

Jennifer Stock: You're listening to Ocean Currents, a podcast brought to you by NOAA's Cordell Bank National Marine Sanctuary. This radio program was originally broadcast on KWMR in Point Reyes Station, California. Thanks for listening!

(Musical Intro)

Jennifer Stock: Welcome to another addition of Ocean Currents, I'm your host, Jennifer Stock. On this show we talk with scientists, educators, explorers, policy makers, ocean enthusiasts, adventurers, 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 on KWMR 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 located just off shore of the KWMR listening radius, off the Marin-Sonoma coast, and is a thriving area, with ocean life both above and below the surface.

There's a lot's going on during today's show, we'll be talking about our local state marine protected areas, we're going to hear the latest on the Sea Star Wasting Syndrome event that's happening right now on the west coast. Many folks have been telling me about these sea stars and we're going to hear a little more about the science behind that, and what we know, and also a sneak preview of the San Francisco International Ocean Film Festival that starts this week. So, we have a busy show, but stick with us. We're going to take a short musical break and be back to start the interviews.

(Pause)

Jennifer Stock: I have Mrs. Amy Trainer in the studio with me today, from the Environmental Action Committee of West Marin, also known as the EAC, so welcome Amy, it's nice to have you in the studio.

Amy Trainer: Thank you, Jenny (sic. Jennifer), so great to be here.

Jennifer Stock: I usually speak with most folks on the phone, so it's such a treat to have a real person here!

Amy Trainer: My pleasure!

Jennifer Stock: So for folks that are not in the West Marin area, the Environmental Action Committee is a grass roots advocacy organization that was founded in 1971, and their efforts focus on protecting this region from immediate threats, and to foster wider understanding of its unique qualities.

So I wanted to dive right in and talk about one of the leading things that you just started this past year, and this is rather new, and rather cool, because the state of California put in a network of marine protected areas in the entire state, and we have some off of Marin that have been here for the last few years, and the efforts that Amy has been working with are basically monitoring and seeing how compliances are going. So Amy, why don't we just start with a little bit of background on the state's MPA's, when they went in and where are they, in context of our west Marin region.

Amy Trainer: Sure, so in 1999 the California legislature passed, and the governor signed into law, the Marine Life Protection Act (MPA). And that enabled, it sort of divided the coast up into six different districts, and so Marin is part of the north central district, and there was a great amount of funding from some private foundations to bring together this very broad array of stakeholders, so fishermen, and sport fishermen, and commercial fishermen, and dive boat users, conservationists. Everyone who had a love for our ocean was just a part of this process, so together what ended up happening was roughly 16% of California's coastline is now protected as part of this marine protected area network, we're the only state in the nation that has anything like this coordinated network of marine protected areas. And so from a scientific point of view, what they have found is that within these Marine Protected Areas where commercial fishing and crabbing are limited, because over time not only the number of our fish and other marine species had declined, but also the size of them, roughly by 90% across the board in many species. So what they found is sort of these safe harbor areas, if you will, that allow the species to rebound, and so that makes it better for everybody because there are just these areas where the species are going bigger and their numbers are getting more abundant, and

so outside they're obviously going to be moving, in cases like salmon, you know they're definitely migrating, and you know crabs move pretty far too, and so it's just these sort of protection areas to really foster that growth and really rebuild our stocks of our marine life. And so what the Marin Marine Protection Program is, it's a citizen science collaboration project, that the Environmental Action Committee has spearheaded, and my core partners are the California Academy of Sciences, Dr. Rebecca Johnson, The Point Reyes National Seashore, Dr. Ben Becker, as well as the Gulf of The Farallones National Marine Sanctuary, and well as the Ocean Science Trust. So, what MPA is, it really started in northern California, and they really had some of the first marine protected areas put in place. And so they said, "OK, you know, scientists are going to be monitoring what's going on every five to ten years in areas that are not part of Marine Protected Areas, as well as areas that are, but what's going on—on the land? Like what are the users, on the land, on the beach, that is adjacent to these MPAs?" And that way we have not only a snapshot of these human uses that might have an impact on the MPA, but in the long run is going to help inform enforcement. I mean any regulation is only as good as if people follow it, if it's enforced. And so this also gives us an idea, that- OK, in these particular places is there enough education? Do we need more outreach? Do we just need to better inform the public to, OK, here's the regulation, what it is and why it's important. So, it's really connecting people not only to their ocean and their coast but also this very special protection. So in Marin county we have two of the three kinds of Marine Protected Areas, we have the State Marine Reserves, which is most of Drakes Bay, and then about a thousand feet off of the headlands, the other part of Drakes Estero, that's all a marine reserve, and basically the taking of all marine resources it prohibited. And then the upper part of Drakes Estero and outside, and then off of that thousand feet off of the headlands is what's called a State Marine Conservation Area. And in those, for instance, in what's called the Point Reyes State Marine Conservation Area, the recreational taking of salmon by trolling and Dungeness crab by trap is allowed, and people can transit through any of these areas, but if it's a reserve there's no take, but if it's a conservation area then these particular allowed uses can go forward.

Jennifer Stock:

So that's one of the most visible ones we can see from land, but there's a couple of other protected areas that are part of this MPA

network that are a little bit further south. Duxbury Reef is also a conservation area, right?

Amy Trainer: Yes. And so Duxbury Reef it goes out about a thousand feet, I think from the mean low high tide line, and we actually just did a volunteer training there a couple weeks ago, and it was great, it was low tides so you could see a lot of the Reef, and this kind of supports the work by Rebecca Johnson of the Cal Academy have been doing, the Rocky Shore Intertidal Project, so it really builds on and is using that core that already know a lot about it, and we can train them and say, "Help us collect this data and here's how it's going to be used."

Jennifer Stock: That's great, because they're educating the public on the use of the intertidal and how to tread lightly.

Amy Trainer: Exactly, and the great thing is that because this is a state wide network there's been this movement, the California Ocean Science Trust has worked with all of these groups, like the EAC, and a bunch of the NGOs down in southern California, to standardize the data set, so if we look at the data 5, 10, you know, 20 years out, we'll have this really uniform data that can be applied statewide. So it's going to be very, very informative. So it's really exciting to be a part of this process and to get program started in Marin.

Jennifer Stock: Well you got it started right away, cause I know the big concern as you got things in place is- how do you let everyone know who needs to know? And I know that's one component of this training program that you're doing is interfacing with potential users. What locations out in west Marin, where would people maybe interface with people that might try to go fishing in a closed area? Like, would people go to Duxbury Reef potentially? Except that's a conservation area, they can.

Amy Trainer: Yeah, they can do the poke pole and there are certain abalone take is allowed there, and then everything else is prohibited. Our volunteers, we've made it really clear that the goal here is not to perform enforcement, that's Fish and Wildlife, that's the National Seashore, that's the sheriffs responsibility, and we're working with Fish and Wildlife wardens, even though there are so few of them, and we're working with the sheriffs to really get them more educated and understanding what these regulations are. Our

volunteers, you always say, "Safety is first." You never have to, you know, if someone is engaging in unlawful activity you definitely aren't under any obligation to go approach them. You want to take notes, if you can get a photo of their license plate, fantastic, something like that. Something that helps the appropriate enforcement and authorities to take the steps they need. They're really out there to interact with the public and say, "Hey, did you know that this is part of this really special statewide network? Here are the restrictions and regulations, just for your information, and can I answer any questions about the resources?" You know, point them to any information. So really serving as the ambassadors of these marine protected areas.

Jennifer Stock: How many volunteers do you have who are already working on this, or is it already tied in with existing programs, with other volunteer programs? Are there any new volunteers that are just doing this?

Amy Trainer: It's definitely both; we definitely have a good number of new volunteers, but the great thing in partnering with the Gulf of The Farallones National Marine Sanctuary's Beach Watch program. So the Beach Watch is mostly monitoring sea life and dead birds and taking numbers of that kind of data, and we're really looking at the human uses. So we've really tapped into those volunteers where our transects to monitor those MPAs exist, almost in every case there's a similar transect for a Beach Watch volunteer that overlaps. So many of them are wonderfully willing to engage in this program with us.

Jennifer Stock: That's great. Now one thing that comes to mind is how do you control all this data? You have multiple sources, with your Beach Watch, or National Park Service, or Cal Academy, and they're taking data on observations they might see on some of the human uses. How is that all being collected and analyzed later on down the line, so we can see these trends.

Amy Trainer: Right, so when we're collecting data we're looking at both consumptive uses, like, "is there a pole in the water, are they fishing, or are they pulling up a crab pot." Or what we call non-consumptive uses, "Are they actively engaged with wildlife, are they surfing?" And then also delineate between on shore consumptive or non-consumptive and off shore consumptive or

non-consumptive. So, like I said, the data sheet has been standardized for the whole coast, and one of the really fantastic things that is about to be available to us is that green info network, which has been creating this whole information management system. So people will be able to take their tablet out, or even if they do take a paper data sheet, they could scan it in and enter the data. EAC and I are both working with both Cal Academy and Point Reyes Seashore to do the quality assurance and quality control on the data. An then I think at some point in the future the Cal Ocean Science Trust will start crunching the data, but having this information management system, where you can go on and, you know, say, "Is a volunteer do this particular transect this week? OK, I'm going to cover it." "What's the tide here? What are the needs?" So it helps organizers like me manage the volunteers, and it helps the volunteers stay just better organized and more connected. It's just a really fantastic tool that they're going to be making available to all of us.

Jennifer Stock:

That's great. For those of you just tuning in, this is Ocean Currents, I'm Jennifer Stock, and my guest right now is Amy Trainer with the Environmental Action Committee, and we're talking about the monitoring efforts in Marin's marine protected areas, right off the coast here in north central California.

So, have people witnessed things in these MPAs that shouldn't be happening?

Amy Trainer:

In the past few months that we've had volunteers out performing transects, we haven't witnessed and unlawful or inappropriate behavior, but there have been those instances before MPA watch started, and it's interesting because when somebody gets a ticket or when somebody gets caught doing something like that, the word has spread very quickly. And so it's actually been really beneficial, even though there have only been a handful, if that, of cases statewide, or even on the northern part of the coast, it's really helped inform people and really woken them up, getting their attention, so they say, "Oh hey, wait a minute, I really need to pay attention to this, this is real, these are regulations, there's a scientific foundation for this. It matters, and you know I want to be a good citizen and participate and honor this."

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- Jennifer Stock:* I think a lot of people don't even know, they just don't realize it. Because you can't see these signs off shore, or these buoys, there's none of that. You have to be clued in to all of this and it seems like, having a permit to fish with, either commercial or recreational, I assume they get this information.
- Amy Trainer:* Right. There's been a huge movement to increase signage at all of the fishing docks, like Bodega Bay, all of the places where you would buy a fishing license, they've made all of these booklets that I have here available, you know, guides for each of the specific MPA regions, it gives the lat and long coordinates. Some fishermen with more sophisticated gear have these plugged into their radar, and so they know when they're entering or existing and MPA. But I think you're right, part of what this is about is increasing that outreach, increasing that education. We want people to know, and when they do know they are going to really respect this, and understand, you know especially the fishermen, "This is really beneficial to us."
- Jennifer Stock:* I think there's some positive stories to share with them that I think are really going to start coming out more. (Clears throat, laughs) Excuse me, there's this frog that jumped in my throat Monday morning and hasn't been able to leave) I know offshore, and this is not in the states MPAs, but there's been these rock fish conservation areas that have been put in place, over 10 years ago, limiting, or eliminating rock fish ground fishing in the entire western seaboard, because like you were saying earlier, rockfish have been over fished and are now small fish, but here they get to be huge fish, and more fecund, more able to reproduce as they get older. And so with this closure in effect, this monitoring has been in place with the Cordell Bank as a partner in this, because the Cordell Bank is one of the sites for monitoring. But they're seeing just incredible benefits, just within the 10-year closure, the fish are bigger, they're getting more diversity of species caught... I'm definitely going to have a show on this once they've had a chance to assess all the big changes but this just has been the preliminary result and it's really positive to see that, it's positive for everybody.
- Amy Trainer:* Yeah. It really is.

Jennifer Stock: So we'll have to keep tuned in with that and see how beach and say, "I think this is so fantastic, I want to be a part of it." You know, there's a fair number of retired folks that thankfully have time on their hands and this is something they are willing to spend their time on, and support. We've had a mom there who was like, "I want to do this because I want my kids to know about it." And she herself wanted to get more educated. So it's been really encouraging, the nice diversity of people that have come out to become volunteers.

Jennifer Stock: Is this going to go on for a while; is this just a period of an education effort? Or do you hope that this will be a long time thing?

Amy Trainer: We're hoping that this is going to be a long-term thing. I just applied for my second year of funding, I'm planning to do some activities for World Oceans Day, so Saturday, June 7th, and then also do a lecture series, partnering with Dominican University on marine resource and ocean science protection this fall. So, you know, really exciting things, Californians love their coast, our coastline is a world treasure, our marine resources and state jurisdiction goes out three miles. You know, even the sanctuaries have far more jurisdiction, but I think just having that near shore habitat protected, as you know, is just so vital to so many of our populations, so.

Jennifer Stock: I know, that's great; I want to get involved with your lecture series. That's great fantastic.

Well, another nice thing that the EAC, the Environmental Action Committee, has done is really celebrate the wildlife that we have here in the west Marin region by starting up this festival, the Birding and Nature Festival,

Amy Trainer: Yes!

Jennifer Stock: It's coming up, can you tell us a little bit about registration and any highlights for that?

Amy Trainer: Absolutely, I'd love to. This is the 5th Annual Point Reyes Birding and Nature Festival; it takes place Friday, April 25th through Sunday April 27th. We have some of the finest naturalists and bird

guides, certainly within California, if not the world. You know, people like Keith Hansen, Jewels Evans, and David Gwemfheimer. Sarah Allen doing marine mammals, John Muir Laws doing sketching in nature, and this year I'm really proud that we're bringing David Allen Sibley, who as everyone knows is just such a rock star and a well respected birder, author, artist. He has his new Sibley Guide to Birds, second edition coming out in just a few weeks, so there are going to be some book signing events, he's going to do the keynote presentation at our banquet. And it's such a great event; we have events for kids this year that are family friendly. I've really wanted to bring the underserved and bilingual community into the natural world and provide free activities for them. So, Juan Carlos Soles from WildCare, he's their education director, he's going to do a bilingual free walk over in Marin, Sunday we have a kids bird count, we have a family friendly hike out at Abbott's, we have the first annual Rich Stallcup nature hike for young birders, that David Allen Sibley is going to lead, and I made this a free hike. Kids ages 11 to 17 are eligible to apply, they just have to submit an essay about what birding means to them and why they would want to have a change to go birding with David Allen Sibley. So it's such an amazing weekend, you know, it's econ tourism, it supports our businesses, there about 500 or 600 birders that come to town, shop at our stores, stay at our bed and breakfasts, eat at our restaurants. And it really furthers EAC's mission, of teaching everyone about how amazing the diversity of habitats is out here, and our work as advocates to really protect that and maintain that string healthy balance of diversity.

Jennifer Stock: It's a great event; I'm always so excited every time it rolls around. Some day I'll get to go on one of these walks, when my toddler is not a toddler anymore.

Amy Trainer: Wonderful.

Jennifer Stock: You know? It is! A friend that I talked to, that I used to work with at the park service, a long, long time ago, said that she came to Point Reyes for one day and she listed off this huge list of new birds for her and just raving and raving and it just made me realize, "Gosh, I know this place is special but it's really, really is just so special for not only marine wildlife but also these migratory species that move through here and I'm just so happy that this

festival got started a couple years ago and got the best of the best out here.

Amy Trainer:

We do, we're so fortunate, and it's really a celebration of those guides and naturalists, and what we have out here, as well as what we learn from them, and it's timed to be at the height of Spring migration, so we usually see a good 200 species and again, it's really such a great community of birders, many people are coming from the Bay Area, but we're having people coming from Europe now, and coming from all over the country, so people are discovering what a special place Point Reyes is and certainly how amazing the wildlife is here.

Jennifer Stock:

That's great. Well lastly, I know we have a couple more minutes, and you are one of the most busy women out here in west Marin, and there is yet another effort that EAC is working on that I paid attention to; you're working on oil spill response effort and the capability to respond, and I know you are just getting started on this, but what's going on with that? How is EAC involved with that?

Amy Trainer:

Yeah, so I worked on federal and state oil spill and response issues in Washington State, and when I came to California I was really curious at the state of prevention. I think prevention has to be the top priority; we have to do everything we can to ensure that whether it's oil tankers or these ultra large container vessels, that we have the tugs and firefighting capabilities to prevent a major disaster. And so I started looking and California has a very strong state law, the Lempert-Keene-Seastrand Act, which requires that the state maintain the best achievable protection to our coast and ocean resources through the best available technology. And, you know, Alaska is really the pioneer as to what is really the best available technology, and so our look really revealed that the state is not meeting the best available technologies standard, which is unfortunate, we also looked at the use of chemical dispersants and really feel strongly that science does not support the use of them because they just don't work in cold water. And that ocean water actually has its own naturally occurring chemical that will break down oils, so if you're going to have a spill offshore, it's going to break down, that we can look at new technology, like boats that can skim this oil much more efficiently than they could 20 years ago, and so investing in that type of technology, rather than

dumping a bunch of toxic chemicals. I firmly believe that the reason there's such a big dead zone in the gulf is because they dumped millions of gallons of Corexit, which is a highly toxic; in fact, when it combines with oil it actually greatly increases the toxicity. So you think about the cumulative impact on the whole marine food web. It could just be devastating, so I really for like, "Hey, these are the wealthiest container vessels in the world that come into the bay, they are not US owned, they are foreign flagged vessels, we need to make sure they're held accountable for the risks they are creating within our coast and ocean resources. So it's a long process, we making some progress, still in conversation. But yeah, this is something I feel really passionate about.

Jennifer Stock: Yeah. Well based on the amount of ship coming through, I mean, it's a highway. It's a highway. And I know here at the sanctuary we're working a lot on the ship strike, and in part to the impact of the endangered whales, and we've been lucky. I'm not going to knock on wood in the radio studio, but **Costco Bosum** was the last major spill we had and it was pretty minor in compared to the potential. And we always have to be vigilant on this issue, so I am really pleased that you're helping raise the bar with all the different agencies, it's a very extensive list of partners that are involved, so...

Amy Trainer: Yes. Thank you.

Jennifer Stock: Great, Amy. Well thank you so much. Is there a website to link people to who would like to tune in to some of the information, including the birding festival?

Amy Trainer: Yes. So the Birding Festival has its own site, it's spelled out www.pointreyesbirdingfestival.org, there are still some tickets for the book signing event, which we're co-sponsoring with Point Reyes Books, and many of the field hikes have not sold out yet, so there's definitely still a chance to participate, but tickets are really going fast. EAC's site, www.eacmarin.org, all kinds of great information and resources at the website, and then if, you know, if anyone would like any more information, I'm at (415) 663-9312, and don't hesitate to give me a call.

Jennifer Stock: Amy, thank you so much for coming in today and giving us the low down on MPAs and oil, and the birding festival!

Amy Trainer: Thank you, Jenny (Jennifer). Take care.

Jennifer Stock: Take care. Thank you.

And for those of you still with us, we'll be back in a bit, talking about sea star wasting syndrome. Stay with us.

(Music fades in)

Jennifer Stock: For those of us that walks the shores of Point Reyes and beyond you may have seen or heard about an event that is taking place right now all along the west coast, from Alaska to Baja – sea stars are literally wasting away. This event is called sea star wasting disease, or sea star wasting syndrome, and it's caused a lot of concern among beach goers as well as the scientific community. So I am very glad to have the opportunity to speak with Doctor Pete Raimondi, who is a professor at University of Santa Cruz, the chair of the department of ecology and evolutionary biology at Long Marine Lab. And he's been the primary contact for details regarding this issue, so thank you, Pete, for making the time to call in today.

Pete Raimondi: You're very welcome.

Jennifer Stock: I understand the extent of this is quite extensive; can you talk about that a little bit?

Pete Raimondi: Sure. Right now we've found the wasting in sea stars ranging from Alaska down through the border of Mexico. We're not really sure if it extends south into Mexico, we don't really have a lot of data from Mexico, but it goes at least from San Diego up into Alaska.

Jennifer Stock: And what exactly do people notice? From my understanding, from pictures, it just sort of looks like the sea stars are just sort of melting away. What do people see when they diagnose this?

Pete Raimondi: Well, one thing I want to be really up front about right now is that when we say, "sea star wasting" it's really a description of a series of symptoms, it's not a real formal diagnosis of the disease, it's a series of symptoms, and the symptoms vary a lot depending on the species of interest. I think a lot of your listeners would've seen this

out in what we call intertidal locations, and there's just two or three species that occur out there. The most common one is the Elmer star, it's this purple or orange sea star that's typically very common out in tide pool areas, and that has these interesting symptoms, which include necrosis, which just means decaying of the tissue, and loss of the arms and sometimes just sort of wasting away. Other species, the key one underwater, what we call subtidal, was pycnopodia, the sunflower star, and that species is the one that really does sort of just melt away very quickly, over the course of perhaps 24 hours, whereas tide pool species takes longer than that to waste away.

Jennifer Stock: So, these are the symptoms we are seeing it seems to be just a couple of species...

Pete Raimondi: No, no, let me interrupt, it's more than a couple; we've documented it in 12 species, there's not that many species along the west coast, it's common among most of the rocky reef associated species.

Jennifer Stock: OK, so most of the rocky reef species. How about subtidally, under water—what monitoring has been conducted, and how deep have you looked to observe the impact on that community.

Pete Raimondi: Yeah, that's a really good question. Well, you know, the original observations were both underwater and intertidal, but primarily intertidally, most of the original observations were up north in the Midwest, especially within the Puget Sound/ Vancouver area, we've recently initiated a program to look subtidally. We've been diving along northern California, and there's some information from the more central California, near the Point Reyes, further north actually than that, and south and also in BC. In addition we have recently gotten some new observations that have come from ROVs that are operating at much deeper depths, to see if there's any death data that can be mined from the ROV surveys. We haven't really gotten into those data yet but we plan see if it goes beyond diver depths. But what I can tell you is that in places where people have been diving it's been if not worse, at least as bad as these tide pool areas. It's just that it's hard to get data from those areas.

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- Jennifer Stock:* Right. Hard to get. Do we have any ideas to this point as to the cause of this?
- Pete Raimondi:* Yeah, we do, and I'm going to describe the sequence of events that we think occurred, because it's not a straightforward event.
- Jennifer Stock:* Uh huh.
- Pete Raimondi:* What we think is that there is an initial insult to the organism, and an "insult" just means compromises it. And we really believe at this point that it is a pathogen, and a pathogen the way we're using it is either a bacteria, a parasite, or a virus, and that causes the insult, and the form of the insult is either an attack to the immune system or actually does some damage to the tissue, or both. But that happens at that point is there is a secondary infection that's almost certainly bacterial, and that bacterial infection is what causes the bulk of the damage, and leads to the majority of the symptoms that we call wasting. We're doing experiments, there're people up a western Washington university, and at Cornell University, and they're doing experiments to see what the mode of transmission is, whether the transmission can be through the water, or contact, or both, and those experiments are ongoing. Right now it looks as if there is transmission through the water, which helps explain how it spreads around one location. So, we're getting pretty close to knowing what's going on.
- Jennifer Stock:* Interesting, now I'm assuming that, like bacteria, parasite, virus, there are things that are common in the water all the time, so what makes the initial compromise to the sea star? It's just very odd that it's happening on such a wide scale. Is there an increase on these initial pathogens that are infecting?
- Pete Raimondi:* Well, you really hit on one of the two major questions that is really important—given that it's a pathogen the real question for that is, "Is it a native pathogen that's gone rogue, or is it an exotic pathogen?" If it's a native pathogen that's gone rogue, well then the second question kicks in, "Well why now and why where it is?" And how does it spread? And if it's an exotic, then the second question kicks in, "Where did it come from and how did it get here?" And what are the modes off its distribution? And those two things will follow, we hope, from the question of what it is. The work to describe what it is, also, contains a molecular component

and it's possible that when the molecular sort of signature of that pathogen is found, then we'll be able to identify whether it's a local or an endemic species, or an exotic species. And if it's exotic, where did it come from. And then most of these other questions will become the prominent one. And they're prominent because whether it's exotic or native, or whether if it's native if it's gone rough or if exotic where it came from, we have no idea of what the outcome will be or how long it's likely to persist, whether we're in the beginning of the outbreak, or in the middle, or near the end. And I think even more importantly whether this is going to initiate other types of event that result from the loss of these top predators, and these are all questions that are being addressed, but not answered yet.

Jennifer Stock:

That's interesting. You know I have to ask, because a lot of people have asked me as an educator, about the impact of the radiation from Fukushima, because there's been a lot of very scary testimony or blogs put out with probably inaccurate information, but can you just speak to that in terms of the potential radiation from Fukushima and any possible relation.

Pete Raimondi:

Sure. Yes, and I'm really glad you asked that because we encountered the same thing. We do not think that there is any relation between the radiation from Fukushima, and what's going on here. And in part that's because we feel pretty comfortable with what the pathogen, you know, what the likely pathogen is. And also because you know the models, and actually the observations that are on the west coast don't actually suggest the radiation being higher than ambient, but the other thing about it is the characteristics of the event are very different, meaning this is from Alaska down to southern California, and there's no models now of any spread coming from the tsunami, be it debris or radiation that would put that stuff, you know, any of it, in southern California. So we're really comfortable saying there's no evidence, none, that shows it being related to radiation.

Jennifer Stock:

That's great. Now, you did mention before that this is a unique event, but it's not exactly solo. It's happened in the past, there've been these big die offs before, historically. I vaguely remember in El Niño, in the nineties, I was living on Catalina islands at the time, teaching down there, and all our sea stars were melting away and it was attributed to the warm water; is that a similar event?

Pete Raimondi: Yeah, and that's why earlier I described it as a description of symptoms. So you're exactly right, sea star wasting events happen pretty regularly. So there was the 1997-98, that's probably when you were out at Catalina, and as you say it really had a major impact in southern California and Mexico, with respect to sea star, and with some respect to sea urchins. There was an even bigger event in 1983-84, again associated with El Niño, and then in the late 1970's there was a really big event in Gulf of California—all of those were associated with warm water. And so the reason this is an unprecedented event is because of the geography, because it's really wide spread, those '83, '84, '97, '98, never spread above Point Conception, which is here in California, and that's because the warm water didn't go much above Point Conception. We don't know, you know? In retrospect we don't know if those events were related to just the warming of the water, compromising the animals as it could have done, or if there were pathogens that came up with the warm water that caused the problem but either way it was clearly associated with warm water. So the real difference third time is that it's not in any way associated with warm water, in fact we've been in a cool phase since '97-98. And locations where it was first seen and where it's seen currently are not even warm water areas, and there've been no El Niño sort of event, so that's the reason it's so troubling to us, it's not like the other events, and so when the El Niño switches off, or goes to a La Niña event, it's going to go away because it's not associated with the warm water. That's what's so troubling.

Jennifer Stock: Yeah, well that'll be interesting to see, because apparently we're moving towards an El Niño period, which is associated with warmer waters, so sea stars, this event really reacts to another condition.

Pete Raimondi: That's right, it may make it much worse, if there truly is warming water in this particular unrelated event, than that would be a kind of synergistic, but badly synergistic event, perhaps.

Jennifer Stock: So, this thing really underscores to me the importance of long term monitoring, and I know that you've been a big part of Rocky Pacific Intertidal Monitoring network, a multi agency network. Can you talk a little bit about this consortium of research groups

and how you all work together to gather and keep data together so we have something to look at in a systematic way?

Pete Raimondi: Yeah, I'm really happy to do that. There's this group called Rocky Marine Multiagency Intertidal Network, and then this other thing called Pacific Rocky Intertidal Network. And we are a consortium of a bunch of groups; they are funded by variety of sources including BoEM, which is the Bureau of Energy Management. And the Packard Foundation, and the State of California Ocean and Science trust. And the real goal was to standardize the monitoring up and down the coast, and to establish baselines, but also to keep an ongoing record that can be used for a variety of purposes. So a good example would be oil spills, you know this initiated because of the Exxon-Valdez oil spills, because there was really no baseline data in which to judge impact, so that's why BoEM got involved, but since then a lot of groups have jumped on because there is a great need for baseline monitoring, and ongoing monitoring, so you have baselines to establish what was there before something happened. And this is a perfect example of it, where there's this event that has swept up a down the coast. Because we have sights up and down the coast we were not only able to detect it, but we were there to estimate the impact, both interims of the sea stars and the communities which the sea stars live, and that's the next phase for us, is to sample these sites again, post the disease, and see how the communities respond to the loss of these species. And these monitoring programs are prenting in the tidal and the intertidal

Jennifer Stock: That's going to be really interesting to see, I'm sure that up it for all those (people) going out to do those intertidal surveys. It could be a very different year to see what it looks like without sea stars. Because sea stars are considered a keystone species aren't they? Without sea stars there would be a big change for the prey they typically eat.

Pete Raimondi: Yeah, and I'm going to put on two hats here. One is going to be the kind of concerned conservation biologist, but the other one is going to be the scientist ecologist. And you know, as you stated, the actual keystone species is the Ocher star, that's the one that was first described as a keystone species and there as work that was done, primarily in Washington, that suggests that its removal would result in pretty broad consequences for the rest of the

community. And if this is true, you know, you are going to have a very different area out there. It's not going to be a desert, I want your listeners to understand we're not going from a lush land to a desert; it's just going to be different. And the other thing is, now putting on my scientist hat, is that we rarely get the opportunity to test the ecological theory over big ranges, over big social scales. Much of the ecological theory is developed over small-scale experiments, and so this is an opportunity to see whether these predictions, which are not so much dire, but are important, are going to be manifest over large spatial scales, because we have a removal experiment going on over an immense spatial scale.

Jennifer Stock: Very interesting. Are you interested in members of the public sharing their observations somehow?

Pete Raimondi: Yes, in fact if they go to our website, www.seastarwasting.org, that's I think one of our key contributions to understanding the special spread of this, is that we get a lot of public observations, and there's actually a form online and the public can actually send it to us, and we are about to vet it and to put it into our database, and there's also a map, and I think it was updated just a few days ago, February 26th, that shows the instances of wasting,, along with the areas where we've not found it, so you can see it's patchy along the whole west coast, and you can see what species are effected, as well as when the documentation was made. And these maps are a hybrid between our own observations with our groups that are going out but also with a lot of public data that's been put in. And it's incredibly valuable because to be really completely understood, the key question is whether there's a single initiation point or multiple initiation points and how the spread occurs. And to do this you need what we call an epidemiological map, which shows where it is and when it got there. And we have an immense amount of data, perhaps more collected than any marine disease that's ever been documented, and in large part because of public observation.

Jennifer Stock: Fantastic. So folks to go to www.seastarwasting.org to get information and figure out how they can share their observations with the scientist community.

Pete Raimondi: Exactly.

Jennifer Stock: Well Pete, thank you so much. I have to wrap it up right now but that you se much for calling in on your busy, busy schedule and sharing your information about this event.

Pete Raimondi: You're very welcome, thank you.

Jennifer Stock: All right, take care.

Folks tuning in, you've been listening to Ocean Currents, and that was Dr. Pete Raimondi, from UC Santa Cruz, talking about the sea star wasting event that's happening right now on the west coast. So if you go out to the intertidal zone, you've very likely to encounter sea stars that are on their way to dying g be wasting away, or not even there. So it's a really interesting scientific event that's happening, and there's some interesting monitoring going on. I'm glad that Pete could join us. We're going to take a short break, and when we come back we'll be talking about the International Ocean Film Festival, happening in San Francisco.

(Interlude music fades in.)

Jennifer Stock: You're listening to Ocean Currents, live with me on the phone is Anna Blanco, of the San Francisco international Film Festival. Anna, you're live on the air!

Ana Blanco: Thanks so much, it's a pleasure to be here.

Jennifer Stock: Thanks for calling in! Well give us a quick update, we have about five minute for some highlights of the week, maybe starting Wednesday with the opening gala event.

Ana Blanco: Well we have a really exciting opening gala, Wednesday night, March 5th, at the aquarium at the Bay; it starts at 5:30. And we're very honored to have Captain Don Walsh amongst us; he's going to be our keynote speaker. He is the first person to have gone down to the Marianas Trench, back in January of 1960, and he's going to be addressing the audience with a wonderful presentation called, "Our Oceans, The Explorers, and The Storytellers." Prior to his presentation we have an open night gala with wine, and hor d'oeuvres and seafood nibbles, donated by some of the best Bay Area seafood restaurants, and that's in the Aquarium of The Bay. So that's the perfect kickoff to the following days we have 50 films

being screened from 70 different countries. At last count I think we have 16 filmmakers who are going to be present for Q and A onstage. So we are very, very excited to have all these films from every genre; animation, documentary, narratives, and they each have their own stories to tell about the ocean. We're very pleased to have for the first time, two new film blocks, one is specifically about whales and that's on Tuesday, at 4 o'clock, and the other new one we have that we're very excited about is the new dive program, it features a wonderful film by film maker Bob Talbot, called Ocean Men, Extreme Dive, and that's on Sunday, and 5 o'clock, and there's a panel discussion immediately following that film program that which includes Bob Talbot and a couple of other key diving people from the Bay Area, but also from across the nation. So in addition to the film there will be an opportunity to ask them their experience as divers, and some of the questions that the films themselves raise. So there's a lot to do, a lot for people of all ages, the films take place at Bay Theater, which is a Pier 39 in San Francisco.

Jennifer Stock

Nice! I was just looking at the panel you'll have for the extreme diving program, and see a local diver we've had on KWMR, on Ocean Currents, Ron Elliot. So, that's fantastic. As well as Matt Vieta, we've also had on the radio, talking about diving at Cordell Bank, and Kip Evans, who we've worked with quite a bit within sanctuaries, a very well know photographer and underwater film maker, and Francesca, she's very involved with the Gulf of The Farallones Sanctuary, so that is going to be a very rich panel of very rich people.

Ana Blanco:

Yes, it is. And there's also another new film that Kip Evans has released, called California Hope Bluff, I'm not sure if you're familiar with Hope Bluff, but it's part of the California protected area, and Kip has a new film, and that is airing on Thursday, at 4:30 in the afternoon, and he will again be available for Q and A for that particular film, so we're excited to have him here for that as well.

Jennifer Stock:

That's wonderful, and it ties in really well to the beginning of my program, I had an interview about the marine protected areas and the monitoring that we have happening out here, and this is one about the entire state process of the MPA, so that's great. Way to go, Kip! So tell me about the masquerade part of the gala.

Ana Blanco: Oh, I am so excited, I am so happy you asked about that because for the gala we about 300-350 people coming for that evening, we thought it'd be fun if we had everybody show up with a mask, it's obviously optional, but if it's ocean inspired and it's a mask it's very welcomed. I believe most of our volunteers have procured masks, and so we're very excited to add a little bit more fun to an already really fun event.

Jennifer Stock: That's great. Well Ana, can you just give us the website for people to get more details, the schedule, and get tickets.

Ana Blanco: Yes. The site is www.oceanfilmfest.org; you can also call us here at the office, at 415-561-6251 if you have any questions. But everything is on the website, including tickets, a description of every program. And I would like to give one more shout out to the student film competition, that will be airing on Sunday at 10:30, and that with be the ten 10 films from our third annual student film competition, so they're films from middle school and high school students. So that should be very fun.

Jennifer Stock: Well thank you so much Ana for calling in!

Ana Blanco: Thanks for having me!

Jennifer Stock: Have a great week!

Ana Blanco: Thank you, talk to you soon.

Jennifer Stock: OK. Take care.

www.oceanfilmfest.org is the place to get more information about this annual event, this is the 11th International Ocean Film Festival, 50 films, 17 countries, a wide diversity of independently produced films, it's a really wonderful event. If you can make it for any of those events, I've made it there in the past and it is just so cool.

Well, that is about it for today. Thank you for tuning in. Ocean Currents is the first Monday of every month, and I have a podcast, you can go to iTunes and look for Ocean Currents, or subscribe via my website, www.cordellbank.noaa.gov, to get past episodes. And I love hearing from past listeners! Please feel free to email me your

comments or suggestions, or future topics you'd love to learn more about at Jennifer.stock@noaa.gov But we are out of time today, and I appreciate everyone tuning into ocean currents. Thanks again for tuning in, have a great afternoon.

(Exit music)

Jennifer Stock:

Thank you for listening to Ocean Currents. This show is brought to you by NOAA's Cordell Bank National Marine Sanctuary, on West Marin community radio, KWMR. Views expressed by guests on this program may or may not be that of the national Oceanic and Atmospheric Administration, and are meant to be educational in nature. To learn more about Cordell Bank National Marine Sanctuary go to www.cordellbank.noaa.gov