

PACIFIC **Currents**

WINTER 2025



Marine Species Report Card

Learn about the first-of-its-kind Marine Species Report Card.

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LETTER FROM THE CEO

Taking Action Together is the Answer

Thoughts on the magnitude of the Marine Species Report Card from our CEO.

Santa Ana wind gusts up to one hundred miles per hour. Ocean water at bathtub temperatures. Tornados in places that do not have tornados. The main plotline: the Earth finished its hottest year in recorded history on December 31, 2024. This all sounds like a dystopian future for which we have no answers. But we do have answers. In 2024 coal-power output in the United States fell to its lowest level in sixty years. Communities rally together following unnatural disasters such as the recent Los Angeles fires or the floods from Hurricane Helene in the southeastern United States. Over one-hundred countries support the idea of a legally binding international accord to reduce marine plastic pollution.

Paying attention, being prepared, and taking action together is the answer.

In this *Currents* issue, you can learn about the inaugural California Marine Species Report presented by the Aquarium of the Pacific. It brought together over two dozen marine biologists to assemble population data for thirty iconic California marine species. This is paying attention. Using consistent, long-term monitoring data, we can see that the efforts to recover giant sea bass are paying off. We can also see the steady decline of white abalone, which has caused this species to be the first marine invertebrate to be federally listed as endangered.

But the biggest value of the Report Card project is not what we can learn from it today, but what it can offer five, ten, and twenty years from now as our planet—and the ocean—is buffeted by one environmental disaster after another.

The pace of climate change and the crescendo of the extreme events that result from a warming atmosphere have caught even the most alarmist climate scientists off guard. We do not know what awaits us. Drones, satellites, and artificial intelligence are drowning us in gigabytes of environmental data, but do we know if California mussels are showing signs of population decline due to hot temperatures? Is there any hint in the data that a warmer ocean will alter the relationship between sardines and anchovies?

Data on temperature, ocean acidity, dissolved oxygen, heavy metals, chlorophyll, and an almost unlimited library of physical and chemical variables that define our ocean and planet are more available than ever before. But what about species?

When we talk about nature, it is not measurements of nitrogen, carbon dioxide, sediments, chlorophyll or any of a myriad features of the chemical and physical environment that motivates us. It is the plants and animals that inspire us. Laboratory studies can help, but only natural history observations and monitoring in the wild natural world can tell us how we are impacting ocean life.

Our dream is for the Report Card to inspire community scientists, researchers, and private and public funders to sustain and expand

long-term monitoring of California marine species. Monitoring for monitoring's sake is a hard sell. The monitoring in the Report Card is designed to detect system changes and fundamental shifts in how species relate to one another and to us.

Species have cultural and economic value as well—and the more we can connect the public to our Report Card, the more likely the public is to support or volunteer for conservation.

It is up to us what happens to the species with which we share our iconic California coastline. As a friend once told me, “we are the cavalry.” Knowing how these thirty species are doing is the first step to making sure we do not unwittingly allow any to disappear from our shores for lack of attention.

Thank you for your support as a member that allows us to do important work like the Marine Species Report Card.

Peter Kareiva

Dr. Peter Kareiva joined the Aquarium of Pacific in August 2020. He holds a B.A. in zoology, M.S. in environmental biology, and Ph.D. in ecology and evolutionary biology. He is committed to science that engages the public and believes that connecting to nature is the one thing that can overcome the deep political and social divides that plague the nation today.



FRESH VOICES

From Childhood Visits to Aquarium Contributor

A student pursuing marine biology describes their journey from an Aquarium visit to helping synthesize data for the Marine Species Report Card.

As a child, I always held a fascination with the natural world. I spent countless hours outside collecting samples of leaves and rocks, while trying to observe different animals. I also checked out countless books from the library to educate myself on different organisms and environments.

I remember the first time I visited the Aquarium of the Pacific for a field trip in elementary school, and my excitement seeing what I was reading about in my books come to life in front of me. When I saw the diver in the Honda Blue Cavern interacting with the giant

sea bass, I thought “Yup, this is it. This is what I am going to do.” That visit sparked my passion for marine life, fueling my desire to understand and protect marine ecosystems.

The Aquarium provides a unique privilege to engage with marine life up close, cultivating a sense of stewardship and appreciation for the ocean. Each animal in those carefully crafted exhibits serves as an ambassador for their ecosystem, allowing a glimpse into their world.

Today, our oceans are under threat from climate change, habitat destruction, and overfishing, making it more critical than ever to understand how species are faring in the wild. Recognizing their status isn't just about conserving marine life; it's also about preserving the health of our planet.

When I had the opportunity to work on the Marine Species Report Card project, it felt like a natural extension of my passion and a chance to contribute to a resource that would connect the public with iconic marine species and inspire action to protect them.

Working on this project allowed me to connect with a team of marine experts across different fields. Being able to collaborate with such knowledgeable individuals, with each one contributing their own unique perspective, was a rewarding experience that emphasized how powerful diversity is in science.

Every person with their own expertise and background worked together to create a resource to further connect the public to the chosen marine species. It was a privilege to be a part of this team and to witness firsthand the formation of this Report Card through scientific collaboration.

As the project evolved, so did I. Though initially brought onto the team to help gather and analyze data for fish, I also had the opportunity to apply my skills in programming languages such as R and data analysis to help with the analysis of other marine species that were not my initial focus. I even learned how to make shiny web applications while working with the data and trying to find a way to visualize it.

It was a challenging but rewarding experience that allowed me to grow and further build upon my skills in programming, data

analysis, and understanding the life history of marine species. These are not just tools for this project, but they also serve as a foundation for my growth as a marine biologist. Beyond the technical skills, I also deepened my appreciation for public outreach and conservation, recognizing how these efforts bridge the gap between science and community.

The Marine Species Report Card project is an important tool to foster connections between the public and the marine species that exist in our oceans. It can not only be used as an educational tool, but it can also empower people to take action.

I am excited to inspire awareness of these iconic species, the status in the wild, and the steps that can be taken to assist in their recovery. It has been a privilege to be able to collaborate on this team and to build skills and support that can help me in my career as a marine biologist.

Natalie Shubin

Natalie Shubin is a biology graduate student in the Claisse Lab at Cal Poly Pomona. She is currently working on using sonar data layers to quantify habitat characteristics of artificial reefs. After graduation, she plans to work in the field of marine conservation and biology.



CONSERVATION CORNER

Legislation Works: How Conservation Laws Have Saved Species

Read about the various legislation related to protecting animals and the environment.

Biologists observed several hundred nesting pairs of California brown pelicans lay nests on West Anacapa Island, California in the spring of 1970. Normally, brown pelican eggs have a 70 percent chance of hatching, but this year only one chick survived.

What happened? DDT and its bioaccumulation in pelicans is what happened. Because of DDT in their tissue, pelican eggshells were thin and prematurely breaking. DDT interferes with calcium deposition and egg development in all birds, but fish-eating predators such as pelicans are especially prone to accumulating the pesticide.

That year, it was not just brown pelicans whose eggs were cracking due to DDT - so too were the eggs of the American bald eagle, ospreys, the golden eagle, peregrine falcons, and white pelicans.

Without successful reproductions, populations of these predatory birds were plummeting, and extinction was an imminent possibility. Biologists and policymakers alike charged into action.

In 1966, Congress passed the Endangered Species Preservation Act. This created pathways to identify animals and plants as endangered or threatened and to establish protection measures to recover their populations. Brown pelicans were listed under the Endangered Species Act (ESA) in 1970.

Years later, DDT was banned throughout the United States by the Environmental Protection Agency. Many people thought the action was too late or a lost cause. But it wasn't.

In the 1980s, brown pelican nesting success increased with an average of 900 nest attempts on Anacapa Island in Ventura County; this grew to an average of 4,600 annual nest attempts over 1985 to 2006. Then in 2009, the population was so robust the species was removed from the ESA list, or 'delisted.' At present there are over 70,000 nesting pairs throughout the state.

In 1967, the ESA's first year, 78 species were listed: 14 mammals, 36 birds, 3 reptiles, 3 amphibians, and 22 fishes. In 1973 this evolved law into the Endangered Species Act, which still is in place today.



A gray whale breaching

The ESA benefited several other iconic marine species found off the coast of California. Gray whales were also listed under the ESA in 1970. Commercial whaling had knocked their population down to an estimated low of 4,000-5,000 in the Eastern North Pacific.

Targeted recovery strategies were deployed to reduce the number of whales killed annually and rebuild their population. These included boat distance requirements, shifts in shipping channels, and fishing gear restrictions. The success of the measures was so significant for gray whales in the Eastern North Pacific that they were 'delisted' in 1994.

This is wonderful progress, but more should be done to continue to protect gray whales. Changing environmental conditions including reduced Arctic sea ice and warming waters are affecting gray whale food; researchers have documented that this change in food can result in gray whale emaciation, shifted migratory timing, and diminished reproduction. Ongoing protections will help build resilience against this future change and contribute to preservation of the population.

Gray whales and California pelicans have recovered because the ESA law specifically singled out these species for protection. Conservation laws can also protect areas or habitats as opposed to species. Passed in 1999 the Marine Life Protection Act (MLPA) is an area-based conservation regulation requiring the state establish a statewide, science-based network of marine protected areas (MPAs).

Over the course of eight years, the state solicited input from the public on where to establish MPAs, or zones in the coastal waters where certain activities, such as fishing, are limited or prohibited. MPAs are a tool that benefit dozens of species at one time in a particular location, and when established as part of network, they amplify their benefits to a larger region.

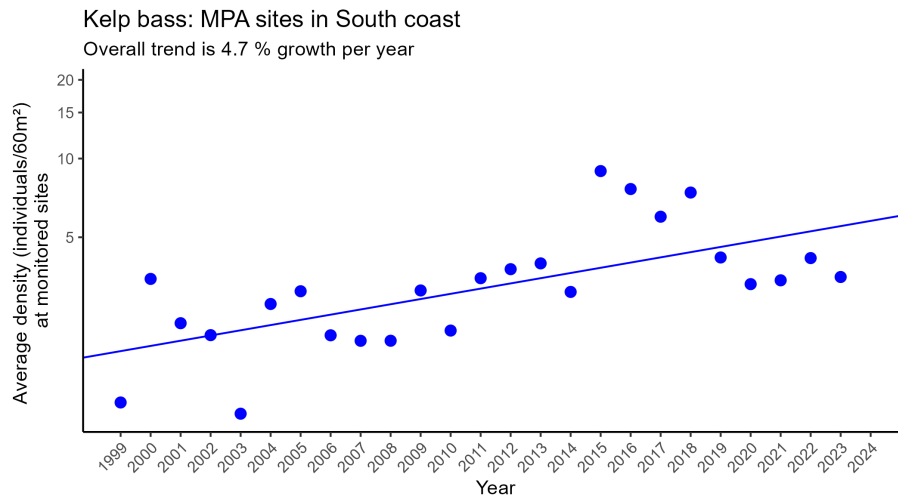
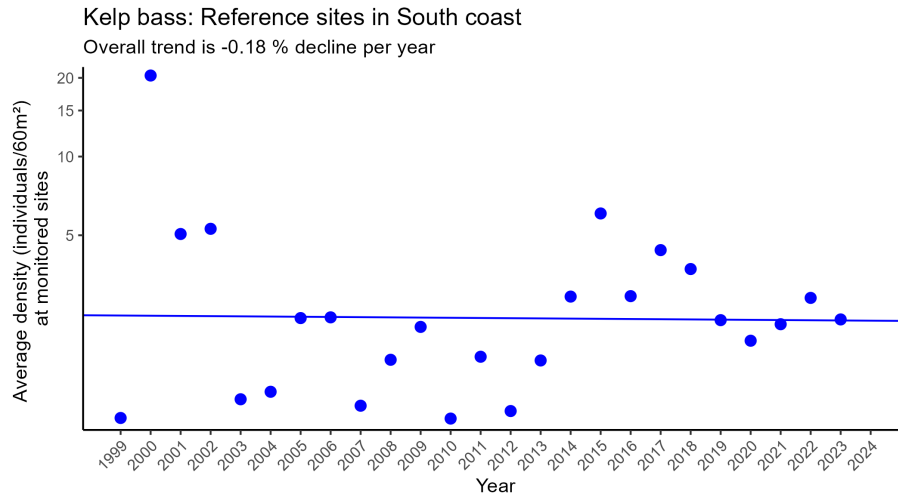
A network of 124 MPAs covering 16 percent of California's waters was the result. Monitoring of key indicators was conducted within and outside of these MPAs. A decadal review – compiling and summarizing all those data – was released in 2023. It showed the MPAs are supporting bigger and/or more abundance fish and invertebrate populations, with variation by region.

Some MPA areas also showed signs of greater resilience and quicker recovery to the marine heat wave of 2013-14. The Aquarium's Marine Species Report Card uses some of the MPA monitoring data in its accounts on California sheephead, Garibaldi, kelp bass, purple sea urchin, and California spiny lobster. When you compare counts from inside a protected area and outside you can see the impact: inside has more.



Kelp Bass

The California MPA network is monitored regularly through series of surveys which count species at fixed locations within and outside of but adjacent to MPAs. The plots below show the data collected for kelp bass in the south coast of California at MPA sites (top chart) and outside, “reference sites” (bottom chart). The data show that since 1999 kelp bass are increasing within MPAs (4.7% growth trend) whereas in adjacent reference sites their populations are mostly stable.



These stories demonstrate the power of laws and regulation in rebuilding populations of species. Regulations' effectiveness is often conditional on other factors, including simultaneous deployment of other conservation strategies and patience. Recovery of species is rarely immediate, but there is hope for the future.



FEATURED ARTICLE

Marine Species Report Card

A first-of-its-kind Report Card serves as a resource to better understand and motivate protection for key marine species in Southern California.

Known as the king of the kelp forest, the iconic giant sea bass was once abundant off our coast. But their docile nature and large size made them the prized catch. Years of overfishing decimated their populations by the 1970s. To save them from impending extinction, they were officially protected in the 1980s.

Monitoring and other efforts by government agencies, non-profits like the Aquarium of the Pacific, and even the diving community helped us see their slow but steady recovery. Protections proved successful in bringing back the giant sea bass from the edge of extinction.

Knowing which species need this type of intervention requires knowledge of their population. Just like in the case of this gentle giant, if we know a species is declining, we can take action that can make a difference in their survival.

While an abundance of monitoring exists for our local habitats for air and water quality, comparatively little is known on how individual species are faring in the face of climate change and other threats. Understanding the population of individual species is key...allowing us to take action before it reaches the brink of extinction.

Conservation for Local Species with the Report Card

The Aquarium of the Pacific has become a steward of the natural world in our own community through inspiring, educational exhibits and a variety of conservation programs from sea turtle rehabilitation and release to caring for rescued sea otters. To further our conservation efforts and meet this important informational need on local species, the Aquarium launched its first Marine Species Report Card on February 6.

The report card combines the work of scientists, researchers, government agencies, and others to assess the status of thirty key California coastal species.

The list includes marine mammals, birds, invertebrates (animals without backbones), fish, kelp, and more. The report card is on the Aquarium's website with photos, facts about the species, information on the threats they face, and an arrow icon that indicates the population trend of each animal and whether it is increasing, declining, or stable.

To create this in-depth report card, the Aquarium formed a team of collaborators from more than a dozen institutions. The report assesses the individual species population trend through publicly available, index site monitoring and is supplemented by stories on the effectiveness of legislation like the Endangered Species Act of 1973, the establishment of marine protected areas, and other protections.

In-Depth Information on Animal Species

Each page outlines threats affecting each species based on peer-reviewed literature. Threats include climate impacts, habitat loss and degradation, food web imbalance, human disturbance and harassment, pollution and disease, and extraction. The most widespread threats across the thirty species are under two categories: climate impacts and pollution/disease.

Among the species covered, several provide interesting stories on threats, successes, and failures, and what we can do to help.

Southern sea otters, gray whales, and the California brown pelican have experienced a significant recovery and are among the eighteen out of the thirty species on the report card with population trends that are either stable or increasing.

Twelve out of the thirty species on the list are experiencing population trend declines that are cause for concern and further protection. These include giant kelp, bull kelp, sunflower sea stars, and white and black abalone. The Aquarium has been working to help many of these species. Some of our conservation projects include growing and outplanting endangered white abalone and for future restoration efforts in the wild, preserving bull kelp and raising baby sunflower sea stars.

Restoring California's Coastal Ecosystem

The report card serves as a valuable tool for the public and policy makers, especially students and teachers, to better understand our ocean neighbors and serve as a motivation for sustained protection measures.

Our hope is that this resource will inspire people to support conservation efforts in a variety of areas from engaging in science to promoting environmental legislation.

To assess changes to populations of species, long-term monitoring programs are vital as are programs to restore California's coastal ecosystems. The species depend on the habitats they live in, and we—as people—depend on these species. With knowledge is power...power to save a species before it reaches a critical point.

To learn more, visit the Marine Species Report Card online and visit the Aquarium to see over a dozen of the species included in the report, including the iconic giant sea bass that proves nature can recover with a little knowledge and a helping hand.





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Animal Updates

Read about a new animal added to the Tropical Reef Habitat.

Caring for Crustaceans with Creativity

An aquarist cares for crabs in need of new shells in a new, inventive way, by using non-toxic epoxy, molding, and paint.

Aquarium of the Pacific Releases Rescued Green Sea Turtle Into the Wild After Surgery and Rehabilitation

The sixty-pound turtle was rescued earlier this month with a fishing hook in its right shoulder.

Aquarium of the Pacific Releases Rehabilitated Loggerhead Sea Turtle Off the Southern California Coast

The Aquarium is also announcing the construction of a new space to help rescued sea turtles and invites the public to help support the cause.

Helping Sharks through Ground-Breaking Research

Aquarium study shows how ultrasounds can be used to evaluate zebra shark eggs and embryos, which will play a role in efforts to reproduce and repopulate this endangered species.



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Philanthropy Highlights

Creating a Legacy Through Planned Giving at the Aquarium of the Pacific.

The Power of Planned Gifts

Planned gifts are transformational commitments that create lasting waves of change.

These thoughtful donations serve as powerful catalysts for the Aquarium of the Pacific's greater purpose to protect and preserve our ocean ecosystems while educating future generations about marine life and conservation.

When you make a planned gift to the Aquarium, you're not just making a donation – you're investing in the future of our oceans and enabling the Aquarium to:

- Maintain and enhance our world-class marine habitats

- Develop innovative science-based educational programs for children and adults
- Advance crucial species-specific conservation efforts and initiatives
- Ensure long-term financial stability for our mission-critical work
- Support rescue and rehabilitation efforts for marine animals

The Nautilus Society: A Community of Vision

The Aquarium of the Pacific's Nautilus Society recognizes individuals who are committed to including the organization as a beneficiary in their life insurance, IRA, living trust, will, or other planned gift instruments.

Named after the remarkable nautilus, whose shell represents both natural perfection and perpetual growth, our Nautilus Society celebrates individuals who have chosen to include the Aquarium in their estate plans.

This group of approximately 50 dedicated supporters comprises of longtime volunteers who have dedicated countless hours to our mission, current and former employees who believe deeply in our work, Board members and Trustees of the Pacific who provide vital leadership, and marine education advocates and ocean conservation champions.

Members of the Nautilus Society receive distinguished recognition through multiple channels. Their enduring commitment is honored on our dedicated Aquarium walls, featured prominently on our website's donor recognition page, and celebrated at exclusive annual events designed to showcase their invaluable support.

Creating Lasting Legacies

Each planned gift tells a unique story of passion for our ocean waters. Whether it's supporting our penguin habitat, funding our endangered sea turtle rescue efforts, or enabling student education programs, these gifts create enduring impacts that last through generations.

How to Begin Your Legacy Journey

Explore Your Options: Visit our planned giving website. Here, you'll find detailed information about giving options, gift planning calculators, sample bequest language, stories of impact, and frequently asked questions.

Consult Your Advisors: Discuss your charitable goals with your financial, legal, and tax advisors to determine the best giving strategy for your situation.

Contact Us: Our development team is ready to help you explore ways to create your unique legacy while supporting the causes you care about most.

Join the Nautilus Society: Once you've included the Aquarium in your estate plans, let us know so we can welcome you into this special group of supporters.

Already included us in your estate plan? Let Us Know. For personalized assistance with planned giving options, please contact Ryan Ashton, vice president of development, at rashton@lbaop.org.

The information provided is not intended as legal or financial advice. We encourage you to consult with your own attorney, financial advisor, and other qualified professionals when considering any planned giving options.



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Aquarium Accolades

Read about Aquarium honorees from our community.

Moompetam Festival

Virginia Carmelo was honored at the Aquarium's Moompetam festival in September 2024.

She is dedicated to supporting and uplifting the indigenous community through activism and using language, song, and dance to preserve and perpetuate Tongva culture. Carmelo has served as a tribal council member and tribal chairperson of the Gabrielino/Tongva Nation of the Los Angeles Basin for over a decade.

Baja Splash

The House of Puerto Rico, San Diego was the honoree at the Aquarium's Baja Splash festival in September 2024.

The nonprofit organization is dedicated to cultural preservation, inclusivity, and making a positive community impact. Their work includes providing disaster relief assistance for Puerto Rico after hurricanes Maria and Fiona, a youth scholarship program, and bringing people together to celebrate and preserve Puerto Rican culture through La Casita (museum) in San Diego and its events and programs.

Southeast Asia Day

Soup Pha was honored at the Aquarium's Southeast Asia Day in October 2024.

He is a Khmer, Lao, and Thai multi-international recording artist signed with Sastra Music and Film of Cambodia and SG music. He serves on the committees for the Asian World Film Festival, FilAm Creative's Southeast Asian representative, and Long Beach Sankranta. His philanthropic work includes actively supporting Southeast Asian community events throughout the world, doing so since he was 12 years old. Pha performed a song he wrote for the Aquarium called "Ocean Family" during the ceremony.