



## 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.

### 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...one of the fog capitals of the universe. And looking out over, uh, 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:* Let me, uh, start here on the coast. We have upwelling of really cold waters—very rich, nutrient rich—right off the...right off the immediate coast. And 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. Then the third big factor is that you have these, uh, 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:* And 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 it's declined by about 30 percent in about 100 years here in coastal California.

---

## Interview with Todd Dawson (continued)

*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're beginning to see some signs of that...that change in the fog-water inputs maybe 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're 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:* Yeah. Some of the predictions that have been, um, sort of, recently released, and this work has been done by a woman named Healy Hamilton, that's really been interested in, sort of, modeling climatic envelopes of plants. And she's focused very specifically on the coast redwood. And she said just what you've said, is that the climatic envelope that's gonna favor the coast redwood is gonna creep its way north into Oregon and, also, it's gonna creep its way west. And, of course, that's 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's gonna get drier and hotter and we're probably gonna 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, you know? What can the national parks do, or the state parks do to deal with that?

*TD:* Well, ther...I think there's a couple of strategies that we've been talking with the parks, um, about. Um, of course, there's always playing a very active role. I mean, you know, 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. Um, those are, obviously, gonna be wetter, cooler areas 'cause the redwoods really love those. We could also try to—in a...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 I mentioned to that, you know, I was doing this story on how fog is declining in the...in the Bay Area and Santa Cruz area, they said, "No way! It has not. You know, I see just as much fog. There's more fog!"

*TD:* You have to take, kind of, the normal oscillation, along with the long-term trends, to really, kind of, understand how something like fog decline or temperature increases really play out. In our human experience, you know, we kind of remember one year at a time. And I think, sometimes, that's why 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.

---

## Conclusion

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