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 2025, 235 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. 9,727 visitors were recorded and 584 were observed to be causing hazards and disturbances in the 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 within the Aliso Berm and Creek area.

Aliso Estuary

Aliso Berm

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 Goby.[1] 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 Diego.[3]

[1] U.S. Fish and Wildlife Service (2000) Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Tidewater Goby

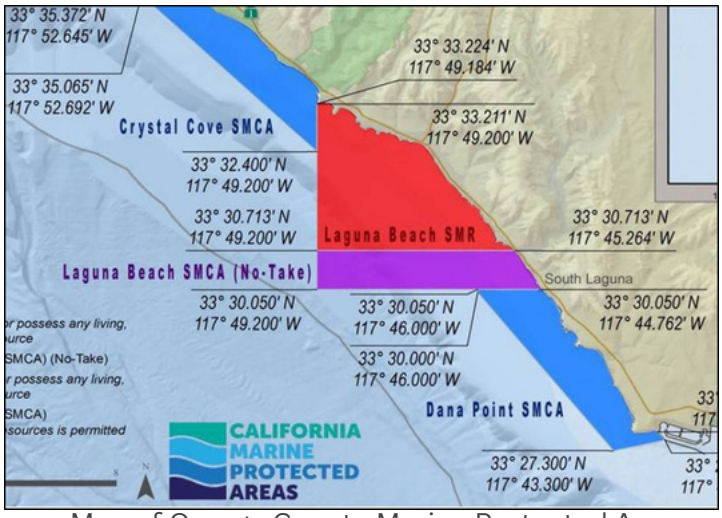
[2] U.S. Fish and Wildlife Service. Tidewater Goby (Eucyclogobius newberryi) | U.S. Fish & Wildlife Service. https://www.fws.gov/species/tidewater-goby-eucyclogobius-newberryi

[3] Swift, C. C., Spies, B., Ellingson, R. A., & Jacobs, D. K. (2016). A new species of the bay goby genus Eucyclogobius, endemic to southern California: evolution, conservation, and decline. PloS one, 11(7), e0158543.

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.



Map of Orange County Marine Protected Areas


Pelicans at Treasure Island


Laguna Beach tidepools

Aliso Beach and Treasure Island both include 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 plans.[5] 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 populations.[6] 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 States[7]. 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 Research Assistants Courtney Rickard or Christina Giudice unless stated otherwise

[4]Executive Order 13158—Marine Protected Areas May 26, 2000. (2000, May 26). GovInfo. Retrieved December 20, 2023, from https://www.govinfo.gov/content/pkg/WCPD-2000-05-29/pdf/WCPD-2000-05-29-Pg1230.pdf
[5]Public Resources Code Division 20 California Coastal Act (2023). (n.d.). California Coastal Commission. Retrieved December 20, 2023, from https://www.coastal.ca.gov/coastact.pdf
[6]Marine Mammal Protection | NOAA Fisheries. (n.d.). NOAA Fisheries. Retrieved December 20, 2023, from https://www.fisheries.noaa.gov/topic/marine-mammal-protection
[7]About the BEACH Act | US EPA. (n.d.). Environmental Protection Agency. Retrieved December 20, 2023, from https://www.epa.gov/beaches/about-beach-act

Creek Disturbance

Over the years, beachgoers have been digging out the sandbar at Aliso Creek, disrupting the natural process of the estuary. Seasonal sand berms are necessary for protecting inland areas from coastal storm erosion and can help mitigate beach erosion.[8] 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 growth.[9] 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.

Path dug through the sand berm by an individual in order to surf the creek

Surfer gets Swept out into Ocean by Standing Wave

Large patch of kelp in creek

Mouth of Aliso Creek after artificial breaching

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.

Additionally, many visitors may become “stranded” on the Treasure Island side of the creek and have to traverse a half a mile north up the beach to street access, and a half a mile back south on PCH to the Aliso Beach parking lot.

[8]Pontiki, M., Puleo, J. A., Bond, H., Wengrove, M., Feagin, R. A., Hsu, T. J., & Huff, T. (2023, September 26). Geomorphic Response of a Coastal Berm to Storm Surge and the Importance of Sheet Flow Dynamics. Journal of Geophysical Research:Earth Surface, 128(10). AGU. https://doi.org/10.1029/2022JF006948
[9]Jose Pedro N. Ribeiro, Ângelo Saggio, Maria Inês Salgueiro Lima (2013) The effects of artificial sandbar breaching on the macrophyte communities of an intermittently open estuary, Estuarine, Coastal and Shelf Science, Volumes 121–122, 2013, Pages 33-39, https://doi.org/10.1016/j.ecss.2013.02.007.

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.

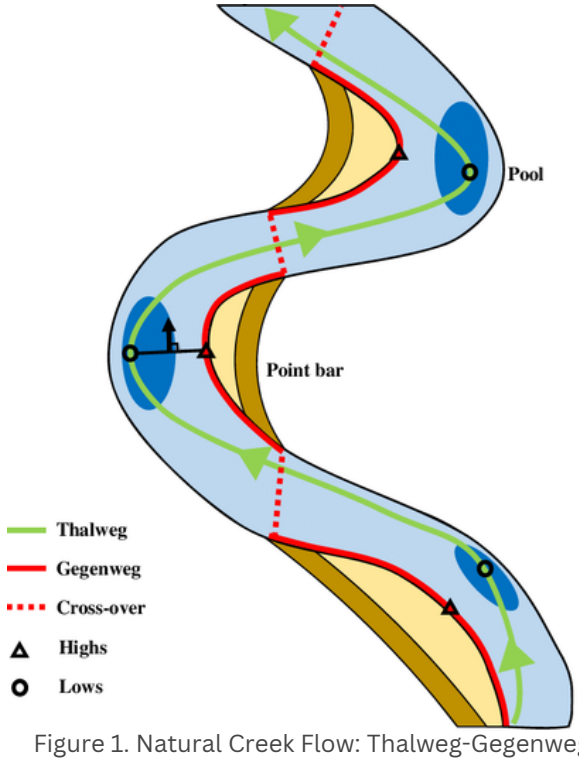


Figure 1. Natural Creek Flow: Thalweg-Gegenweg Bathymetry

Water Flow of Naturally Open Aliso Creek

Significant Drainage of Estuary Post Artificial Breaching Event

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 ecosystem.[12]

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 2018.[13] 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.

[11]Chow, Reynold & Wu, Hao & Bennett, Jeremy & Dugge, Juernjakob & Wöhling, Thomas & Nowak, Wolfgang. (2018). Sensitivity of Simulated Hyporheic Exchange to River Bathymetry: The Steinlach River Test Site. Ground water. 57. 10.1111/gwat.12816.
[12]Naiman, R. J., Latterell, J. J., Pettit, N. E., & Olden, J. D. (2008). Flow variability and thebiophysical vitality of river systems. Geoscience Reports, 340(9-10), 629-643. https://www.sciencedirect.com/science/article/pii/S1631071308000266
[13]Ritchie, Erika. “Aliso Beach berm wasn’t breached over summer for first time in decade, thanks to education, enforcement.” OC Register, 21 November 2018, https://www.ocregister.com/2018/10/11/education-increased-enforcement-keep-aliso-beach-berm-from-being-breached-over-summer-months-for-first-time-in-a-decade/.

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 information surrounding the creek and berm among the public 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.

Issues observed 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 1999[4].

*Executive Order 13158—Marine Protected Areas May 26, 2000. (2000, May 26). GovInfo. Retrieved December 20, 2023, from https://www.govinfo.gov/content/pkg/WCPD-2000-05-29/pdf/WCPD-2000-05-29-Pg1230.pdf

Research Assistant Data

Eleven trained volunteers and two staff members took 235 surveys between January 2nd, 2025 to December 3rd, 2025. Twice as many surveys were taken in 2025 as in 2024 (113 surveys).[7]

Most surveys were conducted at the Aliso Berm and Creek site, accounting for 52% of the surveys. Treasure Island and Aliso Point surveys each comprised 24% of the surveys.

73% of the Aliso Creek surveys listed that the berm was already broken at the time of the survey.

Research Assistants Taking Salinity Samples

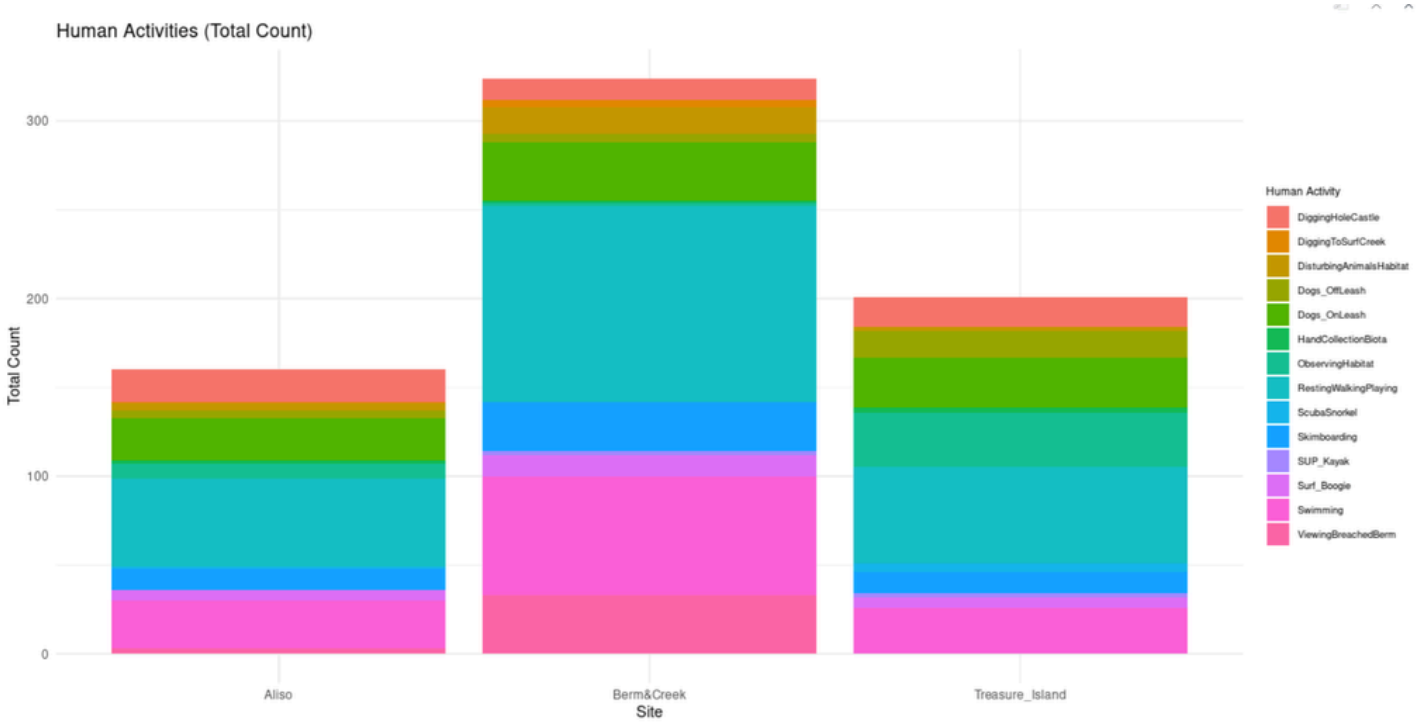


Figure 2. Graph of Human Activities

Our surveys recorded 9,727 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.

Hazards and Disturbances

There was a total of 584 visitors observed to be causing environmental hazards and disturbances. This is a signficant decrease from last year's count of 706.[14] 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 Treasure Island comprised 7%, and Aliso Point comprised 5%.

Individual Disturbing Animals by Chasing Gulls

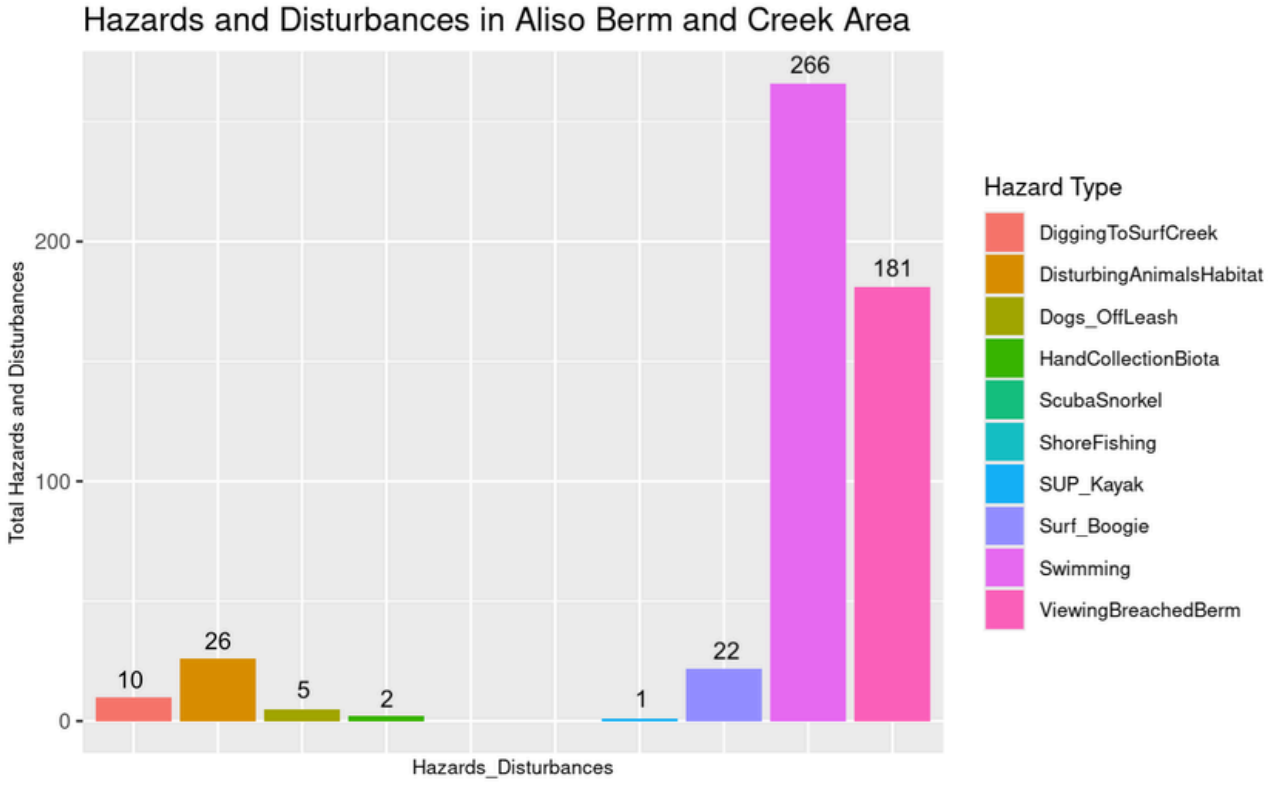


Figure 3. Graph of Hazards and Disturbances in the Berm and Creek Area

The Berm and Creek area alone faced a total of 513 observed hazards and disturbances. The most common hazards in the critical habitat included swimming in the creek and viewing the breached berm. The most common disturbance was disturbing animals and habitat. 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 10 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

[14]Giudice, C. (2024). Monitoring human-wildlife interactions to prevent MPA violations and sandbar breaching. A report of The Laguna Bluebelt Coalition.

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, most of the surveys were taken at Aliso Creek (52%), which caused a perceived increase in wildlife observations.

Harbor Seal Resting at Treasure Island

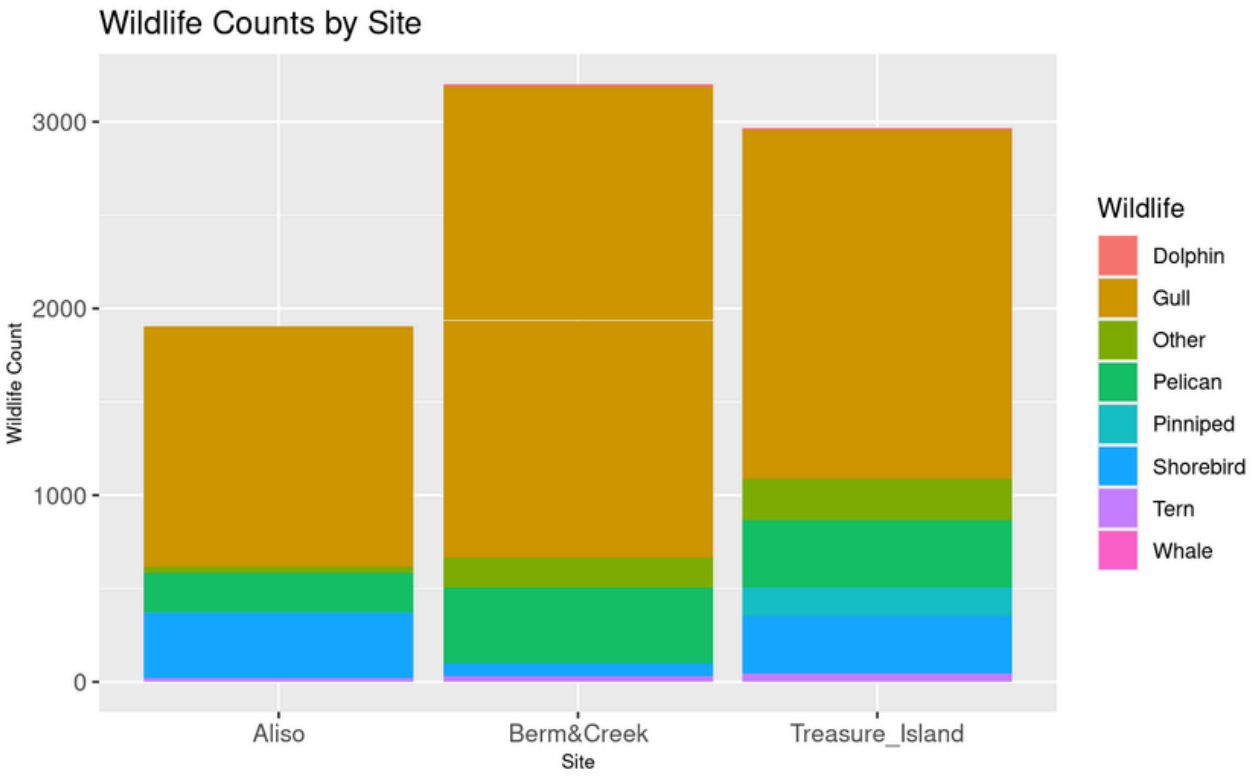


Figure 4. Wildlife Observations Across the Three Sites

According to our breakdown of the wildlife data collected in 2025, 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.

California Sea Lion off of Treasure Island

Western Gull standing in Aliso Creek

Wildlife Cont...

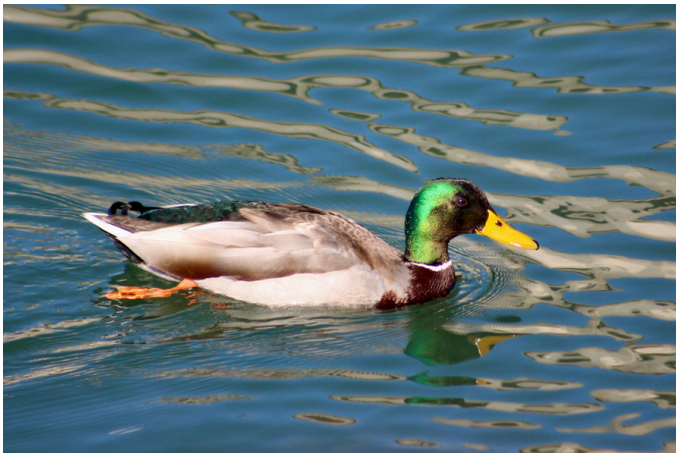
Harbor Seal Resting at Treasure Island

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 report,[15] 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

Dolphin off Aliso Point

Group of American Coots in Aliso Creek

Whimbrel in Aliso Creek

[15]Giudice, C. (2023) Monitoring Human-Wildlife Interactions to Prevent MPA Violations and sandbar Breaching. A report of The Laguna Bluebelt Coalition.

Aliso Creek Water Quality

Data collected by the County of Orange in 2025 indicate that the mouth of Aliso Creek met water contact recreation standards 84.2% of the time while the creek was open to the ocean.[16] This level of compliance suggests that although water quality conditions were suitable for recreation during a majority of sampling events, exceedances of bacterial standards occurred with sufficient frequency to indicate periodic impairment at the creek mouth.

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.

Permanent sign posted at the mouth of Aliso Creek

Figure 5. Salinity in Aliso Creek in Parts Per Thousand

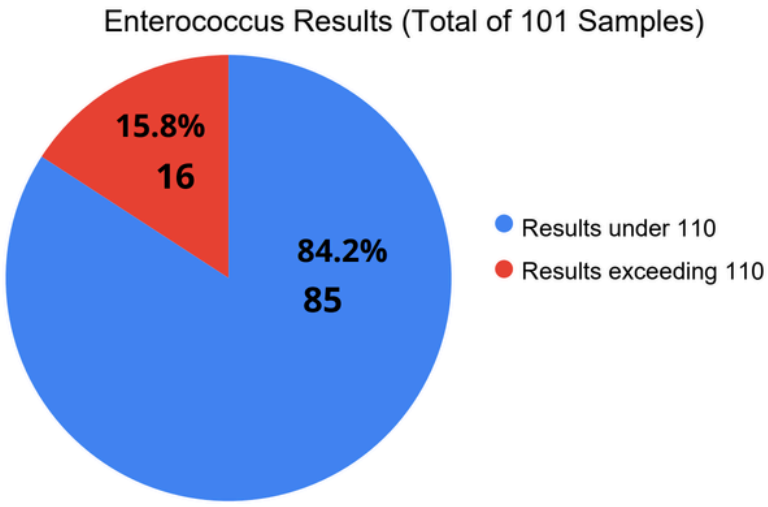


Figure 6. Graph of Enterococcus Samples in Aliso Creek

Our research assistants also gathered salinity data and found that the salinity ranged from 5 ppt-25 ppt 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.

Monitoring of Aliso Creek is ongoing as part of the County of Orange's long-term surface water quality assessment program. The 2025 results therefore provide an important baseline for interpreting future data and emphasize the need for continued monitoring to assess potential public health implications at the creek mouth.[14]

[16]County of Orange. (2025). Surface Water Quality Monitoring Program: Water Quality Data. County of Orange. Retrieved from https://ocgov.app.box.com/v/SDRWaterQualityData
[14]Giudice, C. (2024). Monitoring human-wildlife interactions to prevent MPA violations and sandbar breaching. A report of The Laguna Bluebelt Coalition.

Education and Outreach

Starting in January, Project Manager, Courtney Rickard held weekly outreach events at Aliso Beach. There was a total of 17 outreach events in 2025. In these events, we obtained 133 educational contacts.

The outreach setup included a Laguna Bluebelt tent along with a Laguna Bluebelt tablecloth, paper mache animals, educational signage, Laguna Bluebelt pins, stickers designed by former Project Coordinator Sabrina Medina, informational pamphlets, and a watershed model. Research Assistants created more interactive materials, such as “fish puppets” designed for increased interactions amongst the youth.

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.

Along with educating the public on the importance of watershed health, Marine Protected Areas, estuary conditions, and simply letting nature take its course, this project provides a unique opportunity for college students and young professionals to get hands-on experience in handling scientific equipment and ecosystem monitoring.

Berm Buddies Outreach Signage

Group of kids playing with the watershed model

Outreach setup including GIS map, brochures, magnets, pins, and postcards

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.

Harbor Seals at Treasure Island

Waves Crashing at Aliso Beach

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.

Group of gulls in Aliso Creek

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.

Thank you to Mike Beanan, Jinger Wallace, and Ray Hiemstra for pouring your support into the Berm Buddies project and encouraging us to become stronger advocates for marine life. Thank you to all of our wonderful volunteers and Orange County Coastkeeper interns. Thank you to the City of Laguna Beach and the Laguna Beach Rotary Club for the financial support of the project, giving us the ability to share more educational resources with the public. Lastly, thank you Orange County Coastkeeper and the Laguna Bluebelt Coalition for your endless support and advocacy of marine health and safety.

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.

Laguna Bluebelt

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