

December 7th, 2015, oc100515.mp3
The Promise of El Niño
Jennifer Stock, Warren Blier (NOAA Meteorologist)

- Jennifer Stock:* Welcome to another edition of Ocean Currents, I'm your host, Jennifer Stock. On this show we talk with scientists, educators, explorers, policy makers, ocean enthusiasts, adventurers, authors, and more, all uncovering and learning about the mysterious and vital part of our planet, the blue ocean. I bring this show to you monthly from NOAA's Cordell Bank National Marine Sanctuary, one of four national marine sanctuaries in California, all working to protect unique and biologically diverse ecosystems. Cordell Bank is just off shore of the KWMR listening radius off the Marin Sonoma coast and is a thriving ocean metropolis from the seafloor to the surface. Have you been focusing on what's happening with El Niño in the Pacific right now? We're going to talk a little bit more about oceanographic phenomena that's occurring right off the coast here. And on the phone with me I have Warren Blier from the National Weather Service. Welcome Warren you're live on the air.
- Warren Blier:* Thank you Jennifer! Pleasure to be here!
- Jennifer Stock:* Thanks for joining me today!
- Warren Blier:* Of course.
- Jennifer Stock:* Warren is Active Meteorologist in Charge of Science and an officer in the San Francisco Bay Area Monterey Forecast Office.
- Warren Blier:* Yeah, let me just say a little about that. So the Forecast Office, the National Forecast Office is the office for the greater San Francisco Bay region physically located down in Monterey, California. So we cover the central coast of California, from the Napa wine country to the heart of the Bay Area, and then all the way down to the Big Sur coast and east through the hills, not quite through the Central Valley.
- Jennifer Stock:* Thank you! That's good to know the full range there. But you're actually tracking something that is way far away from here. That's going to affect us hopefully and El Niño has been a big part of the vocabulary these days on the west coast. And I'd like to go back a little bit; can you briefly define what El Niño is for us?

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Warren Blier: Sure. And there's a tendency to refer El Niño as something that is coming towards us and that's not really true. It is a thing that is developing in the region which it exists and will likely continue to exist and be an equatorial swamp of the Pacific Ocean. And when El Niño then occurs, what basically happens is that the really warm water, which is normally concentrated towards the western side of the equatorial, it kind of migrates to the farther east. Then it usually does, typically towards South America. And in the eastern part of the ocean, we see surface temperatures start to rise across broad regions. Tied into that, these massive areas are thunderstorm complexes that form in those areas. And as the warm water shifts eastward, so do these vast areas of thunderstorms that to some degree are being produced or facilitated by the warm water underneath. And as that shifts, it could have an influence on the global atmospheric circulation.

And that's what we're thinking when we talk about El Niño potentially affecting our weather because in the case of these El Niño events becoming strong, there's seems to be a tendency for it to affect the large atmospheric flow in certain characteristic ways. One of which is low pressure and streams of moisture off the ocean and bring in precipitation off the California coast.

Jennifer Stock: So, can you talk a little bit about the difference between El Niño, which you talked about its formation and how it comes to be, but also this thing we've had in place here which this year has been called "The Blob?"

Warren Blier: So, for reasons which aren't entirely present but probably have to do with persistence of an area of high pressure over the same broad swap of water in the northeast Pacific Ocean, there hasn't been some mixing of the water. But the temperature surface out of the water out over that area, except for into the California coast, the waters have been really warm. So I should be careful on saying "warm," our sea surface temperatures along our coast are much milder than they usually are. But they aren't warm in the standards of the east coast of the Gulf of Mexico.

Jennifer Stock: So does The Blob presence influence for El Niño?

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Warren Blier: There has been some discussion about that. This blob of warm water has affect on our waters in the summer season. And I think a lot of us have noticed that through unusually mild nights, in particular. And those do reflect the water temperatures along the coast, being much milder than they particularly are. But when we start talking about the El Niño event that is developing on to the winter season, the scale of that and the amount of energy that's involved would overwhelm the warm water blob. Winds going over that area, as they will with the migration of storm systems across it, that is likely to be mitigated or even dissipated.

Jennifer Stock: Interesting. So last year there was a lot of prediction and buzz around an El Niño forming and that it peered out a little bit. What was going on last year with the conditions and how it dissipated?

Warren Blier: So, actually, we haven't got quite to the El Niño event last year. These forecasts are based on output from computer models of the ocean atmosphere system. They are very complicated, it's a complicated physical system and they run on fast supercomputers and they predict what the state will be like in the future. And this is essential what we are doing in day-to-day weather forecasting. We are relying on the output of these forecasts models because they tell us what the state of the atmosphere will be tomorrow or the next day and the forecasters in my office interpret the forecast that you get and receive and is broadcast over the air.

So what we start trying to do is this thing going many months to the future, it gets a lot trickier and we run into something that is referred to as the "butterfly effect." Where the times and places with the slightest change can end up having a huge impact on what follows. And over many months there are a lot of opportunities for that. So, we do the best we can to try to see and peer through the window of the future and if conditions of such an El Niño might be developing. And that's what we did last year, the signal wasn't that strong but it seemed to point in a direction to an El Niño and it didn't develop how the computer models predicted.

Jennifer Stock: This is such a fascinating science in terms of all these computers and data and how to make these predictions. It seems, right now, everything we know about ocean and weather predictability is sort of changing a little bit with a lot

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of the effects of the changing climate. Does this affect your confidence in weather prediction overall? Or is the weather prediction mainly based on numbers, so you can say, "Oh, based on these numbers this is what we'll expect"?

Warren Blier: It's really much more of the latter. The climate change, it doesn't really have an effect on our forecast of the weather. Of course, it might influence what that forecast is, but the big idea of the forecast of the weather is that it's starting with whatever the initial conditions are in the atmosphere or the ocean as best as we can define that with all the different things that are out there, from weather satellites to instrumented surface stations that collect data and tell us what's going on. And then the computers are taking all of that data, taking equations, describing the dynamics of the atmosphere and integrating them forward in time to see the future state of the system.

Jennifer Stock: Well, based on what you know at this point, where are we at with the El Niño predictions for this winter and what it might be like and what might start in real changes with the weather?

Warren Blier: So, with this interview coming up, I actually looked this morning and I think one thing to mention is that the El Niño is there. It's already present. And in fact it's not only already present but it's really strong. So, in terms of the warm water migration towards the eastern side of the Antarctic Pacific, surface temperatures in that region have gone up significantly. For the El Niño to continue, it doesn't need to do anything, just stay where it is. The development has already occurred. When you look at the computer models, it's at a state of already being present as it is now. There's many of these models being made and are run by different institutes around the world, each with its own slightly different approach to the mathematics. The vast majority show that it will either stay at its present strength or actually get a little bit stronger as we go into the winter. There are a couple outliers, so this is where the forecasting is tricky. There are two or three that say, "You know what, forward is the later part of the fall to weaken." But, we're going with the vast majority and the vast majority say this will be in place till the winter season. So they are thinking that as we get further into the fall, the likelihood that this will play out with a wet winter for us.

December 7th, 2015, oc100515.mp3
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Jennifer Stock: So, that's the facts for us here. I've read that there's a difference in precipitation expectations in Southern California vs. Northern California. Can you talk a little bit about that?

Warren Blier: With an El Niño, where the impact seems to be largest in terms of impact by departure or increase in the amount of rainfall that's received in an average year. That would be the strongest in Southern California and diminish as you go up the west coast of the United States to about even chances up to southern Oregon. And the odds are exactly reversed up in the Pacific Northwest, which have more drier winters. We're up the coast from Southern California; we're not so far up there that we don't fall into that effect of the increase of precipitation.

Jennifer Stock: So, being that we are already in it right now and that there's a potential for it to increase, what is the type of effect that should we be preparing for? We're predicted to get some pretty heavy rain events, but is it continuous? Is it storm front systems? What other types of weather should we prepare for?

Warren Blier: Part of our reasoning behind how the El Niño is likely to play out has to do with looking at fewer past, very strong El Niño events. But at this point, we really only have sufficiently good data records back to 1950. Before that, there were that good meteorologic and oceanographic data around the world that can even define what was going on, with the intensity of a El Niño event or anything along those lines. Since 1950 to the present time, there have been only 3 strong El Niño events until the present one. Talking about the very wet winters in Southern California and the dry side of the Pacific Northwest, which is normal for us but odd for Southern California.

But we've had cases to look back on. If we look 500 years from now we'd probably have 30 or 40 cases but at this point it is only 3. And in addition to look back with what has happened in the past, there are theories being consistent with the ideas with the wetter than normal winter. But we don't want to say too much more that the odds favor that because there isn't that degree of certainty. And for the second part of the question, if this play out how we think it will, what does that really mean in terms of weather and

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storm systems? It seems to be in the previous small relatively number of strong El Niño events, more storm systems than during typical winters, not necessarily that the storms systems themselves are extraordinarily intense but just more day of rain. But that's not to say that during this upcoming winter or, for that matter, during any winter, actually; if we think back to December 11th or December 12th of Fall of 2014, despite last winter being quite dry in some, San Francisco got 3-to-5 inches of rain in about 24 hours that day. There were a lot of local flooding problems and that's something that could occur in any winter, whether the winter is wet or dry.

Jennifer Stock: I remember that storm very well.

Warren Blier: I remember they shut down the schools in San Francisco.

Jennifer Stock: Well, that's quite a complicated science. It's really exciting in the sense that so many different data streams inform this. And the work is extremely important to inform the rest of society. We depend on this weather forecasting for pretty much day-to-day life, here on planet earth, so thank you for giving this information. Is there any other things that you want to share about El Niño or other things that we might be expecting coming up?

Warren Blier: No, I think we pretty much covered it. I guess one other thing I might want to mention is that, hopefully, this will all play out the way we're anticipating. With the wetter winter, we get quite a bit more rainfall and snow at the higher elevations, like the Sierra Nevadas, than we would in an average winter. That would be a dramatic reversal than what we've seen in the past four winter seasons now, all of which have been dry and have left us in an extraordinary drought condition and water limitation problems that we are presently dealing with.

But I think something important to point out is that even if this does play out with how we're anticipating, it is a really wet winter and the snow accumulated in the mountains. Our drought now is at such an extraordinary magnitude that, while it won't entirely get us out of the woods, it would be a huge help. However, it won't get us out in terms of water table in the land and in the soil; one winter season is not going to do it, even if it's really wet. And I guess the

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message there is that conservation of water remains really important, whether this winter turns out to be wet or not.

Jennifer Stock: I think that's a great point. I'm glad you brought that up and it's something that I've been thinking about, too, in terms of we're the ones who change the messages amongst all these organizations about water conservation. And for people, it's hard to connect, "Oh, it's raining: conserve water".

Warren Blier: They think the drought is over but the water table reservoirs are so phenomenally low now. And it'd take a lot to get things back where they were prior to the drought.

Jennifer Stock: Well a little lead will be welcome.

Warren Blier: Yes, very welcome.

Jennifer Stock: I do hope people remind themselves and their families to conserve. We all need to adapt and Californians just need to use less water. And there are ways we can go on doing that with what we have. Warren, thank you so much for coming on the show today and I wanted to let you know that our community radio station here, KWMR, is getting ready for our Fall Fundraising Drive. And the focus of this drive is El Niño because this radio station is an important vital information source for getting information out to the communities. We're in a rural area around here, and KWMR is still able to serve people even when the power is out in extreme conditions. So, folks keep that in mind as we get towards the pledge drive, that we're getting towards winter. And it will, hopefully, be a little bit wetter than it has been. So, thanks again, Warren, for coming on to talk about El Niño, Warren Blier from the National Weather Service.

Warren Blier: Thank you Jennifer.

Jennifer Stock: Have a great afternoon. So, we've just been talking about the conditions that are setting up for El Niño and a little bit more wet winter with a message to remember, that we still need to conserve water, we're still in a very extreme drought, and even though we may have some relief here, both for the land, wildlife, and plants, and also for us as humans and the reservoirs that we use. I'm looking forward to that and we'll continue to do our little rain dances on the side. And I just want to let folks know that I love to hear from listeners! If you

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have ideas for topics, questions, comments, please email me at jennifer.stock@noaa.gov. *Ocean Currents* is the first Monday of every month, it's part of the West Marin Matters series where every Monday at 1pm you can tune in and learn about a topic on environmental focus, either locally or globally. And *Ocean Currents* has a podcast! If you haven't checked that out yet, you can go on iTunes and search for "Ocean Currents" or you can come to cordellbank.noaa.gov to get past episodes. Thank you for listening, enjoy the ocean, bay, or whatever body of water you can get into safely. This has been *Ocean Currents* here on Community Radio for West Marin, KWMR. Thanks for tuning in!