

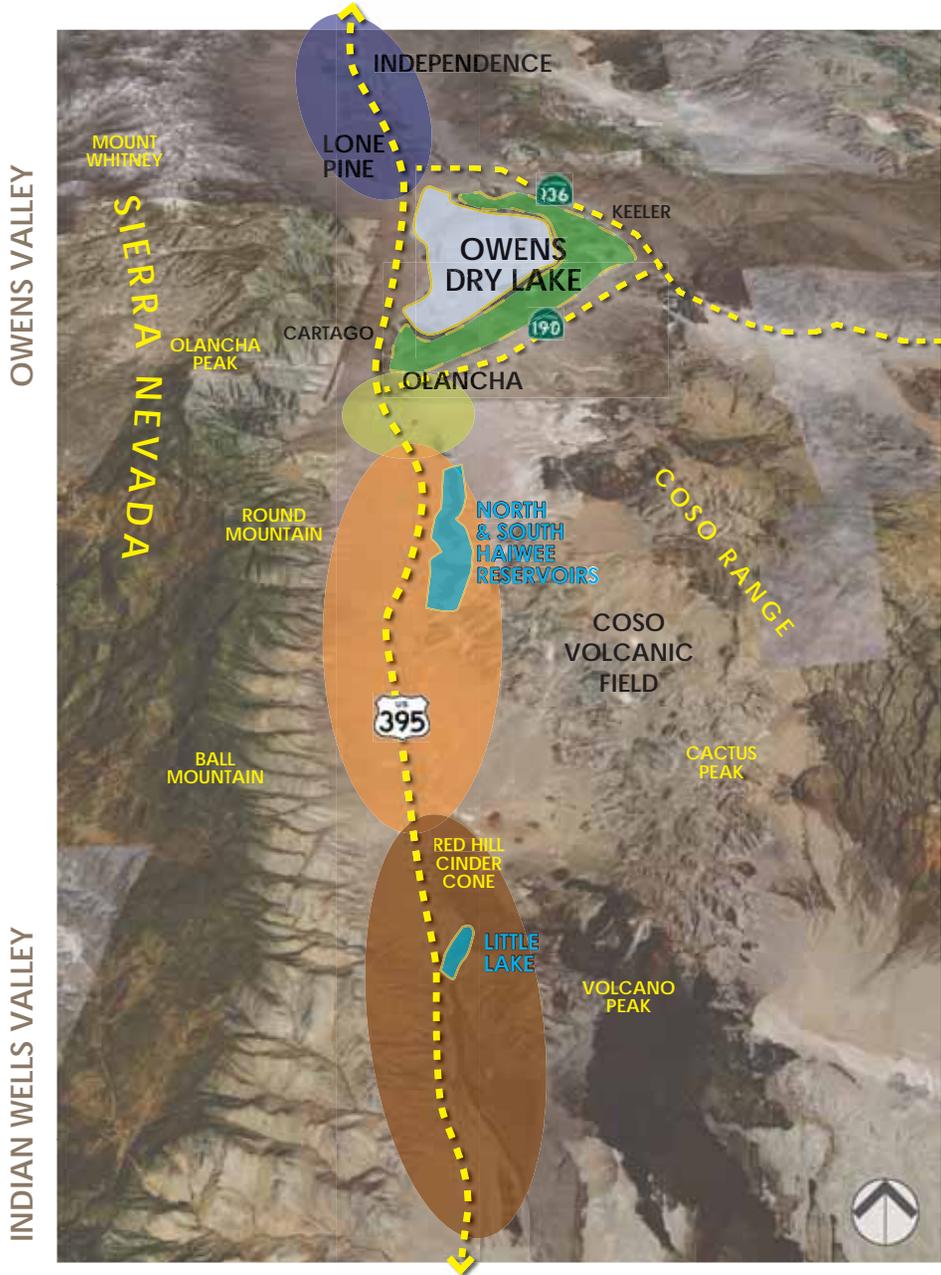
# owens lake



CALIFORNIA TRAILS & GREENWAY CONFERENCE | APRIL 2016



NUVIS PERRY CARDOZA, ASLA  
THE ACORN GROUP JENNIFER RIGBY



# regional map

-  RIPARIAN / TOWN CORRIDOR WITH COTTONWOODS
-  PLAYA MOSAIC
-  SHALLOW FLOOD & SALT GRASS VEGETATION SITES
-  PLATEAU REVEALING ELEVATED VIEW OF OWENS PLAYA
-  RISING SIERRA ESCARPMENT
-  RUGGED CRAGGY TERRAIN WITH DEEP RUSTS / BROWNS AND VOLCANIC FORMATIONS

## location map

Located in Inyo County, east of the Sierra Nevada mountains, the climate in the Owens Valley is semiarid to arid and is characterized by low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and high potential evapotranspiration.

200 miles from Los Angeles  
 190 miles from Riverside  
 450 miles from San Francisco  
 240 miles from Las Vegas



# history

## 1800s

Owens Lake is one of the largest natural lakes in California  
110 acre terminal saline lake (1.5x of seawater)  
Lake serves as resource for local native peoples

## 1913

California Aqueduct completed  
water diverted to Los Angeles

## 1920s

Owens Lake shrunk to 40 square mile  
hyper-saline brine pool

## 1960s-90s

exposed soils and strong winds create  
dust storms - largest single source of  
particulate matter air pollution in the U.S.

## 1998

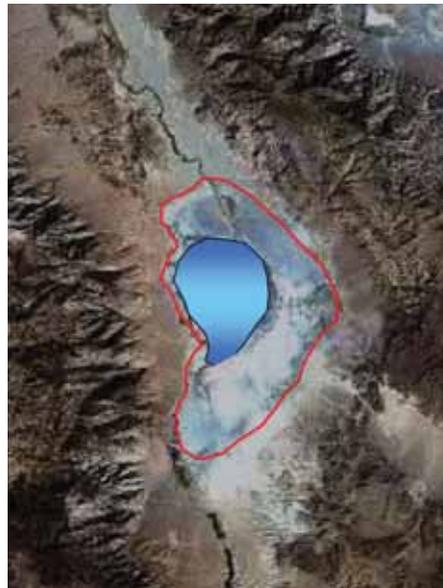
legislation adopted to control dust emissions  
by end of 2006

## 2000s

research resulted in three approved methods  
of successfully controlling dust on a large scale  
shallow flooding, gravel blankets, & native  
vegetation

## 2016

innovative coordinated efforts create  
a positive evolution at Owens Lake - water  
conservation, habitat creation along with  
opportunities for research and passive recreation  
such as hiking and bird watching





95 SQUARE MILES 

# playa map

T301-1 is a 700-acre parcel on the northeast edge of the Owens Lake playa characterized by mild sloping positive drainage, an established wetland habitat zone along the northeast perimeter, and shallow flooding basins along its western edge.



T30-1 enlargement

# existing conditions

## shallow flood

Along the western edge of the T30-1 parcel, shallow flood basins have been maintained as part of the dust mitigation program. These basins have attracted migratory birds, diving birds, foraging water fowl, and provide a water source for many reptiles and small mammals indigenous to the region.

## managed vegetation

62 acres of shrub dominated managed vegetation covers the eastern portion of the parcel. This salt grass dominant vegetation has been maintained through an irrigation system using flood bubblers.

## existing habitat

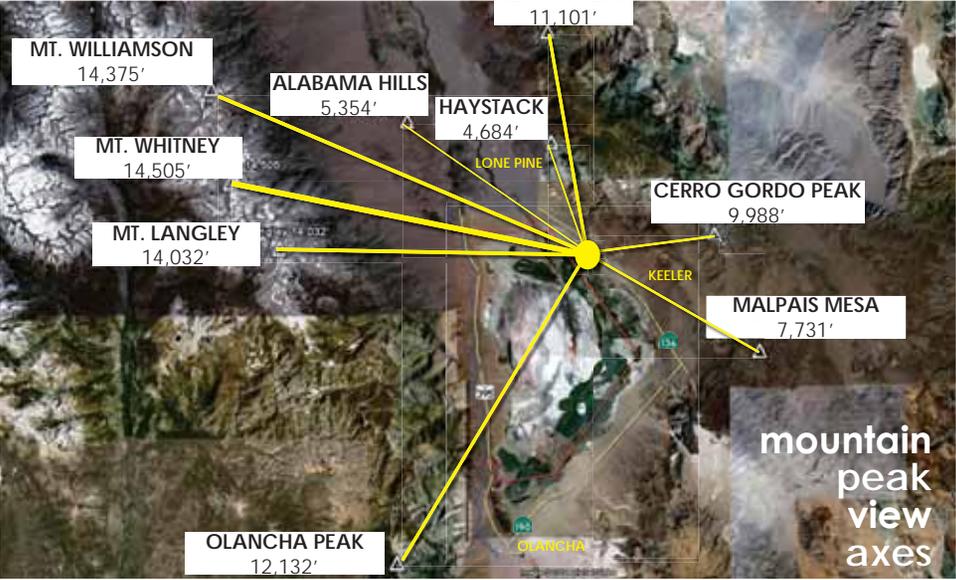
The practice of maintaining shallow flood basins created wildlife habitat where little previously existed on the lakebed playa. Currently, many species utilize the area including Ruddy Ducks, Bufflehead, endangered and protected Snowy Plover, American Avocet, Mallards, Gopher Snakes, Western Meadowlarks, and Northern Harriers.

## berm roads

Elevated berm roads (made from rip rap, rock, and gravel) not only provide access for maintenance vehicles and monitoring activities, but also create the boundaries for the parcels of the Owens Lake Playa or Dust Control Areas (DCAs).



# design inspiration



# approved dust mitigation measures



## **shallow flood**

ranging from a few inches to several feet, shallow flooded areas reduce dust emissions and create wildlife habitat



## **managed vegetation**

salt grass seeded areas maintained through flood bubbler irrigation systems reduce dust emissions and provide wildlife habitat



## **gravel cover**

locally sourced gravel and rock layering reduces dust emissions and can be mounded to create wildlife protection zones

# research and analysis

"The climate in the valley is similar to arid and is characterized by low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and high potential evapotranspiration."

**CLIMATOLOGY OF HIGH WIND EXILES IN THE OWENS VALLEY, CALIFORNIA**  
 The climate of the Owens Valley in the Sierra Nevada region of California is characterized by low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and high potential evapotranspiration. The valley is a high wind exile, and the climate is similar to arid and is characterized by low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and high potential evapotranspiration. The valley is a high wind exile, and the climate is similar to arid and is characterized by low precipitation, abundant sunshine, frequent winds, moderate to low humidity, and high potential evapotranspiration.

**Climate Data**  
 Mean annual precipitation - 10 to 8 inches  
 Most of the precipitation is rain  
 Mean annual temperature is about 55° to 65°F  
 Mean frost-free period is from 75 to 225 days

**Sierra Nevada**  
 Mount Whitney 14,000 FEET  
 Owens Valley 4,000 FEET  
 Owens Dry Lake

**STRONG WINDS**

**SOLAR INFLUENCE**

**TRAIL/LAKE POSITION MARKER CONCEPT**

**LOCAL MATERIAL, HISTORIC LAKE EDGE & REGIONAL PEAKS**

## OVERALL LAKE SITE PLAN & ANALYSIS

Owens Dry Lake Phase 7A & Transition Areas Dust Control Measures

**design inspiration**

**INTERPRETIVE SIGN CONCEPT 'A'**  
 ORGANIC SHAPED GABIONS FILLED WITH LOCALLY AVAILABLE ROCK  
 WEATHER RESISTANT RECYCLED PLASTIC INTERPRETIVE PANEL  
 LIGHTEST SUN BLEACHED ROCK AT TOP  
 MEDIUM COLOR ROCK IN CENTER  
 DARKEST WATER STAINED ROCK AT BASE

**INTERPRETIVE SIGN CONCEPT 'B'**  
 PAIUTE PATTERNS & TEXTURES CARVED INTO ROCK SURFACE  
 WEATHER RESISTANT RECYCLED PLASTIC INTERPRETIVE PANEL  
 LOCALLY CARVED PAIUTE PETROGLYPHS  
 LIGHTEST SUN BLEACHED ROCK AT TOP  
 MEDIUM COLOR ROCK IN CENTER  
 DARKEST WATER STAINED ROCK AT BASE

**BENCH/WINDBREAK CONCEPT**  
 GABIONS FILLED WITH CONTRASTING COLORED LAYERS OF LOCALLY AVAILABLE ROCK  
 EXISTING METAL SIGNAGE ALONG HIGHWAY 136

**TRAIL/LAKE POSITION MARKER CONCEPT**  
 HISTORIC LAKE EDGE, INTERPRETIVE SITE LOCATION WITHIN LAKE CONTEXT & RELATION TO SURROUNDING MOUNTAIN PEAKS

**PAIUTE ROCK ART IN OWENS VALLEY**  
 The Mono recognized the four cardinal directions, believed that the New Moon was a powerful occurrence, and recognized the seasons of the year. During the winter solstice to be the beginning of the new year. The Owens Valley Paiute observed five seasons rather than four. Their seasons consisted of the fall, winter, spring, summer and midsummer. Nature elements or spiritual beings were believed to manifest themselves in the world through water, lightning, thunder and animals.

**water remnants**  
**varying perspectives**  
**lake connections**

**LOCAL MATERIAL, HISTORIC LAKE EDGE & REGIONAL PEAKS**

## SIGNAGE & TRAIL MARKERS

Owens Dry Lake Phase 7A & Transition Areas Dust Control Measures - T30-1

**design development plan**

**LEGEND**

- EXISTING SHALLOW FLOOD
- PROPOSED SHALLOW FLOOD (DETERMINING SLOPELINE FOR HABITAT GUIDES)
- DEEP WATER AREA (EXCAVATED FOR DIVING BIRDS)
- ALKALI MEADOW PLANTING AREAS
- EXISTING MITIGATED HABITAT ZONE
- INTERPRETIVE OVERLOOK (SEE CONCEPTUAL ILLUSTRATIONS HEREON) (EXISTING ABOVE GRADE UTILITY TO BE IDENTIFIED IN THE FIELD)
- SIGNAGE OR TRAIL MARKER

**PEDESTRIAN PULL-OUT CONCEPT VIEW 1**  
 MAINTENANCE ACCESS BERMA ROAD  
 INTERPRETIVE PEDESTRIAN PULL-OUT ADJACENT TO EXISTING BERMA ROAD  
 DEEP WATER EXCAVATION AREA (ICE DIVING BIRDS)  
 SHALLOW FLOOD SHORELINE REALIGNMENT  
 MAINTENANCE ACCESS BERMA ROAD  
 INTERPRETIVE PEDESTRIAN PULL-OUT ADJACENT TO EXISTING BERMA ROAD  
 INTERPRETIVE BOARDWALK WITH OVERLOOK MAINTENANCE ACCESS BERMA ROAD  
 LOCALLY AVAILABLE BOULDERS & ROCK  
 PUBLIC ACCESS ROAD FROM HIGHWAY 136  
 INTERPRETIVE BOARDWALK OR PEDESTRIAN BERMA TRAIL

**PEDESTRIAN PULL-OUT CONCEPT VIEW 2**

**PEDESTRIAN PULL-OUT SECTION**  
 8'-40"  
 EXISTING 2:1 SLOPE  
 SHALLOW FLOOD (WATER LEVEL VARIES)  
 PROPOSED BERMA ROAD ACCESS  
 3:1 - 4:1 SLOPE  
 EXISTING 2:1 SLOPE

**SCALE: 1" = 300'**

## DESIGN DEVELOPMENT PLAN

Owens Dry Lake Phase 7A & Transition Areas Dust Control Measures - T30-2



# scope of study

owens lake

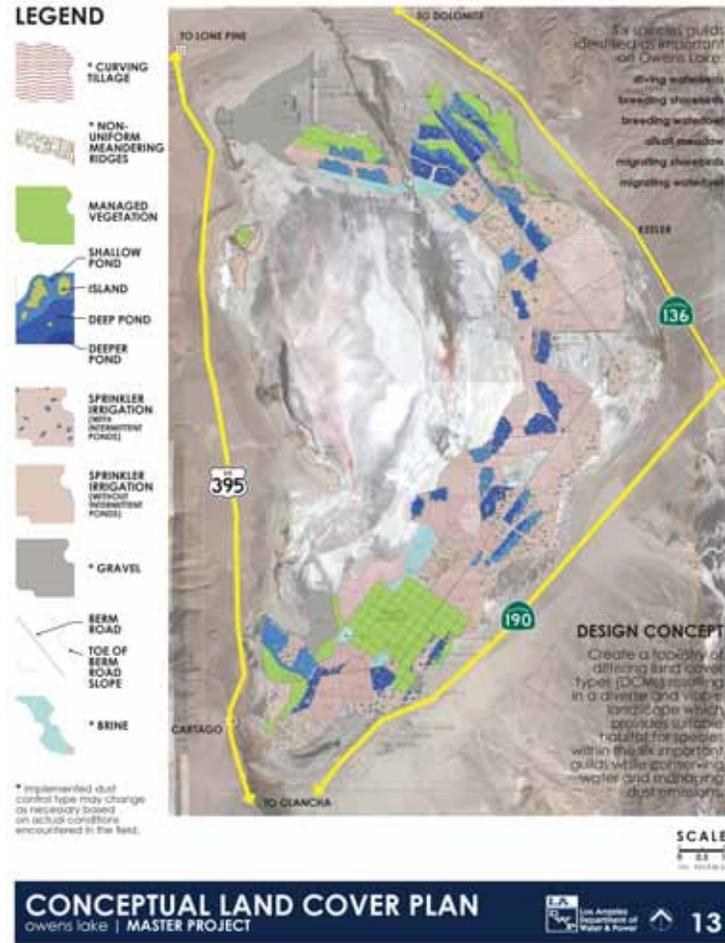
## MASTER PROJECT



transitioning  
to waterless  
and water-  
wise solutions




April 2013 | 1 | 91



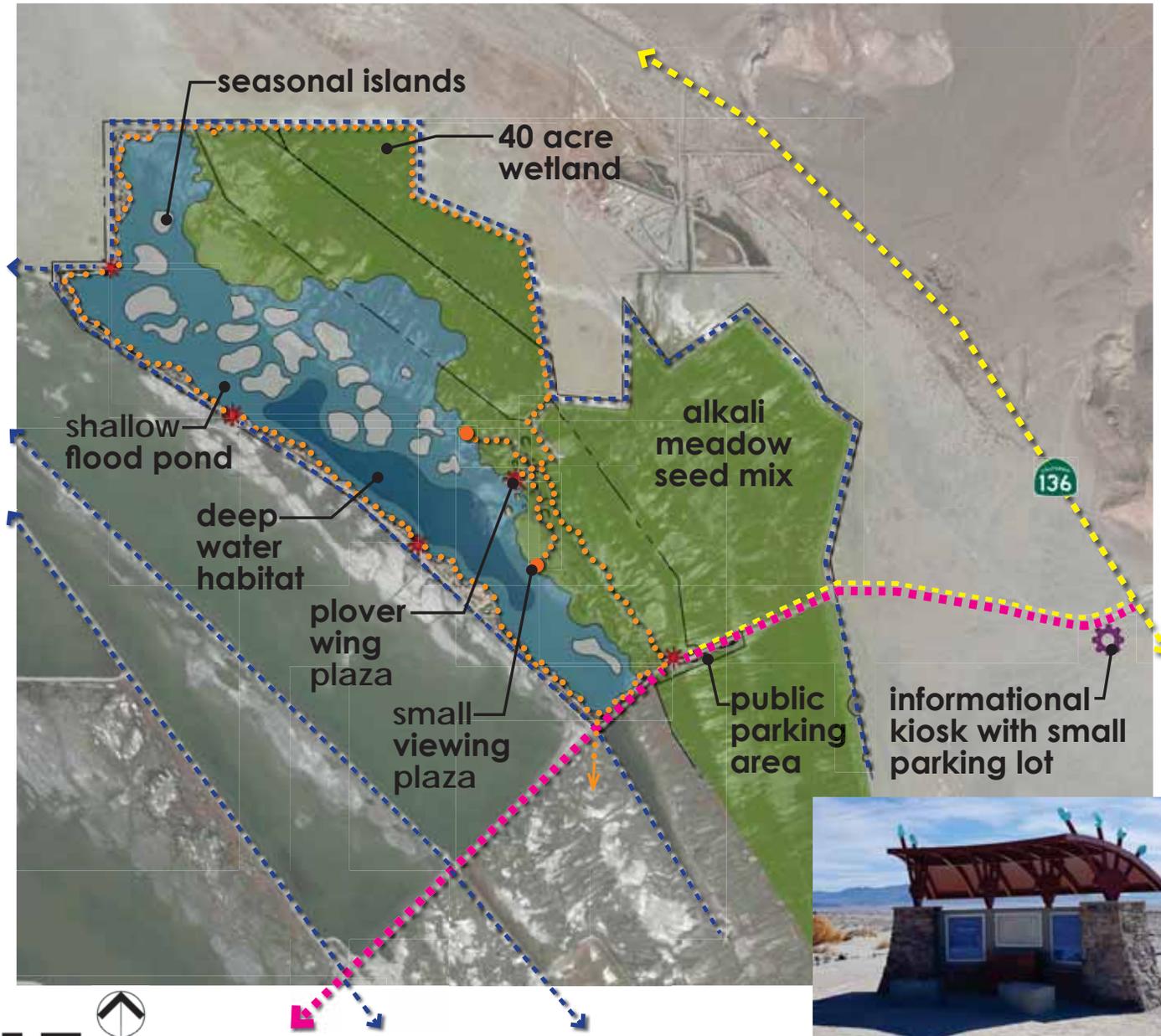
## master project area

45 square mile study

LADWP, along with a diverse group of stakeholders including state and local agencies, non-governmental organizations, and interested individuals, has been an active participant and supporter of the development of an Owens Lake Master Plan. Based upon, and in the spirit of this planning effort, LADWP proposes the Master Project described in this concept document. The proposed Master Project will build upon current planning efforts and begin implementation of a more environmentally friendly solution for Owens Lake. This solution considers California's environmental challenges inside and outside of the Owens Valley, such as endangered species, water supply, water reliability and habitat creation throughout the State.

This Master Project will enhance the design and effectiveness of Owens Lake dust control, through a combination of water conservation, dust control and habitat management. This new design will utilize a mix of tillage, vegetation, water, gravel, roads, and brine to control dust, while preserving and creating habitat for diving waterbirds, shorebirds, waterfowl and the public.

# trail system



**\* interpretive signage locations**

Five interpretive panels offer visitor insight on regional resources, historical activities, geological formations, migratory wildlife, and nesting birds.

**interpretive trail system (4.3 miles)**

**public access road**

**maintenance berm road**

**main haul road**



**informational kiosk**



# introduction of people

"the challenge of providing scale"



shade

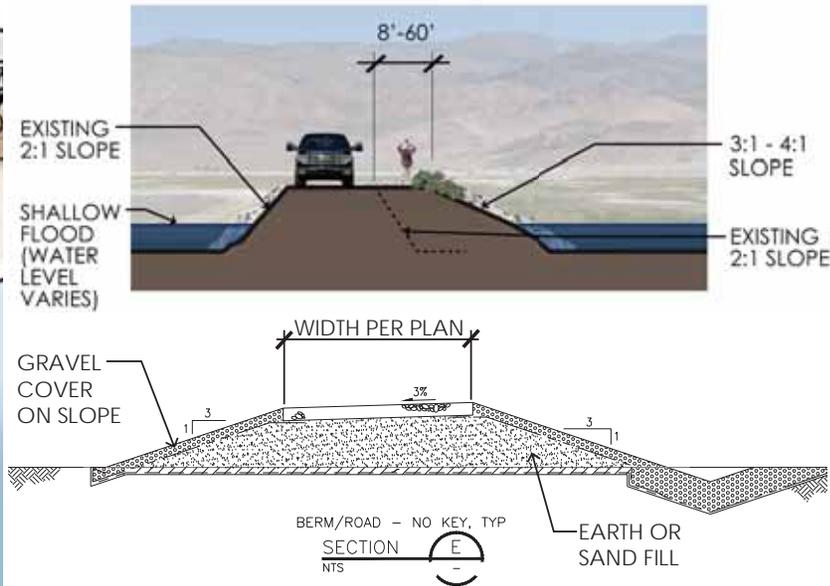


interpretive signage



trail design

# trail construction & considerations



**construction photo  
February 3, 2016**

Using locally sourced gravel and natural form grading techniques, pedestrian trails are pulled away from the maintenance berm roads for safety and to create an enhanced wildlife viewing experience

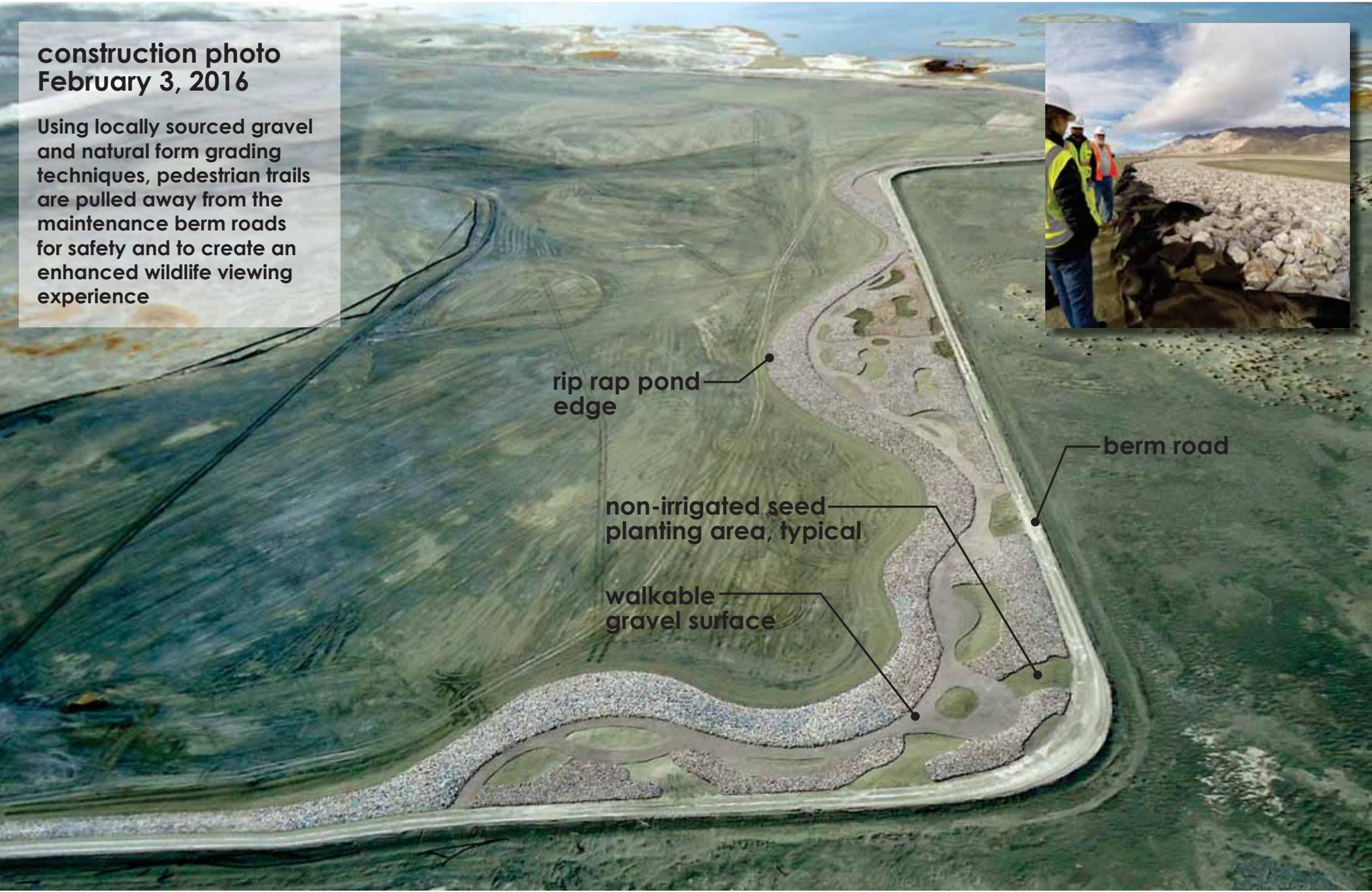


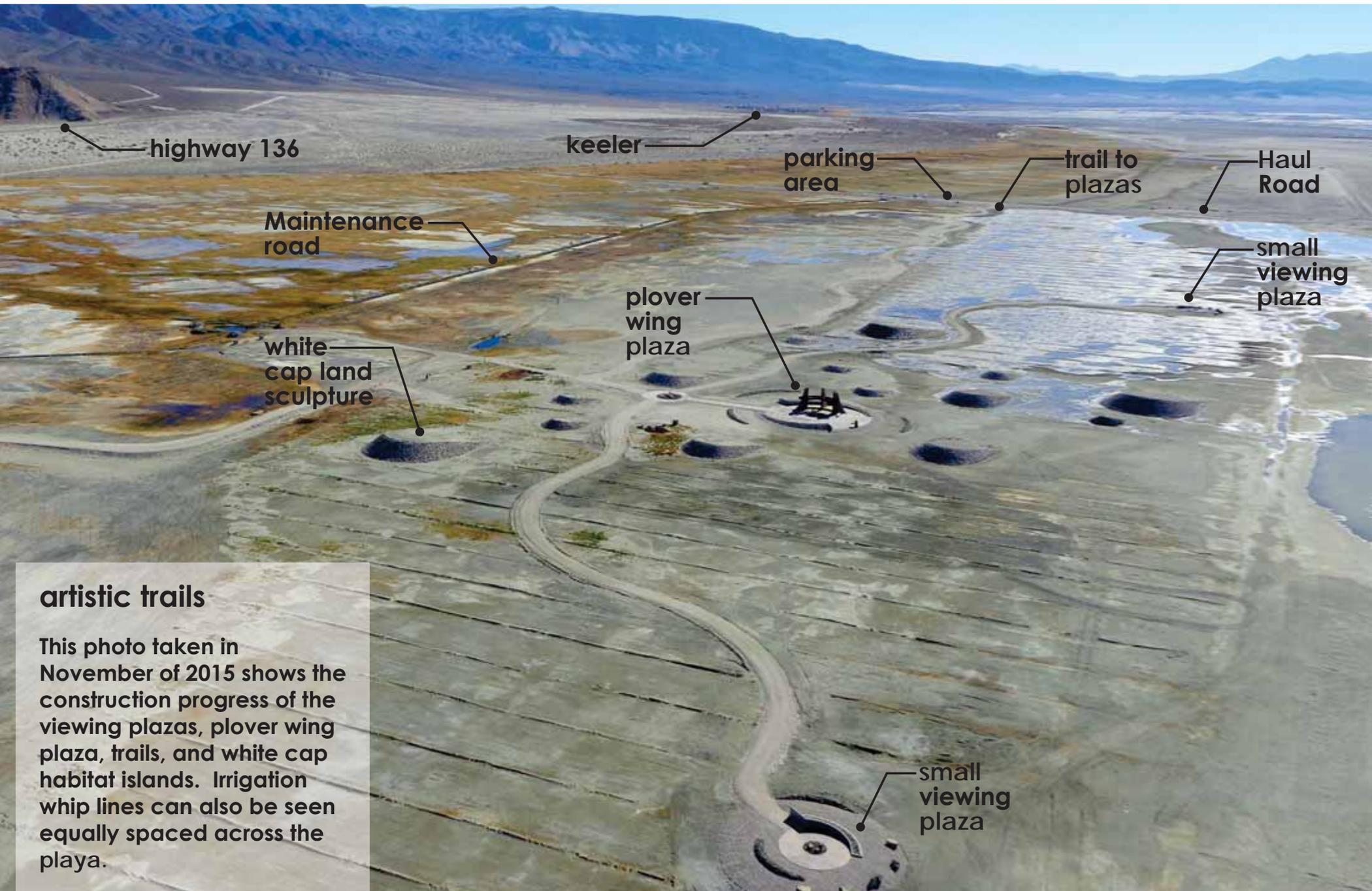
rip rap pond edge

berm road

non-irrigated seed planting area, typical

walkable gravel surface





highway 136

keeler

parking area

trail to plazas

Haul Road

small viewing plaza

Maintenance road

white cap land sculpture

plover wing plaza

small viewing plaza

### artistic trails

This photo taken in November of 2015 shows the construction progress of the viewing plazas, plover wing plaza, trails, and white cap habitat islands. Irrigation whip lines can also be seen equally spaced across the playa.



## **breathhtaking vistas**

This photo taken in January of 2016 shows the dramatic backdrop of the eastern Sierra Nevada Mountain Range dusted with winter snow illustrated the vast scale of the plaza and under-construction trails and plazas of T30-1.

highway 395

trail

white cap land sculpture

plover wing plaza

small viewing plaza

# interpretive vocabulary



## interpretive base

- Corten steel with white rock inlay
- Native American designs provided by local tribal representative



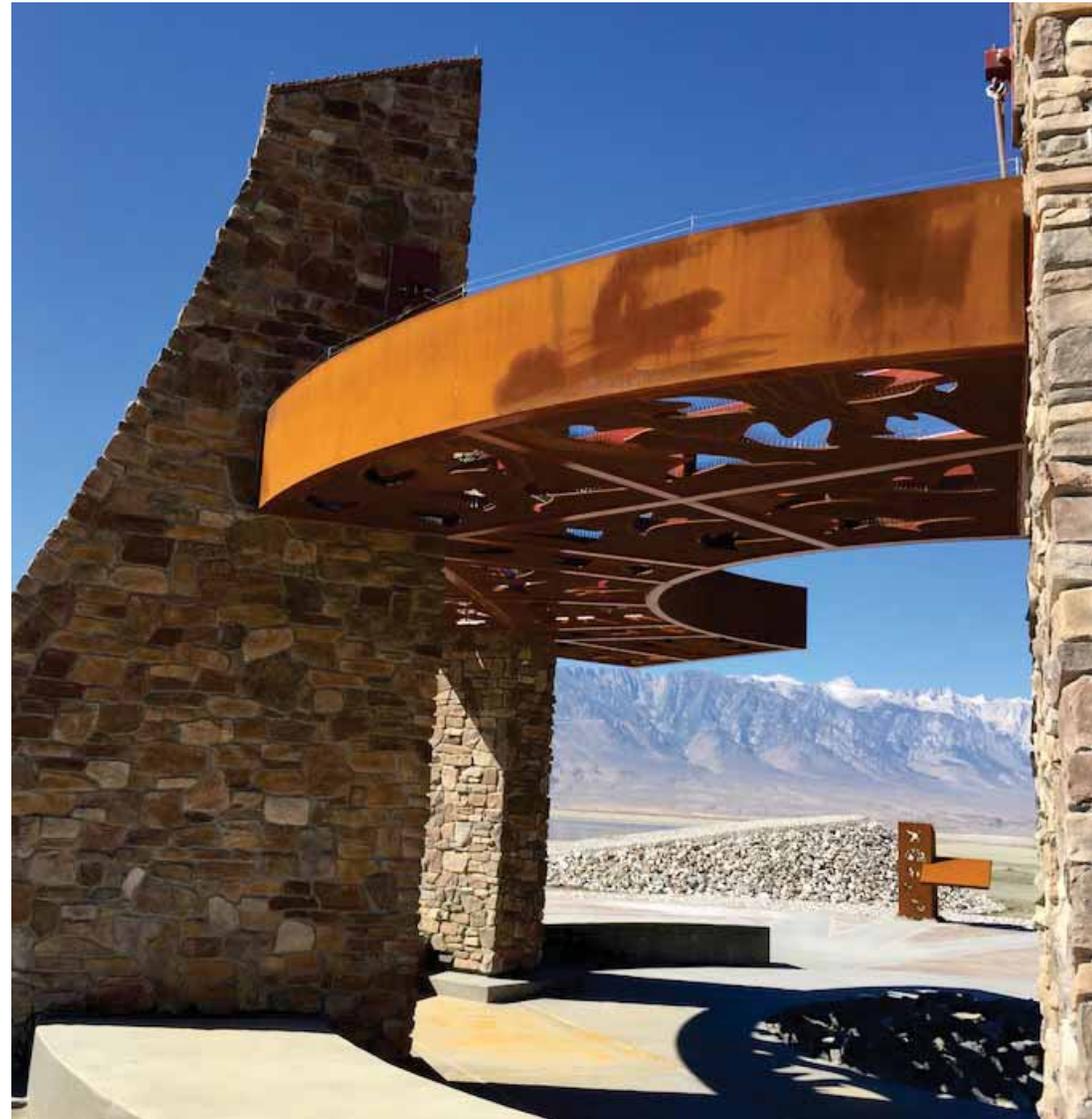
## paving

- Directional concrete etching noting name of peak and elevation

# interpretive vocabulary

## Plover wing shade structure

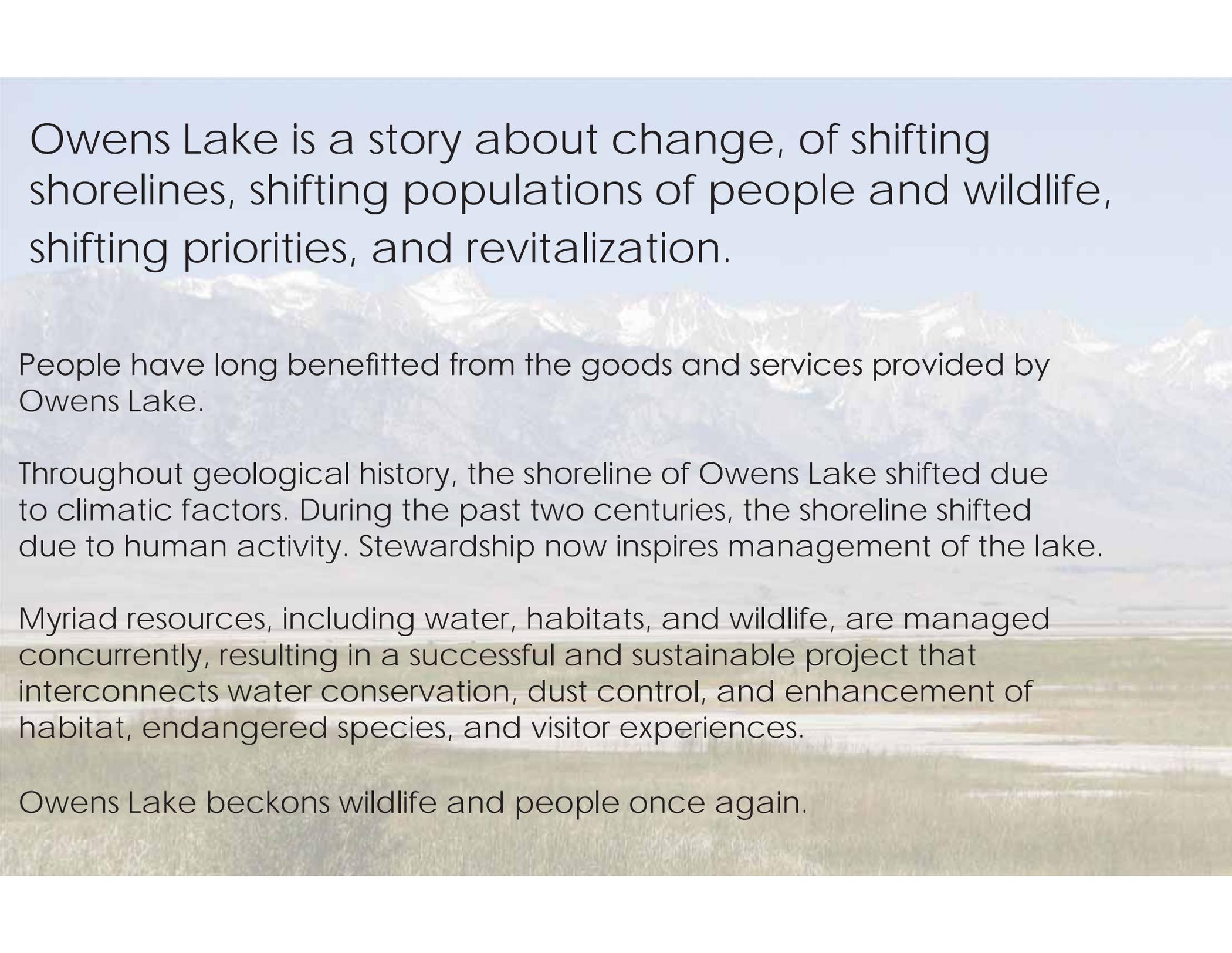
- Stone masonry veneer plover wing column
- Corten steel shade structure with Owens Lake birds cut-outs casting shadows



# Theme-based interpretation

A theme focuses the story and helps the audience see the “big picture.”





Owens Lake is a story about change, of shifting shorelines, shifting populations of people and wildlife, shifting priorities, and revitalization.

People have long benefitted from the goods and services provided by Owens Lake.

Throughout geological history, the shoreline of Owens Lake shifted due to climatic factors. During the past two centuries, the shoreline shifted due to human activity. Stewardship now inspires management of the lake.

Myriad resources, including water, habitats, and wildlife, are managed concurrently, resulting in a successful and sustainable project that interconnects water conservation, dust control, and enhancement of habitat, endangered species, and visitor experiences.

Owens Lake beckons wildlife and people once again.

# Telling a story

We don't need more information. We need to know what it means. We need a story that explains what it means and makes us feel like we fit in there somewhere.

Annette Simmons, *The Story Factor*





American avocet



Dowitcher

**A call for conservation**  
 California has lost 90% of its wetlands to development. As natural landscapes shrink, wildlife loses valuable habitat including nesting space and feeding grounds. As habitat decreases, wildlife populations decrease as well.



Gadwall

# New Water, New Life

Owens Lake is now a key migratory stopover.

**When the dust settles**  
 While dust control takes several forms at Owens Lake, it is the vegetation and water that attract the birds. Los Angeles Department of Water and Power is working to conserve water while maintaining important wildlife habitat.

**New life**  
 Restored sites like Owens Lake serve as critically important wildlife habitat. Shallow pools and waterfowl, in particular, thrive in the shallow pools. These they feed on protein-packed invertebrates like brine flies that provide fuel for long migrations.

In the late 1800s, the shoreline of Owens Lake shifted at the hands of people. Even before the City of Los Angeles began diverting water from Owens River, farmers had tapped its tributaries, causing the lake level to drop.

A century later, water and life are returning to Owens Lake. Shallow pools and ponds constructed to mitigate dust provided an unanticipated benefit as wildlife habitat. Now those dust mitigation features are being designed purposefully for the benefit of wildlife. Improvements include creation of habitat islands, diverse vegetation, and shallow foraging habitat that beckons birds.



Green-winged teal



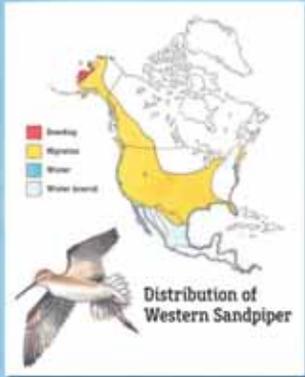
Ponds at Owens lake



American avocet

**Long distance commute**

Like other shorebirds, western sandpipers make annual treks along the Pacific Flyway. Migrating north to breed in the Alaskan tundra in autumn and south to spend winter inland or along the California coast, these small birds travel nearly 5,000 miles each year!



Distribution of Western Sandpiper



Northern shoveler

# A Place to Rest and Nest

Just as brine flies attract birds, birds attract people.

Throughout much of its history, Owens Lake was a haven for birds. During annual migrations, waterfowl, wading birds, and shorebirds stopped here to rest and feed.

Now the City of Los Angeles has transformed Owens Lake into an important migratory stopover location once again. Northern shovelers and other waterfowl arrive in autumn, as they leave their breeding areas to the north. Thousands of western and least sandpipers stop here in spring before traveling north to breed on tundra in Alaska and Canada. Returning in fall, these small shorebirds often log over 5,000 miles during their annual trek! American avocets, snowy plovers, and black-necked stilts stay even longer, remaining to nest and raise their young.

**Recollections of the lake**

"The lake was alive with wild fowl, from the swift flying teal [sic] to the honker geese. Ducks were by the square mile, millions of them. When they rose in flight, the roar of their wings was awesome. In the still, cold winter it could be heard on the mountain top at Cerro Gordo, ten miles away." (Beverly R. Spear, *Saga of Inyo County*, 1977)



Northern harrier



Snowy plover

**Wildlife watching etiquette**

Well-meaning eagets for along Owens Lake's coastline and Delta. Please watch where you walk and stay in established viewing areas.



snowy plover nest



Black-necked stilt



Cerro Gordo



Southern Pacific Railroad cars at Cartago



Soda ash from the Natural Soda Products Co., Keeler

# Gifts of Rock and Water

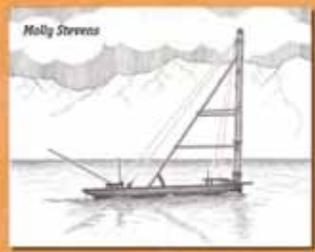
The region surrounding Owens Lake yields more than water.

People have long benefitted from the richness of the Owens Lake area. For at least 10,000 years, American Indians have lived here and harvested resources, including glass-sharp obsidian for arrow points and spearheads.

In the mid-1800s, other resources, like silver and grazing land, began attracting prospectors and settlers. Located high above the town of present day Keeler, Cerro Gordo, or "fat hill," yielded the largest silver deposit in California. That deposit also created a freight challenge, moving bars of bullion to the western shore and timber and charcoal to the eastern shore. Eventually steamships were put to work. Travelling across the lake between Cartago and Swansea, the steamships reduced a three-day journey by mule team to a three-hour boat trip.



Stamp mill at Swansea



Molly Stevens

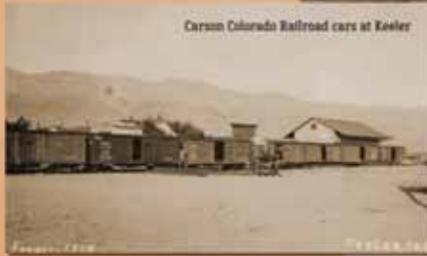
## Steamships in the desert

Between 1877 and 1880 the steamships *Reese Brockie* and *Molly Stevens* operated on Owens Lake. Steamships leaving Cartago and returning to Cartago provided timber and charcoal for the towns of Keeler, Swansea, and Cerro Gordo. On the return trip, the steamships were loaded with bars of silver bullion, some destined for Hollywood for use by early film and some for the San Francisco Mine for use in coinage.

Cottonwood charcoal kilns



Carson Colorado Railroad cars at Keeler



Keeler



# Traces of the Past

## Ranching and mining relics rest on the land.

The region yielded other resources as well, like grazing land, soda ash, trona, and borax. Weatherworn cattle chutes, abandoned mines and factories stand as testament to past human activity. Cerro Gordo remains a ghost town. In Keeler, the Carson and Colorado Railroad Depot and a talc mill still stand. Remnants of the Swansea Pier remain along the east shore. Charcoal kilns, cattle chutes, and a plate glass factory remain on the west shore. Amidst these relics, ranching and mining still take place today.



On display at the Eastern California Museum, this anchor was retrieved from a meadow near Owens Lake.

Keeler Railroad Station



"...In March of 1950, I was 11 years old and spent many days playing in the sand dunes out on the playa just west of the Inyo Development Company ruins. One day three friends and I found a ship's anchor with a length of chain nearby. We tried to get it closer to the shore, but couldn't, so we went back to town and told our parents. Back with help the anchor was brought in and displayed for some time at the Desert Club in Keeler and later at [National Soda Products]."  
(Mr. Francis Pedraza as recorded in 2025)

# viewing



**wildlife**



**vistas/Sierras**



**sunrise/sunset**



## bird-watching

Many groups currently visit the Owens Lake Playa to study wildlife, track species migration, document populations, and gather vital information toward the protection of endangered species.



## at one with nature

Professional photographer Robin Black captured this image of the plover wing plaza on a misty morning with the Coso Mountain Range looming in the background.







questions



thank you!