Country / City United States of America / Pomona, California

University / School California State Polytechnic University, Pomona

Academic year 2017-2018

Title of the project Futile or Fertile? Exploratory Strategies in Playa Management and Habitat Revivalism at the Salton Sea

Authors Brittney Seman, Lauren McKenna, Jordan Henry

PERFORMATIVE NATURE

Barcelona International Landscape Architecture Biennial

September 2018 Barcelona

SCHOOL PRIZE

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Máster d'Arquitectura del Paisatge -DUOT - UPC
ETSAB- Escola Tècnica Superior
d'Arquitectura de Barcelona
Avenida Diagonal, 649 piso 5
08028 Barcelona-Spain

TECHNICAL DOSSIER

Title of the project	Futile or Fertile? Exploratory Strategies in Playa Management and Habitat Revivalism at the Salton Sea
Authors	Brittney Seman, Lauren McKenna, Jordan Henry
Title of the course	Intermediate Landscape Design, Salton Sea Studio
Academic year	Spring 2018
Teaching Staff	Barry Lehrman
Department/Section/Program of belonging	Landscape Architecture, College of Environmental Design
University/School	California State Polytechnic University, Pomona

Written statement, short description of the project in English, no more than 250 words

In recent memory, the scale has been tipped against the Salton Sea. To the south, America's bread basket basks in borderland heat while draining enough water to sustain 80 million people into the Sea each day. Still, the Sea is receding faster than ever -- nearly 3 inches per year -- exposing miles of nutrient-dense playa. Generations of agricultural runoff have saturated the sea floor with salts and selenium, the latter of which grows more toxic when exposed to sunlight, oxygen, and wind.

The site extending North from Poe Road is one of the shallowest in the Sea, which means its playa is being exposed at a faster pace. Deep, sandy soil is prevalent within the site, ideal for establishing vital vegetation. This area has little to no direct drainage from the New River -- its primary source is from three agriculture drains. We propose utilizing the water from the drains to revive new habitat for Desert Pupfish and migratory birds in hopes to sustain their populations. Residual water will seasonally fill tillage swales to mitigate wind erosion and provide optimal conditions for establishing vegetation. The extremely salty seawater will be sequestered to brine ponds and salt flats, which reduces wind erosion. Roughly 44 acres of algal ponds will remove up to 80% of the selenium within the site. Finally, the vast stretches of clay-like playa will be tilled an oblique crosshatch to withstand variations in wind patterns.

For further information
Máster d'Arquitectura del Paisatge -DUOT - UPC

T: + 34 93 401 64 11 / +34 93 552 0842
Contact via email at: biennal.paisatge@upc.edu
Consult the web page http://landscape.coac.net/

Futile or Fertile?

Exploratory strategies in playa management and habitat revivalism at the Salton Sea

Context

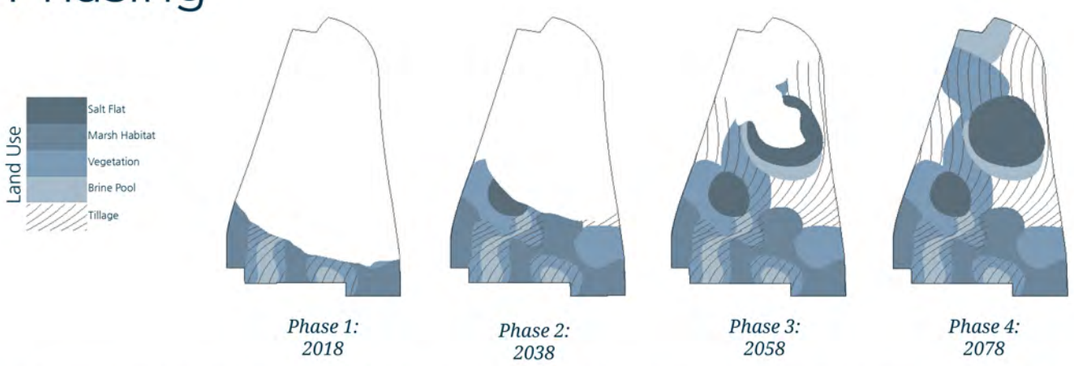
California

Site at Poe Road

In recent memory, the scale has always been tipped against the Salton Sea. To the south, America's true bread basket basks in borderland heat while draining enough water to sustain 80 million people into the Sea each day. Still, the Sea is receding faster than ever -- nearly 3 inches per year -- exposing miles of nutrient-dense playa. Generations of agricultural runoff have saturated the sea floor with salts and selenium, the latter of which growing more toxic when reintroduced to the photic zone. Tillage and vegetation are already being implemented at key sites around the New and Alamo Rivers to mitigate aeolian erosion. Fresh water is the most limited resource in the Salton Trough, bottlenecking future vegetation efforts. Brackish agricultural runoff from the 24 drains on the south shore the Sea is off-limits, as it offers the last available habitat for the endangered Desert Pupfish.

The site extending North from Poe Road is one of the shallowest in the Sea, which means its playa is drying at a faster pace. Also, this area has little to no direct drainage from the New River -- its primary source is from three agriculture drains. Much of the site also has deep, sandy soil, ideal for establishing vegetation. Because of these factors, we propose utilizing the water from the drains to revive new habitat for pupfish, birds, and other aquatic life in hopes to increase their populations. The residual water will seasonally fill tillage swales designed to mitigate wind erosion and provide optimal growing conditions for local plant species. The extremely salty seawater will be sequestered to brine ponds and salt flats, which also reduce wind erosion. Finally, the vast stretches of clay-like playa will be tilled with ploughs and bulldozers in an oblique crosshatch designed to withstand variations in macro wind patterns.

Phasing



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Site Plan & Metrics

1 billion pounds of salt enter the site each year

site is **8.2 square miles** or 5,250 acres

10,660 acre feet of water inflow to site annually

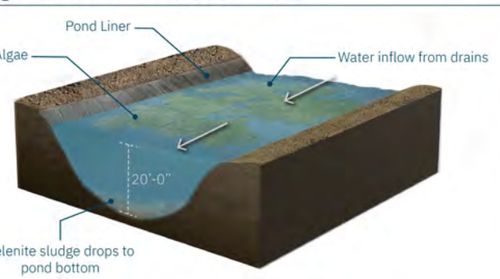
44.4 acres of on-site **algal ponds** remove about **80%** of **selenium** from drainage water

About **2.7 square miles** of **marsh habitat** created

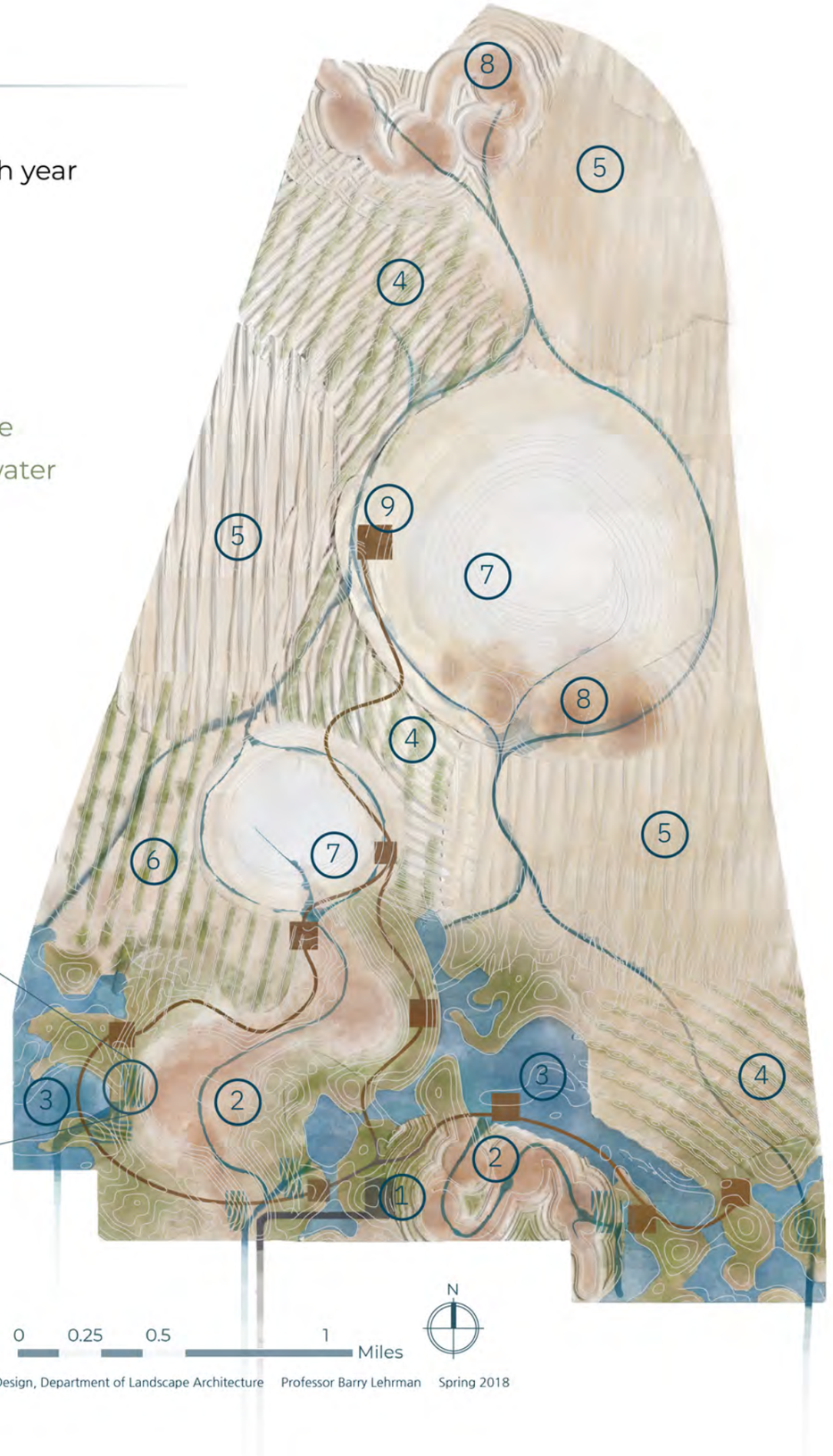
Legend

1. Visitor Center
2. Tillage with Brine Pools and Vegetation
3. Marsh Habitat
4. Tillage with Vegetation
5. Tillage
6. Vegetation
7. Salt Flat
8. Brine Pools
9. Circulation, Viewing Decks

Algal-Bacterial Reduction Pond



Algal-bacterial ponds utilize the bioremediation and filtering capacities of algae species such as cholerella and spirulina to remove toxic heavy metals from wastewater. In these treatment ponds, the water from the drains will go through a series of water bodies and processes before finally being deposited into the site after 32 days. The first series of ponds is the reduction pond in which organic carbon is added to the water, which allows the algae and anoxic bacteria to deplete the dissolved oxygen, nitrate, and selenium. The selenite that is not adsorbed by the algae must be manually removed from the pond's bottom. For the reduction ponds, a depth of 20-25 feet is needed to keep the nearby waterfowl from being attracted to the anoxic sediments. After 20 days in the reduction pond, the water is moved to the high-rate pond then tov an algae settling pond. Once the full cycle has been completed, the algae is harvested from the water, the water is clarified, and the residual and particulate selenite are removed.



Salty Soil

Big Saltbush
Atriplex lentiformis

Iodine Bush
Allenrolfea occidentalis

Upper Habitat

Desert ironwood
Olneya tesota

Honey mesquite
Prosopis glandulosa

Sweet acacia
Vachellia farnesiana

Blue palo verde
Parkinsonia florida

Marsh

Alkali bulrush
Scirpus robustus

Cattail
Typha latifolia

Swamp Timothy
Heleochloa schoenoides

Birds

American avocet
Recurvirostra americana

American white pelican
Pelecanus erythrorhynchos

Snowy plover
Charadrius nivosus

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Program Patterns & Machine Choreography

Programming

Tillage + Vegetation

Salt Flat

Marsh

Tillage

Brine Pools

Machine Choreography

Tractor with Plough

750K with OSD Blade

633E Series II

750K XLT/ 750K LGP with PAT Blade

320B

750K with OSD Blade

Excavator

Tractor with Plough

Bulldozer

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