



## The Natural Laboratory Podcast Transcript: California Sea Otters: A Gap in the Point Reyes Ecosystem

### Introduction

This is the Natural Laboratory, a podcast exploring science for Bay Area National Parks. I'm Cassandra Brooks.

Sea otters once thrived off the entire west coast of North America. The kelp forests off of Point Reyes Seashore would have been prime otter habitat. But aside from the occasional wayward male, visitors at Point Reyes won't see California sea otters today. They were hunted to the brink of extinction in the 18th and 19th centuries for their thick pelts. A small population has recovered off the coast of central California, yet they have failed to expand their range. But why?

### Interview with Tim Tinker

Tim Tinker: *The first and most honest response to that is we don't know the answer completely.*

CB: *That's Tim Tinker, a research biologist with the U.S. Geological Survey in Santa Cruz, CA who studies otters in the Monterey Bay. I met up with Tim in Santa Cruz to find out more.*

TT: *Over the last ten or fifteen years, our research projects have provided us with a lot of insight into some of the factors that are limiting population recovery. In the north end of the range, the reason we probably do not see sea otters up around Point Reyes Seashore yet, it has a lot to do with shark bite mortality.*

CB: *And you are saying again it's shark bite--it's not as if the sharks are targeting otters--their just accidentally checking them out, or they are checking them out intentionally and accidentally killing them.*

TT: *Yeah, that is why you'll notice I am being very careful not to use the*

*term shark predation. These are all single bites and what we think they are, are exploratory bites by the shark to determine whether or not it wants to eat this particular object or not. But even a small bite from a white shark is generally lethal for a sea otter.*

CB: *But shark bites are only one of many threats to California sea otters. Disease, parasites, pollution, and even fishery interactions all contribute to sea otter mortality. But also the otters--particularly the females--just don't move a whole lot. Tinker says the larger Central California sea otter population is actually a series of small neighborhoods with limited exchange between them, especially for females.*

TT: *Most animals in the population do not move very far from the point we capture them for the next three or four years. . . when we study their movements and their behavior, they really don't move more than five or ten kilometers along the coast.*

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## Interview with Jim Estes

CB: *For sea otters to increase their range north, females would have to venture from their local neighborhood. But they seldom do, says Tinker. From the time they mature at three until the time they die, females give birth to one pup each year, and so they are almost always either nursing or pregnant. These high-energy demands require adult females to know their local feeding habitat extremely well, and unlike males they rarely make extensive movements.*

*Scientists are working hard to better understand what's happening with California sea otters because they are so important in maintaining a healthy nearshore environment. After talking with Tinker, I caught up with Jim Estes, a Professor of Ecology and Evolution at the University of California, Santa Cruz who was the first to truly document how profound the sea otter's role is. He went to Alaska in the 1970s where small segments of the Alaskan sea otter population were beginning to recover.*

*Jim Estes: They were thought to be extinct in the early part of the twentieth century, but in fact there were a few small remnant colonies. But since they are very poor dispersers their population buildups were very localized and so there was fifty years of recovery, but it was a very fragmented localized type of recovery. So here we had islands that remained uninhabited by otters and others on which they had completely recovered. And so the first step was simply to go to one of these islands where they hadn't recovered and it took like a tenth of a second to see the story. I mean it was just so stunning. You know I walked out on the shore and I looked down there and instead of kelp all over the bottom, it was just green with sea urchins, and the water clarity was different, and the bottom, and*

*the color and there were all these urchin tests on the beach, which I never saw at places where otters were abundant. And it was like wow, you know, otters eat urchins, urchins eat kelp, and there's the story.*

*And then I started wondering, well gosh, what are the effects on the rest of the ecosystem? It's like taking a forest out. What do you do to everything else--the birds, photosynthesis, and nutrient and energy flow, and all of that?*

CB: *Estes continued to study otters and their effect on the ecosystem they live in, filling in the missing pieces of the story.*

JE: *We understand now that there is this, what we call a trophic cascade. It's a link, in this case, between predators, herbivores, and plants. That predator's limit the herbivores, in this case the otters limit the urchins, thus facilitating the growth of the plants, and that those plants are really the base of the coastal food web. And much of what we have been looking at in the otter kelp forest system is what the consequences of that interaction between otters and urchins and kelp is to other species in ecosystem processes. So what we have discovered is that when you take otters out of the system and the kelps become much less abundant, overall productivity goes way down.*

CB: *Despite the ongoing threats to otters, Estes and Tinker are optimistic that otters might ever so slowly expand their range, perhaps even someday again thriving off the shores of Point Reyes National Seashore.*

*With the Pacific Coast Science and Learning Center, I'm Cassandra Brooks.*