After the Fact | What Sea Lions Reveal About Ocean Health

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TRANSCRIPT

Matthew Gribble, associate professor, University of California, San Francisco: Animals, humans, and the environment are all kind of interconnected. And a sentinel species is something that we can look to to get a picture of what's going on in the environment and give us kind of an advanced warning of—if there's something that could be a concern to people.

Benny Martinez, host, "After the Fact" podcast: Hey everyone. Welcome to "After the Fact." For the Pew Charitable Trusts, I'm Benny Martinez.

Now, a few episodes ago, I spoke to experts in San Francisco about harmful algal blooms, better known to us lay folks as red tide. And we learned about their impact on human and marine health.

Matthew Gribble, who you just heard at the top of the episode, is a researcher at the University of California, San Francisco. He's also a 2026 recipient of the Pew-Hoover Fellowship in Marine and Biomedical Science. And he walked us through the effects of domoic acid, which is a neurotoxin produced by certain harmful algae. It can build up in marine life and cause some pretty bad health effects.

Gribble also told us about sentinel species that can alert us of emerging environmental concerns. Now, these animals, like the California sea lion, are affected by these kinds of environmental changes. And when I was in San Francisco, I spoke to people from The Marine Mammal Center who rescue and rehabilitate sick, injured, and abandoned animals on the coast. The center is the world's largest marine mammal hospital.

Giancarlo Rulli, associate director of public relations, The Marine Mammal Center: The ocean is more stressed than it's ever been. Through these animals, especially sea lions, they offer us a readout in real time into the health of the ocean.

Benny Martinez: That's Giancarlo Rulli from The Marine Mammal Center, who told us that they're anticipating an increase in rescues this fall.

Giancarlo Rulli: Right now, off of Santa Cruz County, the parts per million of *Pseudo-nitzschia*, which is the primary algae connector for domoic acid, is off the charts, off the

charts. It's among the highest rates I have seen in two decades. And typically, there is a bit of a delay by the time that works its way up the food chain to a top predator like a sea lion.

Benny Martinez: And that delay meant that by September, The Marine Mammal Center was receiving more than 500 calls and reports every day about animals needing assistance. That's much higher than usual, and we're told it's because they were dealing with a serious outbreak of domoic acid toxicosis. That's a dangerous condition caused by prolonged exposure to the neurotoxin that's created by this harmful algae.

To learn more about this illness and how it affects marine mammals like seals and sea lions, we spoke to Cara Field. She's a veterinarian and the director of conservation medicine at The Marine Mammal Center.

Cara Field, director of conservation medicine, The Marine Mammal Center: I started out here as a volunteer even before I got into veterinary school, so that introduced me to this world of amazing people who are already not just helping animals but really investigating what was wrong with them.

In veterinary medicine, you have patients, but, with wildlife, you have the environment. We don't know their background. They don't come with a history. So, I've always loved trying to understand and piece together, Why are they showing up on the beaches sick and injured? What is happening at the high level?

Benny Martinez: And it's that curiosity that drove Cara and her team to the realization of the real harm domoic acid was having on marine mammals.

Cara Field: The first year that I started volunteering here at the center was in 1998. And that was the year that the impacts of domoic acid were really characterized in marine mammals, in sea lions specifically. Because that year, over 400 of them washed ashore along California with seizures and other apparent neurological abnormalities. And we were looking for viruses and other diseases that would be driving this.

Eventually it was like, "Oh, this is a biotoxin. And oh my gosh, they get it from eating these fish that are infected because the fish eat the algae." And suddenly, it's like, this is a huge event. This has a massive impact on animal health, and also, humans were impacted before sea lions were. That was described in people that ate contaminated mussels.

And so this is not just an animal problem; this is a human problem as well.

And because domoic acid and other harmful algal bloom toxins can get into the human food chain, because we also love seafood, that suddenly becomes a massive threat.

Understanding what the effects of these toxins are on the body, both marine mammals and seabirds—other people are studying seabirds—and humans, is really important in understanding the risks to all of us.

Benny Martinez: But unfortunately that situation's gotten worse over time.

Cara Field: We now see—instead of just every couple years a big bloom, we see them every year. So, the urgency and the need to understand what's happening and why has become so critical. It's not just a, hey, we're seeing, you know, a handful or a couple hundred animals die every year. We're seeing animals being affected year-round.

And we're seeing, economically, the fishers and folks that eat seafood are very heavily impacted because we shouldn't be eating the contaminated seafood.

Benny Martinez: Here at The Marine Mammal Center, you focus on animals specifically and their exposure to this domoic acid. I'm curious if specific species are maybe more susceptible, more vulnerable, depending on their diet.

Cara Field: So, in the food chain, it starts in algae. Various different fish eat the algae, especially during a bloom at the surface.

Benny Martinez: Right.

Cara Field: And as the algae fall throughout the water column, the different levels of animals that are consuming that algae get affected.

So, we see it very commonly in anchovies, for example. But we've also measured plenty of domoic acid—and in the *Pseudo-nitzschia*, the algae that produces it—in squid and a whole variety of other fish. So, it's not just a, you know, one size fits all.

And then animals like sea lions and many whales, like, mass feed on these big bait balls of, like, anchovies. And they end up ingesting a really concentrated amount in that big feeding event. And that's what seems to be one of the biggest problems, is that they get a whole bunch of it at once, and then over the next hours and days, it really, it really hurts their systems and they end up having seizures. They may die at sea. The lucky ones wash ashore and potentially could be rescued and provided supportive care. But for many, it's too late, the damage has already been done, and their brains and hearts, especially, are strongly affected and permanently damaged.

Benny Martinez: You're obviously here at, at least preparing for some increased level of domoic acid in some of the animals that come in. But over your time here, how have things progressed? What has been your experience in that end?

Cara Field: We see a lot of animals that were impacted. They seem to recover, but then they develop brain damage later. And so, we get those animals washing ashore year-round. And they're skinny, and they're hungry, and they're confused, and they have epilepsy. And so, we can't always tell that—they don’t have domoic acid in their system anymore. And to fatten them up and release them back in the wild is just inviting them to wander and die with a lot of potential pain and suffering.

That's a big thing for us, is this chronic condition that we see. And how is that impacting not just the sea lions that show up at our doorstep, but in the ocean, how many animals are really being affected? What about the whales? What about the seabirds? All these other species that we know have been—have succumbed to domoic acid poisoning.

Benny Martinez: We were able to visit the pathology lab where they perform necropsies, which is essentially an animal autopsy. And the center also has an onsite biomedical lab equipped with advanced testing tools, and that allows the team to confirm the presence of domoic acid.

What do people who, maybe this isn't on their radar, what do people need to know about this, if they're seeing sea lions on shore?

Cara Field: When people see an animal that's washed ashore that seems like it might not be quite right, if it seems sick or injured, call the professionals so that we can come and hopefully assess it and take care of it and figure out why it's there.

Sometimes it's a seizure. Sometimes they're in a coma. Sometimes it can cause aggression. If they are aggressive, that can be really scary, and that can hurt somebody. So again, stay away from them. They're already sick, so give them space.

Benny Martinez: Yeah. Do not disturb.

Cara Field: And then call the professionals.

Benny Martinez: And that's where The Marine Mammal Center comes in. They're the professionals.

I got to see most of the facility up close while, of course, keeping a safe distance from the marine mammals they work with.

Giancarlo Rulli: So we have animals on watch. We're maybe following entanglement animals that are traversing a couple hundred miles of coast.

Benny Martinez: Along the way, Giancarlo, who in addition to being their associate director of public relations, also doubles as a longtime volunteer, told us a little bit more about their work.

Giancarlo Rulli: Between our 600 miles here and in Hawaii, we have about 1,400 active volunteers, me being one of them, and about 140 staff spread out between California and in Hawaii.

Benny Martinez: How do animals come to be in your care?

Giancarlo Rulli: We have a fleet of response volunteers spread out across our 600-mile California response range. We get upwards of 22,000 calls to our hotline every year. It's the busiest hotline on the West Coast.

The public is our eyes and ears. And then we make, kind of, determination in the field: Is it resting? Do the vets deem it worthy, based on photos and video with our responders in the field, whether a rescue is necessary? We have trained response volunteers that are basically performing rescues in consultation with our veterinary staff and our dispatchers daily.

Benny Martinez: Giancarlo told us about the variety of animals they work with at The Marine Mammal Center.

Giancarlo Rulli: The northern elephant seal sound is pretty iconic for this time of year.

We've done “How to Train Your Dragon.” We work with Lucas Studio a ton, in terms of mixing down sound.

Uruk-hai in Lord of the Rings are from here.

Benny Martinez: And I'll warn you, I did rewatch Lord of the Rings after this, and you can't unhear the seals. Somehow the battle scenes aren't as intense when all you hear are seals calling for more fish.

And speaking of feeding the animals, we were told we had to keep a safe distance during mealtime to prevent them from becoming, you know, too accustomed to humans.

And we're told that that could actually make it more difficult for their release back into the ocean.

Giancarlo Rulli: With the sea lions, we have to be a little more firm in terms of making sure that we're preventing habituation because the imprint capability for young California sea lions is quite high. There's boards that are there, not only for our protection but to mask our likeness.

Benny Martinez: And Giancarlo told us more about how the center operates, especially during domoic acid outbreaks, which can get very busy for the team.

Giancarlo Rulli: In past years, like in 2015 during the height of the crisis, we had 290 animals on site at one time. That's like, 10 to 15 animals a pen.

We have about 90 right now, which is busy, but a lot of these volunteers have never experienced what it was like.

Benny Martinez: How many animals here are here because of red tide?

Giancarlo Rulli: What's complex about domoic acid poisoning is that, like, for the last six to seven years, we've been in a La Niña pattern, and everybody associates or publicly thinks that warm water temperatures equals red tide domoic acid poisoning, and that's not always the case. In fact, some of the worst outbreaks have occurred during very cold-water years. And that's due to California coast having immense amounts of upwelling and strong offshore winds that circulates the *Pseudo-nitzschia* through the water column, and then it works its way up.

And because sea lions don't drink water, they're getting all of water and hydration from the food that they eat. They have no natural way of flushing the toxin out. So, if we can catch them early enough—and then trying to stabilize them, putting them on anti-seizure medication.

Benny Martinez: And part of what they do is help feed malnourished animals and get them healthy again before releasing them back into the wild. For the animals that can't eat whole fish on their own, volunteers whip up what they call a fish smoothie, which I imagine are less appetizing than the blueberry and peanut butter protein smoothies I make for myself.

Giancarlo Rulli: This is our fish kitchen, which we're going to go inside. During the height of our busy season, we can be going through 1,000 pounds of sustainably caught herring every single day to feed our patients.

We talk a lot about sustainability. It's really important to be getting the fish from sustainable fisheries.

When you have 10 elephant seal pups in a pool, and one of them is getting a hard medicine, it can be really hard to know who's who, and that's where those hat tags play a big role. They're basically an extra name tag.

Benny Martinez: And name tags are important. Giancarlo told me that they tag and monitor animals not only while they're in their care but also after they're released back to the ocean.

Giancarlo Rulli: We're rescuing anywhere from 800 to 1,800 animals a year. With that volume of animals, there's just no way financially to put a postrelease tracking tag on every animal.

And there's different color tags for different response organizations. So, if we get a restrand, meaning an animal that comes back in, we'll know whether it's one of ours or if it came from another facility based on the tag and if it was treated somewhere else.

The orange flipper tag that each animal gets will stay with that animal for the rest of its life.

And so, that connection point, to kind of follow along, we have patient pages on our site, so you can log and see when it was released, how it's doing.

Benny Martinez: I have a lighthearted question. All of these animals have names, so who's responsible for naming?

Giancarlo Rulli: We typically will give the reporting party the opportunity to name the animal. Gets complicated when you've had 27,000-plus names in our history. So our rule of thumb is basically after 10 years, we can unretire names and bring them back.

We went through Italian pastas here about a year ago. Linguine, penne. Like, we had a bazillion. Rigatoni. We've gone through our Star Wars phase.

Benny Martinez: I, for one, looking at the board, I'm gravitating towards Gary. Gary just feels like an apt name.

Giancarlo: I actually—my dad's named Gary, so I might have to take a photo of that.

Benny Martinez: I kept tabs on Gary, the California sea lion, on the center's website. Gary's diagnosis included malnutrition, and knowing that many of the animals can face difficult outcomes when they're experiencing these kinds of problems, I was a little bit nervous for him.

But I'm happy to report that after less than two months at the center, Gary was released back into the Pacific.

I talked to Cara about how this is challenging work, even when there are positive outcomes.

Cara, you mentioned you've been doing this for over a decade. That's a long time. What keeps you going?

Cara Field: I think one of the biggest things that keeps me going is the community that I'm so fortunate to work with, because we all get down sometimes, but then you also see all these people around you that are trying to do good things. And so that brings you back up to that like, yeah, like, we can have an impact, we can make a difference, we can make this a better world. We have seen successes with, you know, some animal species recovering or starting to recover.

For me, hope is not just an individual thing. Hope is a community thing. Not just our local community here at the center, but more broadly, the scientific, the aquatic animal health community. When you find yourself with people that are so passionate and caring—for me, that's a really important thing.

Benny Martinez: The sense of community is important, not just for the people working directly on this issue but for the rest of the planet. Something we kept hearing about in discussing red tide and protecting our ocean was this greater sense of interconnectedness.

Giancarlo Rulli: This impacts us too. These sea lions are really that canary in the coal mine for diseases like domoic acid. These animals are telling us something, and what they're telling us is critical to listen to for our own health.

Benny Martinez: The health of people, animals, and the environment all depend on each other in many ways. And this is something we talk a lot about at Pew in protecting marine life and the ocean to ensure the health of people and our planet.

The importance of ocean health and human health is … ?

Cara Field: It's 100% critical. We humans are completely linked to the oceans. Oceans are 70-plus percent of our planet. So, whether people know it or not—and most people don't think about it if it's kind of out of sight, out of mind—but we are on this floating ball that is, you know, the vast majority is ocean, and we're seeing changes at levels we've never seen before. And are there things that we can fix, that we can adjust, that we can remove some of the danger for ourselves, for our planet?

Benny Martinez: Thank you so much for listening. To learn more, visit www.pew.org/afterthefact. There you can also find our episode from September on the research behind red tide. And if you enjoyed the episode, leave us a comment or a review, and be sure to follow us wherever you get your podcasts.

For The Pew Charitable Trusts, I'm Benny Martinez, and this is “After the Fact.” Until next time.