



ARTEFACT DESIGN

POB 102

Cardiff, CA 92007

(760) 944-3502

USFWS, HUMBOLDT BAY, CA

SHOREBIRD LOOP TRAIL AT SALMON CREEK

The Artefact team developed and produced four 48"W x 21"H interpretive panels for a new viewing deck and restored area in the Humboldt Bay National Wildlife Refuge.

Birding in the area and landscape changes due to seismic activity and climate change are highlighted.

Cleared for Takeoff

Can I Fly?
Birds are designed to be on the move. Like you, they are warm-blooded. But birds are the *only* animals with feathers, and *every* bird has wings. Wing flapping produces takeoff, so that birds can overcome the force of gravity and stay aloft. It's like swimming in the wind.

Primary and Secondary Flight Feathers help birds take to the skies. Strong ligaments anchor them to bones to handle the demands of flight.

Primary Feathers are the longest feathers on the outer half of the wing. Birds move them like rigid fingers to help with forward thrust.

Secondary Feathers provide lift by overlapping to form an airtight, curved surface for moving through the air.

Strong Breast Muscles power birds in flight.

Tail Feathers are essential for steering by helping to control drag during flight and landing.

Lift
Upstroke
Downstroke
After birds generate upward force—lift force—only with the downward flap of their wings.

Upstroke
The outer part of the wing points straight along its line of travel so birds can pass through the air with the least resistance.

Winging It
See how different wing shapes help a bird move through wind and water.

LIFTOFF
Larger wings help the Northern Shoveler launch from the water like a helicopter.

IN THE AIR
Glider
Flocks of Brown Pelicans glide along in V formation to save energy, riding the air above the ocean.

Hover
The White-tailed Kite flaps its wings in place during the wind. This flight style is called idling.

UNDERWATER
Swimmer
The Common Murre dives into the ocean for fish using its wings to "fly" underwater.

Family Trees

You're in a National Wildlife Refuge, where the protection of resident and migratory birds is a priority.

Treetop Nursery
Look across to the trees on the ridge. From **March to August** you can see a rookery (ROOK-er-ee), or communal nesting spot for Egrets and Herons. Most nests are independent, yet these social birds rely on group protection from predators. Nesting by wetlands with open views, and on the forest edge, means many eyes see who's coming.

Arrivals & Landings
Egrets and Herons are residents here. Visiting birds, such as waterfowl and shorebirds, come and go using migratory stopovers—like Humboldt Bay—along the Pacific Flyway.

Who's in the Rookery?
Egrets and Herons are now common, but were once in danger. Their beautiful feathers were plucked for 19th-century hat fashions, until early conservation laws ended plume hunting. Saving these birds led to the establishment of the National Wildlife Refuge System in 1903.

Black-crowned Night Heron
This heron is active at night until dawn. Look for its gray and black plumage, and long white head plumes, or feathers.

Great Blue Heron
With a 6-foot wingspan in regal blues, it's the largest North American heron.

Great Egret
Watch for this all-white wader with its yellow bill and black feet and legs. It hunts in pastures and wetlands for fish, amphibians, and small mammals like field mice and gophers.

Snowy Egret
The smaller Snowy Egret has a black bill and yellow feet. It can make bubbles in the water with its bill to attract fish.



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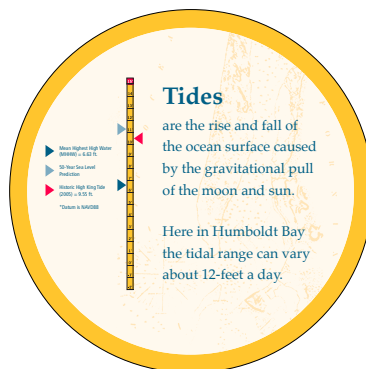
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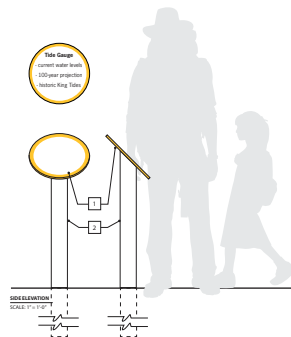
SHOREBIRD LOOP TRAIL AT SALMON CREEK

A tidal gauge and panel interactive were also developed.



FRONT ELEVATION
SCALE 1" = 1'-0"

TIDE GAUGE PANEL
1. (1) 15" dia. x 5" graphic panel
2. (1) 4" sq. alum. support, paint
PANEL



SIDE ELEVATION
SCALE 1" = 1'-0"



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ARTEFACTS.COM

Project Name:

Humboldt Bay State

Shorebird Loop Trail at

Salmon Creek

Drawing Title:

Interactive

Plot Type: 1/16

Quantity: 1

Location: as noted

USFWS Humboldt Bay

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Flowing Through Time



Pre-European Settlement
Freshwater streams flow unobstructed
to the ocean and fill with incoming
tides. Native vegetation is and
around this bay and related to its
natural resources.



Settlers Arrive
Saltwater and wetlands are
naturally unfertile, making it easier
to alter them for crops, roads and
towns. You are in a former saltmarsh
that was converted into a cattle ranch.



Refuge and Wetland Restoration
Wetlands provide habitats, fish nurseries
and filter incoming waters. You can see
water control structures that manage
water flows to restore wetlands.

Holdup at Cattail Creek

Water flows from Cattail and Salmon Creeks
are managed for thousands of migratory
waterfowl and shorebirds. Tide gates and
water control structures retain winter and
spring freshwater flows to create seasonal
wetlands. Without these gates and dikes,
saltwater would reach the highway
during extreme tides.



You Are Here Now
Changing tides bring uncertainty —
from weather and rising seas.
For example, adaptive management plans
help to ensure the health of Humboldt Bay.

Water, Which Way?

Fish-Friendly Tide Gate

At high tide the gate stays closed keeping most
of the salt water out. When the tide drops, the
gate opens to allow freshwater into the bay.
A fish-friendly opening allows fish to safely
migrate in and out, anytime.

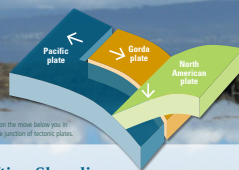


Water Control Structure

Refuge managers can pond or hold water
in different areas and depths. This provides
wetlands with a diversity of plants and aquatic
organisms for waterfowl and other wildlife.



Life in the Balance



Earth is on the move below you in
this triple junction of tectonic plates.

Shifting Shorelines

Where you are standing, Humboldt
Bay is slowly sinking, or subsiding.
The tectonic movement of the Gorda
Plate going under the North American
Plate is dragging the Northern
California coastline down.



Rising Seas

Imagine Humboldt Bay in 50 to 100 years.
As the climate warms, sea levels will
continue to rise, coastal flooding will
increase and possibly overwhelm beaches
and dunes. If allowed space, coastal habitats
may migrate inland in some areas.

Tuluvat Village Site, near Eureka, CA
Extreme tides often called King Tides at
Humboldt Bay show us what the future
of sea level rise will look like.
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