BOULDER BEACH

project site:

Hoover Dam and Bypass Bridge

Las Vegas

Lake Mead
Visitors want quick access to water

The most heavily used beach on Lake Mead

BOULDER BEACH

110º air
80º water

Visitors want quick access to water
Mechanized mooring for unpredictable shoreline fluctuations on inland lakes and reservoirs. A recreational demonstration on Boulder Beach, Lake Mead.
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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
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.

**WATER LEVEL ELEVATIONS:**
- High water: 1229’
- Current water: 1081’
- Lowest water: 893’

PROPOSAL SITE

LAKE MEAD
Historically, Boulder Beach is a gathering space for events and recreation.
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.
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.
SNACK BAR
STORAGE ROOM
CABLE TENSION
SWIM STEP
LAND SWIM INTERACTION BEACH ACCESS
INTERACTION BEACH ACCESS DAY USE PICNIC
SOLID SHADE FILTERED SHADE
LAKE INTERACTION
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.
PROPOSAL

SNACK BAR

STORAGE ROOM

RESTROOMS

DRINK BAR

PICNIC AND LOUNGE AREA

BEACH ACCESS

UNDERWATER BEACH

BEACH AREA

SNACK BAR

PICNIC AND LOUNGE AREA

BEACH ACCESS

UNDERWATER BEACH

BEACH AREA

SNACK BAR

PICNIC AND LOUNGE AREA
Plywood bases are hand cut with jigsaw. 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.
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.
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.
EXISTING

LAND BASED INFRASTRUCTURE

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

SOLUTION A

PIER OR TIDAL POST DOCKS

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

SOLUTION B

CABLE SPREAD ANCHORS

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

AUTOMATED, SELF ANCHORING.

The floating facility always maintains a constant relationship to the shoreline.
The three-piece system has five major formations, with infinite positions in between. The sliding technology allows for adaptation to natural topographic conditions.
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.
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.
The staggered benches and roof slats come from the natural lines created by nearby alluvial washes.
Many bodies of water are experiencing drought and flood cycles. This docking system can be refashioned for any climate, scale, or user demand.

A preliminary list of places that could benefit from a mechanized mooring system for recreation areas, marinas, or private establishments.
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.
MODEL


| DISPLAY PRESENTATION |
L.E.D. underlight displays original Colorado River Channel within Lake Mead. This channel determines where Boulder Beach will recede to.
RGB L.E.D. light boxes.
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

#2 INCLINE RAIL
Mechanical movement on incline rail.

Cons:
- Visibly intrusive infrastructure
- Permanently fixed

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.
# 3 CAMPING RESORT

Floating campgrounds and day use area

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

![Diagram of campgrounds and day use area with labels for bar and casino viewpoint, rental units, boat slips, offices, park ranger offices, boulder beach access road, day-use, day-use rentals only, no boats, swim area, water sports rentals, pool area, cafe, boulder beach parking, scale 1" = 200', and design iterations.]
The floating park will often be viewed from higher elevations upon arrival; therefore, a vegetated roof and a directed view upon entrance provide an intriguing invitation.

Shade, fritted PV panels, and rainwater collection

Louvered sun shades

Planter areas give spaces individual privacy

DESIGN ITERATIONS
"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.
Float out-powers weight, pulling the dock towards the rising shoreline.

Float drops with water levels, weight pulls dock away from shore.

Float rises with high water; out-powers weight.

Weight descends; pulls dock away from shore.

Float and weight both raise and lower together, keeping tension on the cable.

Rails act as horizontal guide at shoreline.

Boulder beach access road.

Anchoring cables.

Stabilizer beam on deep end.

Boulder beach has 5% slope.

Cable fixed to dock.

Pulley wheel.

Rail guides.

2 miles ranger station.

Rail guide and tensioning.

20 units

20 : 1 gear ratio.

20 units
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.
Wanye Wu with Daniel Beck. 4/18/2015 11:30am


