



## The Natural Laboratory Podcast Transcript: Declining fog in coastal California?

### Introduction

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

[intro music]

### Interview with Mike Vasey

Cassandra Brooks: *Can you tell me where we are right now?*

Mike Vasey: *Point Reyes peninsula, which is really one of the fog capitals of the universe. And looking out over Point Reyes Headland, and Drakes Bay, and the Pacific Ocean, and it's a fantastic scene. Along the coast it's particularly exciting; you have so many different unique species that occur.*

CB: *That's Mike Vasey, a lecturer at San Francisco State University and PhD student at UC Santa Cruz who studies plants on the California coast. The rich, lush environment of Point Reyes—and really all of coastal California—heavily depends on the fog. During rainless summers, this fog—which can account for 1/3 of the ecosystem's water input—is critical to the persistence of the local plants and ecosystem.*

CB: *Earlier you were explaining to me where fog originates from. Can you tell that story to me now?*

MV: *Well, let me start here on the coast. We have upwelling of really cold water—very rich, nutrient rich—right off the immediate coast. Then winds that are warmer, that have a lot of moisture, come sweeping in off the Pacific, and when they hit that upwelling cold water, they condense into fog. And the third big factor is that you have these hot air masses that are moving out towards the ocean at high elevation, and as they move out towards the Pacific, they kind of depress down and cause an inversion of that condensation, that cloud layer, so it becomes this so called marine layer. And this occurs late spring through the summer.*

### Interview with Todd Dawson

CB: *But recent studies have indicated that the fog is declining from the California coast. I went to meet with Todd Dawson, a professor at UC Berkeley who has studied California fog for decades. In a recent study with former graduate student and postdoc Jim Johnstone, Dawson found some troubling trends.*

Todd Dawson: *Jim and I basically discovered that if we looked over the last 50 to 60 years, we started to see that not only temperatures along the coast were warming up, but fog was actually declining. And when we started to really look at that even over longer time frames, we began to see really over the last century, fog has been declining and*

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**Interview with  
Todd Dawson  
(continued)**

*it's declined by about 30 percent in about 100 years here in coastal California.*

*CB: Are you able to see any impact on the environment yet from this? Or will it take longer to see a shift?*

*TD: We are beginning to see some signs of that change in the fog-water inputs may be having some impacts in the southern parts of, say, the redwood range. So you go down to southern Big Sur, right at the very southern end of where the coast redwood lives, and we begin to see now that the summers are a lot drier, soils dry out, they are drier for a longer period of time.*

*CB: And it means that perhaps the redwood range will shift north, or will just decrease, or might go away all together?*

*TD: Some of the predictions that have been recently released, and some of this work has been done by a woman named Healy Hamilton, who has been really interested in modeling climatic envelopes of plants. And she is focused specifically on the coast redwood. And she said just what you've said, is that the climatic envelope that's going to favor the coast redwood is going to creep its way north into Oregon and also it's going to creep its way west. And of course that is impossible because as we go west we hit the Pacific Ocean. So what that really means is that the envelope is getting narrower, it's moving north, and at the southern end of the range, it is going to get drier and hotter, and we are probably going to be losing trees there eventually. Whether that happens in the next 20*

*years or the next 50 years, we can't really say yet.*

*CB: What can people do? What can the national parks do, or the state parks do?*

*TD: There are a couple of strategies that we've been talking with the parks about. Of course there's always playing a very active role. We can plant trees, and we can plant trees into areas that may be much more favorable—little microclimatic areas—little niches that we know could be very favorable to healthy redwood growth. Those are obviously going to be wetter, cooler areas because the redwoods really love those. We could also try to—in a sort of entire geographical context—go and do an analysis of where are those climatic niches that might be very favorable for future recruitment and healthy growth for mature trees, and make sure those areas are set aside.*

*CB: A few of my friends that I mentioned to that I was doing this story on how fog is declining in the Bay Area and Santa Cruz area, they said, "No way! I see just as much fog; there is more fog!"*

*TD: You have to take the normal oscillation along with the long term trends to really understand how something like fog decline or temperature increases really play out. In our human experience, we kind of remember one year at a time, and I think sometimes that is why sometimes people say, "Hey wait a minute it was a really foggy year last year!" And you go, "You know, you're right. It was." But in the long term picture it's actually been on the decline.*

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**Conclusion**

With the pacific coast science and learning center, I'm Cassandra Brooks.

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