

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

(Music)

*Jennifer Stock:*    This is Jennifer Stock and you're listening to Ocean Currents. On this show we talk with scientists, educators, fisherman, explorers, policymakers, ocean enthusiasts, kids, authors and more all uncovering and learning about the mysterious and vital part of our blue planet, the blue ocean. I'm ready to dive into another year of ocean content and bring it to you through Ocean Currents on the radio today and all year long. Today we are talking about the case of the disappearing kelp on the Sonoma Coast. More specifically, we're talking about bull kelp; the kelp with that big, bulbous air bladder on it. I'm going to be bringing in some experts in just a few minutes to talk more about this. So stay with us here on Ocean Currents to learn more about kelp.

(Music)

*Jennifer Stock:*    Bull kelp is an ecological and cultural fabric of this region. When I think of walking the beaches, I think about the drift kelp. When I think about heading offshore on the ocean, I think about the bull kelp rafts that we see drifting offshore providing many temporary ecosystems. When I think about the Sonoma Coast, I think about abalone, bull kelp and rockfish. But things have changed drastically along our coast since 2012. Bull kelp forests in the Marin-Sonoma region have been almost completely decimated. My guests today have been engaged in learning about the problem and formulating plans to conserve and restore, to the best of our management abilities, this vital ecosystem to the coast and ocean. My guests today are Rietta Hohman of the Greater Farallones Marine Sanctuary association. She is the Greater Farallones National Marine Sanctuary Kelp Recovery Working Group Coordinator and a long time excellent marine educator for the sanctuary. We also have Cynthia Catton, an environmental scientist with the California Department of Fish and Wildlife's Marine Region. Based in the Bodega Bay field office at the UC Davis Bodega Marine Laboratory, her main responsibilities are in marine invertebrate fisheries and

conservation research. I want to welcome both our guests to KWMR. Thank you for calling in today. You're both live on the air.

*Cynthia Catton:*        Wonderful. Thank you so much.

*Jennifer Stock:*        All right. Do I have both Rietta and Cynthia on?

*Rietta Hohman:*        Yes, thank you.

*Jennifer Stock:*        Great. Welcome, both of you.

Rietta, let's start with you. You're a diver, a scientist and an educator, and for those of us listeners that may not be that familiar, can you describe to us what the bull kelp ecosystem is all about; what it looks like; what it should look like; its ecological range; how it reproduces; and what animals live in it.

*Rietta Hohman:*        Yea, definitely.

*Jennifer Stock:*        Rietta, I think I lost you there. I'm not sure. Cynthia, why don't you go ahead and answer that question, and maybe Rietta will call right back in.

*Cynthia Catton:*        Certainly, yes. The bull kelp forest is a major ecosystem off our nearshore coast in Northern California all the way up into Alaska. It has a really wide range, geographic range. It is, I think, equivalent to a redwood forest in terms that it's really important for creating habitat for a lot of different critters and really affects the overall environment in the area. It creates a lot of hiding places for fish and it offers food for a lot of organisms like abalone and urchins; it shades a lot of the understory; and is really important for helping with some of the environmental conditions in terms of chemistry of the ocean in the local area potentially as well as wave action.

*Jennifer Stock:*        What is the range for bull kelp? Is it throughout the entire State of California?

*Cynthia Catton:*        So a lot of people might be more familiar with Southern California kelp forest ecosystems which are dominated by giant kelp. It's the same height as the bull kelp but it has a lot more foliage. Each individual giant kelp has lots of stocks that come up and blades that come all the way up. Bull kelp

has one stock and it shoots all the way up to the surface. It's really fast-growing; it needs to get to the light as fast as it can because all of its blades are up at the surface where it's gathering all of the sunshine that helps it grow and produce. Bull kelp is dominating north of San Francisco. There's an area of our coast that has a combination of giant kelp and bull kelp, and that's from Point Conception to San Francisco, generally, we can see a mixture of those two species.

*Jennifer Stock:*      How about reproduction. How do bull kelp reproduce since they are not a flowering plant? How do bull kelp reproduce?

*Cynthia Catton:*    Kelp produces spores. It actually has a really interesting life history. It has multiple phases of its life history. It can get kind of complicated, but the stage that we are most familiar with which is actually this tall, incredible habitat out there. Each individual creates spores. You can see usually in the late summer, fall time period, if you look at the blades, you'll see a thick, dark patch, a series of thick dark patches showing up along the blades, and that's where the spores are being created. Bull kelp will just release that patch of spores and it will go floating off releasing those spores.

*Jennifer Stock:*      How far can spores travel in terms of propagation? How many do they release when they are propagating?

*Cynthia Catton:*    That's a very good question, and not one we have a good answer to yet.

*Jennifer Stock:*      It must be pretty hard to study spores in the ocean, right?

*Cynthia Catton:*    They're microscopic. They're really, really tiny and very difficult to find in the wild. We do know a bit about their growth and progress from laboratory studies where we have more control - we know that we put spores there, so we can look there. We can find them; we know what species they are. But since spores are so tiny, gathering them from the wild, you have to grow them up before you can tell what they are. So yeah, it's difficult to study, but I think that's a really critically, important question right now about how far can those spores travel. One of the main concerns we have right now is how spore-limited we are on our coast right now to promote growth of the bull kelp. I think we'll get there further along in our discussion.

*Jennifer Stock:* I've been reading up a bit. There's been quite a few studies globally where kelp exists too. So interesting to kind of compare notes of species in different regions, ecoregions. Well Rietta is having a tough time calling in. I sent her the number to call in. I know she'll get back in at some point, so I'll keep going with you.

*Cynthia Catton:* No problem. I just want to make one more point. It's really an important difference that sets bull kelp apart from the other species that we're familiar with which is giant kelp. Giant kelp is a perennial and bull kelp is an annual. Perennials are plants that can dieback to the base and then grow back from that base the next year, so they just continue on through individual growth. They are not just reliant on that spore production to create or to persist the population going forward. Bull kelp is a bit like corn, very fast growing, but it relies on that spore production. Each individual will dieback or get ripped off the reef each winter from the storms, and that's a natural part of that cycle. But they can't grow back from the base, even if it's left there. They have to grow back from the spores.

*Jennifer Stock:* That must be an issue for repopulation and concern in terms of bringing back kelp if the conditions are right.

*Cynthia Catton:* Right.

*Jennifer Stock:* In terms of monitoring, how has the State monitored kelp in California? Is it just visual surveys by diving? What type of surveys do we know just so we know the coverage of kelp? I've seen some maps that show this incredibly dramatic, drastic reduction from 2008 to 2016. How do you monitor kelp? It's a huge State, huge ecosystem. It's such an important ecosystem in its breadth. I'd love to hear more about that.

*Cynthia Catton:* Those maps that you've seen and maybe some your listeners have seen, are showing the amount of kelp that has reached the surface. It's a nice proxy for the health of the ecosystem to be able to look at what's growing at the surface. It would be like taking aerial images of the redwood forest and just seeing the canopy and not the understory. It's important to know that what we are surveying with that is just what's reaching the surface. There's a lot going on underneath that we also want to know what's going on with

that. Like I said, it's a nice opportunity for us to see things on a large scale. Those surveys were done with an airplane and georeferenced images that were combined into a large map. We have multiple years of those data and so we can see how the most recent years compare with what we've seen in the past. Like I've said, that doesn't give us the full story. It just gives us this large overview. It is also challenging because airplanes are expensive and also you have to fly them at the right time of year, at the right time of day when the tides are low, and you need to have no cloud cover and no glare off the water. So it's challenging. We are looking into other ways that we can approach getting the same data maybe using satellite imagery, maybe using drone technology for at least smaller areas. Again, that's giving us the uppermost layer of information. To get that information about what's happening under the water, we need to go under the water. We have, Cal Fish & Wildlife, has a long term for almost, I guess, this year would make it 20 years. We're in 2019, so we're in 20 years of data coming up on North Coast bull forest ecosystems where we are counting organisms under the water tracking the habitat, not just the large kelp.

We also have a number of other subtidal monitoring programs in California. One is Reef Check, which is the Citizen Science version of what we've been doing where recreational divers can get involved and collect data. Also, the PISCO, which is a group that is based out of Santa Cruz. They have done a bit of monitoring on the North Coast. They mostly have been focusing subtidally in the Central Coast and Southern California.

*Jennifer Stock:* I have Rietta back on the line. Rietta, I want to join you to the conversation here. Welcome. You're live on KWMMR.

*Rietta Hohman:* Excellent. Thank you. Sorry for the dropped call earlier.

*Jennifer Stock:* No worries. It's technology. Rietta, just to catch you up, I've been talking with Cynthia and she talks a bit about the kelp ecosystem and how we study and monitor kelp on the Sonoma Coast. As we talked about earlier in the program, there's been this drastic reduction in kelp that I'm hoping you both can talk to a bit here about what does this mean and what are we doing. So Rietta, how about we come back to you now and talk a little bit about what declines have we

seen and what are some of the potential causes of decline that are causing this drastic loss.

*Rietta Hohman:* Over the past decade, there have been a number of different stressors on the ecosystem that have compounded. These include warm water events; we had a multi-year persistent marine heatwave. We had a disease come through that affected more than 20 species of our sea stars, and they are a primary predator of urchins, so we saw a subsequent increase in urchin populations. There was a harmful algal bloom that impacted especially the Sonoma coastline back in 2011. All of these things together had sort of formed what actually the Fish and Wildlife team has dubbed “the perfect storm of stressors” that had come together to really have a heavy impact on the ecosystem and cause such a dramatic decline.

*Jennifer Stock:* How has this affected the communities on the North Coast in terms of economy, fisheries, recreation? I'm sure there's been a strong impact from this algae loss that has happened. Cynthia, why don't you talk about that.

*Cynthia Catton:* Sure. The kelp is, like I said, kind of the core, the foundation of the ecosystem that we rely on heavily for our fisheries, for recreation, and I would say for inspiration. It is just this amazing system to visit. The loss of that has really affected the entire ecosystem to the point where we are not seeing really any algal growth. Not just the tall bull kelp, but all the understory kelp and other all algal species as well. It's created massive starvation conditions for those herbivores that rely on the kelp including abalone and urchins, which are major fisheries on our coast that create opportunities for tourism, and they are some major economic drivers for these small communities on this remote coast. So it's been a really dramatic impact really quickly. In 2014 was the first year that we saw this rapid loss of bull kelp and it's been progressively affecting the ecosystem more and more over the last 4 or 5 years. We first started to see the impact to actually the red urchin fishery; It's a commercial fishery on the North Coast that has been one of the top five fisheries in the state of California for the last 20 years. This last set of years has seen dramatic declines in the fishery's productivity. In terms of those urchins, those red urchins that are trying to feed on the kelp to grow the *uni* that we eat, they're not getting enough kelp to produce any *uni* in many cases. Even though

there is a lot of urchins out there, they don't have any food value. We can't harvest them for food. The red urchin is the larger of the two species and is historically the target of a commercial fishery that's a major commercial fishery for our coast.

The purple urchins because they are smaller, there is a shorter window of opportunity for that species to be targeted by the commercial fishery where they are producing enough *uni* to be of sufficient food value to market. So the major historical focus on the fishery has been the red urchin. Neither of those species are doing poorly in terms of numbers. We've seen substantial increases in both species of urchin in terms of numbers, but neither of them is producing sufficient *uni* to support the commercial fishery. That commercial fishery submitted a request for federal disaster relief funds a couple of years ago which they were denied is my understanding.

Jennifer Stock: Huh. Wow.

Cynthia Catton: That continues to be a severe impact to our coastal communities. I would say that was sort of the canary in the coal mine of impact. The red urchin fishery was the first to be impacted because it has such a direct reliance on kelp as a food source to create the *uni* production. We saw a similar issue in terms of the abalone fishery, a major recreational fishery, multiple decades of running this really robust red abalone fishery. It's one of the last remaining robust, recreational fisheries in the world. It was a really big deal when we recommended to the Fish and Game Commission that that fishery be closed last year. That was really devastating. We had to make that recommendation because we saw mass mortality in the fishery of those abalone because of long term starvation conditions that continue today. The last few weeks, we've had some really big storms washing big waves up, and we've been getting reports all up and down the North Coast about abalone dead and dying, washing up on shore. They're just too weak to hold onto the rocks.

Jennifer Stock: Those poor snails. It's so sad.

Cynthia Catton: It really is. Just really devastating. Like I've said, we've been going out and doing our subtidal surveys. In 2014, we lost

the bull kelp, but we hadn't lost the understory yet. In 2015 was the first year I think we started to see this really traumatic transition from a kelp forest ecosystem to what we call an urchin barren condition where we're seeing an overabundance of purple urchin's extreme grazing pressure on all the algal species. Since then we've been seeing that progress even further so that we see that the urchins, the purple urchins that are the most abundant, are actually munching through not just the fleshy algae that sometimes that we like to eat - like the seaweed that is on our sushi rolls or something or in seaweed salad. But they are also eating through the crust, the pink crust that covers most of the rocks that is an alga. It is a calcified alga, really hard to eat. It's like photosynthetic rock. It's not good food. They are eating through that.

*Jennifer Stock:*            That's the coralline algae, right?

*Cynthia Catton:*        Yes. We are seeing, in 80% of our survey area, bare rock now. That's a signal that this is beyond what we'd consider a typical urchin barren condition, which is bad enough. This has progressed beyond that so that it is really affecting even that foundational crust on the reef.

*Jennifer Stock:*        I'm going to interrupt you right there.

*Cynthia Catton:*        Sure.

*Jennifer Stock:*        This is KWMR, Point Reyes Station. You're listening to Ocean Currents. We're talking today about the kelp situation on the Marin-Sonoma Coast with Cynthia Catton from the California Department of Fish and Wildlife and Rietta Hohman of the Greater Farallones National Marine Sanctuary. I actually want to move now a little bit to the work you both have been doing because responding to this big disaster with these cascading effects of the ecosystem changing and the impact to the commercial fishery as well as the recreational fishery and the communities that rely on that tourism. The Greater Farallones National Marine Sanctuary, which is the Federal Marine Protected Area that runs all the way up to Point Arena, along with the California Fish and Wildlife, I understand, had a working group put together to address this issue. Rietta, you were the coordinator of this group. Can you give us a little background on how this group came together, who made up this group, and what the goals

of this group were? Because it's really one of our best efforts to address this situation instead of just monitoring it. Now there's this group of people really working to decide how to put the science together to move forward and doing something about it.

*Rietta Hohman:* Just to clarify a little bit, I'm actually the science lead for the Kelp Recovery Working Group, whereas Sara Hutto is our Kelp Recovery Working Group coordinator. She's the head of our climate program.

*Jennifer Stock:* Thank you for clarifying.

*Rietta Hohman:* The working group has been volunteering with the California Department of Fish and Wildlife since 2011, and experienced the decline of the kelp forest firsthand. It seems in the first couple of years when we really experienced this dramatic loss, that it wasn't really much of a recognized issue at first. At the time, it seemed really prudent to see if we could pull people together and figure out a process for solutions, to analyze the data, to determine what could be done. I worked really closely with Cynthia last year. We're working on putting together a larger scale working group, actually, that would encompass the West Coast. But then the Sanctuary provided a lot of support through the Sanctuary Advisory Council. In January, I presented the formation of the working group and potential partners to the Sanctuary Advisory Council. We really tried to look at who could be representative on the working group that has specific expertise or particular datasets or were members of the community with relevant insight or experience. We really brought together this diverse group, an interdisciplinary team, to look at the state of the science and what has been done so far. It was co-chaired, of course, by our Sanctuary Advisory Council representative, Francesca Koe, and Cynthia. We looked at again the state of the science, looking at kelp loss in the region and identifying what data and knowledge gaps there were. We invited guest speakers from other regions to discuss their restoration strategies and methods and what recovery actions had been taken in, for example, Southern California, the Puget Sound. So other regions that could have potential applications for this region. We looked at what efforts have been done to monitor kelp canopy and subtidal ecosystems. We looked specifically for kelp canopy; we looked at aerial mapping, remote sensing,

and satellite imagery. Then we dug into criteria that could be used in selecting restoration sites along the Sonoma and Mendocino coastlines. All of this was done within the past year. As I mentioned, I presented in January, we formed the working group, invited members, and then we held three meetings, in-person meetings, that we held throughout the year where we discussed all of these different aspects. The working group members put together a set of recommendations for the Sanctuary and for Fish and Wildlife to review moving forward. Those recommendations will be incorporated into a Bull Kelp Recovery Plan that will be implemented by both agencies.

*Jennifer Stock:* Fantastic. What are the working group recommendations? Can you speak broadly to them at this point since they are not released beyond the Sanctuary Advisory Council at this point?

*Rietta Hohman:* The recommendations, we're actually going to be posting on our websites in the next couple of weeks. Folks can go to [farallones.org/kelp](http://farallones.org/kelp) and see all of our meeting notes, and our members, and presentations that were given, and the actual recommendations themselves. The recommendations are under review right now, so they are not finalized, so that's one thing to keep in mind. The overarching recommendation was to establish, in partnership with the California Department of Fish and Wildlife, a Kelp Recovery Program within the sanctuary that would work to implement sea recommendations or strategies that were developed by the working group. A huge part of that is developing a network. We really wanted to capitalize on this awesome partnership that we formed with these different groups and members of the community and establish a really strong network of partners. This has already been established to a certain extent, and Cynthia can speak to the Kelper group a bit. Really the primary recommendations were to establish this program and have a coordinator that would implement recommendations involving monitoring and research, community and engagement, and the site selection process for restoration.

*Jennifer Stock:* I understand there have been some efforts to attempt to locally or in specific areas remove this excess of purple urchins that may be preventing the opportunity for bull kelp to grow. It's been a way that recreational divers and the

communities have been able to be engaged in this a bit. So I just want to jump back and ask about that. Cynthia, can you talk about that a little bit in terms of these urchin derbies? What's the efficacy in those? Are they helpful? Are they something that could ecologically help the bull kelp ecosystem?

*Cynthia Catton:* Yeah, I think that's a great question. Going back to Rietta's point about the Kelper partnership, I think that the working group that we formed and the recommendations that we've come up with as a group, are really building off the experiences that the Kelper partnership has had in the last year or two. Stepping back a bit, I started to talk with the commercial urchin divers back in 2016 when they first started to have severe impacts to their fishery; To talk with them about what I've been seeing on the science side of things, what they've been seeing in terms of whether the impacts that they've been seeing not just to the habitat but also to their industry, and talk about how we can work together. One of the lessons learned from a lot of other situations that are similar to this, where we have lots of purple urchins and an urchin barren condition, is that if we can reduce that grazing pressure, we can support kelp recovery. That is, I think, an important piece. We can't make the assumption that urchins are the only thing that is hindering kelp recovery, and we can't assume that if we take the urchins out that the thing that will come back is the kelp. That is one of the strongest issues right now is that there is high levels of grazing pressure. Part of what we are doing is doing the research, learning about this system, how does this system respond because, as I've said, this is a different system than we've seen urchin barrens come up in the past. This is not a giant kelp forest. In Southern California this is an annual species. In Northern California, we need to make sure that what we're doing is actually going in the right direction. We can use this information to let us know if there is anything else that's hindering recovery locally.

*Jennifer Stock:* Sounds like there is a little bit of monitoring associated with urchin removal along with these derbies to see if there is anything that can be gained from it.

*Cynthia Catton:* Absolutely. The entire point is to do the research that we need to inform our next steps. The work that we've been doing, it started out with a collaboration with the commercial

urchin divers. It has expanded tremendously to include recreational divers, non-profits, industry in aquaculture and in-land management, in composting. There are so many people who are affected by this issue and who have really great ideas about how to move forward with problem solving. It's really brought the community together very strongly. I think that it's a really ideal model for how we can all work together to help mitigate some of this issue, these impacts of climate change for our communities.

*Jennifer Stock:* I agree, 100%. It's great to hear all of these folks coming together, different aspects of the community in bringing all the science together, and engagement, and sharing, and making this plan moving forward. Rietta, can you talk about the Kelper partnership that is one of these outcomes for moving forward to help recover the kelp?

*Rietta Hohman:* The kelp recovery network will build off of the Kelper partnership. So I think the specifics of that, the actual Kelper group, Cynthia can speak in detail about. The network that we are really hoping to put together will be built off of the Kelper partnership and our working group process. I see it as a way of implementing or really streamlining both and bringing in the folks who participated in the working group, which a large portion of them are also a part of the Kelper partnership, but there were some that maybe have not been involved up to this point but we want to bring them in and build off of that really strong partnership that we really have been working hard to establish, Cynthia especially has been working to establish over the last few years. Then incorporating our working group process this year, and moving forward with really how can we address the recommendations that will be reviewed and eventually adopted by the Sanctuary and Fish and Wildlife, and how we can build upon all of these partnerships that have come together. It's all been very exciting to see all these different folks involved, and I think that moving forward it will be really beneficial to bring everyone together and form this really strong network where we can share data and opportunities and focus on the bigger picture of the kelp forest ecosystem and what we can do to facilitate recovery.

*Jennifer Stock:* Great. A lot of this is involving scientists and people that are really engaged in monitoring in the ocean or recreational or commercial harvesting. What do you think is really important

for community members that are not necessarily in the ocean or are doing science themselves, but the larger public? What are different ways that they might be able to be involved to help facilitate some these ideas for the recovery program?

*Rietta Hohman:* I think one of the most important things is to stay informed, to keep in touch, to see what has come from the working group or what has come from the partnership in the future. We're hoping to really provide a centralized area where we can let people know about opportunities for Citizen Science. There are already Citizen Science programs such as Reef Check from the Northern California coastline, and Cynthia works with The Nature Conservancy to put together a Citizen Kelp Program where beachgoers can go and actually log whether or not they see kelp at the surface or on the beach. Knowing what opportunities are available for Citizen Science, but in general staying informed as to what progress has been made, the state of the ecosystem, and what efforts are being performed. Of course, the urchin removals are really awesome opportunities for anyone that likes to get into the water and actually actively be a part of the solution. There's a lot of opportunity moving forward to stay involved and stay informed.

*Jennifer Stock:* Absolutely. That's fantastic. We need to wrap it up here in just a minute, and I wanted to give both of you another opportunity to say any last words and to make sure you share again any websites where people can learn about the working group's efforts and science that they brought together. Rietta, you mentioned [farallones.org/kelp](http://farallones.org/kelp). Any other websites that might be of use, and any last words that either of you want to share about this kelp recovery effort?

*Cynthia Catton:* I think another really great resource is the website for the Help the Kelp Campaign run by one of our major Kelper partners, the NOYO Center for Marine Science in Fort Bragg. They have an excellent website which talks about the issue but also has opportunities for people to go and see how they can get involved in lots of different ways, not just underwater. One of the next urchin harvest events, the recreational urchin harvest event, that is being planned is planned for January 12th and 13th at Van Damme State Park, which is a nice place to do that in January since it's a fairly protected cove. I think they'll be able to get in the water pretty well

there regardless of the weather. I will be up there with my team and the NOYO Science Center folks will be there. A lot of the Kelper partners will be there supporting the Watermen's Alliance who is coordinating this recreational harvest event. We'll be doing a bunch of sampling of the urchins that are brought to the shore. We're going to be cracking some open, seeing what kind of reproductive condition they're at, how much *uni* are they producing, what are they eating. You don't have to be going underwater to be involved. If you want to come and hang out and see what the inside of an urchin looks like, you are welcome to come up and join us. Just to add to what Rietta was saying before, stay informed but also inform. There are a lot of people who still have not heard about this issue, and I think it's a really critically important issue to be aware of for our coast. Please do share this information with your friends and family.

*Jennifer Stock:* Great, that's wonderful. Rietta, anything else you'd like to add?

*Rietta Hohman:* No, I think we've covered all of the relevant basis. I do want to say that our Sanctuary Advisory Council meets at the end of February, I think it's on February 27th, and it is open to the public. So if anyone wants to come see us present on the final Bull Kelp Recovery Plan, they are certainly more than welcome to do so. The plan will be available to the public after that.

*Jennifer Stock:* Great, that's awesome. Do you know where this February 27th Advisory Council meeting will be?

*Rietta Hohman:* I don't off the top of my head, but we do have a website for our Sanctuary Advisory Council that folks can go onto and they'll be posted on there. I think once it's determined, if it hasn't been yet, then folks can go on there and see where it will be held.

*Jennifer Stock:* I think that's farallons.noaa.gov. Well, great. I just want to say thank you to both of you. I think that this whole story is such an incredible lesson about ocean literacy and the interconnectedness of ocean ecosystems and communities and economies and fisheries and culture as well. Also, a really great example of stewardship of agencies working together collaboratively with the communities and bringing in all of the stakeholders and people together. Thank you for

sharing all of this work and for doing all this work this past year. I'll definitely be keeping posted and sharing news with this audience here in Point Reyes and beyond. Thank you so much and have a great new year.

*Cynthia Catton:* Thank you so much.

*Rietta Hohman:* Great, thank you,

*Jennifer Stock:* All right. Take care.

We've just been talking with Cynthia Cattan from the California Fish and Wildlife and Rietta Hohman from the Greater Farallones National Marine Sanctuary Association. We've been talking about the state of the kelp on the Sonoma Coast, which has been in a drastic decline, and some really wonderful actions from these agencies working together with the communities up in the North Coast to put together this Kelp Recovery Program to bring as many people together to help address this issue. We are going to take a quick, quick break. As you may hear, I have another guest in the studio here, and he's prepared some ocean jokes today. Since we don't have our Positively Ocean episode today, we have some jokes to bring to you. We'll be back in just a moment to bring in Owen to talk about some jokes.

(Music)

*Jennifer Stock:* School's not back in yet, so I have a very special, young guest in the studio with me. I have Owen Kinyon, my son. My little marine mammal. Owen has prepared some ocean jokes to share with you. We just have a couple minutes, Owen, so I don't know if we'll have time to go through all of them. Are you ready?

*Owen Kinyon:* Yes.

*Jennifer Stock:* Go ahead. Pick out a joke.

*Owen Kinyon:* What kind of car does an oyster drive?

*Jennifer Stock:* I don't know.

*Owen Kinyon:* A clam-borghini.

*Jennifer Stock:* [laughter] A clam-borghini. All right!

*Owen Kinyon:* What kinds of sharks make good carpenters?

*Jennifer Stock:* Hmmm. I don't know.

*Owen Kinyon:* Hammerheads.

*Jennifer Stock:* Hammerheads. Like a hammer, got it.

*Owen Kinyon:* What's black and white and red all over?

*Jennifer Stock:* Black and white and red all over. A checkerboard with red checkers on it?

*Owen Kinyon:* No. Answer: an orca with a sunburn.

*Jennifer Stock:* [laughter] I hope that doesn't happen too often.

*Owen Kinyon:* Where do killer whales go to the dentist?

*Jennifer Stock:* Where do they go to the dentist? I didn't know they went to the dentist.

*Owen Kinyon:* The orca-dontist

*Jennifer Stock:* Oh, to get braces. The orthodontist. I got it. There were some good fish ones on there, too. Do you got a good fish one?

*Owen Kinyon:* Why are fish so smart?

*Jennifer Stock:* Ohh. Well, they're smarter than humans. They must do something right. No? What's the answer?

*Owen Kinyon:* They spend lots of time in schools.

*Jennifer Stock:* Ooooh schools. All right, how about one more?

*Owen Kinyon:* What do sea monsters like to eat?

*Jennifer Stock:* No idea.

*Owen Kinyon:* Fish and Ships.

*Jennifer Stock:* Fish and ships. [laughter] That I think is my favorite one. A little play on the word Fish and Chips. Well, I have to ask you, thank you for sharing those jokes, but can I ask you another question?

*Owen Kinyon:* Yes.

*Jennifer Stock:* What do you like most about the ocean?

*Owen Kinyon:* The fish.

*Jennifer Stock:* The fish. What do you like about fish? Do you like looking at them or...

*Owen Kinyon:* Yes, I like looking at them.

*Jennifer Stock:* And don't you also like to do other things with fish?

*Owen Kinyon:* Fishing.

*Jennifer Stock:* Trying fishing. Yeah. What is your favorite ocean animal?

*Owen Kinyon:* Hmm. That's hard.

*Jennifer Stock:* [laughter] You don't have to have a favorite, maybe one of your...

*Owen Kinyon:* All of them.

*Jennifer Stock:* All of them. Awesome. Is there anything important you'd like to share with people about how to take care of the ocean? Is there anything people can do every day to help take care of the ocean?

*Owen Kinyon:* No littering or not buying lots of plastic.

*Jennifer Stock:* Oh, that's excellent. Thank you. Does your mom make you pick up trash sometimes? Yeah, he's nodding his head.

*Owen Kinyon:* Sometimes I do it by myself.

*Jennifer Stock:* I know. I am really proud about you doing that. Thank you. Thanks for coming into the studio today, and it's back to school tomorrow, right?

*Owen Kinyon:* Yeah.

*Jennifer Stock:* Alright, you have one more announcement and I'm going to let you know when to read that. We're not quite there yet. Ok? Thanks for sharing those jokes and your information. I want to say thank you to the listeners today for tuning in and listening about our kelp situation. We will be hopefully back next month. Let's hope this federal shutdown ends soon. Next month we'll also have a Positively Ocean episode to bring back with Liz Fox our producer. Ocean Currents is always the first Monday of every month at 11 o'clock to 12. Normally, you can hear past episodes of this show through the podcast in iTunes or on the [cordellbank.noaa.gov](http://cordellbank.noaa.gov) website. Right now, during the government shutdown, it is all shut down, but when it opens, it will all be right back up. We'll make sure to add any new episodes that have been lingering to hear the past 11 years of shows of Ocean Currents. In the last few months, I have gotten a couple emails from listeners that have been listening through the podcast, and I just want to say, thank you. I love hearing from listeners. If you have ideas for topics or questions or comments, please email me, [cordellbank@noaa.gov](mailto:cordellbank@noaa.gov), and I will definitely get back to you. Owen, I think you have one last thing to add here. Go for it!

*Owen Kinyon:* Thank you so much 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.

*Jennifer Stock:* Fantastic. Thank you, Owen, for joining me today in the studio. Thanks to everybody for listening on KWMR.

(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 contact the show's host Jennifer Stock, email me at [jennifer.stock@noaa.gov](mailto:jennifer.stock@noaa.gov). To learn more about Cordell Bank National Marine Sanctuary, go to [cordellbank.noaa.gov](http://cordellbank.noaa.gov).

(Music)

(Splash)