



Monitoring Human-Wildlife Disturbances to Protect Sand Barrier Estuaries from Artificial Breaching



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Introduction



Executive Summary

The Laguna Bluebelt Coalition's Aliso Beach Wildlife-Habitat Monitoring Project has been ongoing at Aliso Beach and Treasure Island in Laguna Beach, CA since 2021. The project focuses on conducting research and outreach at the bar-built estuary of Aliso Creek, which is fed by a 30-square-mile urban watershed.

Between January and December 2024, 113 monitoring surveys were completed by 11 trained volunteers and 2 Orange County Coastkeeper staff members. Surveys were taken at three different sites: Treasure Island, Aliso Berm and Creek, and Aliso Point. 5,475 visitors were recorded and 706 were observed to be causing hazards and disturbances in the Marine Protected Area.

Hazards and disturbances included digging out the sand berm at Aliso Creek, disturbing the wildlife habitat, collecting biota, having off-leash dogs, and viewing the breached berm. 88% of the recorded hazards and disturbances occurred in the Aliso Berm and Creek area.



Aliso Estuary





Google Earth photo of Aliso Creek
Background

The Aliso estuary is a **temporarily open/closed system**, so it does not permanently flow into the ocean due to the natural formation of a sandbar. This sandbar is imperative for preventing dry season urban runoff from flowing into the ocean as well as lessening the effect of sea level rise, beach erosion, and extreme weather by breaking up incoming wave impact. Additionally, it serves as a barrier between the freshwater wildlife in the creek and marine species in the ocean. However, this area has been exposed to high amounts of human disturbance, and the sand barrier is abruptly broken open, causing the freshwater habitat to be significantly altered.

This area has also been designated by the U.S. Fish and Wildlife Service as a critical habitat for the endangered Tidewater Goby¹. According to the U.S. Fish and Wildlife Service, "Artificial breaching causes lagoons to be converted to open marine systems, allowing an influx of salt water into the lagoon... frequent or untimely artificial breaching degrades the lagoon's water quality and can kill tidewater gobies."²

Due to human impact on the Aliso Creek lagoon system, the Southern Tidewater Goby has not been observed in Aliso Creek in recent years, and it is now only found in lagoons in San Diego³.

Aliso Berm

Marine Protected Areas

A Marine Protected Area is an area of the marine environment that has been reserved by federal, state, tribal, or local laws to provide lasting protection for natural and cultural resources (Executive Order 13158)⁴. The Marine Life Protection Act of 1999 is the law that put California's current MPAs in place.

MPA's are essential for sustaining marine life populations threatened by overharvesting and habitat alteration. The project area includes a State Marine Reserve (SMR) and No Take State Marine Conservation Area (SMCA). Both areas prohibit "take" of any kind by the public. "Take" is defined as the extraction or significant alteration of cultural or natural resources.



Whimbrel at Aliso Beach



Ochre Sea Star at Laguna Beach tidepools



Map of Orange County Marine Protected Areas

Aliso Beach and Treasure Island are both in Marine Protected Areas that prohibit "take." Not only are the wildlife, plants, and geological items in this area protected by MPA status, but several local, state, and federal laws also have jurisdiction.

The California Coastal Act of 1976 forced

developers to use carefully planned sustainable development plans⁵. This was put in place to lessen the impacts of coastal development and prevent beach erosion that could endanger wildlife that requires stable shore habitats.

The Marine Mammal Protection Act of 1972

prohibited the "take" of all marine mammals due to their declining populations⁶. The animals protected include whales, dolphins, and pinnipeds like seals and sea lions.

The **Clean Water Act** and **BEACH Act** help protect fishable, swimmable, and navigable waters of the United States⁷. The BEACH Act served as an amendment to the Clean Water Act of 1972 to require health-based regulations and enhanced pathogen monitoring in coastal recreation areas.



*All photos in this report were taken by Project Manager Christina Giudice unless stated otherwise

Creek Disturbance

Over the years, beachgoers have been digging out the sandbar at Aliso Creek, disrupting the natural process of the estuary. This potentially violates various environmental regulations like the Endangered Species Act and Marine Life Protection Act. Seasonal sand berms are necessary for protecting inland areas from coastal storm erosion and can help mitigate beach erosion⁸. Without these natural barriers, beaches with high coastal development are susceptible to erosion that can severely alter the natural landscape and threaten beachfront properties.

Additionally, when people open the sandbar, this drains the estuary, killing freshwater organisms that are washed into the ocean and exposing freshwater plants to varying salinities which can hinder their growth⁹. All of these organisms, invertebrates and vegetation alike, play important roles vital for maintaining the natural function of their ecosystem. If these organisms are exposed to constant artificial breaching that causes vast variations in water levels daily, they have little to no chance of survival. Furthermore, many waterfowl rely on this vast abundance of freshwater to bathe and forage.



An American Coot and a Gadwall Enjoying the Creek



Significant Drainage of Estuary Post Artificial Breaching Event



Individuals Digging the Sand Berm to Surf the Creek



Surfer gets Swept out into Ocean by Standing Wave

Not only does artificial breaching of the creek harm wildlife but it also poses a threat to human safety. Only professionals can surf the resulting standing wave making it dangerous for everyday beachgoers. When the berm is dug out, the strong flow of the creek water paves the way for a massive canyon-like crevice on the beach. This results in steep cliffs that can get up to 10 feet high, creating a treacherous drop that can harm beachgoers if not navigated carefully.

The opening of the creek is very dangerous when breached as it creates strong standing waves that flow across the beach and can easily sweep visitors off their feet. Safe access to any California beach without obstruction is protected by Article X, Section 4 of the California Constitution¹⁰.



Creek Morphology

Aliso Creek naturally opens once the amount of water reaches a high volume inside of the berm. These natural breaks rarely result in a straight flow to the ocean due to the "side-to-side" dynamics of water flow as seen in this drawing (Figure 1)¹¹. The flow naturally erodes either side of the stream channel, carving out the inner parts of the bank to make up for excess water flow. This is common for dry season flow considering heavy storms that result in a vast creek flushing are considerably rare.

When people break the berm in a straight line to the ocean to surf it, this counteracts the natural flow that all creeks and rivers follow. People are artificially mimicking wet season flow of the creek nearly every single day of the week, which is significantly impacting the wildlife and morphology of the berm and creek area.



Water Flow of Naturally Open Aliso Creek





Figure 1. Natural Creek Flow: Thalweg-Gegenweg Bathymetry

Temporarily open/closed estuaries are seasonally open due to high water volume from winter storms and are closed once the waves create a sandbar that closes off the creek. This natural process is gradual and must be allowed to operate on its own to protect the freshwater wildlife in the creek and allow marine species to enter or leave the creek depending on natural conditions. This gradual flow is a natural occurrence in the dry season and is vital for organisms to adapt to their ecosystem¹².

Anthropogenic processes that act on natural ecosystems at high speeds have been affecting estuaries all across the world. The last dry season Aliso Creek was **not** artificially breached was the Summer of 2018¹³. This was the first time in more than a decade that the creek was able to undergo its natural process as a temporarily open/closed estuary. It is vital for humans to leave this ecosystem alone and allow it to operate under the conditions of its natural processes, rather than to fit human interests.

Additionally, through the natural hydrologic cycle, the creek water is continuously being cycled through inland water flow, evaporation, and infiltration through sediment.

Project Overview

The Aliso Beach Wildlife Habitat Monitoring Program utilizes staff members from Orange County Coastkeeper along with volunteers to document the human and wildlife activities in three survey areas. These include Treasure Island, Aliso Creek, and Aliso Point.

The lack of enforcement in this area has motivated us to pay close attention to activities in the area. Each member had access to the Marine Safety phone number along with CA Fish and Wildlife CalTip to report any violations.



People Viewing the Breached Berm from Steep Cliffs

Oftentimes individuals will park at Aliso Beach and walk across the sand berm to Treasure Island. However, when the berm is broken, crossing from neighboring beaches is very dangerous, especially for elderly people and young children.



Individuals Surfing the Standing Wave



Survey Boundaries

Each surveyor would take 30-minute surveys of wildlife presence and human activity at each site. The data included site conditions, human recreational activities, wildlife presence and behavior, offshore activities, and potential violations and hazards.

Potential violations included:

- Digging out the sandbar at Aliso Creek
- Disturbing wildlife habitat
- Hand collection of biota
- Shore-based fishing
- Off-leash dogs (City of Laguna Beach violation)

The hazards included viewing the breached berm. This is because someone could fall from the steep cliffs of the broken sandbar when approaching it.

Digging out the sandbar and draining it into the ocean can kill organisms living in the sand below the mean high tide line. This is considered "take" under the Marine Life Protection Act of 1999⁴.

Research Assistant Data

Eleven trained volunteers and two staff members took 113 surveys between January 11th, 2024 to December 31st, 2024.

Most surveys were taken at the Aliso Berm and Creek site, forming 55% of the surveys. Treasure Island surveys comprised 25% of the surveys and Aliso Point comprised 20%.

70% of the Aliso Creek surveys listed that the berm was already broken at the time of the survey.



Research Assistant Taking Salinity Samples



Figure 2. Graph of Human Activities

Our surveys recorded 5,475 visitors at Treasure Island, Aliso Creek, and Aliso Point in total. In the Aliso Point, Berm and Creek, and Treasure Island surveys, resting, walking, or playing were the most common recreational activities observed.



Research Assistant Observing Breached Berm



Observing Activities at Treasure Island

Hazards and Disturbances

There was a total of 706 visitors observed to be causing environmental hazards and disturbances. The disturbances to animals and their habitat included breaking the berm to surf it, sliding down the sand cliffs, feeding animals, taking shells or kelp from their natural area, swimming in the creek, and having off-leash dogs. Meanwhile, the hazards included viewing the breached berm. 88% of the hazards and disturbances were found to be recorded at the Berm and Creek survey area while Aliso Point comprised 10% and Treasure Island comprised 2%.



Individual Disturbing Animals by Chasing Gulls

Hazards and Disturbances in Aliso Berm and Creek Area



Figure 3. Graph of Hazards and Disturbances in the Berm and Creek Area

The Berm and Creek area alone faced a total of 621 observed hazards and disturbances. The most common hazard in the critical habitat included viewing the breached berm. The most common disturbance was disturbing animals and habitat. With additional findings that are not included in our graphs, we found that the berm had been breached more than 60 times in 2024. With the help of outside information, we learned that the berm was being broken multiple times a week but we were only able to observe it on-site during structured surveys 26 times. It is important to keep wildlife disturbances to a minimum in the Marine Protected Area to prevent potential damage to these critical habitats.



Viewing Breached Berm



Digging Berm to Surf Creek

Wildlife



Many wildlife species were encountered throughout the year. This included sea lions, harbor seals, terns, gulls, shorebirds, waterfowl, pelicans, dolphins, and birds of prey. It is important to note that many wildlife observations were noted outside of survey times and were not included in the graphs. Additionally, more surveys were taken at Aliso Creek (70%) which caused a perceived increase in wildlife observations.



Harbor Seal Resting at Treasure Island



Wildlife Counts by Site

Figure 4. Wildlife Observations Across the Three Sites

According to our breakdown of the wildlife data collected in 2024, gulls were the most prevalent. Additionally, there were high amounts of birds present at all locations including terns, different kinds of shorebirds, pelicans, cormorants, ducks, coots, egrets, and many more. However, there were a few harbor seals and sea lions spotted at Treasure Island and pods of dolphins at all locations.





A Group of Terns at Aliso Creek

A Pod of Bottlenose Dolphins off Aliso Beach

Wildlife Cont... 🗲



Pair of American Coots in Aliso Creek



Snowy Egret in Aliso Creek

As previously discussed, Aliso Creek and the surrounding areas serve as a crucial habitat for many diverse wildlife species. These wildlife rely on the consistent yet gradual natural patterns of their ecosystem to undergo their natural functions of foraging or reproducing.

As seen in our 2023 report¹⁴, when humans constantly disturb their habitat, they will be less likely to return. These natural resources are meant to prioritize wildlife needs, without negative impacts on their natural processes.

This is why it is important for people to leave wildlife alone, especially in Marine Protected Areas. This means picking up trash, keeping domestic animals on a leash, not taking biota like shells, kelp, or rocks, and most importantly: **leaving wildlife habitats alone**.



Mallard in Aliso Creek



Harbor Seal at Treasure Island



Black Turnstone at Treasure Island



Whimbrel in Aliso Creek

Aliso Creek Water Quality



Our research assistants acquired water quality data from the County of Orange to evaluate the presence of fecal indicators in Aliso Creek while it was open to the ocean. The standards for fecal indicators are created by the USEPA and California State Water Board. The standard for Enterococcus in marine or brackish environments is 110 colony-forming units. A colony-forming unit is defined as a single bacterium or group that can form a visible colony and provides information about how much bacteria is in a given sample.

Our research assistants also gathered salinity data and found that the salinity ranged from **8 ppt-30 ppt** in two different sampling points behind and in front of the Aliso bridge. This tells us that Aliso Creek falls under **brackish** conditions that are defined in salinities from 0.5–35 ppt. With this information, Enterococcus would be the most applicable fecal indicator for this brackish ecosystem.



Figure 5. Salinity in Aliso Creek in Parts Per Thousand



Two salinity sampling points in Aliso Creek via Google Earth



Of the 50 samples collected in Aliso Creek, 17 exceeded bacteria standards, which was 34% of the samples. Meanwhile, 33 samples met bacteria standards, making up 66% of the data.

Education and Outreach 🖊

Starting in January, Project Manager, Christina Giudice held weekly outreach events at Aliso Beach. There was a total of 27 outreach events in 2024. In these events, we obtained 118 educational contacts.

The outreach setup included a Laguna Bluebelt tent along with a Laguna Bluebelt tablecloth, paper mache animals, educational signage, stickers designed by former Project Coordinator Sabrina Medina, informational pamphlets, and a watershed model.

Our materials also included a GIS map that illustrates the Aliso Creek watershed along with high-fire threat areas that depend on the creek as a water source.



Berm Buddies Outreach



Scientific poster presented at the 2024 National Environmental Monitoring Conference by Project Manager Christina Giudice Group of kids playing with the watershed model

Conclusions and Next Steps 🟃

As discussed in our report, it is incredibly important that we respect the wildlife of Aliso Beach by letting nature run its course and reducing negative anthropogenic impacts. This includes taking trash off the beach, respectfully observing sensitive tidepool species, and ensuring not to disturb marine animals and their habitat. It is imperative that we work together to preserve our local natural resources in this ever-changing world. Our Marine Protected Areas not only nurture wildlife but also enhance the enjoyment and quality of life of people who rely on a clean, safe environment.

Everyone should have equal access, use, and enjoyment of the MPA which is why it is vital for us to advocate for a reduction in artificial breaching of the Aliso Berm. This can pose a safety issue and introduce disturbances to wildlife that rely on the freshwater resource for survival. It is our goal to ensure that the temporarily open/closed Aliso estuary continues its gradual cycle and is not "sped up" through anthropogenic means.



Harbor Seals at Treasure Island







Sanderling at Aliso Beach



Black Oystercatcher at Aliso Beach

With additional funding, we plan to have more opportunities to educate beachgoers and study the health of the Marine Protected Area and the freshwater life of Aliso Creek. This will provide more information on how the creek life is being affected by continuous artificial breaching and how we can implement strategies to protect them.

We are hopeful for an ordinance that limits the artificial breaching of the berm so the ecosystem can return to its rightful natural function. We also fully support the estuary restoration project that will enhance the water and habitat quality of the creek to ensure a safe area for wildlife and people alike. Anthropogenic impacts have significantly changed wildlife habitats all around the globe, so let's work together to reduce negative impacts on our few remaining protected coastal ecosystems. We are all responsible for the protection and safety of Laguna Beach's Marine Protected Areas and we should all advocate to keep it a safe environment for wildlife and people.

Acknowledgements

Dedicated to the ocean and to those who vow to protect it.

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The Laguna Bluebelt Coalition brings together organizations and individuals with a common goal of protecting and restoring marine life, conserving biological diversity and maintaining healthy, sustainable marine habitats for all plant, fish and animal species. We promote education of local marine resources and enforcement of environmental protection laws and regulations. The Coalition seeks to provide a forum for communication, relationship building, and public outreach toward the common goals of caring for the marine life environments of Laguna Beach.