



ARTEFACT DESIGN

POB 102
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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 rise 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 flaps to help with forward thrust.

Secondary Feathers provide lift by overlapping to form an arched, air-wedge surface for moving through the air.

Strong Breast muscles power birds in flight.

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

Lift
↑

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

Upstroke
The outer part of the wing passes 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
Large 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 facing the wind. This flight style is called *loafing*.

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.

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

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 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.



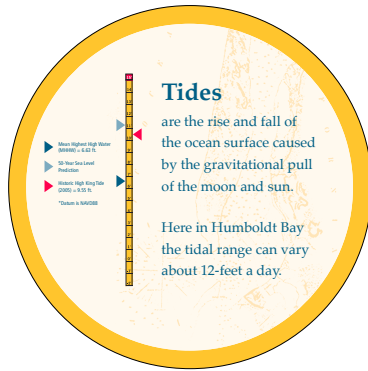
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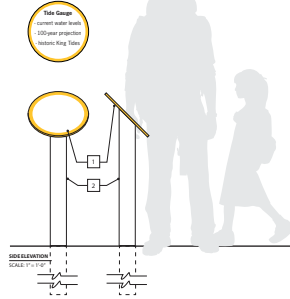
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A tidal gauge and panel interactive were also developed.



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



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Project Name: Humboldt Bay Tidal Gauge Panel at Salmon Creek
Drawing Title: Tidal Gauge Panel
Date: 10/13/2017
Scale: as noted



PLEASE NOTE:
This panel is made of metal, wood, and plastic. It may be damaged if not handled properly.

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Date: 13 October 2017
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Flowing Through Time

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.

Pre-European Settlement
Freshwater streams flow unobstructed to the ocean and flow with incoming tides. Native villages lived in and around the bay and relied on its natural resources.

Settlers Arrive
Saltwater and wetlands are naturally unfenced, making it easier to alter them for ranches, roads and towns. You see it at Gilmer Salthrough that was converted into a cattle ranch.

Refuge and Wetland Restoration
Wetlands provide habitat, fish nurseries and flow-retention systems. You can see water control structures that manage water flows to restore wetlands.

You Are Here Now
Changing climate brings uncertainty — more extreme 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 gates stay closed keeping most of the salt water out. When the tide drops, the gates open to allow freshwater into the bay. A fish-friendly opening allows fish to safely migrate in and out, anytime.

Water Control Structure
Ridge manages can pond or hold water in different areas and depths. This provides wetlands with a diversity of plants and aquatic organisms for waterbirds and other wildlife.

Life in the Balance

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.

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

Tuluwat 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.