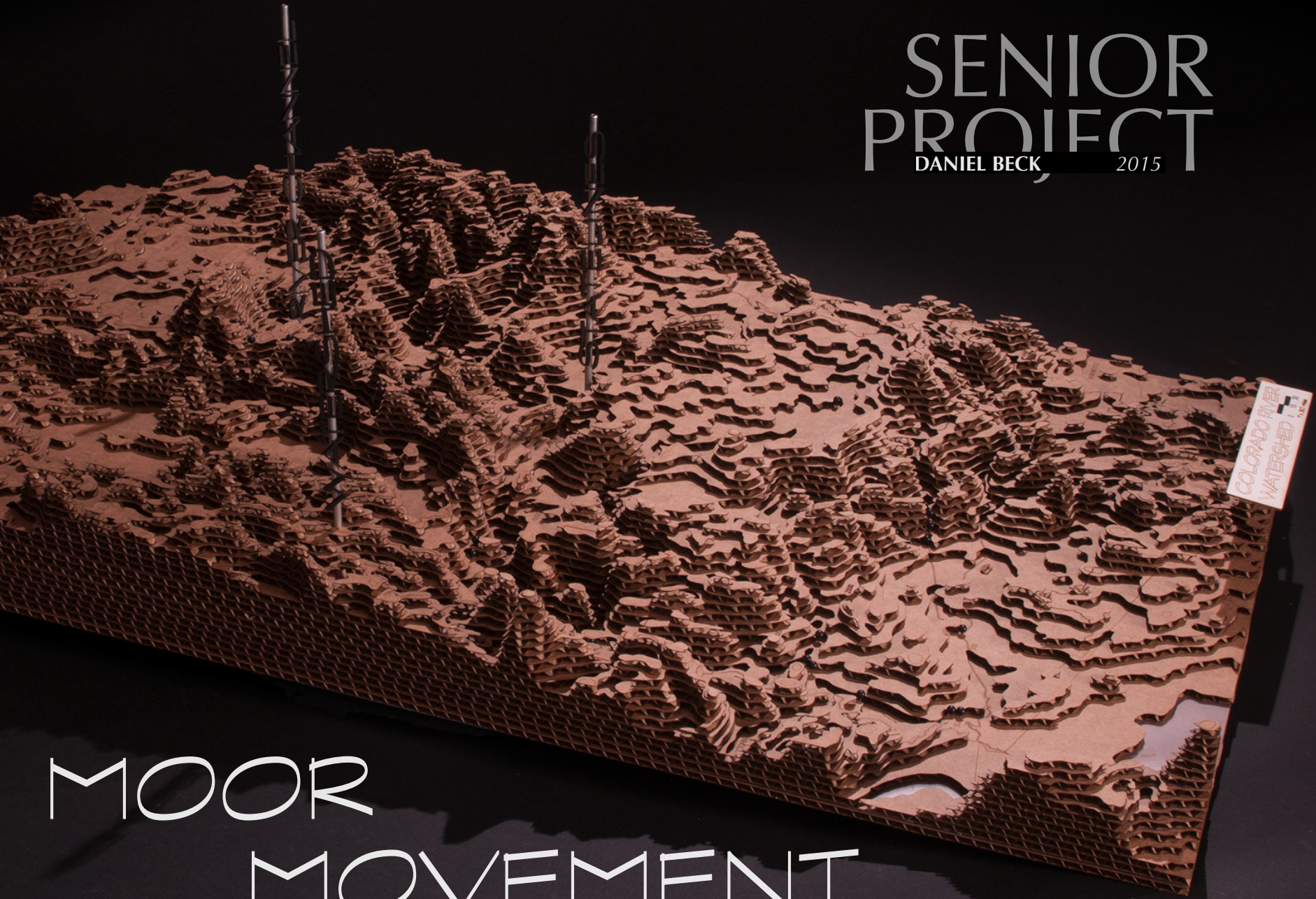


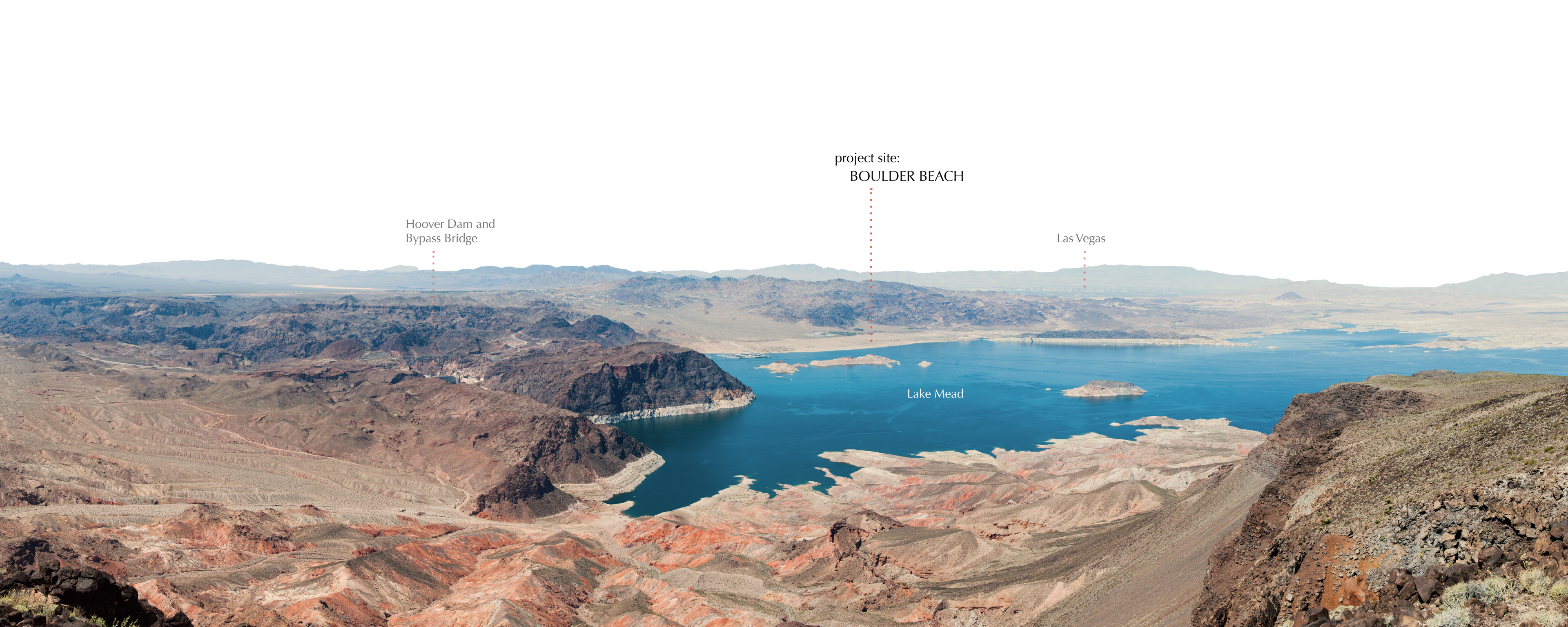
SENIOR PROJECT

DANIEL BECK

2015



MOOR MOVEMENT



Hoover Dam and
Bypass Bridge

project site:
BOULDER BEACH

Las Vegas

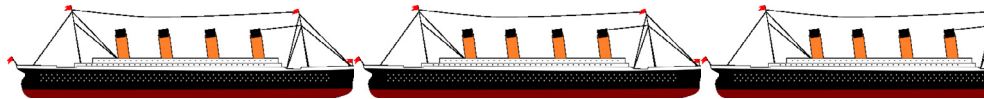
Lake Mead

PROBLEM

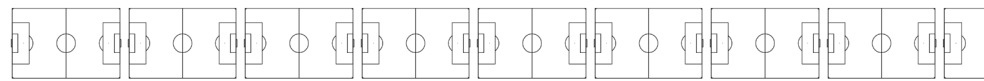
BOULDER BEACH

110° air
80° water

The most heavily used beach on Lake Mead
Visitors want quick access to water



2.8 Titanics



8.3 Soccer Fields



2,500'

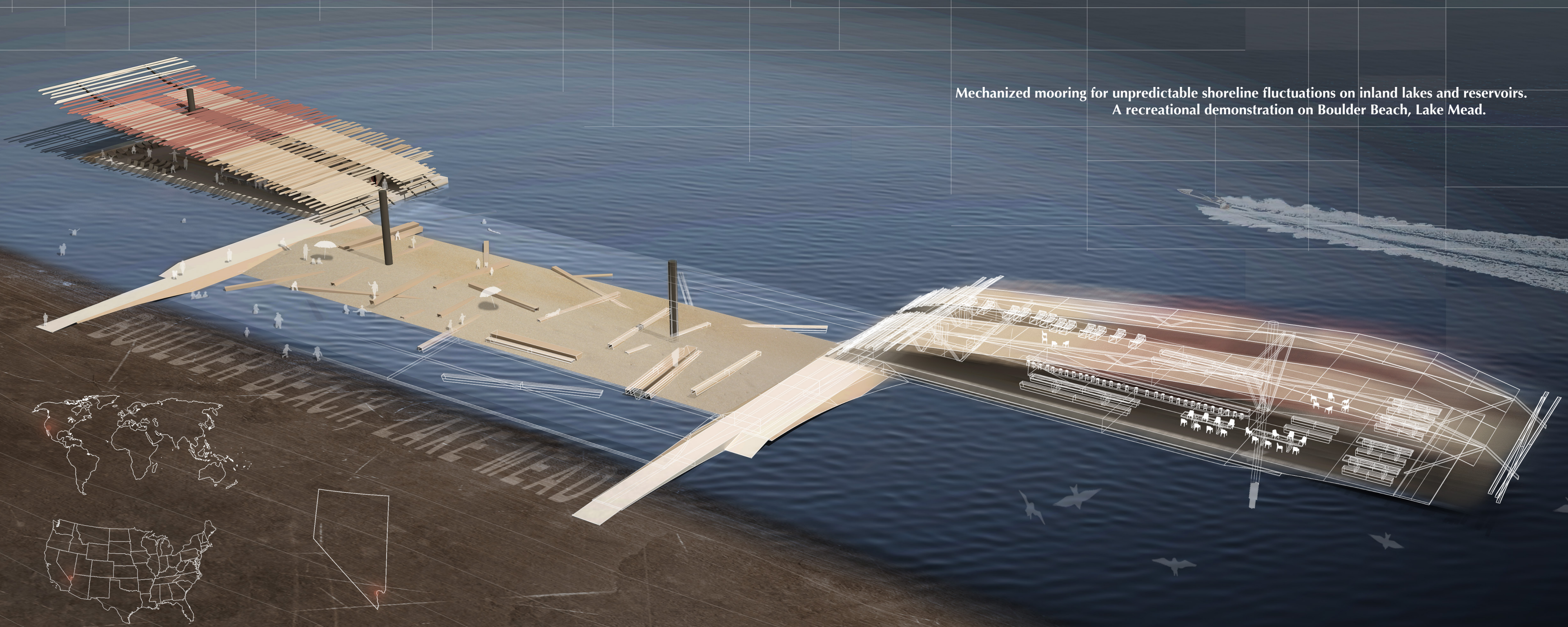
.47 mi



BOULDER BEACH

148'

Mechanized mooring for unpredictable shoreline fluctuations on inland lakes and reservoirs.
A recreational demonstration on Boulder Beach, Lake Mead.





2

context

10

proposal

26

movement

video

32

recreation situation

38

form variation

42

form inspiration

46

site alternatives

50

display presentation

video

60

design iterations

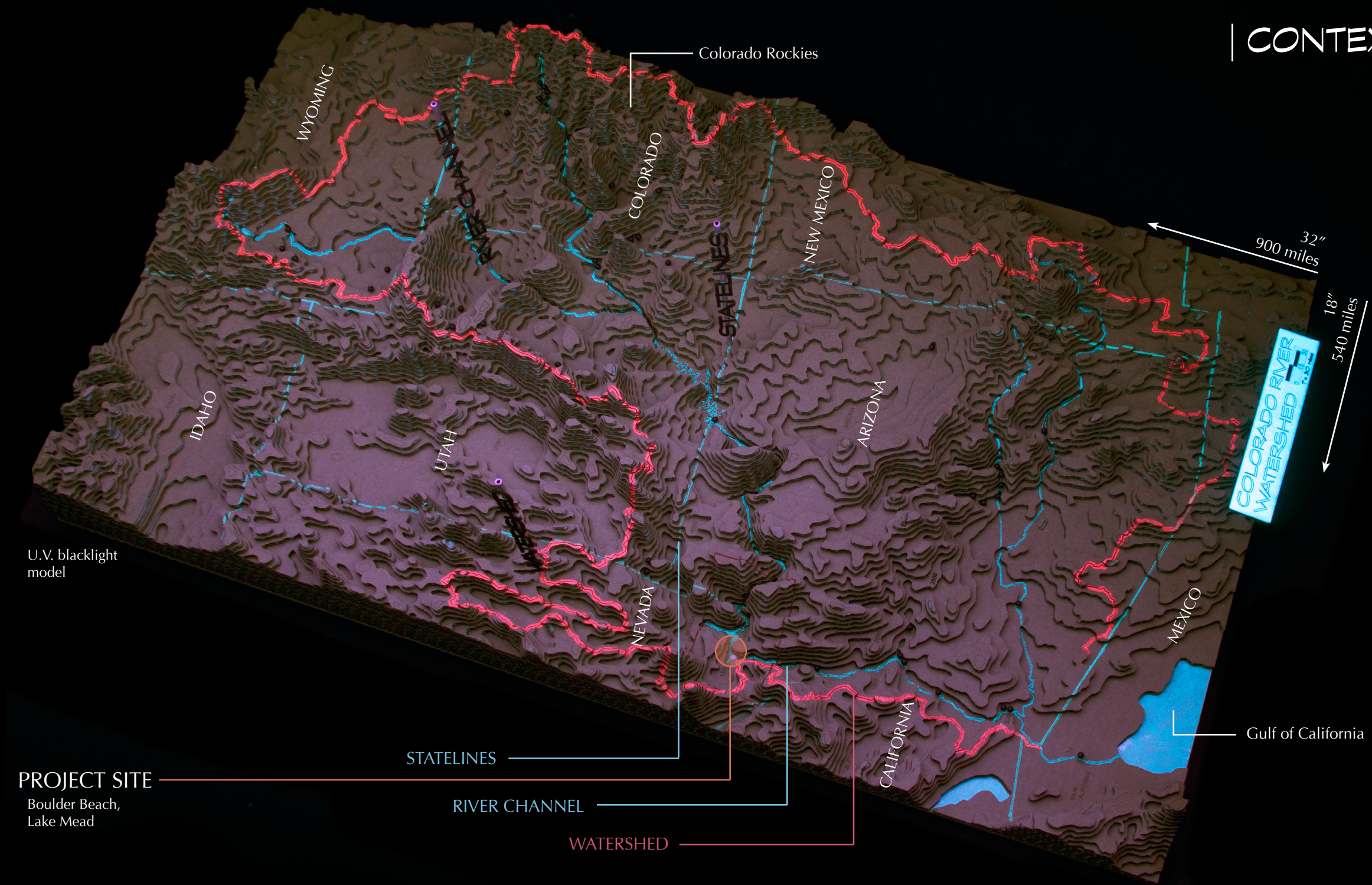
70

construction process

video

COLORADO RIVER WATERSHED

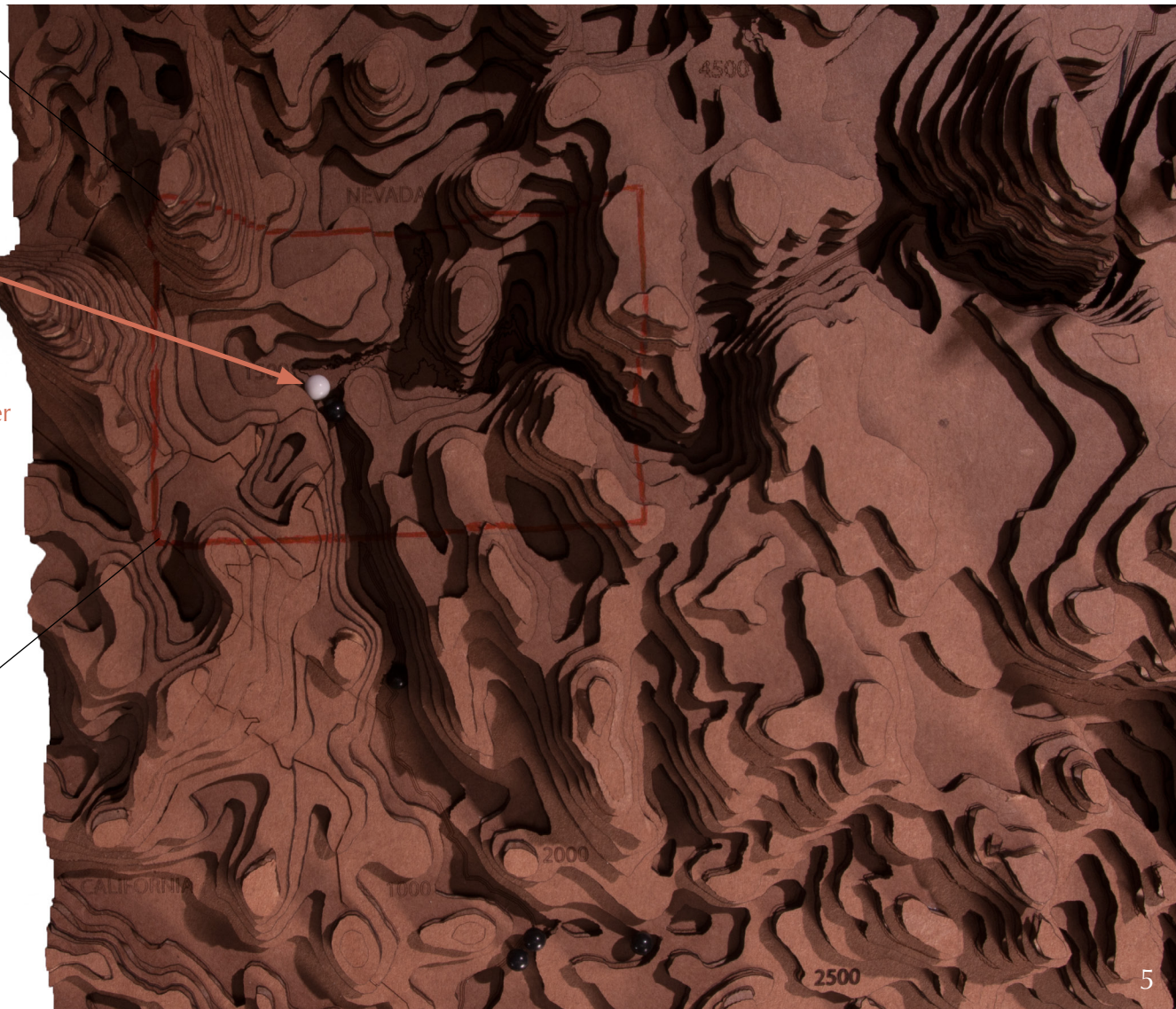
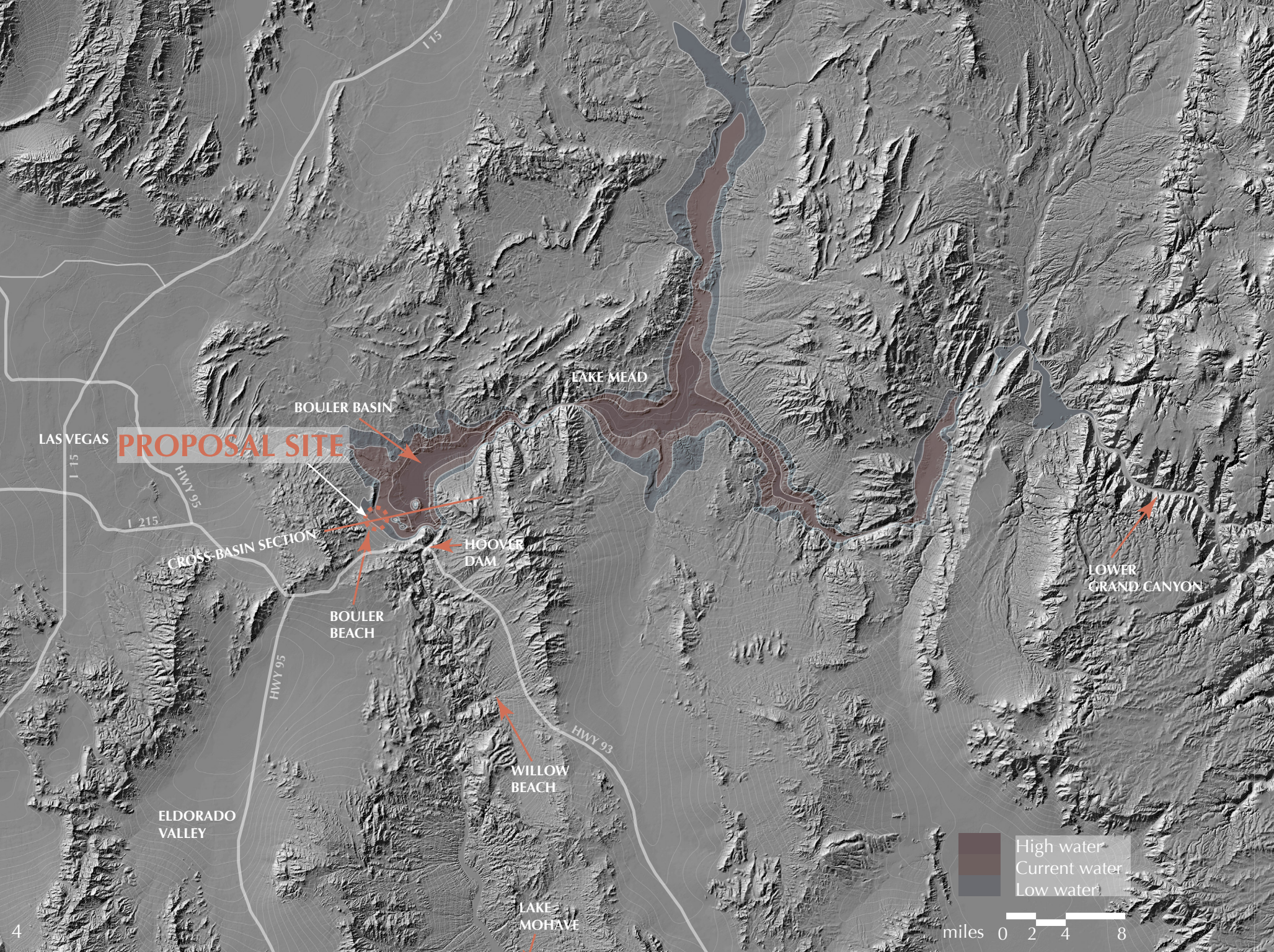
Colorado River watershed:	243,000 square miles
Colorado to Mexico:	1,450 miles
Supports Jobs:	0.25 million jobs
Economic Output:	\$26 billion

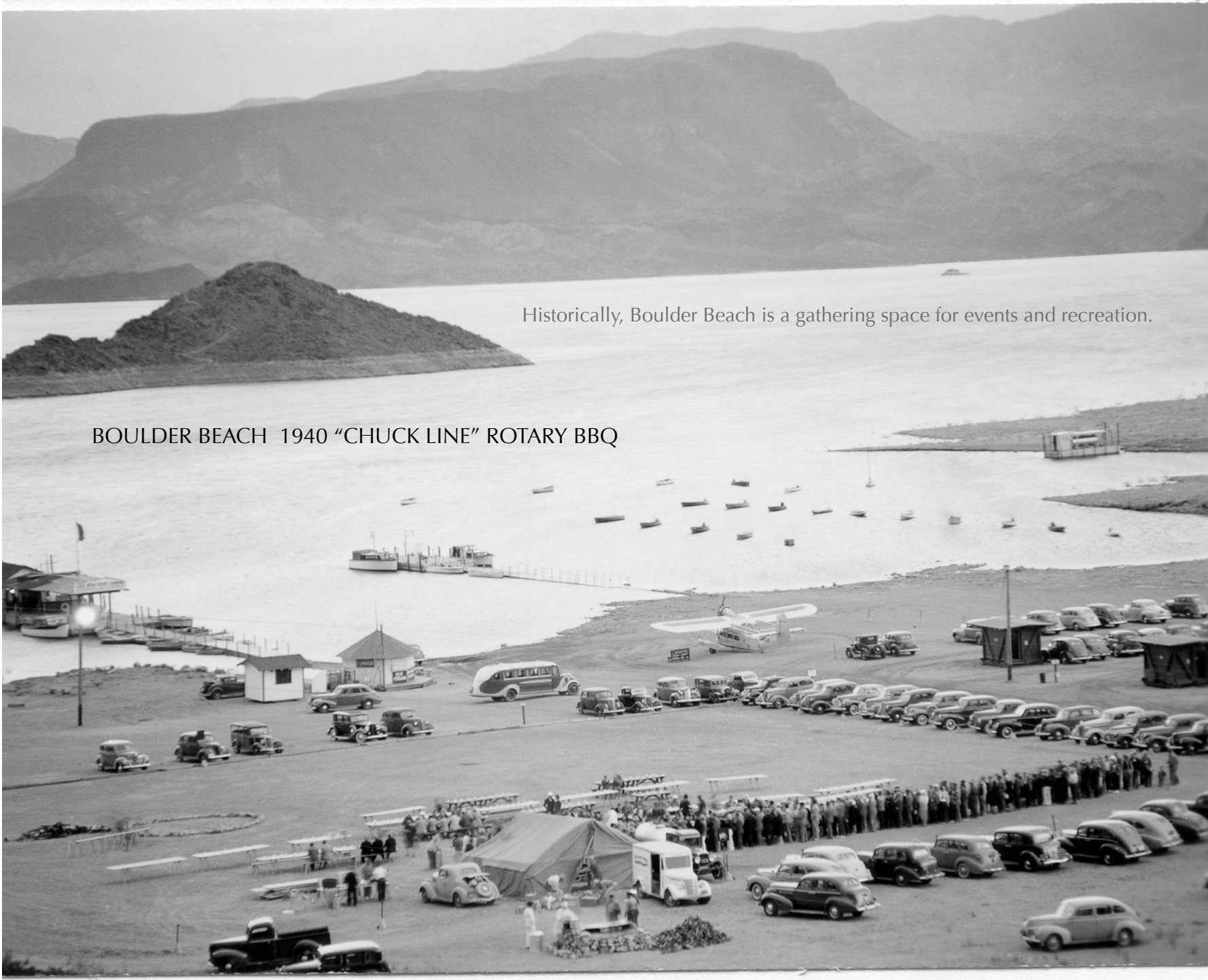


WATER LEVEL ELEVATIONS:		
High water	1229'	
Current water	1081'	148' low
Lowest water	895'	

Lake Mead is the largest man-made reservoir in the United States. It lies within Lake Mead National Recreation Area, the 6th most visited National Park Site with 6.9 million annual visitors. Boulder Beach is the primary beach on the lake and hosts the largest recreation population from Las Vegas.

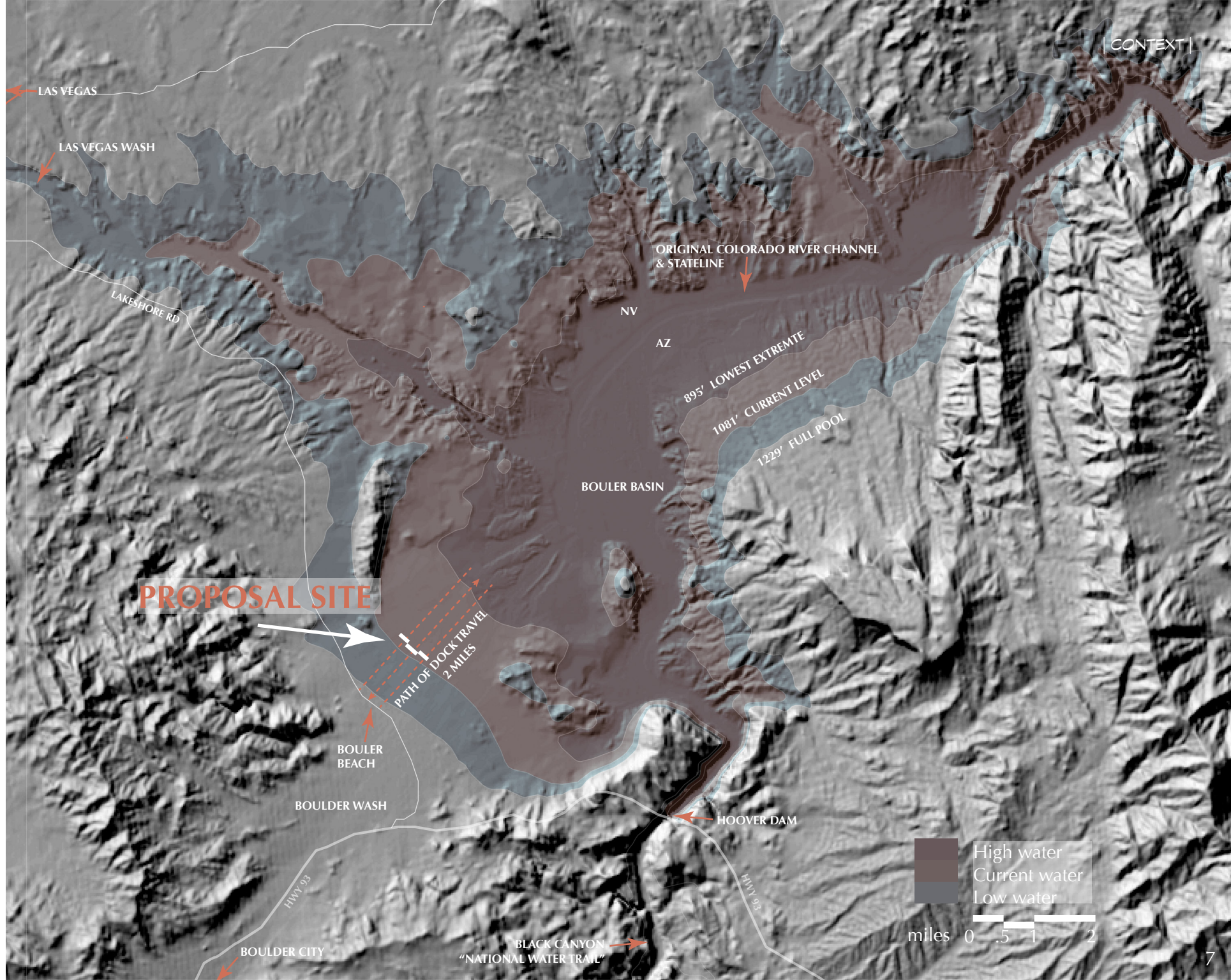
Services at Boulder Beach are inadequate and dysfunctional for a beach with only a 5% slope on a lake that experiences drastic water level fluctuations.





Historically, Boulder Beach is a gathering space for events and recreation.

BOULDER BEACH 1940 "CHUCK LINE" ROTARY BBQ

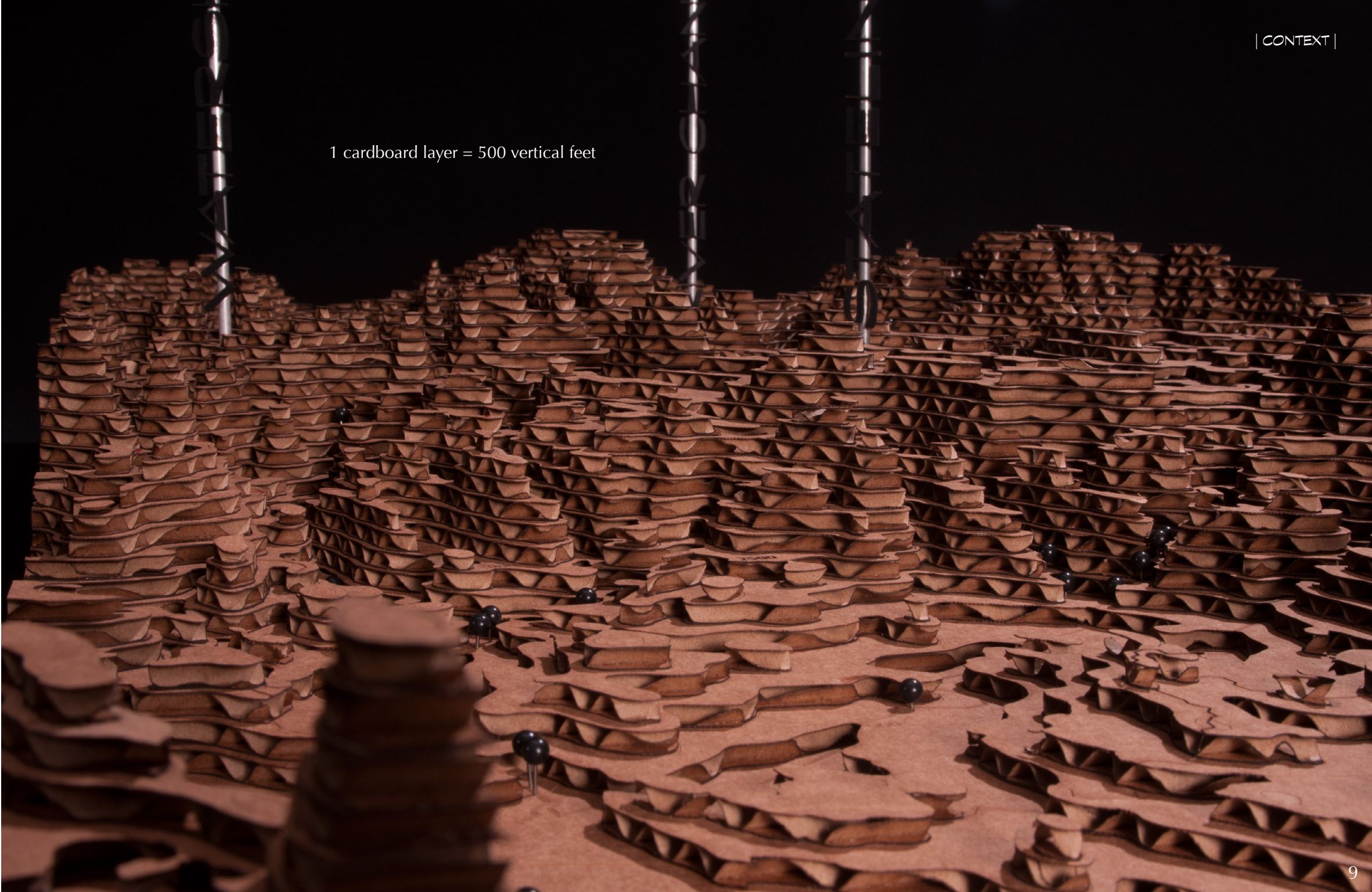


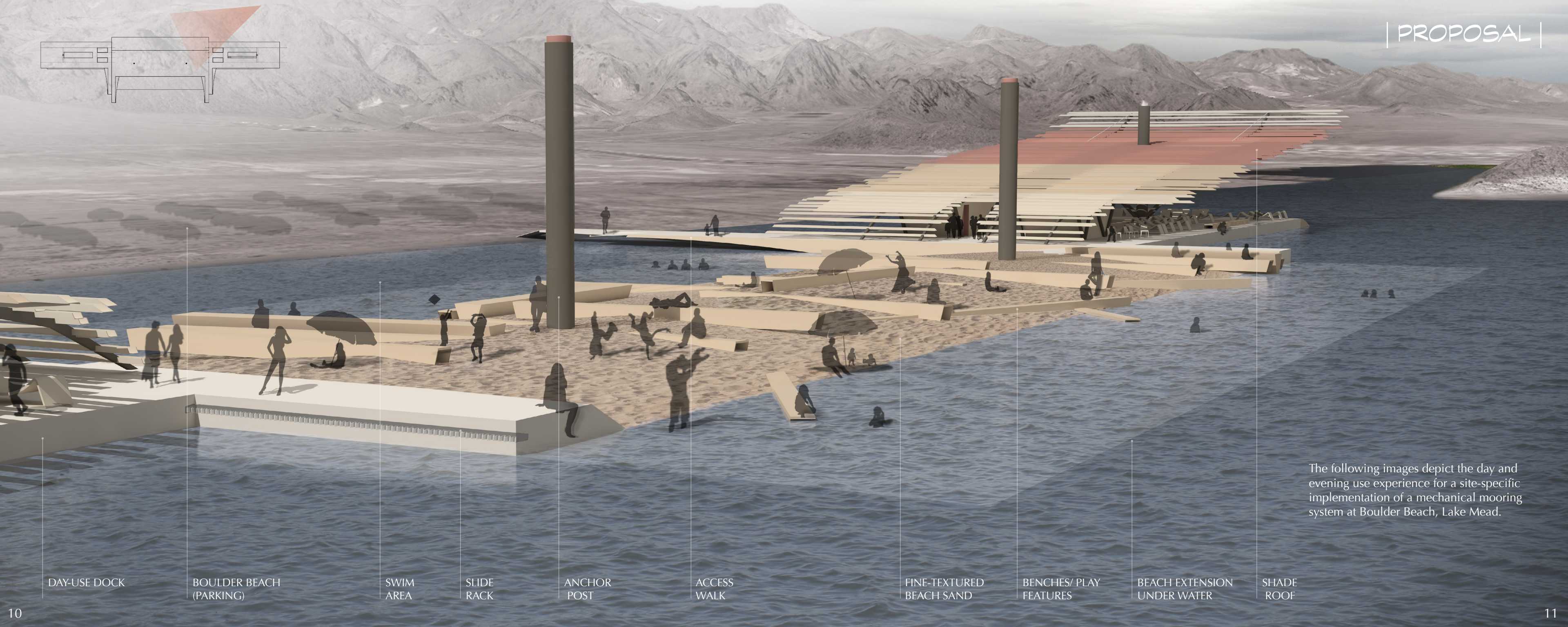
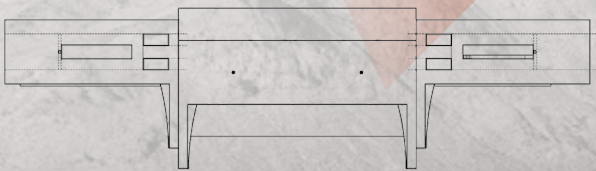
DAMS

There are **44** dams within the Colorado River Basin. The watershed is highly controlled and reservoir levels depend on natural weather conditions as well as political agreements.



1 cardboard layer = 500 vertical feet





DAY-USE DOCK

BOULDER BEACH
(PARKING)

SWIM
AREA

SLIDE
RACK

ANCHOR
POST

ACCESS
WALK

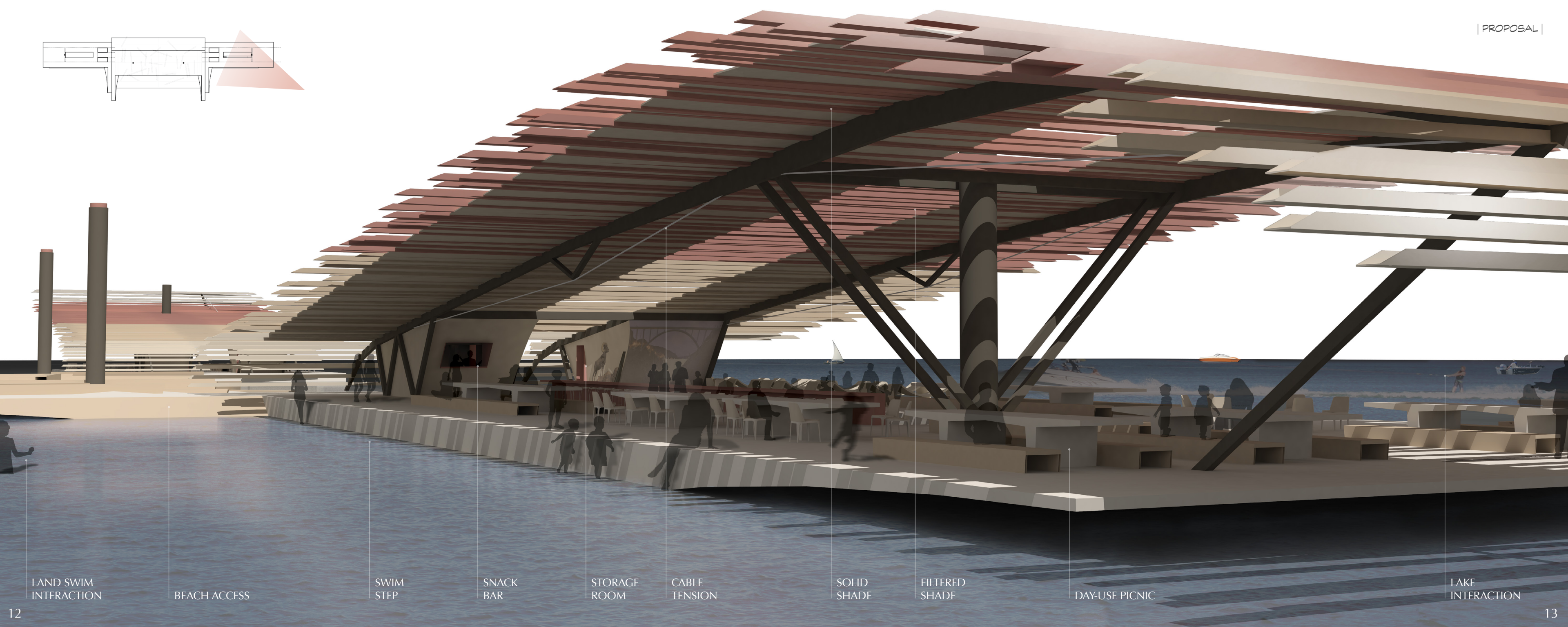
FINE-TEXTURED
BEACH SAND

BENCHES/ PLAY
FEATURES

BEACH EXTENSION
UNDER WATER

SHADE
ROOF

The following images depict the day and evening use experience for a site-specific implementation of a mechanical mooring system at Boulder Beach, Lake Mead.



LAND SWIM
INTERACTION

BEACH ACCESS

SWIM
STEP

SNACK
BAR

STORAGE
ROOM

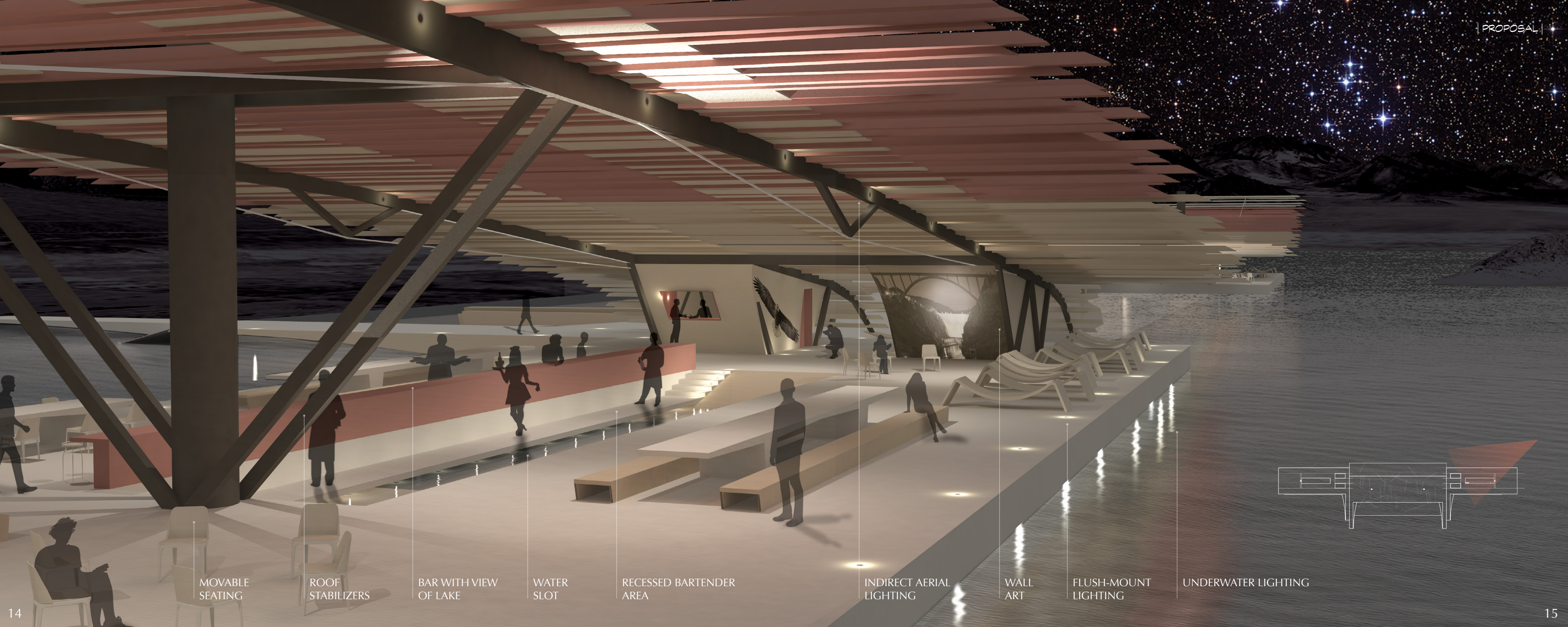
CABLE
TENSION

SOLID
SHADE

FILTERED
SHADE

DAY-USE PICNIC

LAKE
INTERACTION



MOVABLE SEATING

ROOF STABILIZERS

BAR WITH VIEW OF LAKE

WATER SLOT

RECESSED BARTENDER AREA

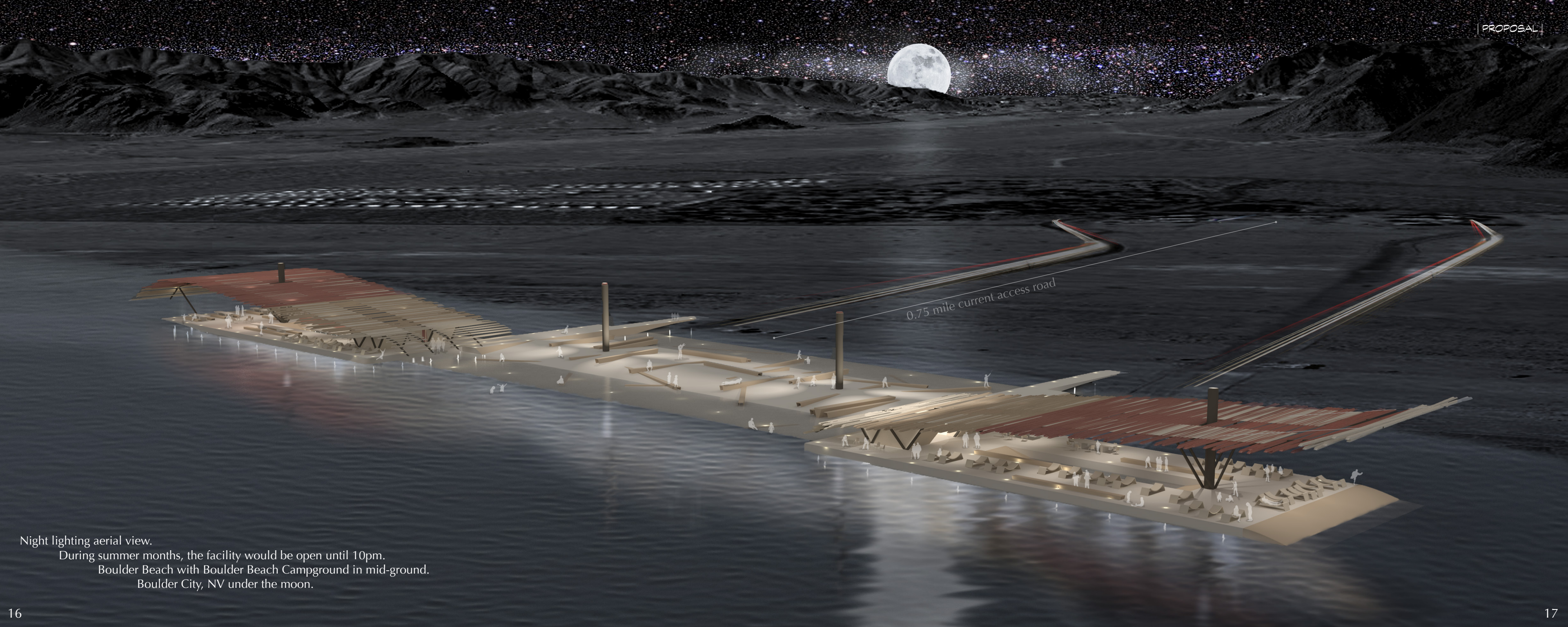
INDIRECT AERIAL LIGHTING

WALL ART

FLUSH-MOUNT LIGHTING

UNDERWATER LIGHTING





0.75 mile current access road

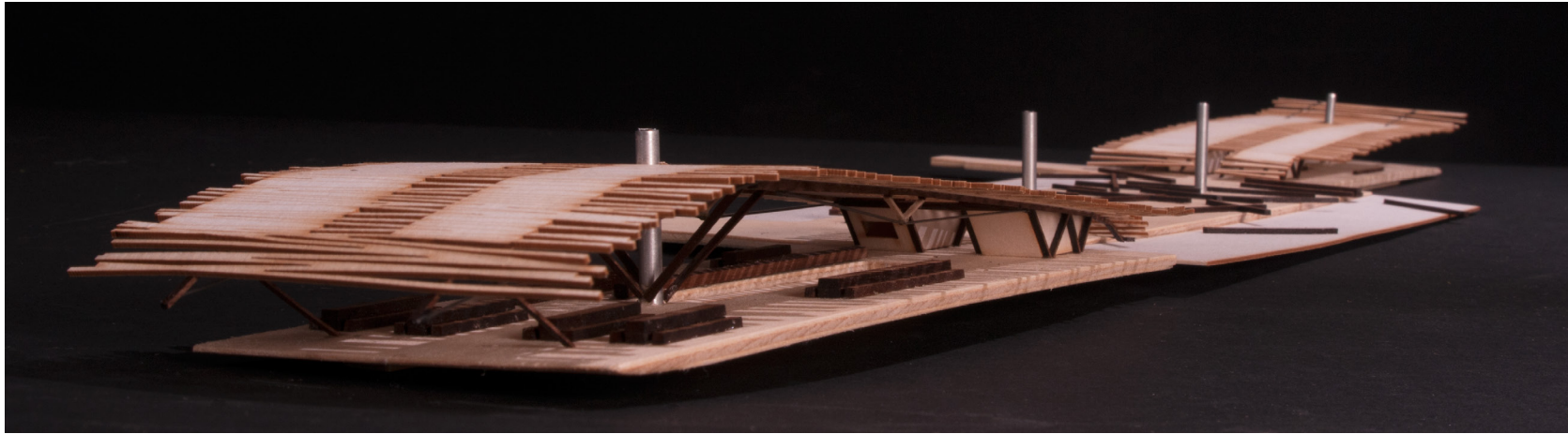
Night lighting aerial view.
 During summer months, the facility would be open until 10pm.
 Boulder Beach with Boulder Beach Campground in mid-ground.
 Boulder City, NV under the moon.

This is the view from on the docks at Boulder Beach

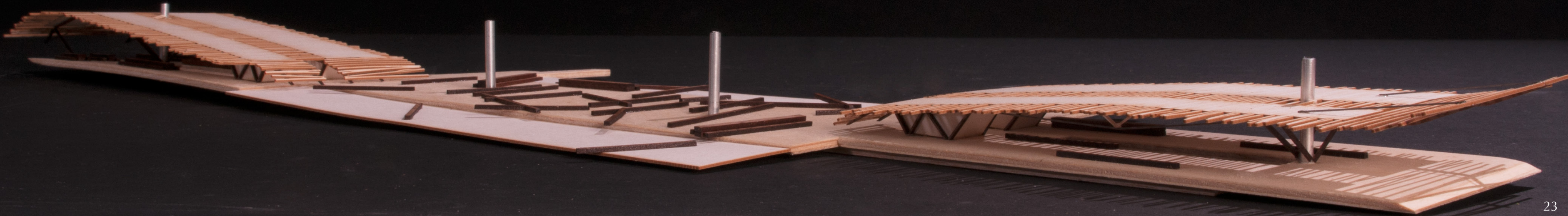
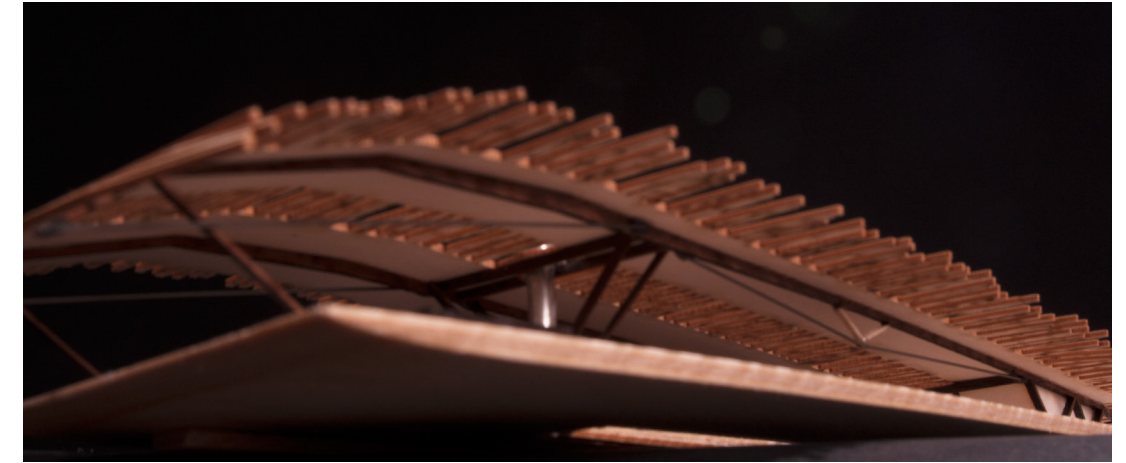


Raw image source: NPS



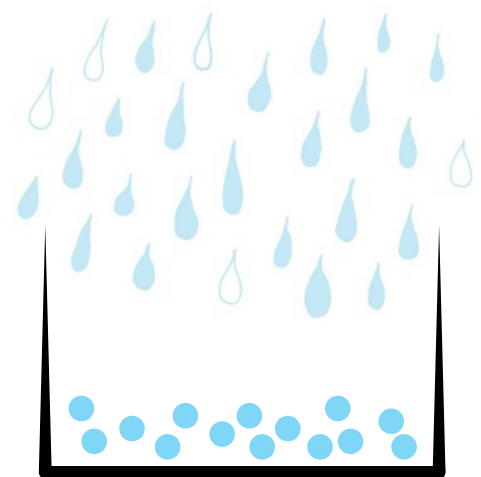


Plywood bases are hand cut with jig-saw. Aluminum posts cut with pipe-cutter. All remaining pieces designed in AutoCAD, then lasercut and hand assembled. Roof is 1/32" taskboard. Benches, tables, steel frame are 1/16" walnut.

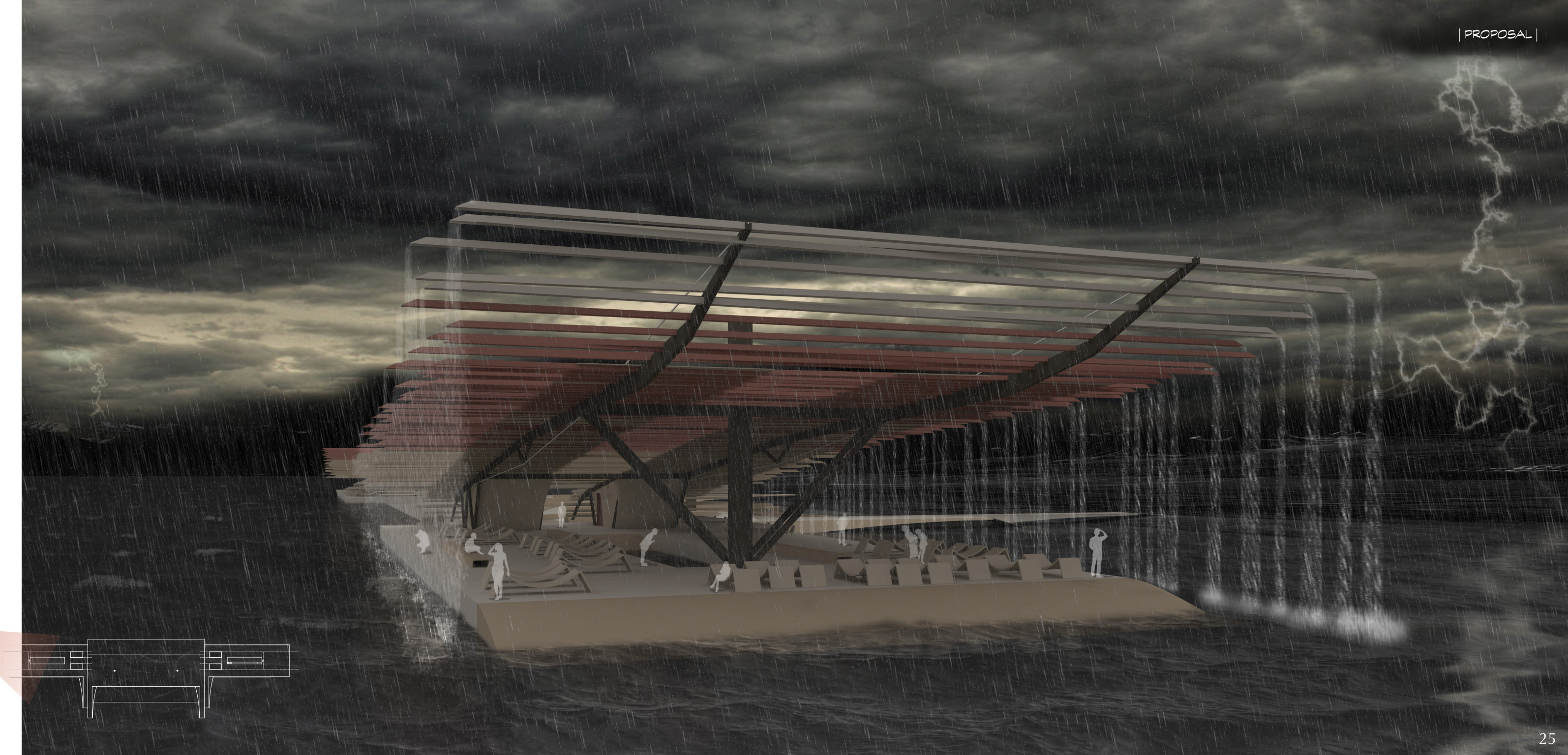


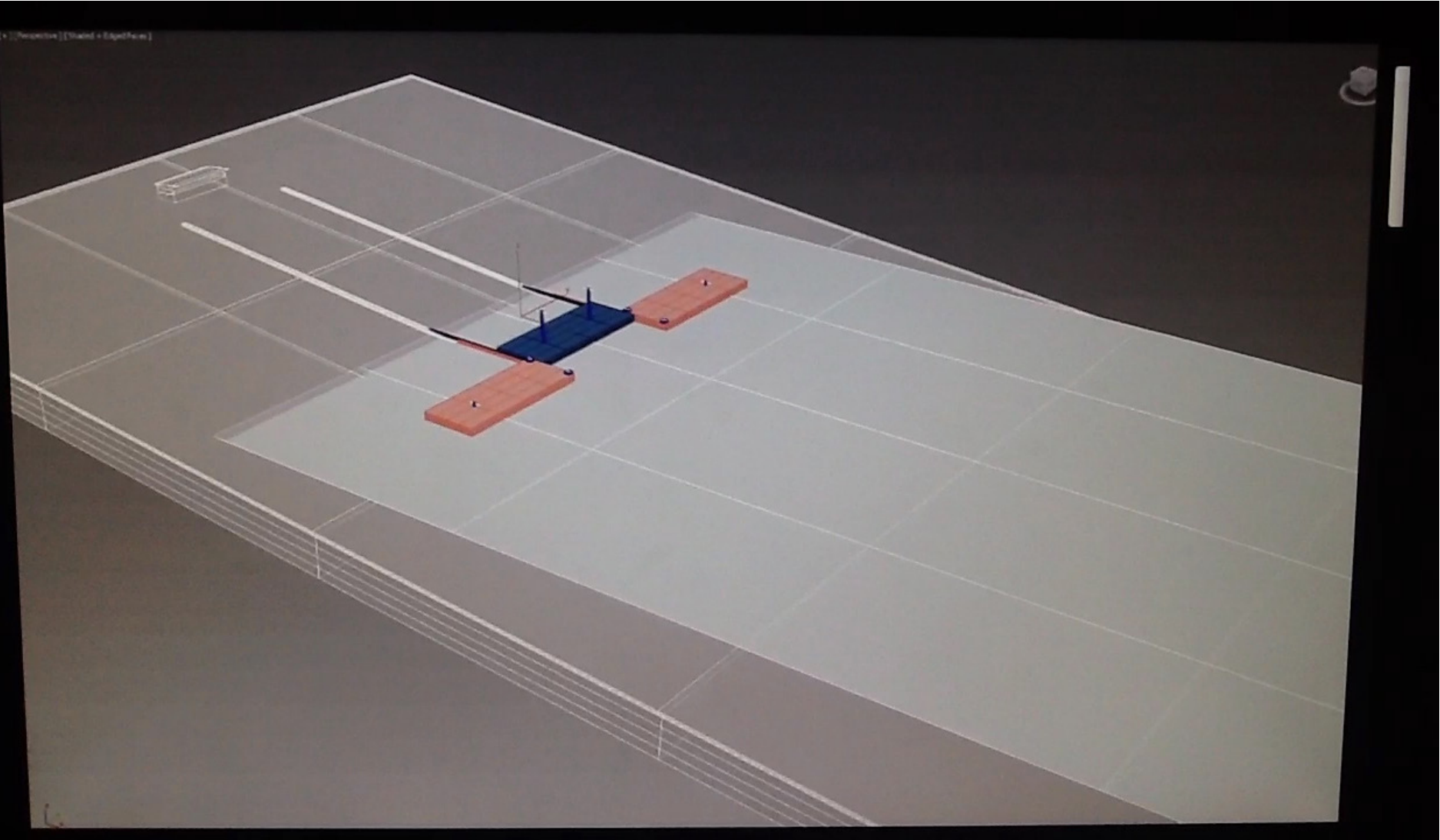
Monsoon thunderstorms are a common occurrence on Lake Mead—so let's make the rain be known.

The roof slats are U-shaped for structural integrity, making them natural collectors of water. 50% of water will be caught by the slats, where it will spill over the ends, creating a musical splash of water in an uneven, yet rhythmic pattern.



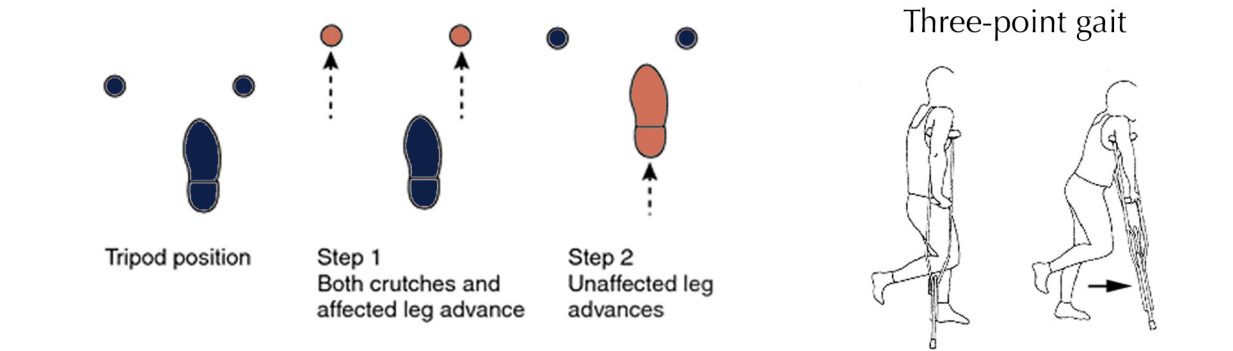
SECTION: Roof Slat



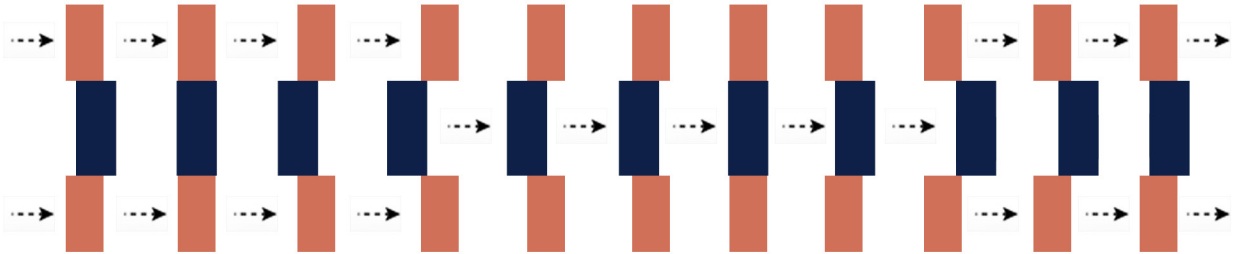


3DS MAX ANIMATION

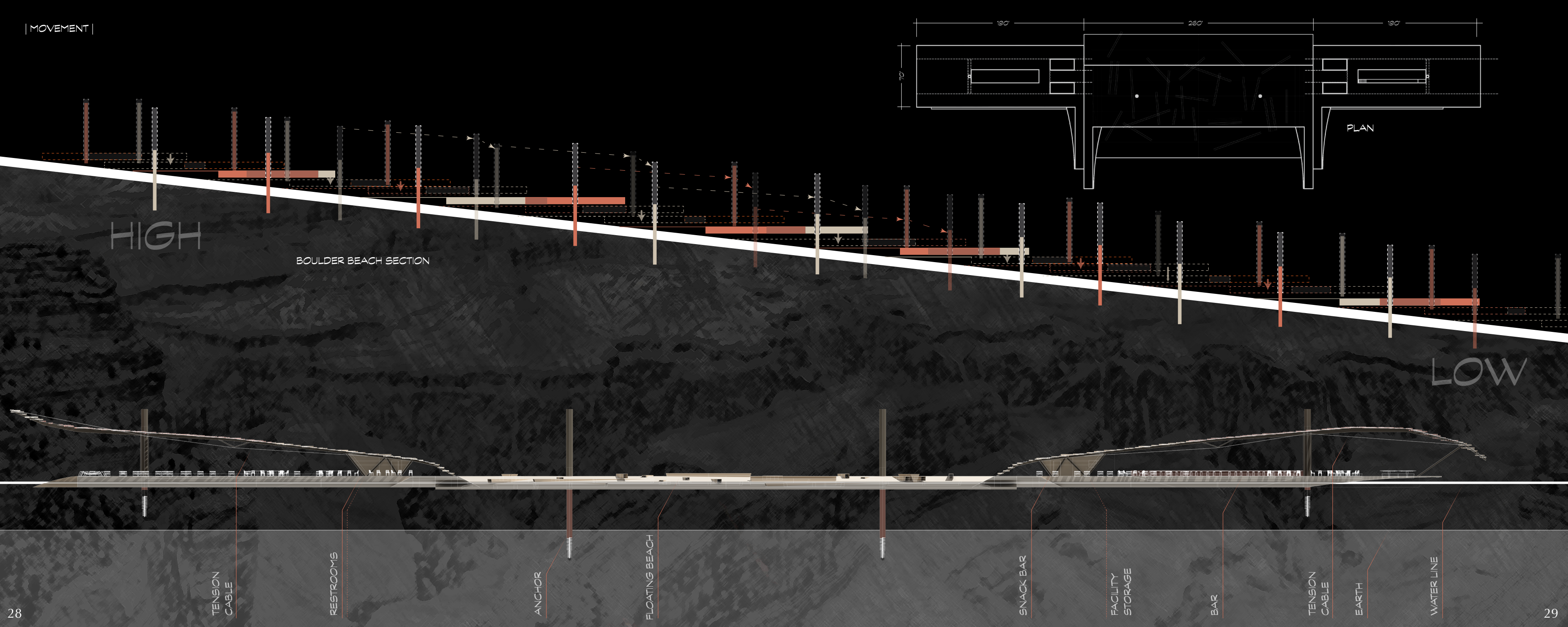
CRUTCHES



DOCKS

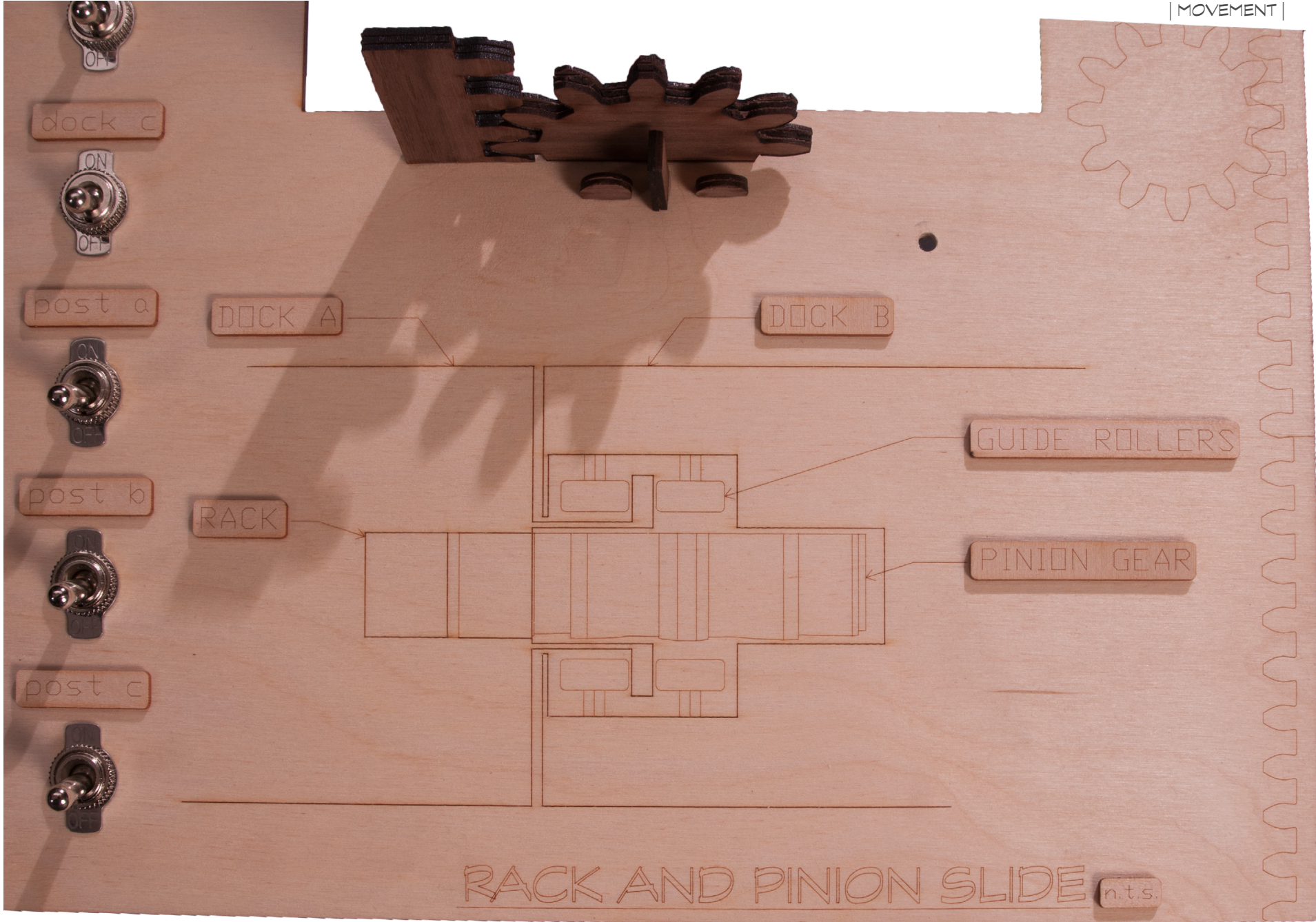
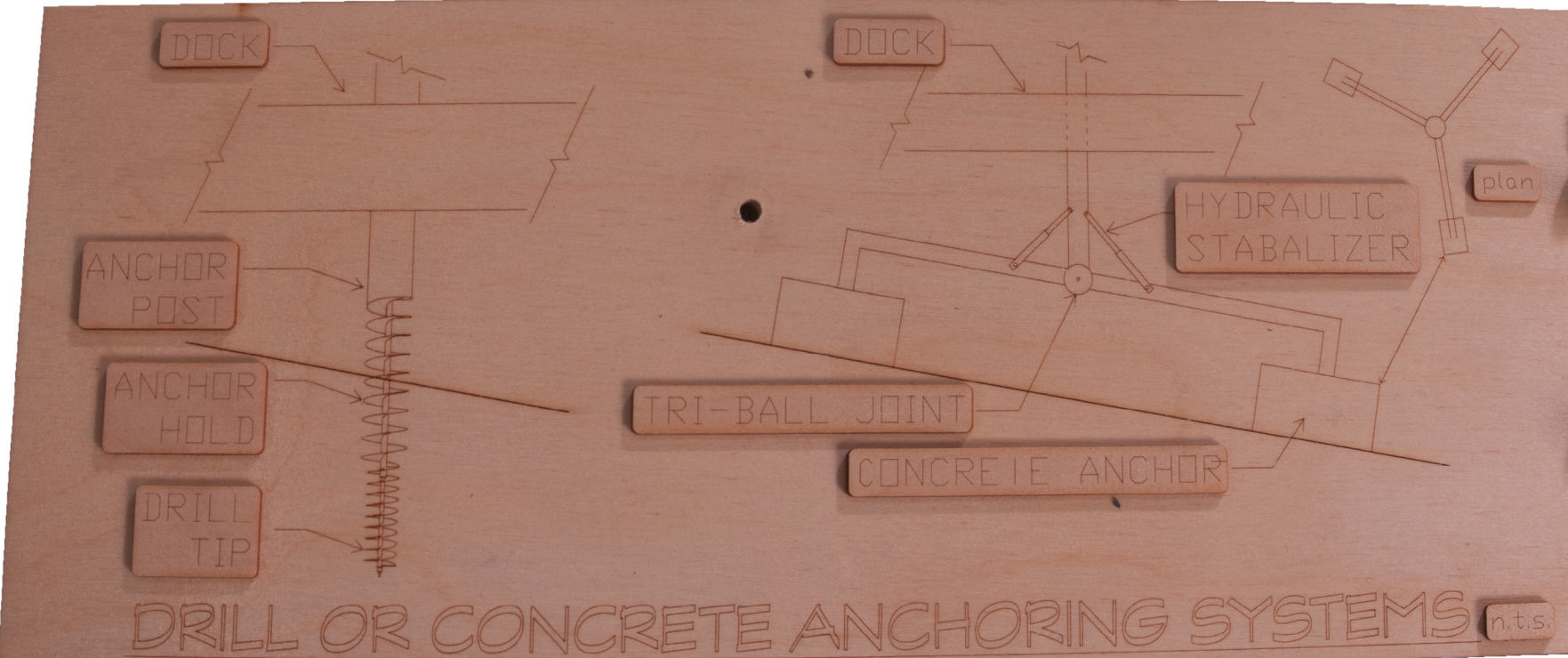


This proposed mooring system uses established engineering techniques (flotation, drilling, gears, slides, bearings, and mass) to take the existing conventional mooring system to the next level—saving time, money, and hassle.

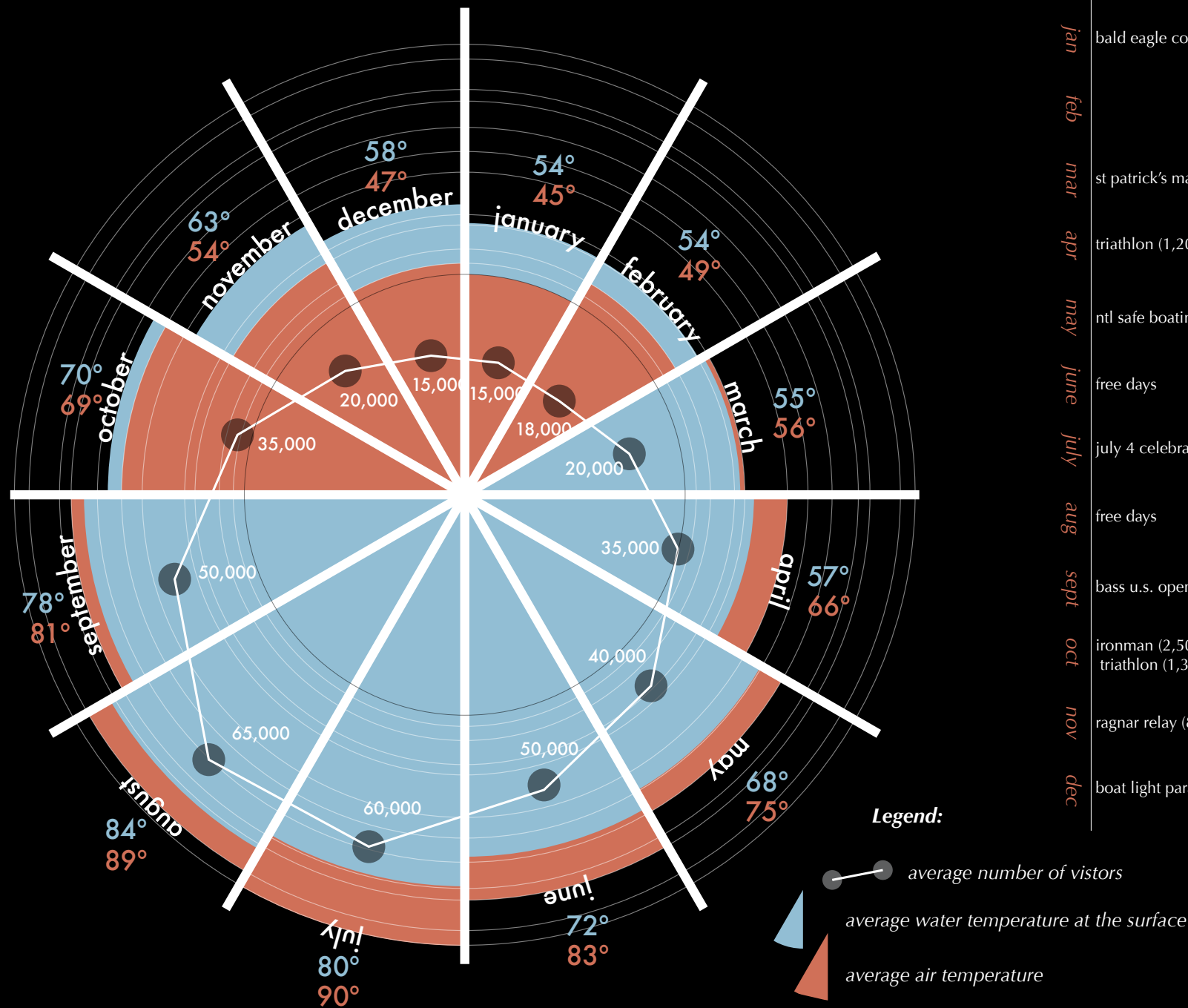


ANCHORING

The drill system is shown in all renderings and works well with soft, alluvial soils. The concrete foot system could work for steeper terrain with denser soil or rock conditions.



MONTHS ON THE LAKE

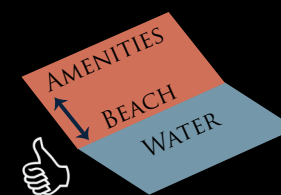


- jan bald eagle count (132 count)
- feb
- mar st patrick's marathon (1,000 ppl)
- apr triathlon (1,200 ppl)
- may ntl safe boating week
- jun free days
- july july 4 celebration
- aug free days
- sept bass u.s. open (300 ppl)
- oct ironman (2,500 ppl) triathlon (1,300 ppl)
- nov ragnar relay (8,000 ppl)
- dec boat light parade

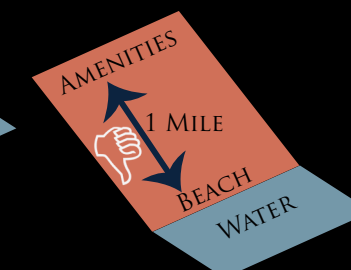
6.9 MILLION VISITORS ANNUALLY

| RECREATION SITUATION |

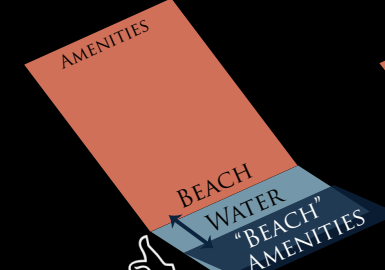
This recreation demonstration lies within Lake Mead National Recreation Area. 6.9 million people visit the area annually, making it the 6th most visited site under the National Park Service. The Colorado River channel flows through Lake Mead, which determines where the lake shrinks to during droughts. A beach with so much demand must be able to fully function despite water levels. An automated floating dock is the best solution proven as shown.



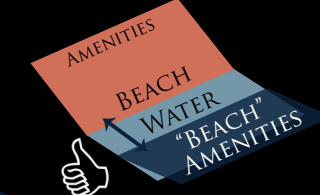
SUCCESSFUL BEACHES



ISSUE WITH BOULDER BEACH



SOLUTION TO BOULDER BEACH LOW WATER



SOLUTION TO BOULDER BEACH HIGH WATER

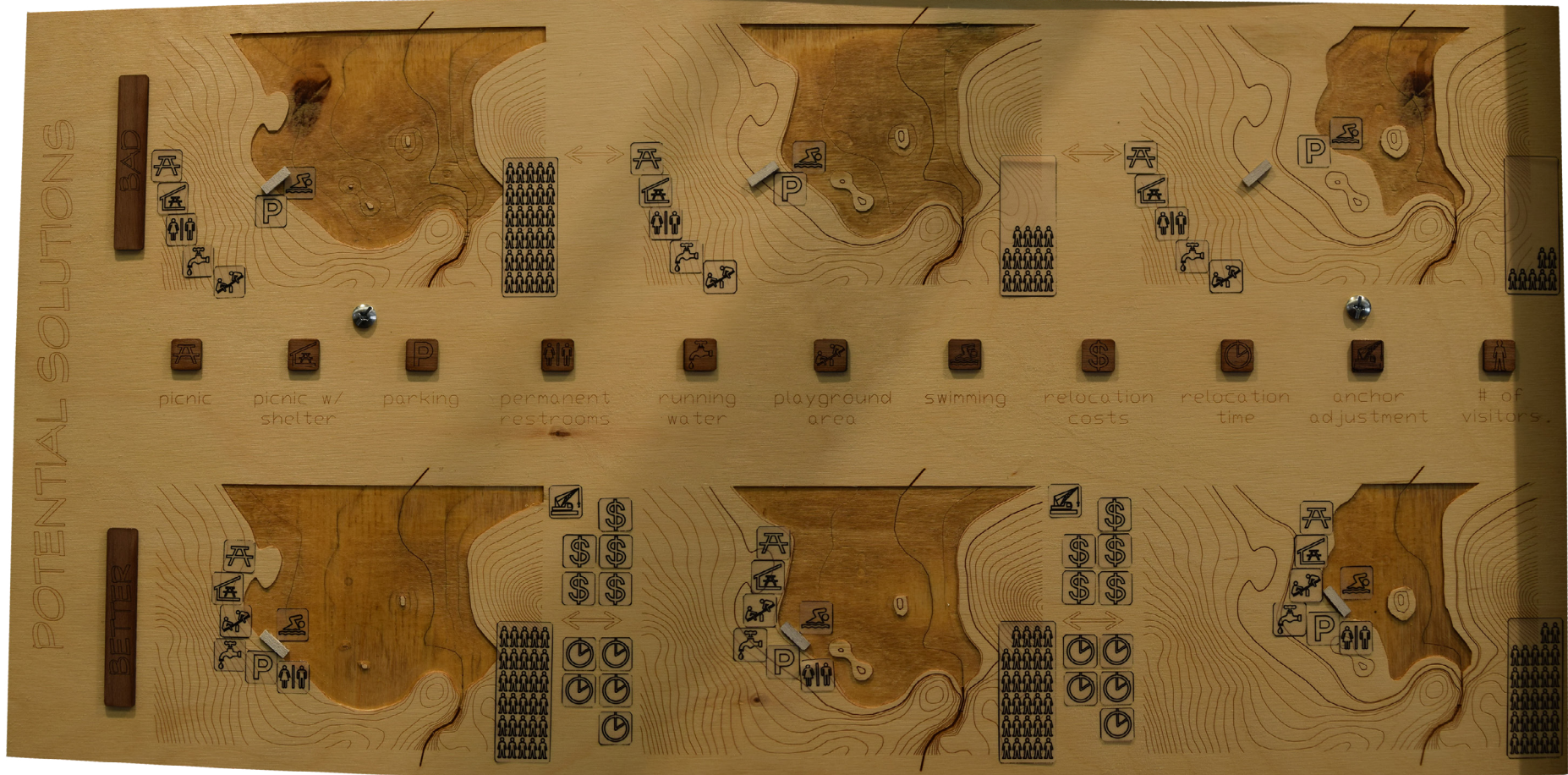


EXISTING

LAND BASED INFRASTRUCTURE

WORST

Facilities cannot move with the lowering water levels. Less people want to visit.



SOLUTION A

PIER OR TIDAL POST DOCKS

BAD

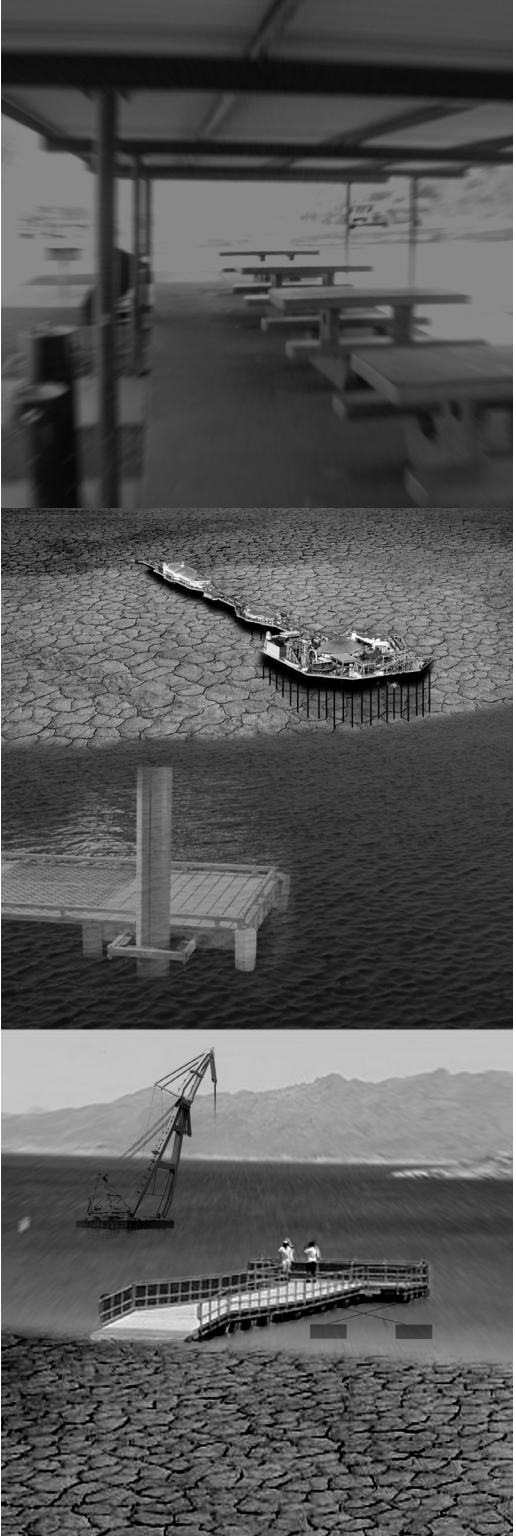
Facilities can only adapt to small water level fluctuations of 0' - 10'.

SOLUTION B

CABLE SPREAD ANCHORS

BETTER

Concrete or helix anchors require constant repositioning by a floating crane, which costs a lot and takes too much time.

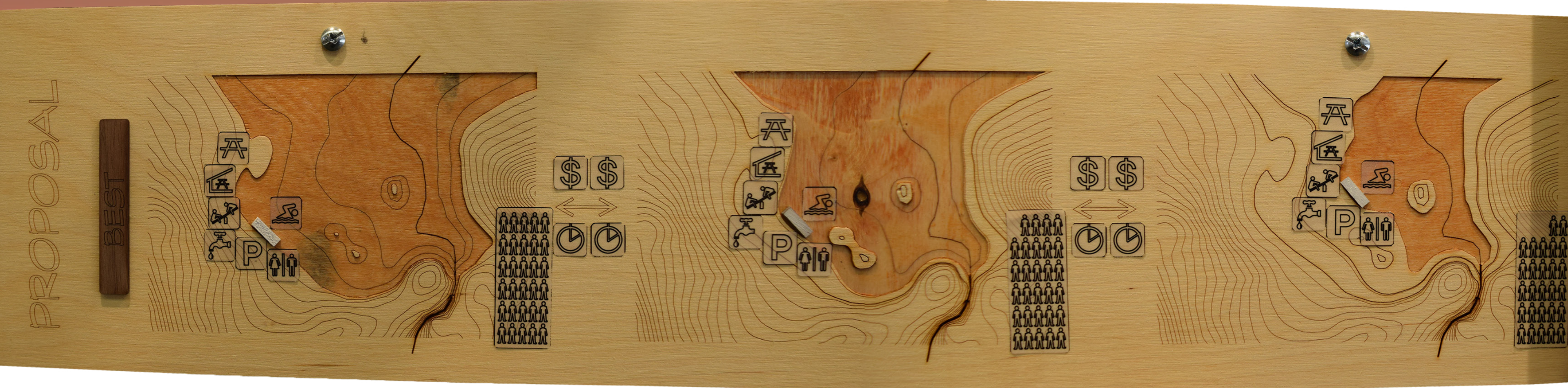
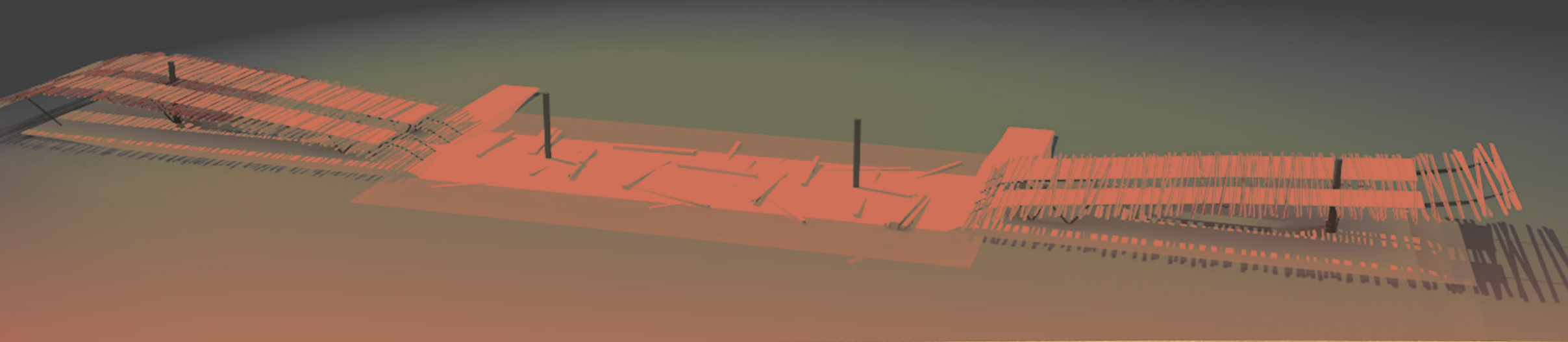


PROPOSAL

AUTOMATED, SELF ANCHORING

BEST

The floating facility always maintains a constant relationship to the shoreline.





| FORM VARIATION |

The three-piece system has five major formations, with infinite positions in between. The sliding technology allows for adaptation to natural topographic conditions.



CIRCULATION

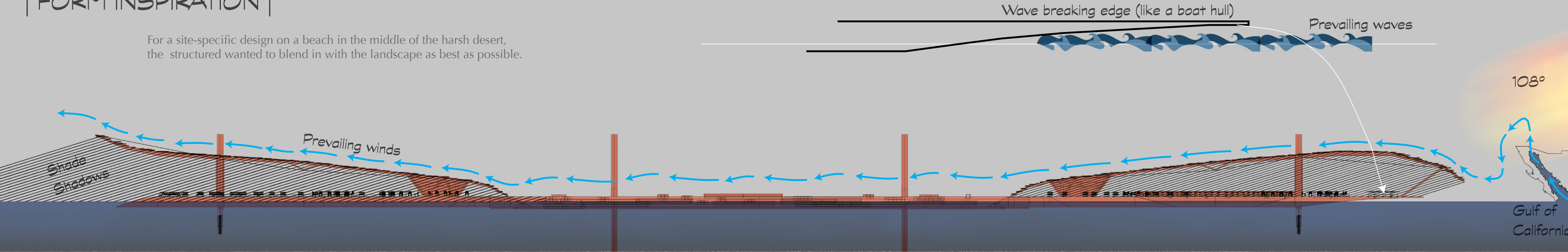


Configuration will never look the same from above. The three piece movement can constantly adapt to curving shorelines. As long as at least one dock has its beach access walks extended to the shore, the docks can be positioned however managers please.

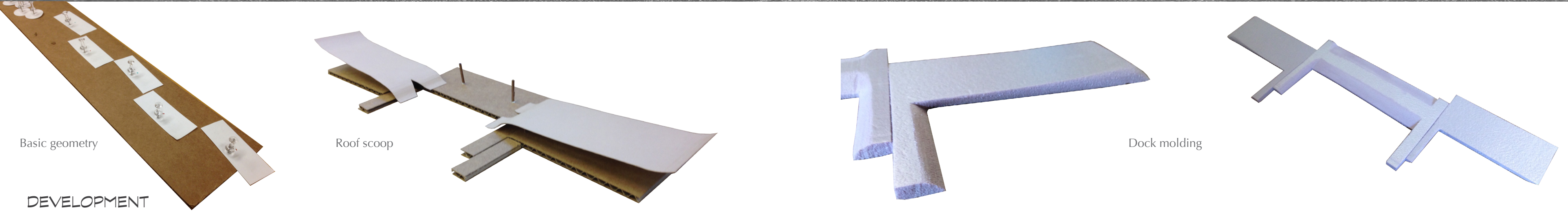
For example, the dock in the foreground is positioned at an extended distance from the shore for recreational variance.

FORM INSPIRATION |

For a site-specific design on a beach in the middle of the harsh desert, the structured wanted to blend in with the landscape as best as possible.

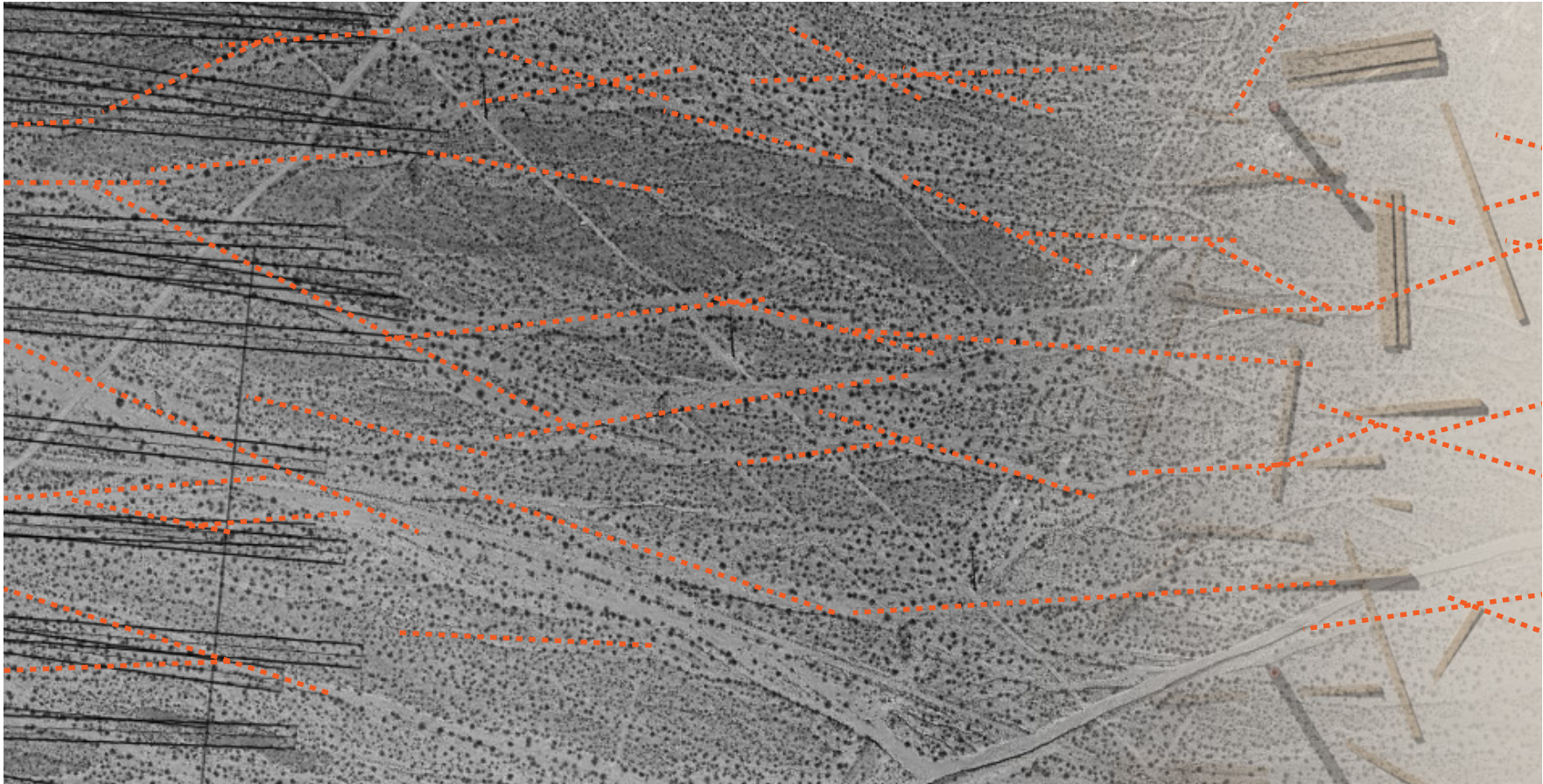


CLIMATE RESPONSE



DEVELOPMENT

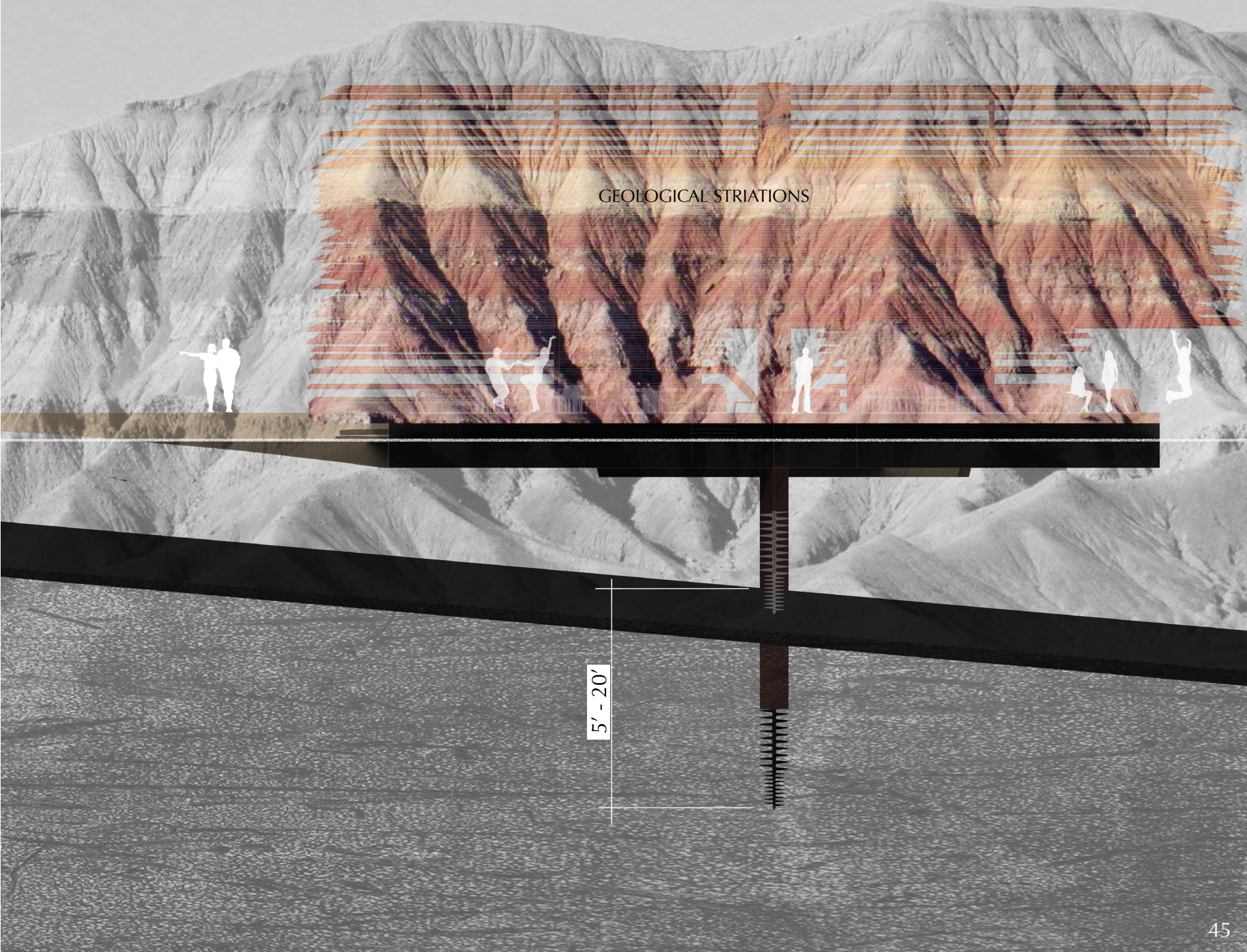
ALLUVIAL WASHES



The staggered benches and roof slats come from the natural lines created by nearby alluvial washes.

Colors of the roof represent layers in nearby geological striations.

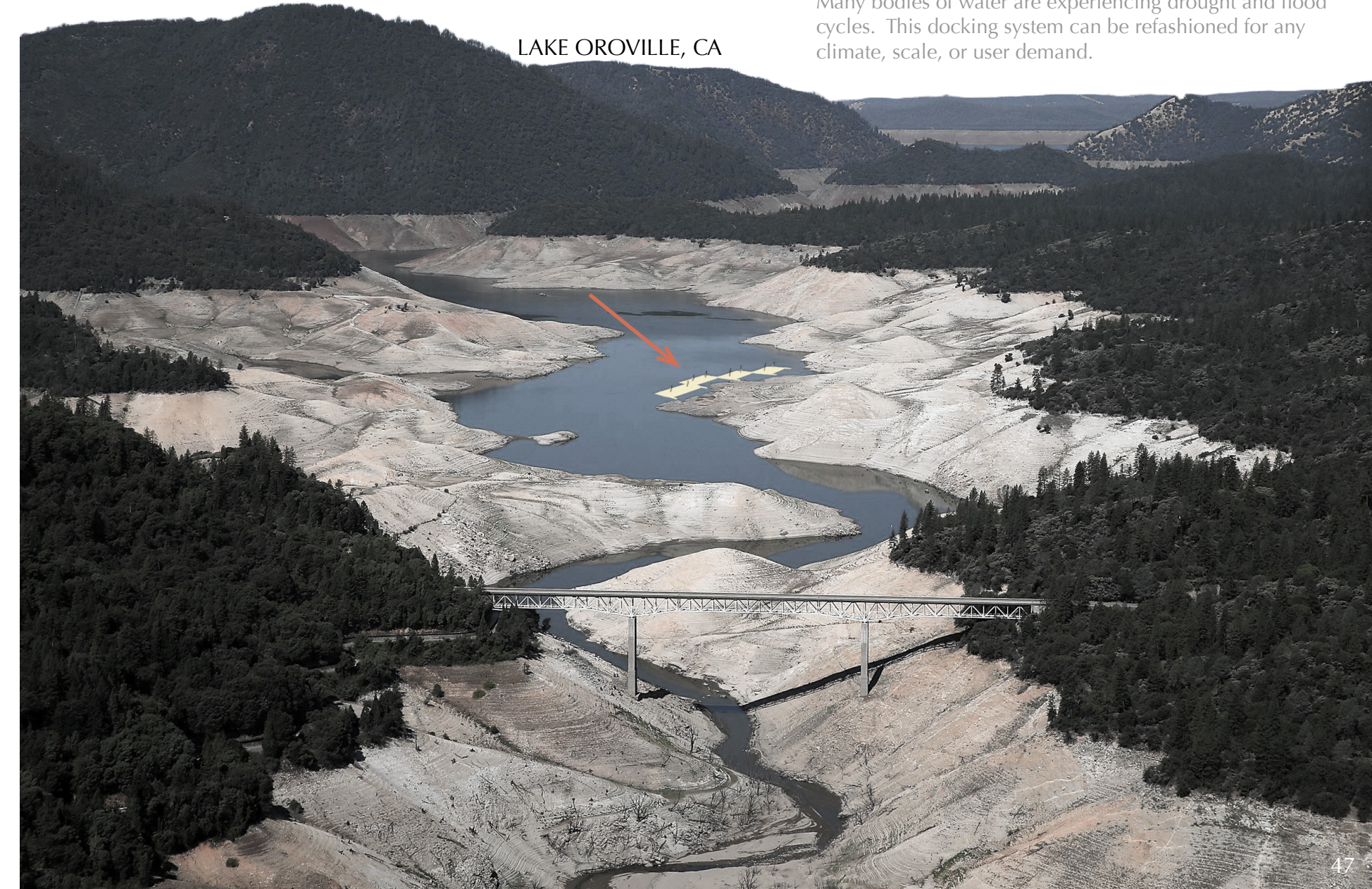
| FORM INSPIRATION |





| SITE ALTERNATIVES |

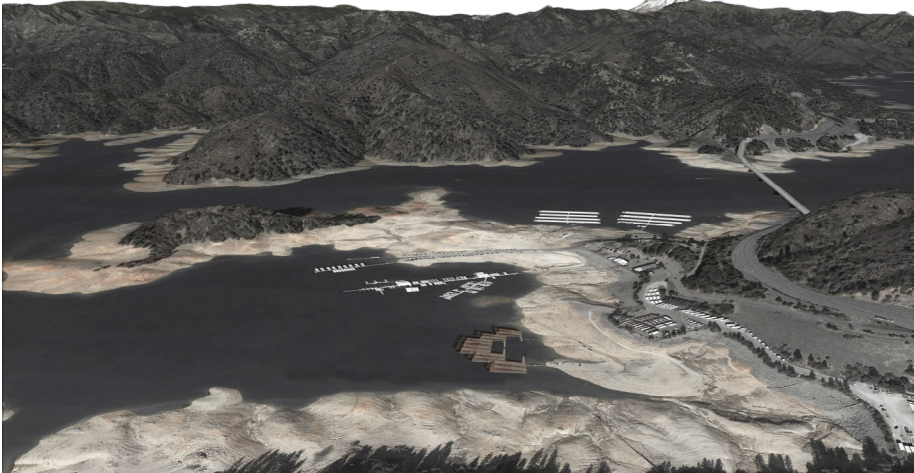
Many bodies of water are experiencing drought and flood cycles. This docking system can be refashioned for any climate, scale, or user demand.



SALTON SEA, CA



SHASTA LAKE, CA



LAKE NACIMIENTO, CA



LAKE POWELL, UT



FOLSOM LAKE, CA

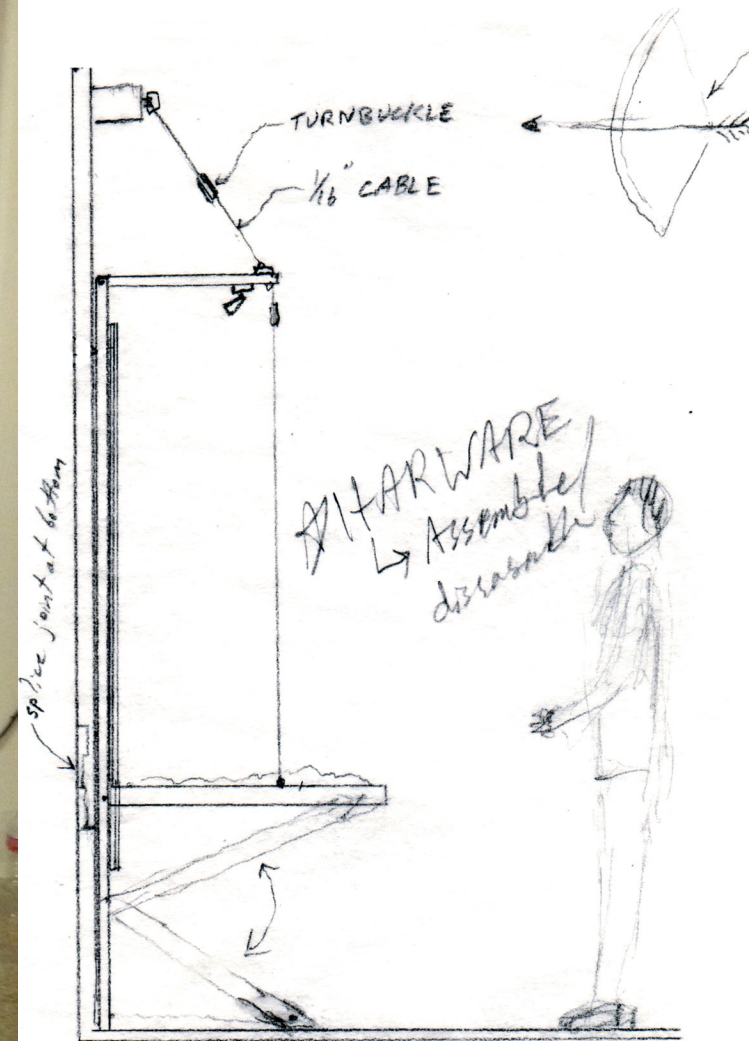


| DISPLAY PRESENTATION |

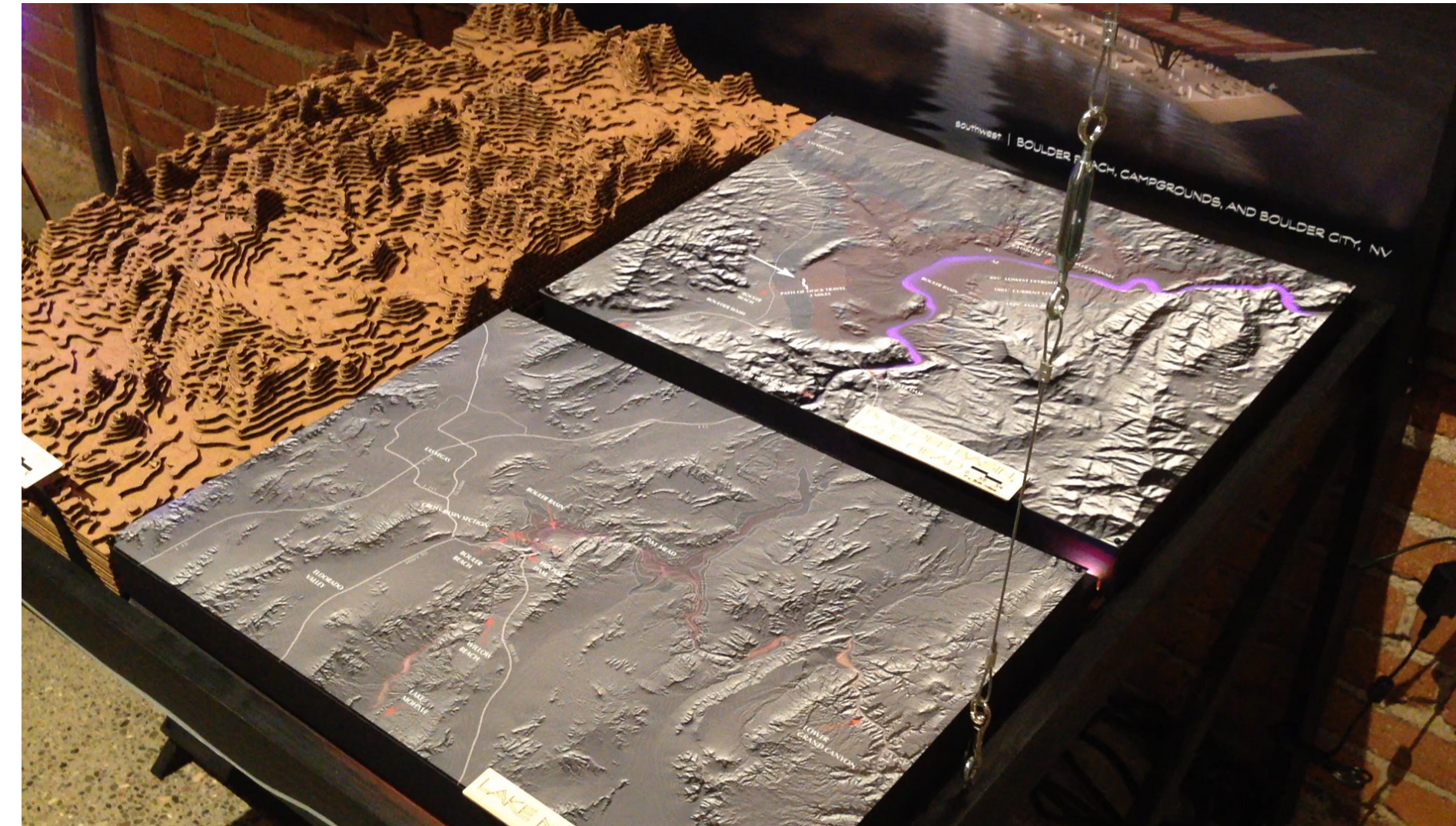
The goal was to intrigue a viewer and make them want to learn about the project. Using several different types of media made for a successful presentation.



EARLY DESIGN SKETCH



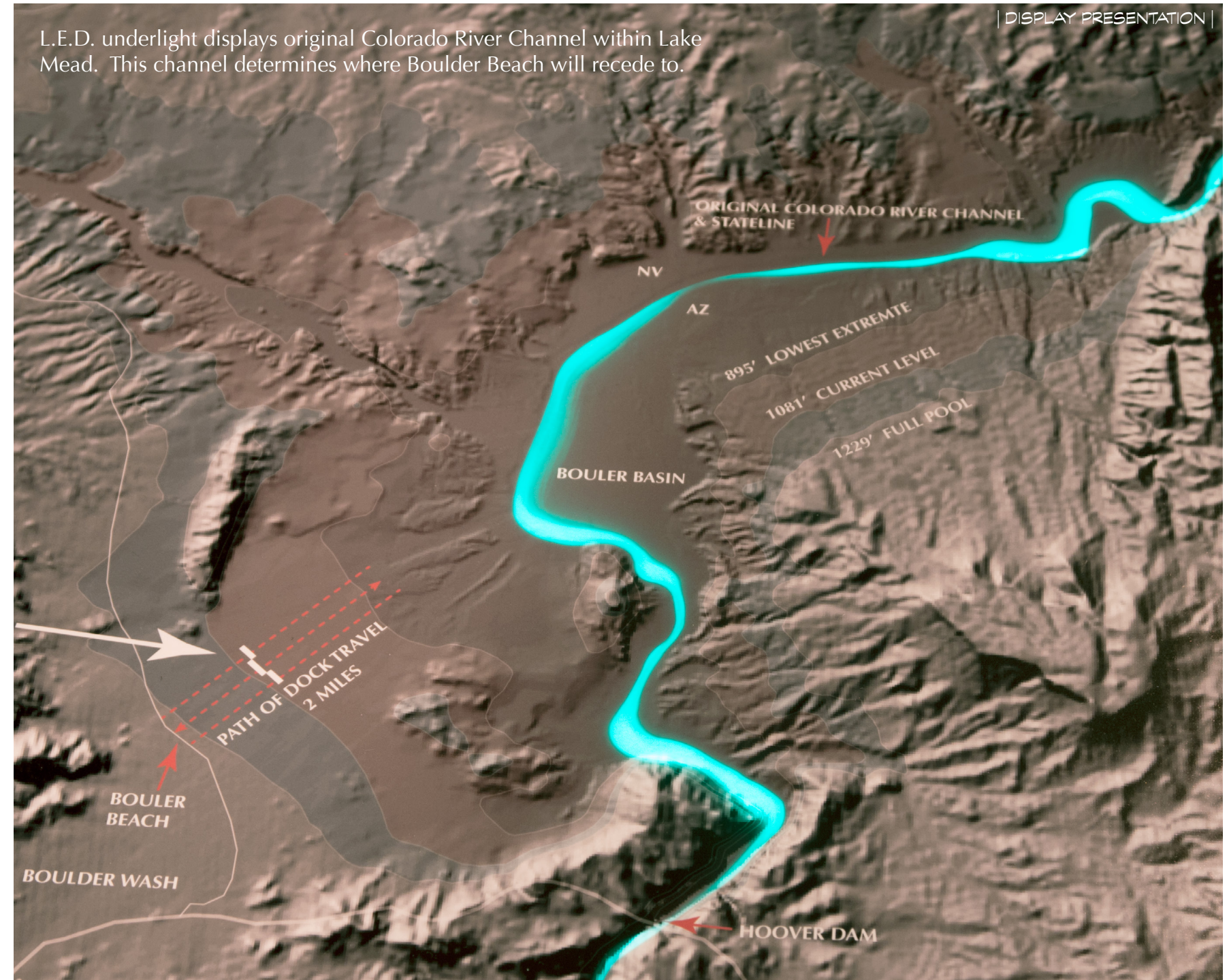
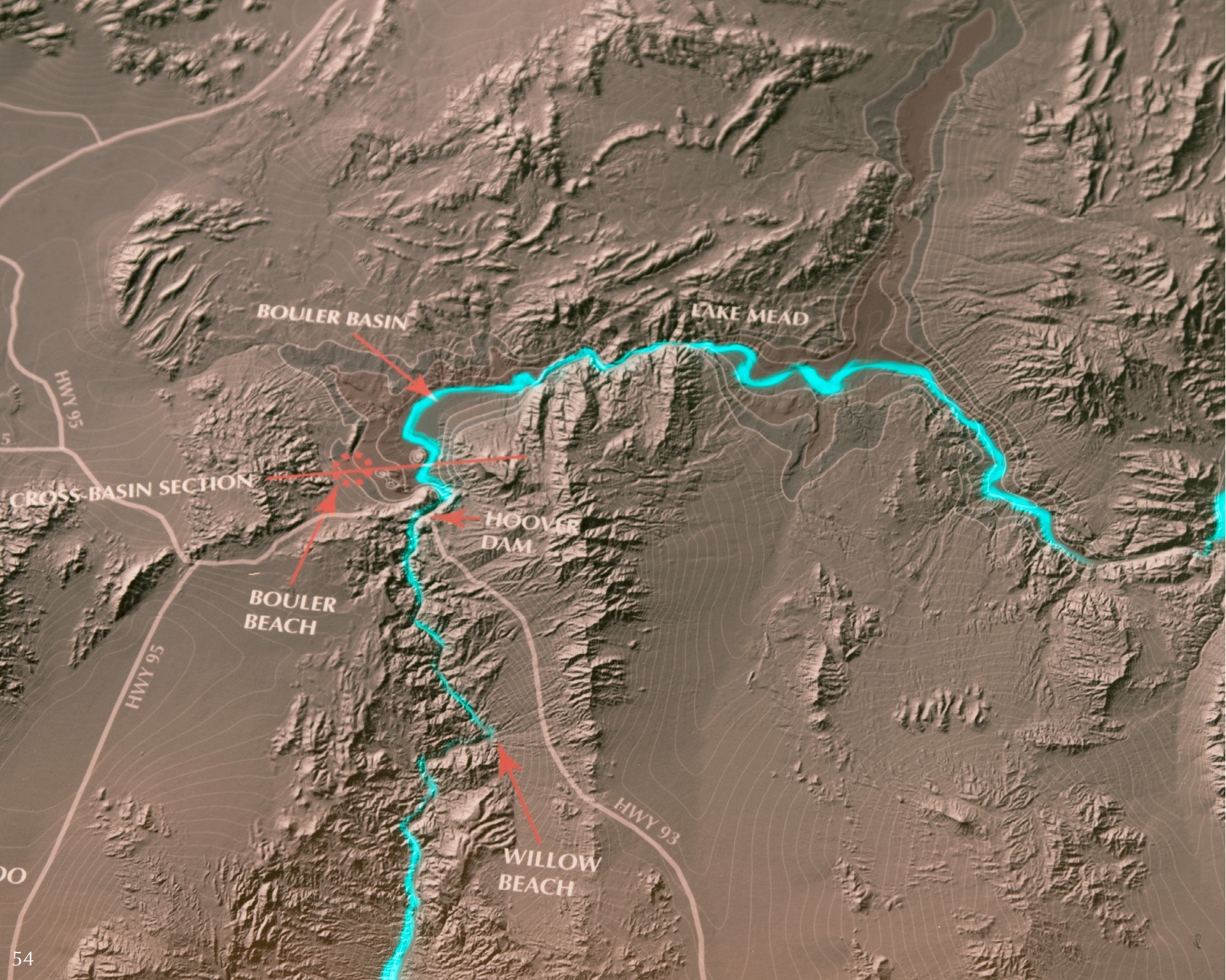
DISPLAY WALK-THROUGH VIDEO

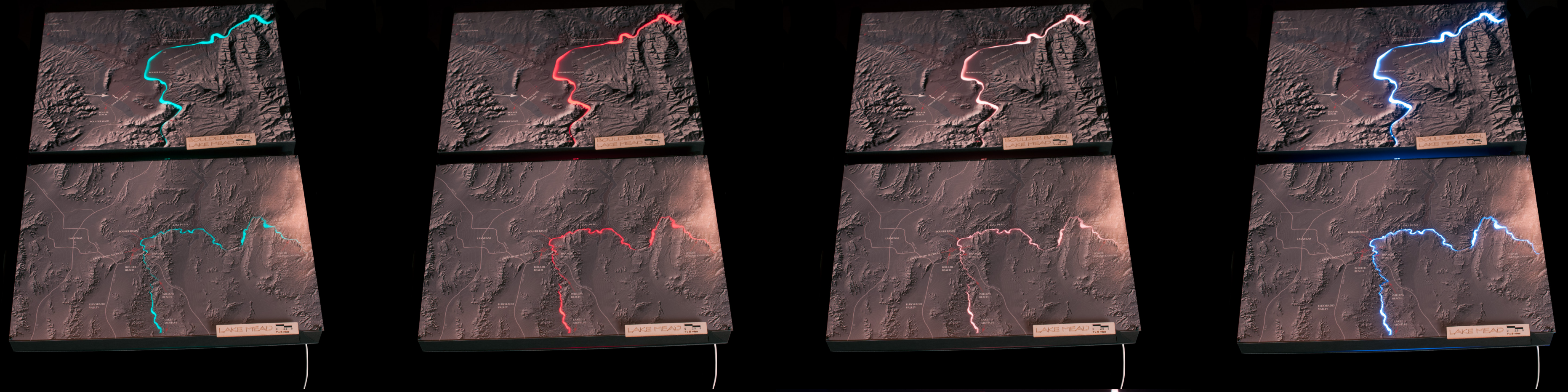


MODEL

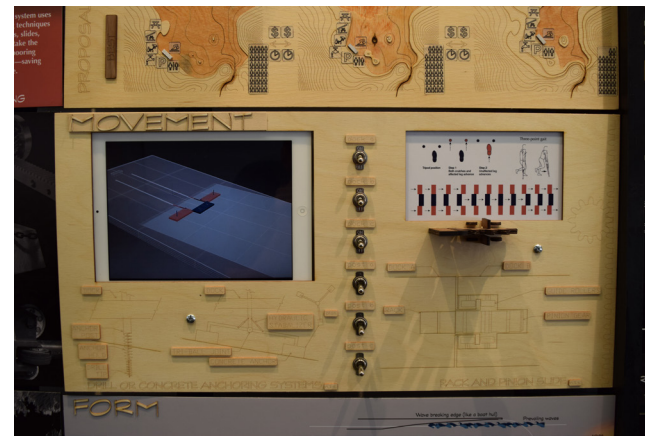
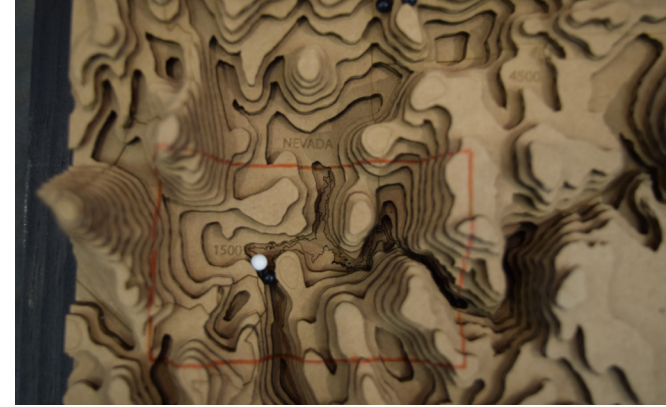
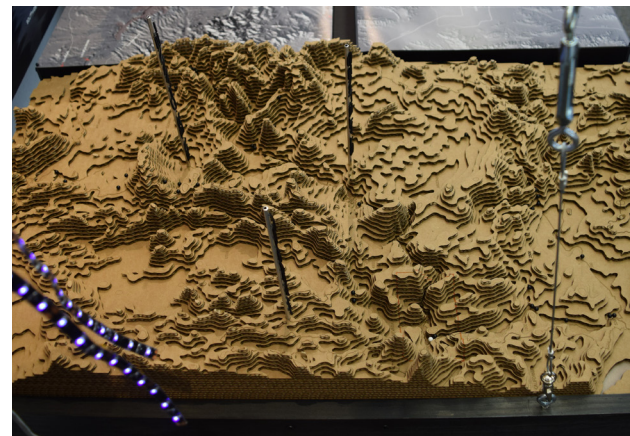
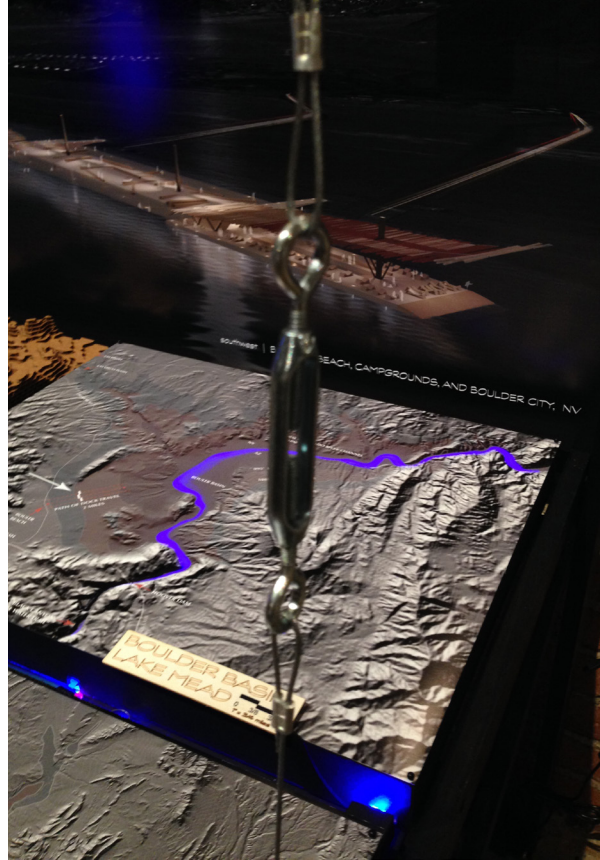
1/8" corrugated cardboard model. Laser cut. Hand glued. U.V. pens under L.E.D. blacklight. 60-second exposure.







RGB L.E.D. light boxes.



| DISPLAY PRESENTATION |

laser cut, score, etch modeling and detail graphics

custom labeling

spray paint

wire rope and swaging techniques

woodworking

plunge router inlay

iPad animation

plywood infographics with transparency paper

walnut, basswood, plexi, taskboard, cardboard, crescent board materials

L.E.D. lighting

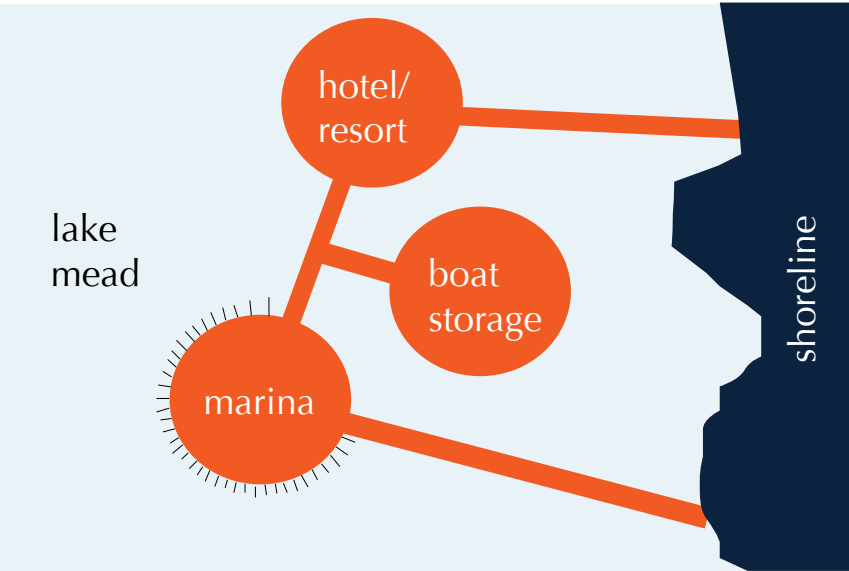
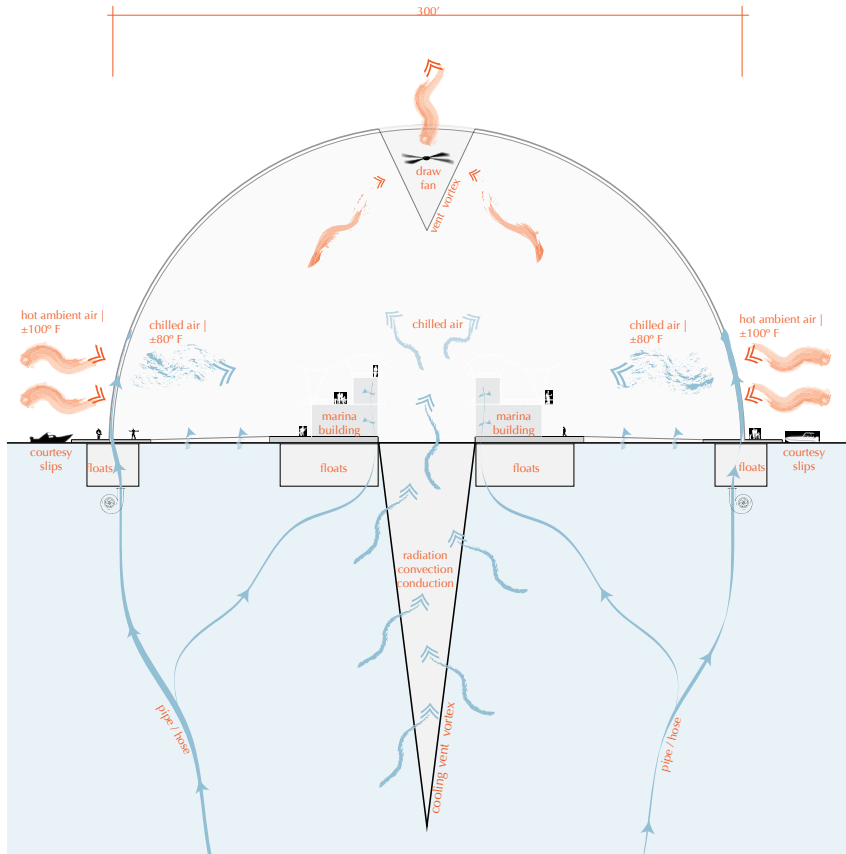
U.V. pens and with black light

3D sections and perspectives

INITIAL CONCEPTS

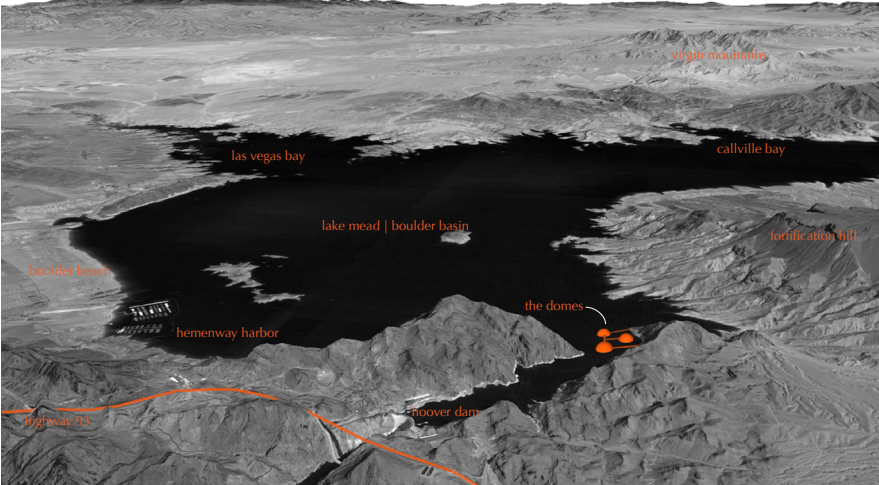
- # 1 COLD TAP
- Deep lake-water cooling climate controlled floating environment.
- Cons:
- Unnecessary volume of climate control

- Difficult access connection



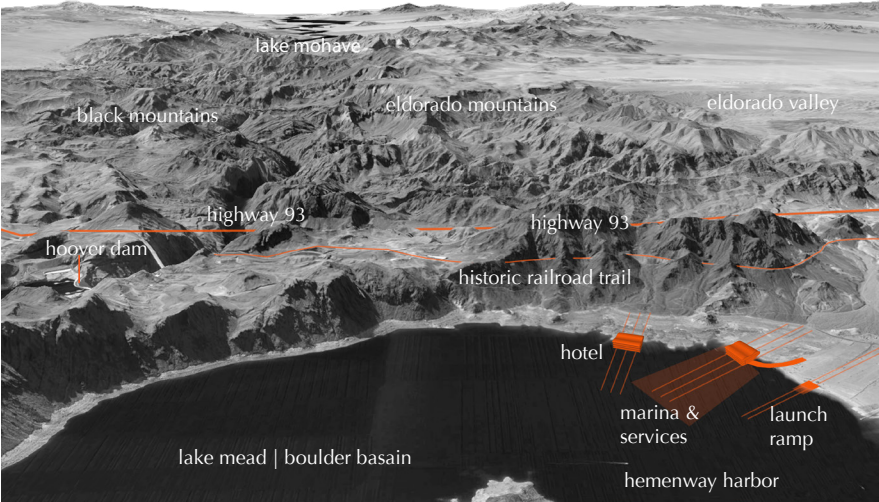
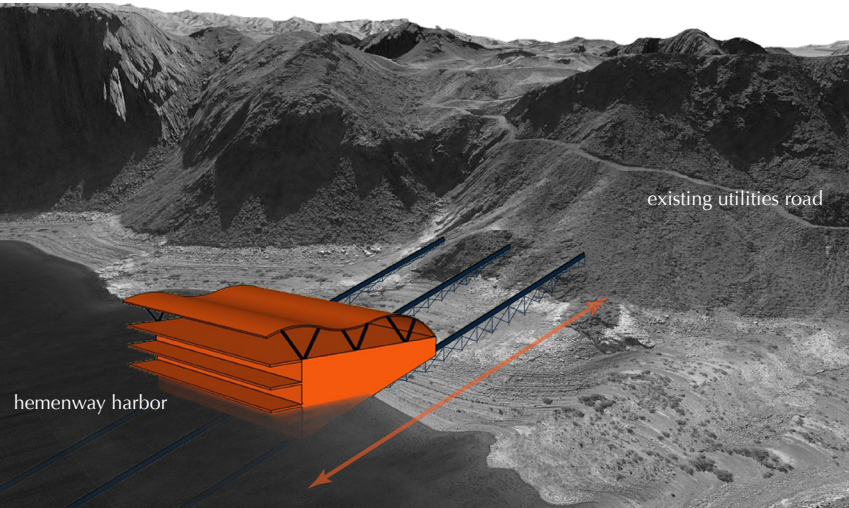
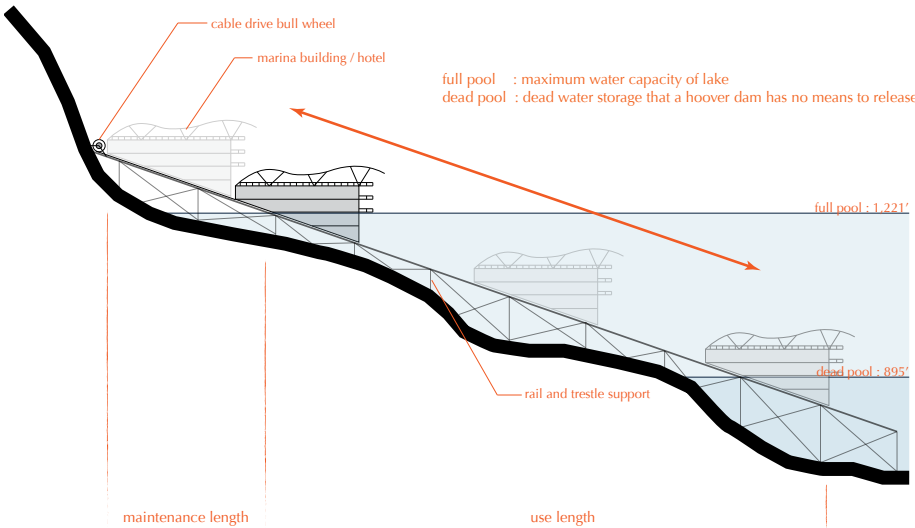
DESIGN ITERATIONS

The design process began with concepts on marina design, boat launch ramp resiliency, deep-lake-water-cooling; and then moved to an all-inclusive floating day-use and camp resort. The final design was a simplified version of all ideas that narrowed focus to recreation activities on Boulder Beach.



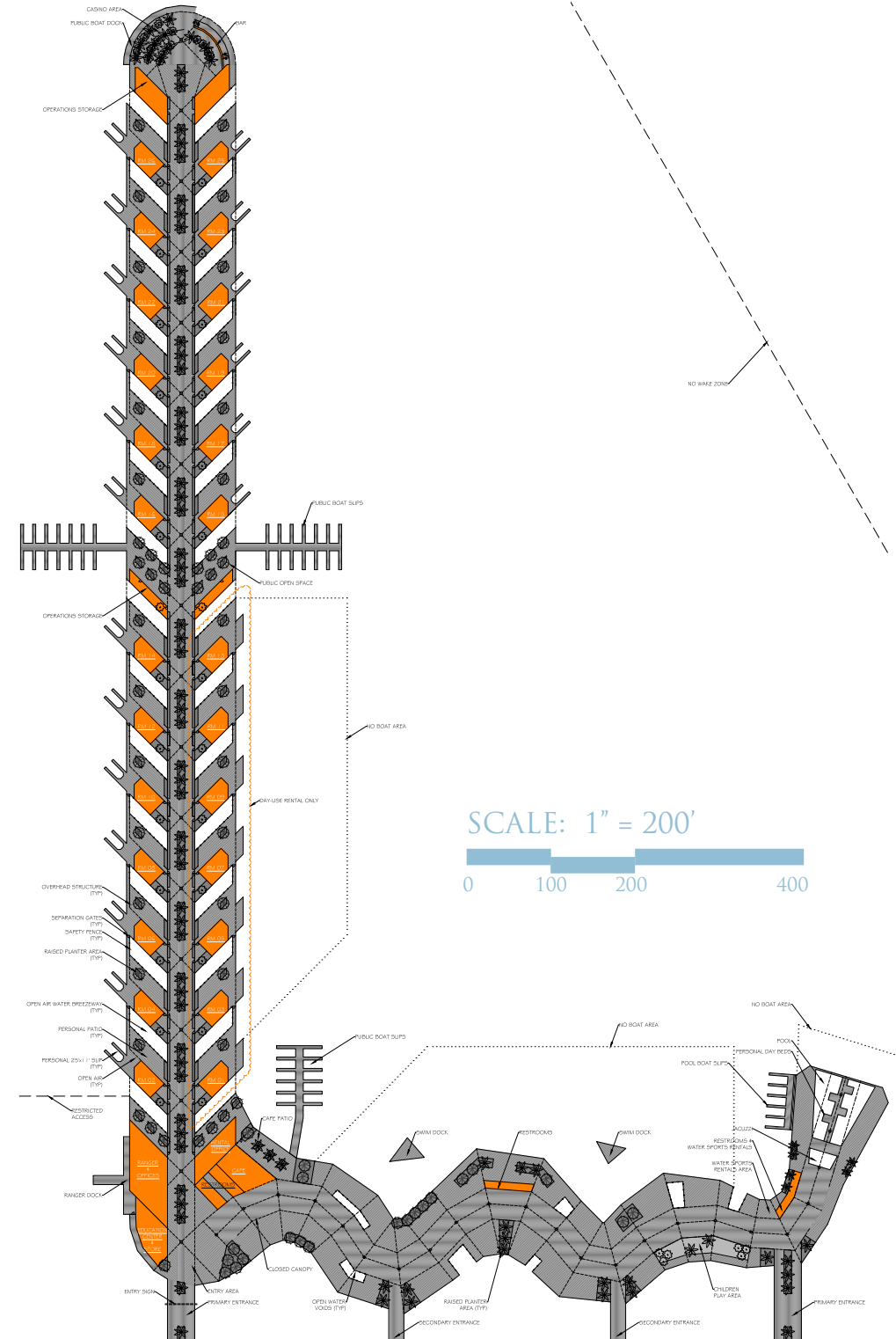
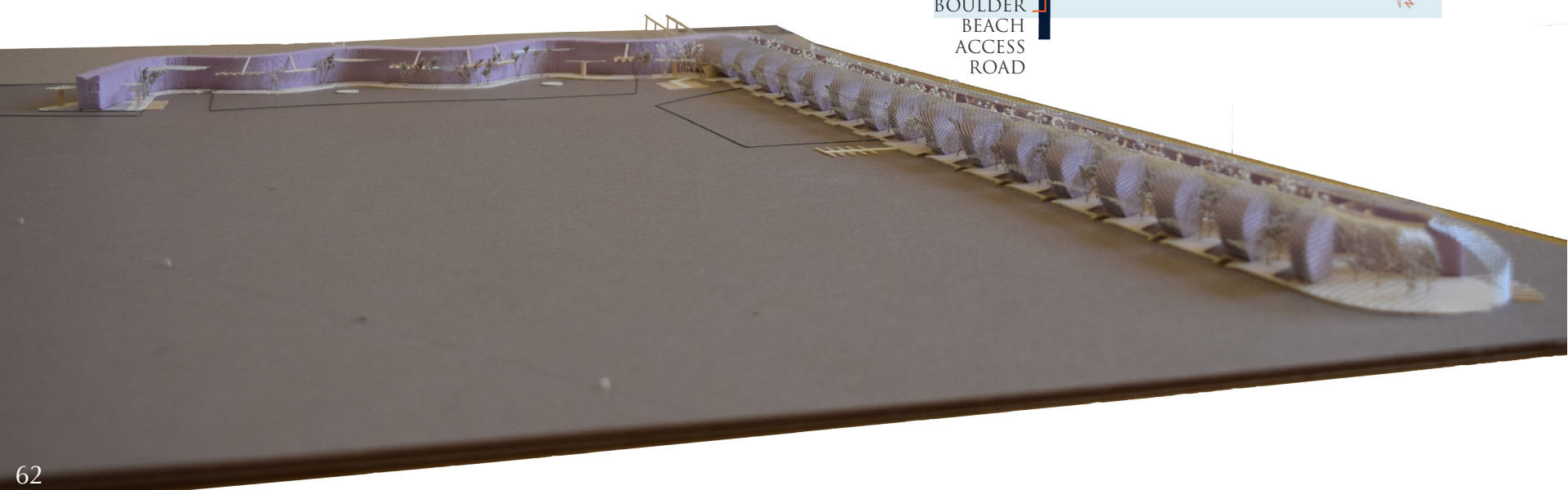
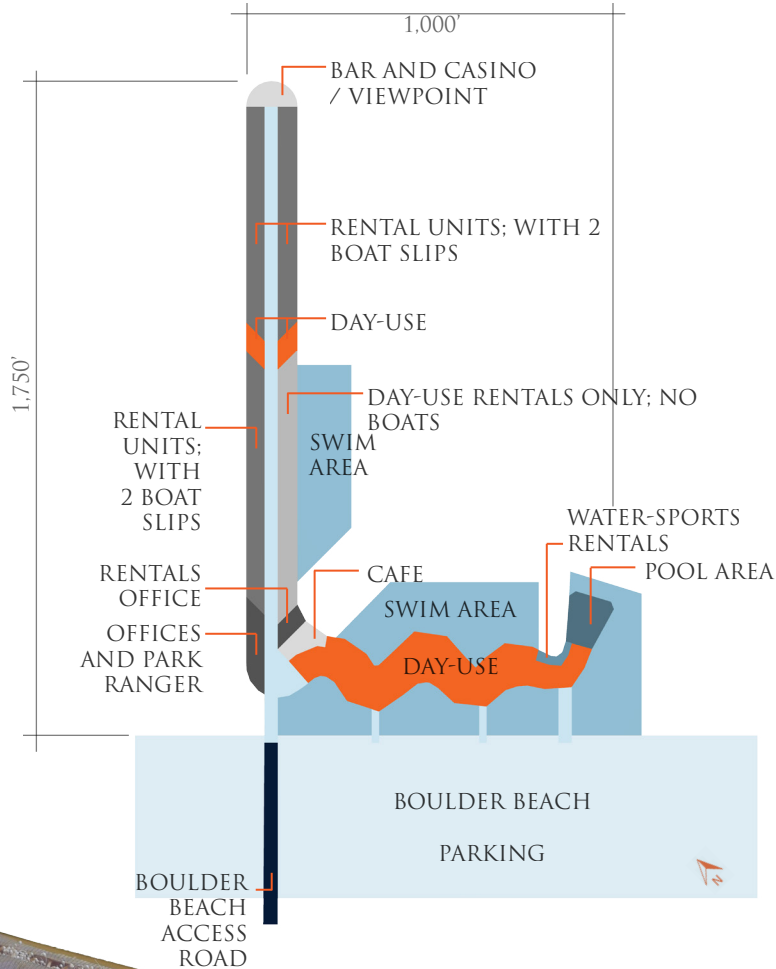
- # 2 INCLINE RAIL
- Mechanical movement on incline rail.
- Cons:
- Visibly intrusive infrastructure

- Permanently fixed



3 CAMPING RESORT
Floating campgrounds and day use area

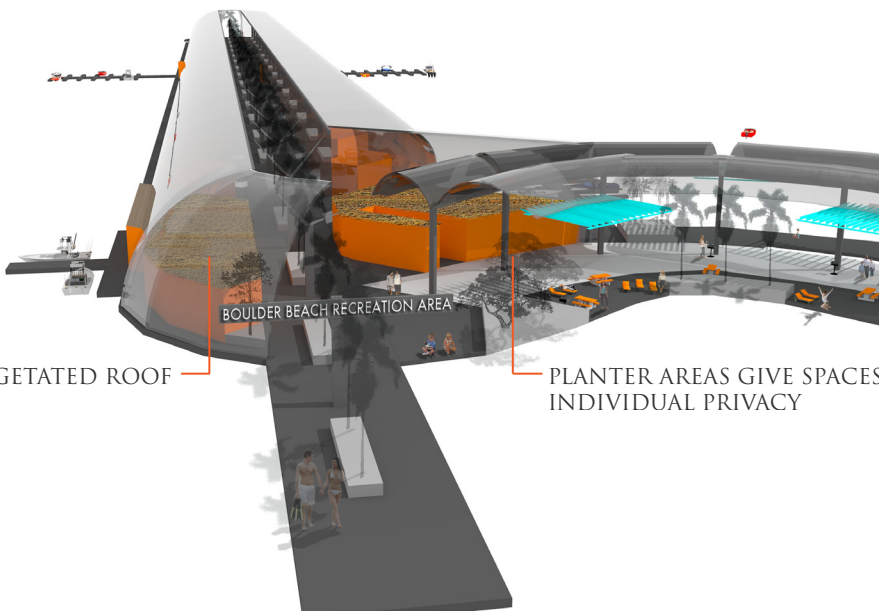
- Cons:
- Massive infrastructure
 - Weak form
 - Unanswered environmental questions regarding vegetation in planter areas



SCALE: 1" = 200'

0 100 200 400

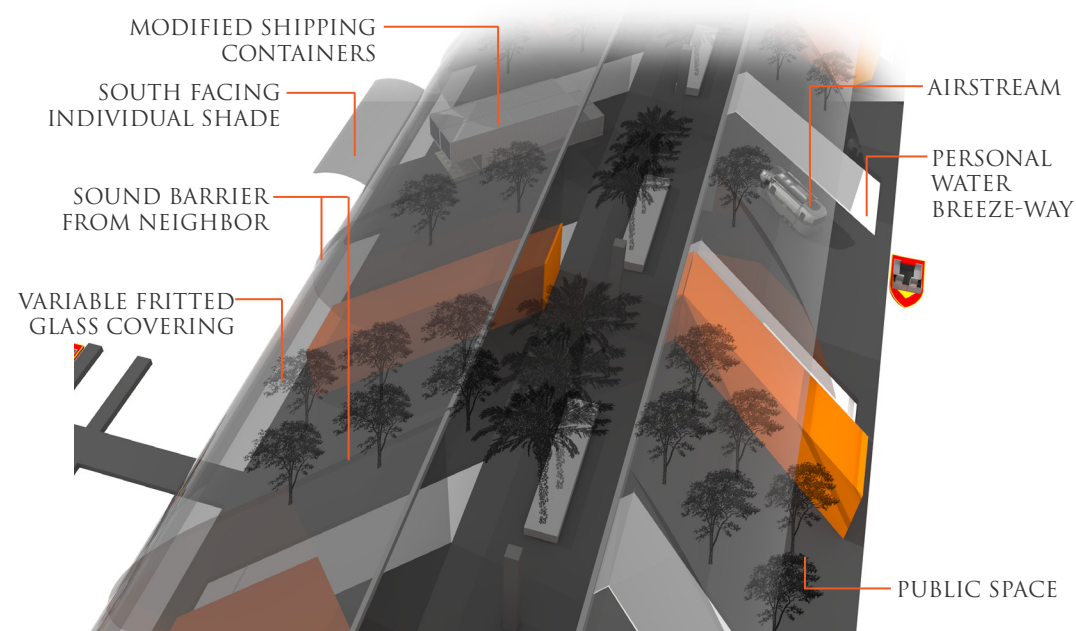
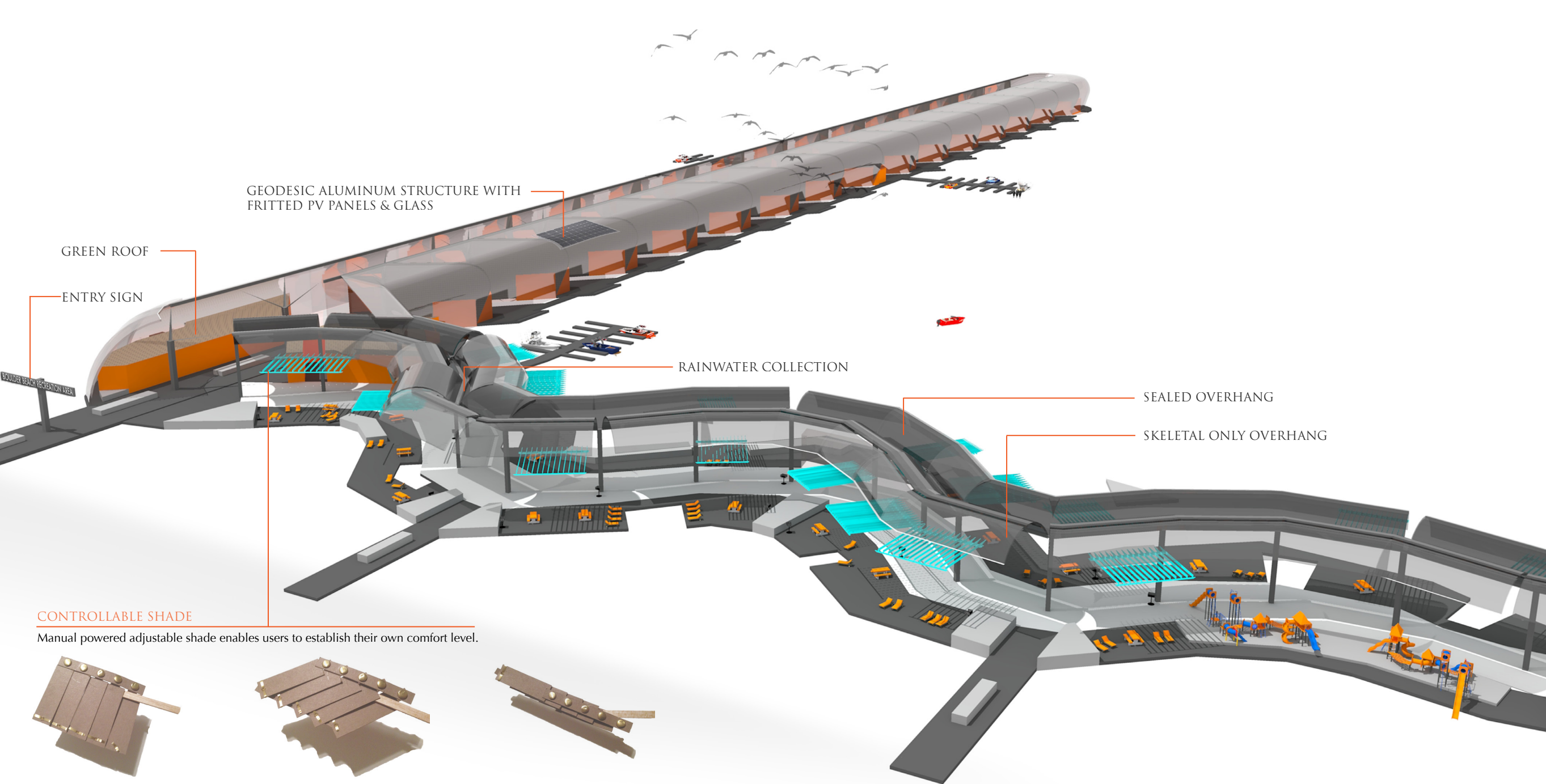
The floating park will often be viewed from higher elevations upon arrival; therefore, a vegetated roof and a directed view upon entrance provides an intriguing invitation.



LOUVERED SUN SHADES

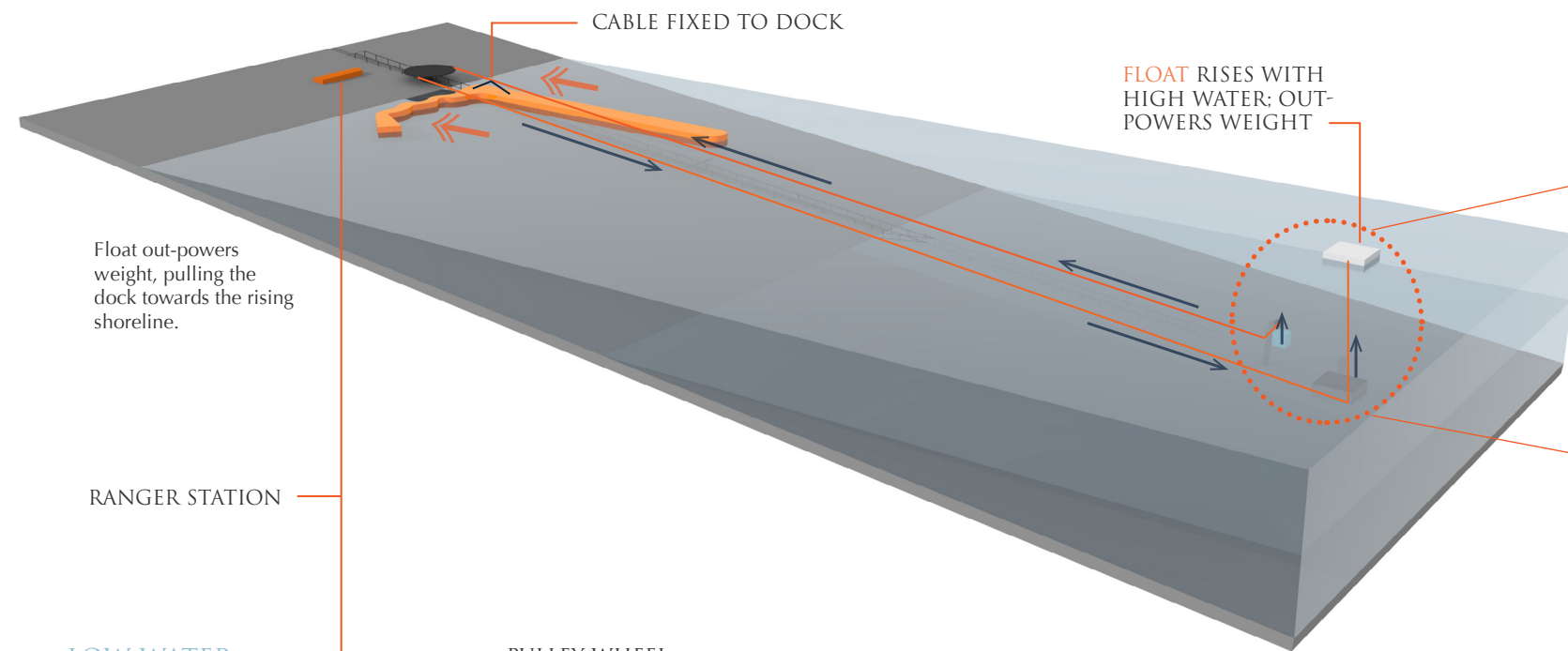
SHADE, FRITTED PV PANELS, AND RAINWATER COLLECTION



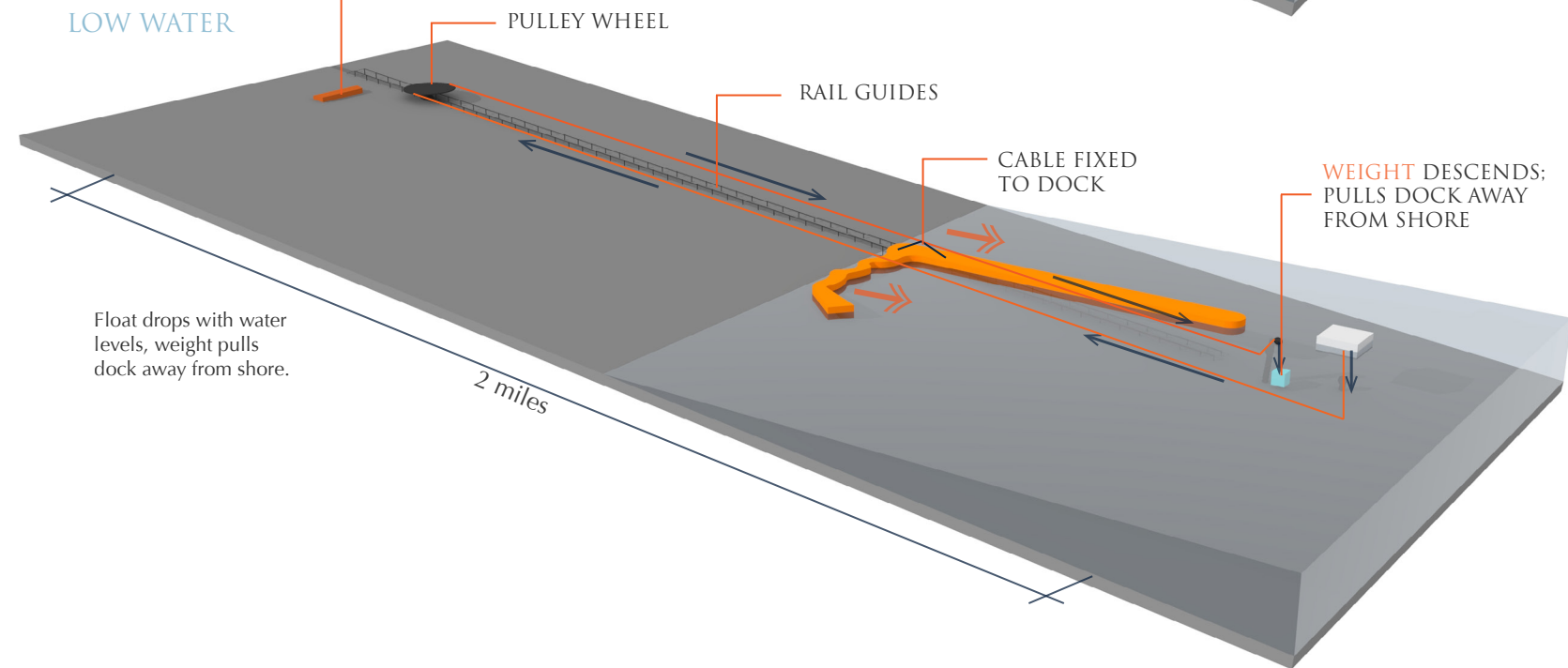


"Campsites" or "rooms" can be rented for overnight just like at a conventional campground, or they can be rented for day use only. Each site contains around 1,800 SF of usable space within a semi-enclosed geodesic structure, which is large enough to make you feel like you are outside. Each room might contain a different theme, with semi-permanent housing, such as converted shipping containers, or a unique Airstream camper trailer.

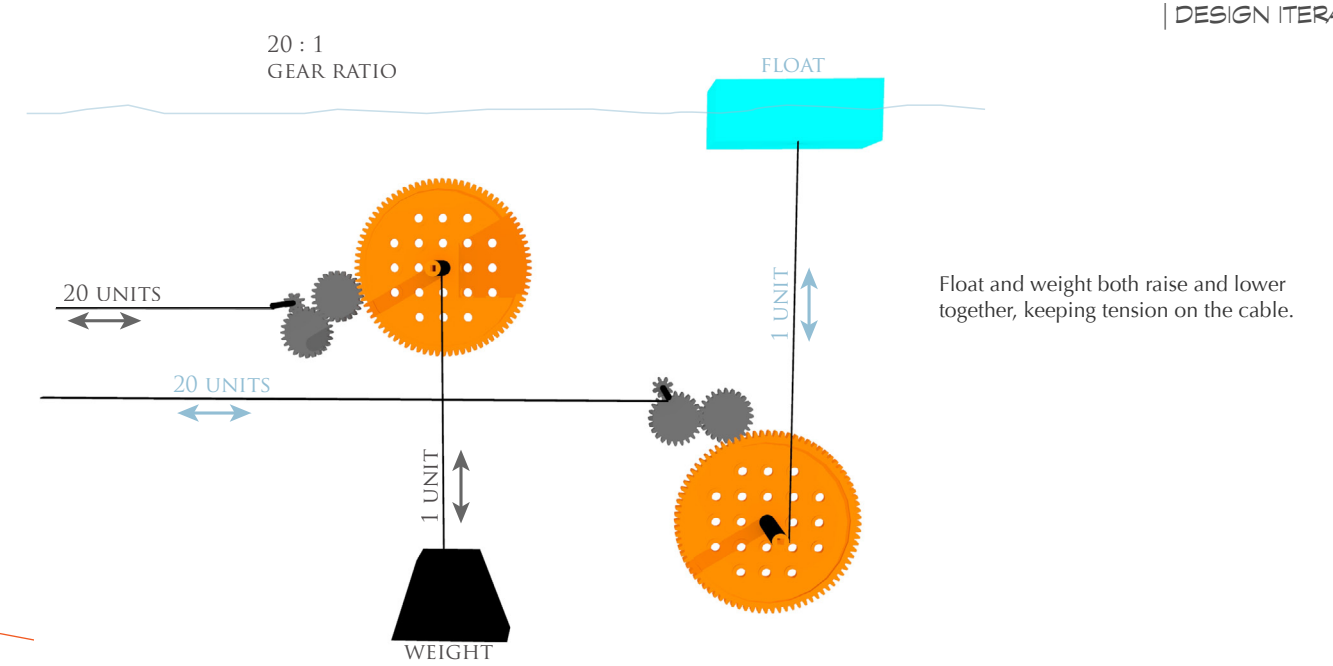
HIGH WATER



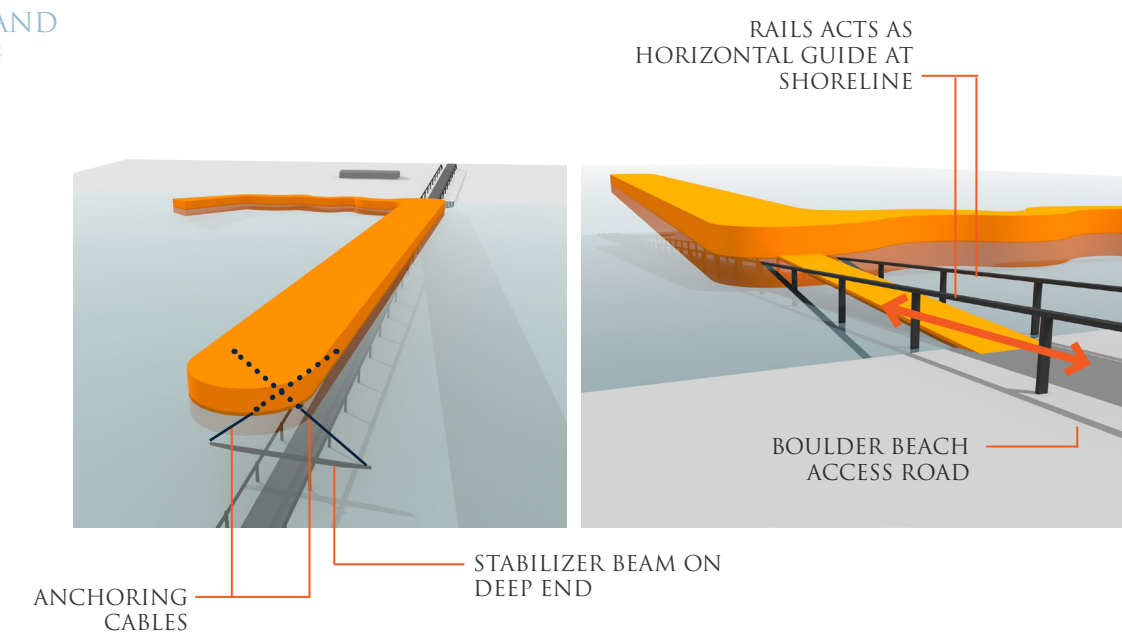
LOW WATER



BOULBER BEACH HAS 5% SLOPE

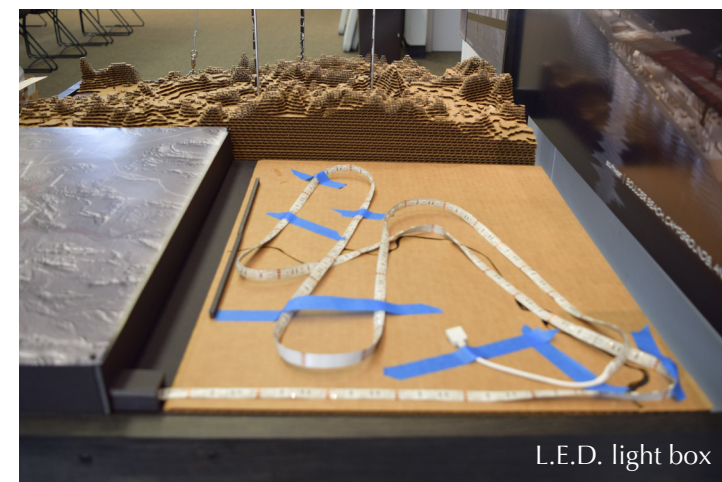


RAIL GUIDE AND TENSIONING





SET-UP TIME LAPSE VIDEO



L.E.D. light box



stencil profile

CONSTRUCTION PROCESS

Design-build of the entire display was an integral part of displaying my interests in construction techniques, ranging from wood joinery and stencil painting to detailed physical modeling and electrical lighting.



display lap joint dovetail saw



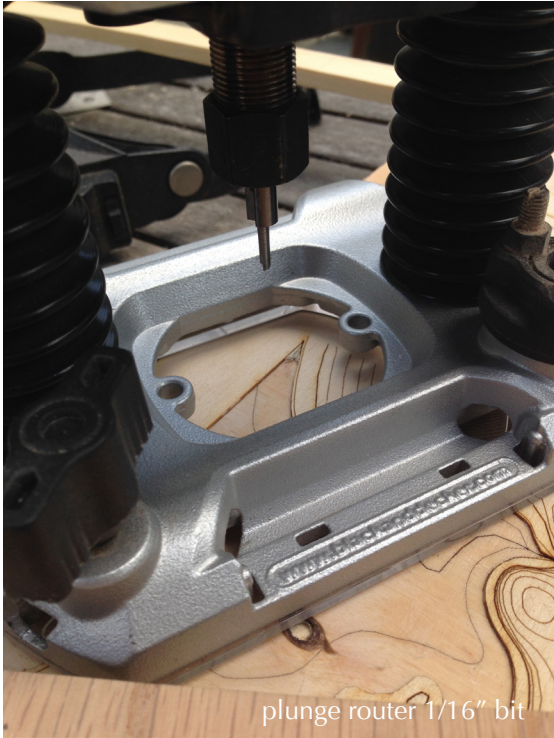
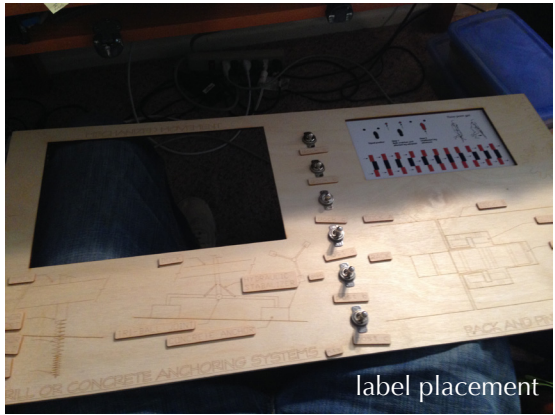
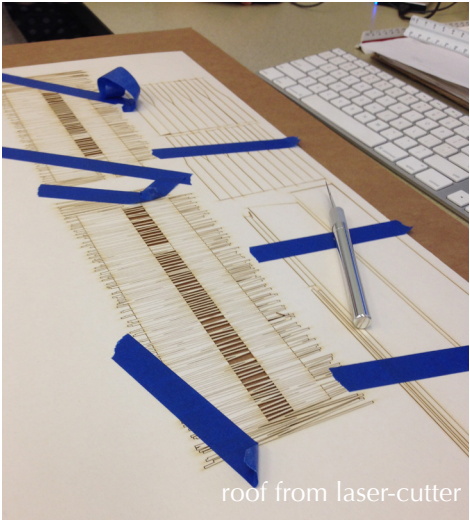
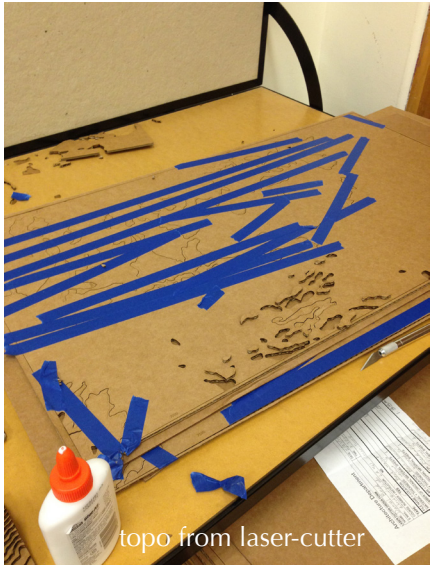
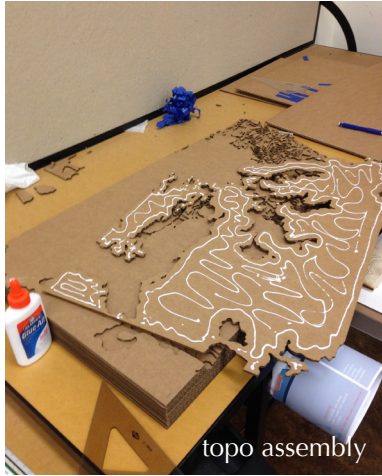
display lap joint relief cuts



light box construction



display lap joint



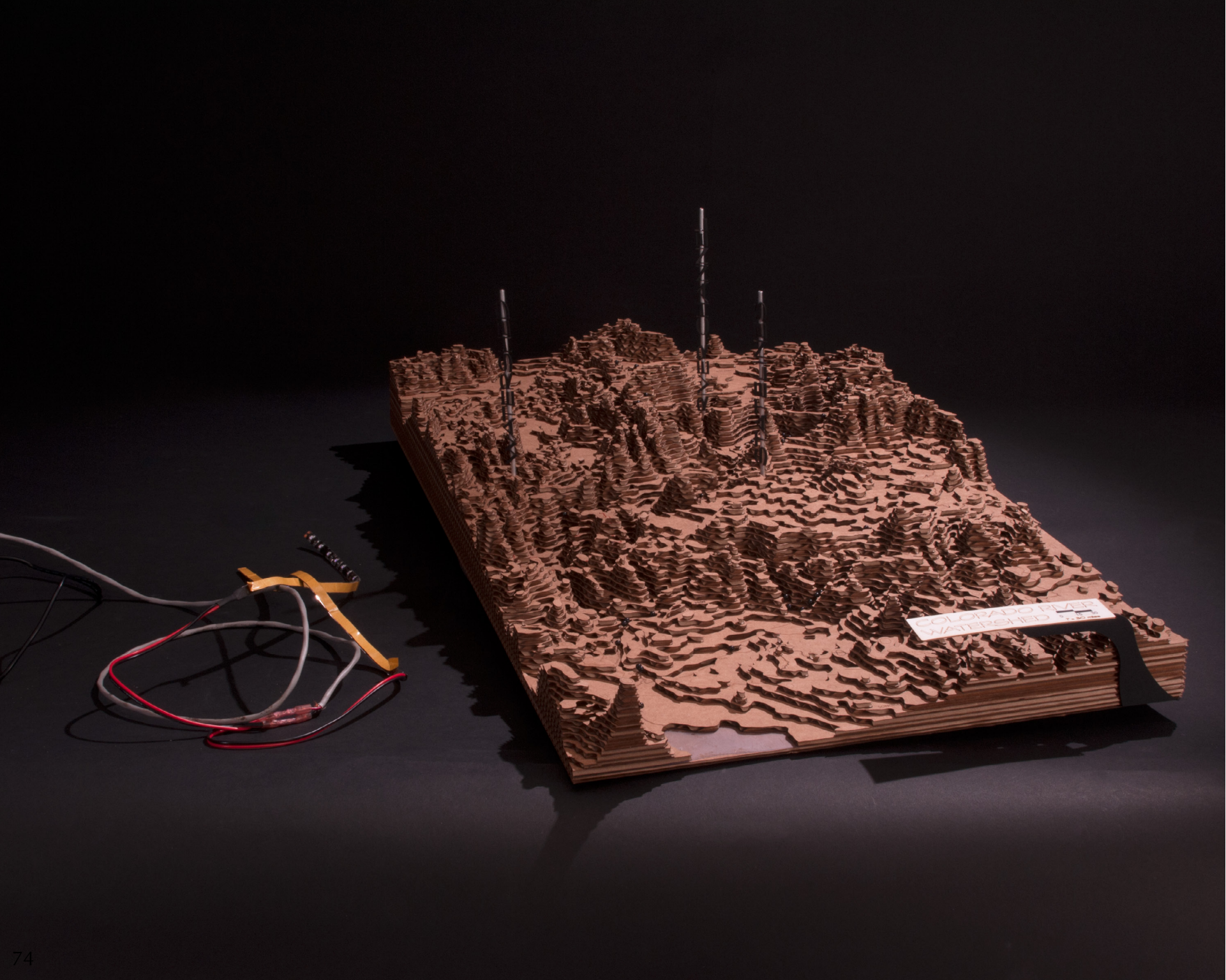


IMAGE REFERENCES

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