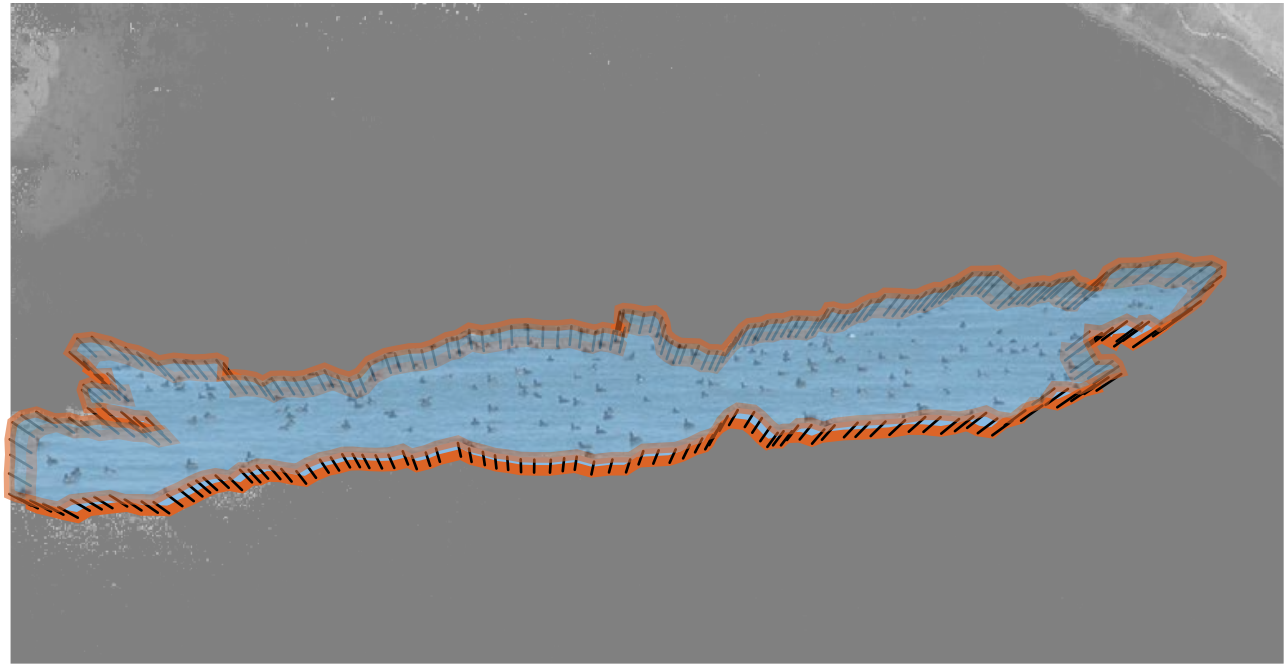


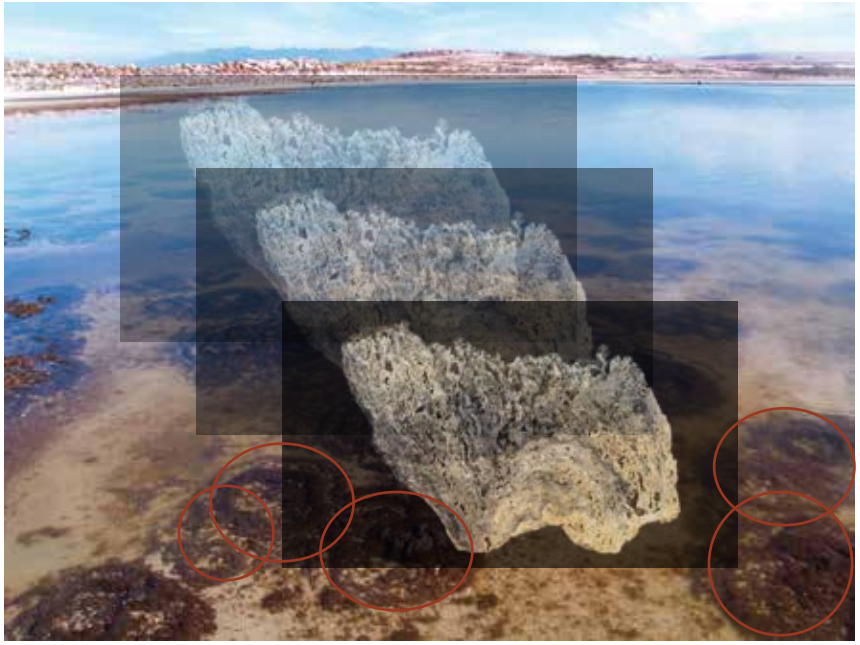
When full this tank would hold 8.2 million liters of water and 1,000 brine shrimp per liter.
This would feed 2,597 Eared Grebes for 15 weeks eating 30,000 shrimp a day.



Front Section View.
The Prosthetic Habitat behaves as a tank when filled with water. It is sturdy and supports the water inside which allows for the Brine Shrimp to live and the Microbial Mat to revive.

Top Section View.
The Prosthetic Habitat is open and allows the birds to find their way in to feed. This is a lake within a lake and does not need to be protected from the outside elements.

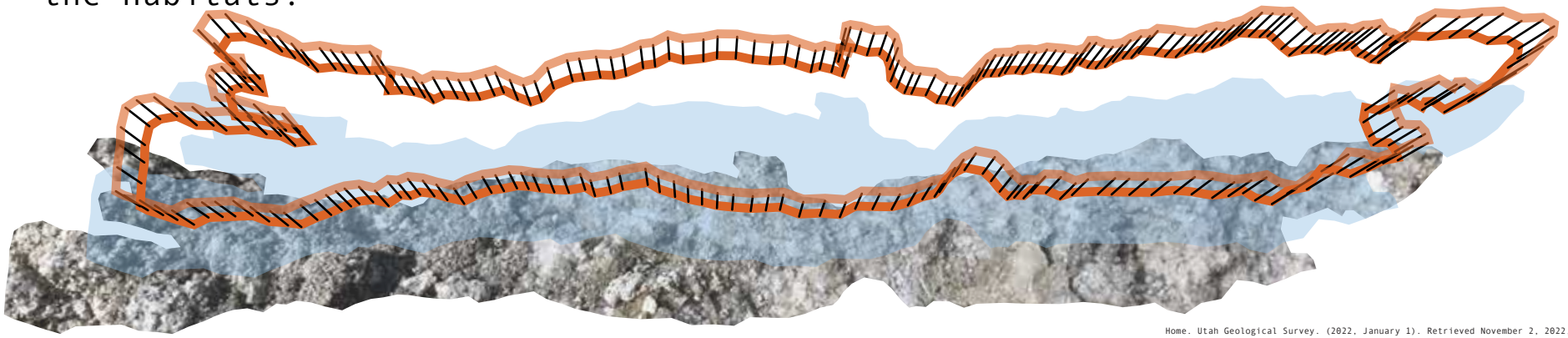




These habitats will be built around Microbialites in the lake.
Microbialites are living rock structures in the lake. They are the oldest forms on Earth and are the lifeline of all living organisms in the lake and that rely on the lake.
They form by sediment and mircrobes layering together over time.
The top layer, the Microbial Mat is used as a food source by organisms in the lake.

When exposed to sunlight these structures are bleached and can no longer be used as a food source.

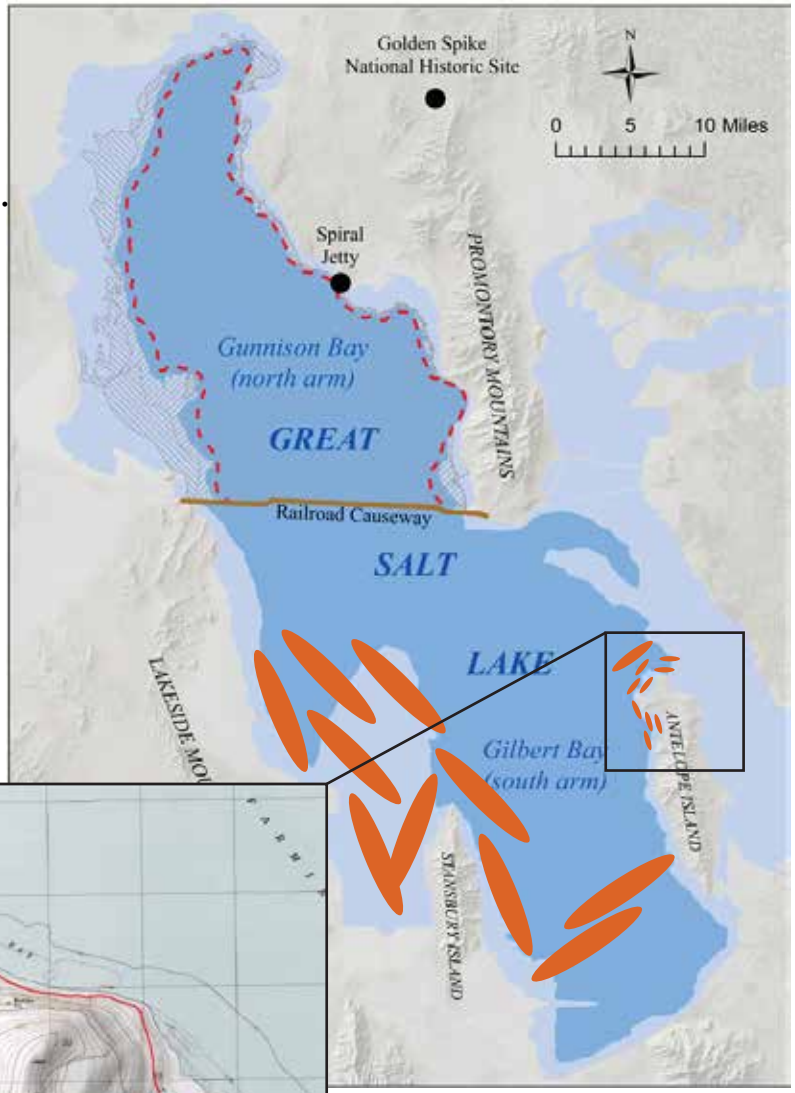
By implementing these Prosthetic Habitats around the exposed Microbialites they will be covered with water and able to rejuvenate. Once they have returned to a healthy state they will be able to feed the Brine Shrimp in the Habitats.



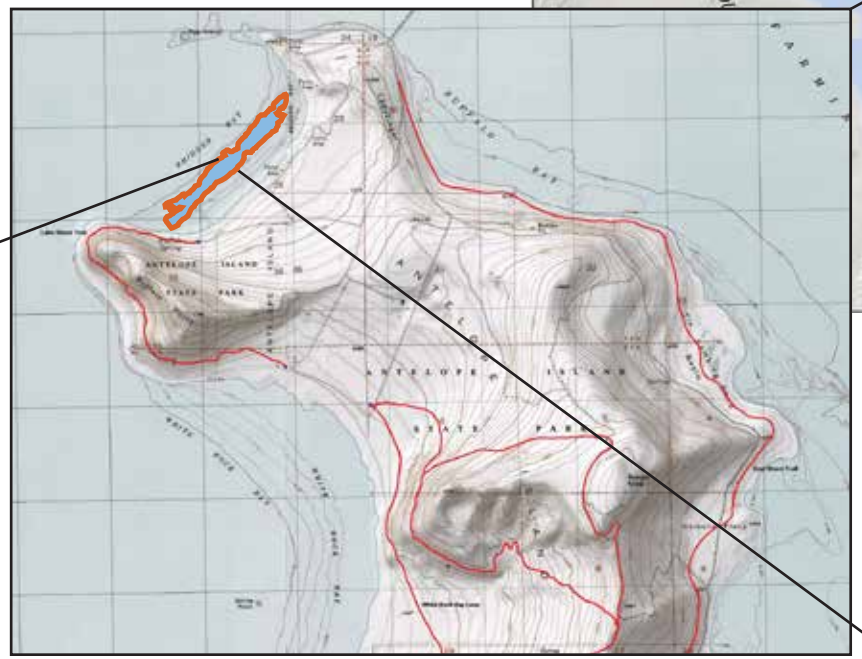
Home. Utah Geological Survey. (2022, January 1). Retrieved November 2, 2022, from https://geology.utah.gov/map-pub/survey-notes/geosights/geosights-microbialites-of-bridger-bay-antelope-island-great-salt-lake/

The orange ovals represent areas where these prosthetic habitats could potentially be, based on the Microbialites that are currently exposed. The zoomed in area at the tip of Antelope Island is where the example Prosthetic Habitat would be placed, in Bridger Bay.

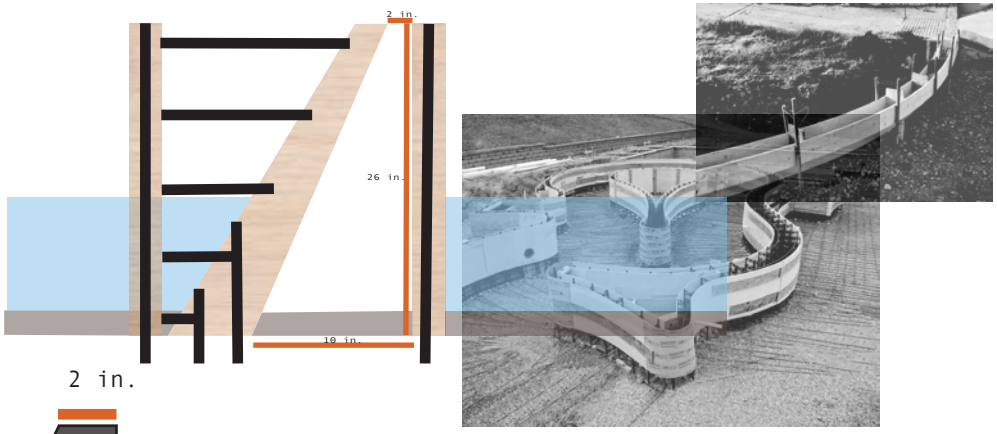
Eared Grebe's naturally nest near Microbialites and would continue to build nests in the water around the structure. Their diving method of retrieving food would allow them access into the tank as the walls would be low enough.

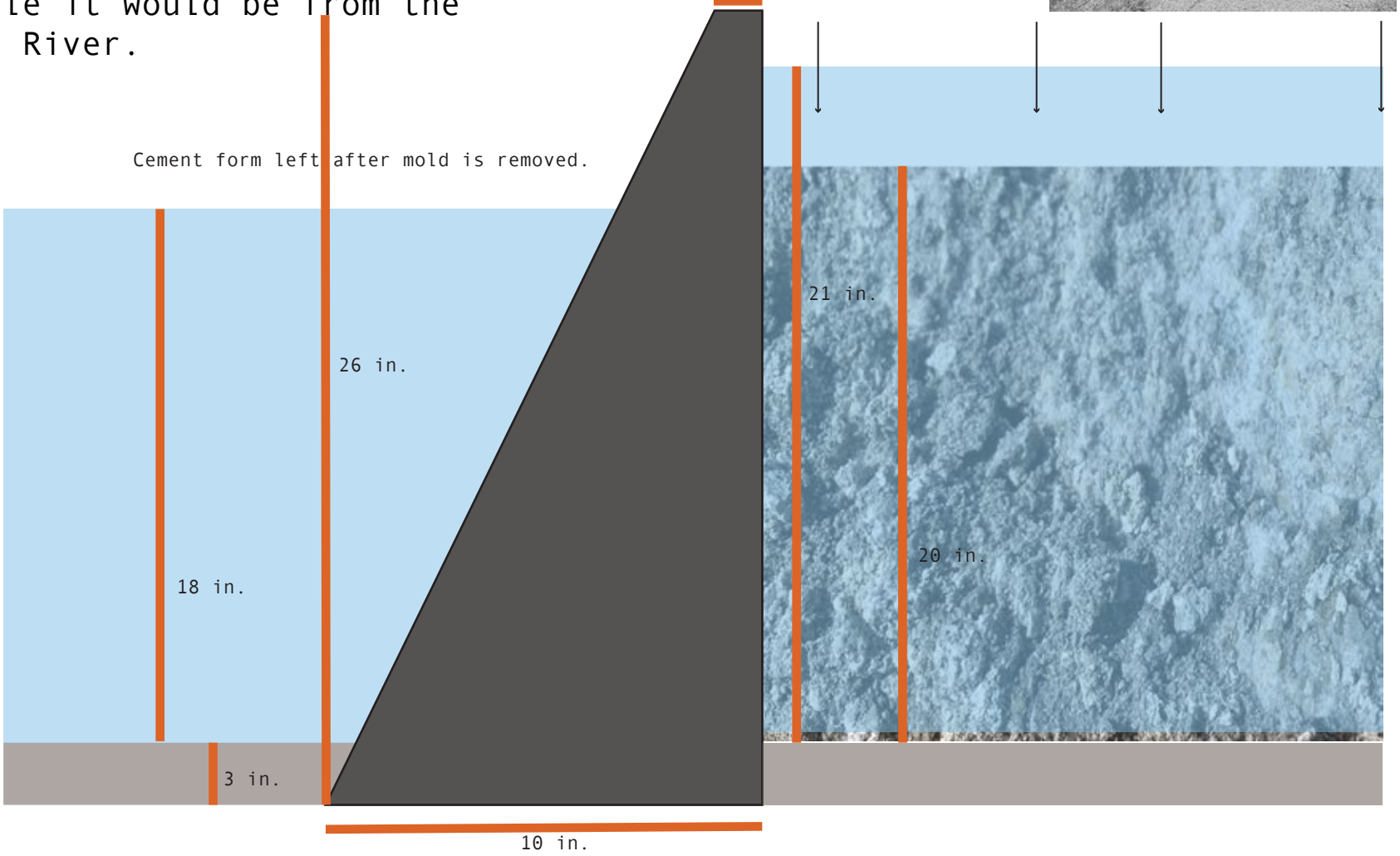


Prosthetic Habitat EX.01



To form these structures, a form will be built in the water with wood and steel bars. This form will be filled with concrete and then left to cure for a week. After the wood and steel will be removed and the structure will be filled with water from whichever water source is nearest. For this example it would be from the Weber River.





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