

Jennifer Stock: It's June 20th and this is Jennifer Stock and I'm out on another research cruise with Cordell Bank National Marine Sanctuary on the research vessel, Fulmar, which is the shared research vessel between Monterey Bay, Gulf of the Farallones, and Cordell Bank National Marine Sanctuary. We'll be heading out to Cordell Bank today to do our monthly monitoring program where it's called the Cordell Bank Ocean Monitoring Program where we do transects throughout the sanctuary, monitoring for seabirds and mammals and anything else that might be on the surface such as debris or blue sharks, molas, ocean sunfish, and also do some oceanographic sampling along the way.

So, we'll be talking with some of the folks on board, observers today, the cruise leader today, and try to catch some of the notes from the field. Thanks for joining us today.

(Boat Sounds)

Jennifer Stock: It's been a pretty windy spring here in the Point Reyes region and all up and down the coast. I was very curious to see if we'd actually make it out this week. A lot of other boats have not been able to make it out to the ocean because of the high winds and huge swells. One of the larger NOAA ships on the fleet, The MacArthur II, is a 224 foot vessel, it was actually at Drake's Bay the last few days, hasn't been able to get out and do the work that it was scheduled to do, doing a lot of net sampling in the water, but I think they were able to get out today just like we were. The swells have calmed down and it's really quite beautiful. Less than 10 knots of wind, beautiful visibility, really nice for trying to spot marine mammals and seabirds. So, looking forward to it. I think we're going to get some good data today and see what the spring is delivering on the surface of the water.

(Boat Sounds)

Jennifer Stock: So, I'm standing here with Peter Pyle and we just finished the first transect, a CTD, just starting to move to the next one and Peter Pyle is here to describe the scene because we're in a really interesting area.

Peter Pyle: Yeah, we're out toward the outer edge of Cordell Bank and there's an awful lot of albatross, more than we usually see. We just counted 102 albatross within about a kilometer of the boat just doing a circle around while we were taking the CTD reading. We also had 3 pair of orca, killer whales, very large males come by, a

lot of shearwaters and Cassin's auklets and some northern fur seals. So, it generally indicates a lot of life out here, which is good. We had two years of lower productivity and now this year it seems like the upwelling winds have returned and the productivity is back. So, the birds should be rebounding pretty nicely from the two down years.

Jennifer Stock: So, what is this front line here that you're seeing and what is this caused by?

Peter Pyle: We're crossing right over a frontal zone we call, it's a boundary between two water masses. When there's....California current is strong and comes down there's a lot of sort of swirling and mixing that occurs around the edges of the current and we're right on the edge of one of those. So, the boundary between two water masses and a lot of food typically concentrates along them and that's why we're seeing quite a few albatross right now and the northern fur seal just all concentrated right along this frontal zone and I think...seemed like the orca were attracted to it as well and there's the phone...

Jennifer Stock: You need to get the phone. Alright. It's a busy time on the bridge here. We're getting ready for our next movement. Alright, so we're moving away now. Does this mean we're going to the next transect area?

Peter Pyle: Yeah. So, we started at the north. We do six lines each of about 12 or 13 kilometers in length, takes about 40 minutes per line, and we census all of the birds within 200 meters on one side of the vessel as we're going along and then we census all of the marine mammals within 600 meters within both sides of the vessel and so, albatross we also try to do within 600 meters on both sides, but today it's kind of challenging because of the numbers of albatross we're seeing.

Jennifer Stock: Does this seem like an abnormally large amount of albatrosses for this time of year or is this a time where they're normally foraging here?

Peter Pyle: Yeah. Well, interestingly, things have changed here because they used to do drag-fishing where they'd drag the bottom and bring a lot of stuff up and that albatross learned to come and follow those boats and pick up the discard. So, actually in the last...now, those vessels have been banned from the Cordell Bank region and the number of albatross we've seen out here have dropped a lot since then, but now its nice to see good numbers of them again and this

is actually a natural situation. So, there must be some food. Their main food items are squid.

It's possible that these Humboldt squid that have been around have something to do with it, but there surely has to be some sort of food resource that's around right now to attract them all. So, we'll see what we can see today to try to figure that out. You know, if we don't see anything it could be something that comes up only at night.

Jennifer Stock: We're talking to Lisa Etherington, our research coordinator. She's on the MacArthur right now with PRBO and they're doing net sampling and she mentioned that they caught a couple juvenile squid, larval squid. They don't know what species, but might be some squid hanging out in the water column.

Peter Pyle: Yeah. Those are, they're called market squid, those small ones. That's the one that the fishery is real interested in as well and there have been more squid around lately. I kind of think that the overfishing that's typically been happening has maybe been a good thing for squid populations in the Pacific, which in turn, is a good thing for the albatross, but, you know, then it's a bad thing for the fish and other things. So, you know, we have to be careful when we're upsetting the balance of nature out here.

Jennifer Stock: A lot of different cycles going on. Cool. Well, thanks Peter. We'll talk to you in a little bit as we're moving on to a new area...So, we've just started transect two and I'll try to get our microphone and you can hear some of the observations that we're seeing...not going to keep it on the whole time, though. It's thirty minutes and sometimes there's these fast moments. Sometimes there are these slow moments or where they're seeing lots of observations.

(Unintelligible voices and boat noises)

Male voice: Minute 16, Cassin's Auklet.

Male Voice 2: Did you want to give directions for the auklets?

Male Voice: Yeah. They were flying 3-0.

Male Voice 2: 3-0.

Male Voice 2: What zone were they flying to in 15?

- Male voice:* They were in 2. In zone 2 and at 16 was...30 on the water in zone 1, 50 on the water in zone 2. A minute 17, Cassin's auklet...

(Unintelligible voices and boat noises)
- Male Voice:* Minute 17 was sixty Cassin's on the water in zone 2, 20 Cassin's on the water in zone 1, 10 flying in zone 2, flying direction was 3-0. Minute 18 Cassin's auklet...it's not usually this busy, don't worry.

(Boat noises)
- Jennifer Stock:* So, Cassin's auklets are out foraging during the day and they come back to the nests on the islands at night.
- Peter Pyle:* Yeah, that's correct.
- Jennifer Stock:* I remember being out there and hearing, it's just this massive sound of...all arriving at the same time or do they arrive at the same time or...?
- Peter Pyle:* Yeah, there seems to be a big push right in the first hour or so after it gets dark. If they come in earlier, the western gulls will attack them and kill them and actually kill them and eat them. So, that's why they come in at night. I mean it's nice to see all these Cassin's out here. It probably indicates there's a lot of krill, which is what you'd expect from a year like this where we had a lot of upwelling.
- Jennifer Stock:* A lot of wind. So, do the parents regurgitate to the chicks on the nest? How do they feed the chicks?
- Peter Pyle:* They have a pouch called a Gular pouch that is in their neck and they can fill that up with krill and sometimes some fish and other things and then they come back and cough it back up to feed their chicks.
- Jennifer Stock:* Some for themselves, some for the chicks?
- Peter Pyle:* Yeah. Undoubtedly, they're getting some nutrition off of it as well and yeah, that's an interesting question. We don't know a lot about it, how the adult chooses what to eat itself and what to then save for its chicks, but when food is plenty, which is I'm sure going to be the case this year, they probably don't have to worry about it too much as, you know, there's plenty to go around.
- Jennifer Stock:* And rhinoceros auklets do the same thing, forage during the day?

Peter Pyle: Yeah and they go out to deeper water and go...and they can dive deeper and they specialize on different species of fish that live at midwater level, some...particularly these ones called sarees and also anchovies and rockfish.

Jennifer Stock: So, they're probably a little bit more adaptable than the Cassin's auklets are during poor food years.

Peter Pyle: Yeah. The Cassin's are really dependent on the krill whereas the rhinoceros auklets, their food source is a little bit more stable. The other thing is that on good upwelling years there's a lot of rockfish and all of the seabirds eat that, but then on poor upwelling years like the last couple there's no rockfish, but then on those warmer water years, you'll tend to get the anchovies coming up in higher numbers. So, a lot of them will go and switch to the anchovies.

It's sort of like a plan B. When there's no rockfish there will be anchovies and then the really interesting thing now is that the Pacific sardine is coming back and this was a fish that was wiped out during the late 40's and 50's in part, perhaps, by the cannery row and the big sardine fisheries that operated out of Monterey and San Francisco and so, they'd been gone for the region for about 60 years, but now are coming back and it'll be exciting to see how the birds respond to the return of sardines.

Jennifer Stock: That crash was also partly because of the oceanographic conditions at that time, wasn't it? It was kind of like, they hit the fishery really hard at the same time the fisheries...the sardines were in smaller numbers due to the ocean conditions.

Peter Pyle: Yeah. There's debate about that. The sardines, apparently, in the historical record go through these big cycles naturally anyway. So, it's likely, in my estimation, that they were on a downturn in their cycle because sardines are one of those fishes that breed really quickly and are in very high numbers. So, it's kind of hard for me to imagine that they can get wiped out by a fishery, unlike the larger species that are...take a longer time to breed. Those are the ones that are a lot more vulnerable, but the sardines...but, on the other hand, sardines, you can catch them really easily because their response to a predator, including boats, is to ball up into a huge ball. So, it was very easy for the fishing...fishermen to find, you know, ball them all up and then surround the whole ball with a net and then pull them all out.

Jennifer Stock: Thanks. We're still in a huge mass of auklets. Are they still as abundant as we were seeing earlier on this transect?

Male voice: Dropping a little bit. Not much.

Peter Pyle: Should see a blue whale...

Jennifer Stock: That would be really good to see. I haven't seen a blue in two years.

Male Voice: It's right in the time where they're supposed to be coming in.

Jennifer Stock: So, I'm sitting here with Michael Carver, who is the operations coordinator at Cordell Bank National Marine Sanctuary and has been leading this Cordell Bank Ocean Monitoring Program for the last few years and Michael, what are the main goals of this study?

Michael Carver: Initially, we were just looking at distribution and abundance of seabirds and marine mammals, trying to come up with baseline data. For years, naturalists have been coming to Cordell Bank and the surround waters of Gulf of the Farallones in birding trips, but there hadn't been a lot of documentation specifically over Cordell Bank. So, for the first few years, that was one of our primary goals and we're starting to notice that now, that the seasonal trends as well as the year to year variation.

Jennifer Stock: And in the last year or two, there's been an additional...adding in oceanographic data as well and how about correlating the oceanographic data with the birds and the mammals?

Michael Carver: We're just starting to incorporate the oceanographic data and the time series is quite young, so to speak, but we're starting to see the hotspots with the chlorophyll A concentrations in some of the, sort of, our obligate feeders, specifically the Cassin's auklets and noticing higher densities over Cordell. You know, these birds which are feeding on krill tend to be congregating on the northern portions of the bank and we can't say for sure...we can just say there's a correlation now and that's about it.

Jennifer Stock: So, this year...earlier, on one of the earlier transects we just saw hundreds and hundreds of auklets. What was it like last year for auklets from your experience on the water?

Michael Carver: Yeah. In the surveys last year, very low numbers and the year before when they were getting almost none in the surveys down that are going on in Gulf of the Farallones by PRBO. In October of 2005, we did notice decent numbers in the northern portions of

Cordell Bank, but we're definitely, this year, seeing a lot more than we saw last year.

Jennifer Stock: (It) will be exciting to hear how the breeding is going on the Farallon Islands where they're at. How about albatross? I've never been out here and seen so many albatross in my entire eight years at the sanctuary. Okay, about that long, but still it's pretty exciting and, you know, I'm not out here all the time, but is this the hot time of year when they're foraging here?

Michael Carver: Yeah. They're just now ending their trips back to the nest and...now at the end of June and this is the most I've seen as well. You know, just in one spot count we had earlier in the day we had 100 that Steve Howell counted in just doing a 360 degree count.

Jennifer Stock: Yeah, Peter mentioned this earlier. We were talking about it.

Michael Carver: Yeah. So, really high numbers.

Jennifer Stock: Cool. How about whales? We haven't seen too many whales today, but do we have any idea of where the prey might be? It's hard to tell.

Michael Carver: Yeah. You know, we're still seeing sort of the customary gray whales close to shore on our way out to Cordell Bank, but in my experience marine mammal counts are still relatively lower than they had been in previous years. So...

Jennifer Stock: It's still pretty early in the season too.

Michael Carver: It is. It is.

Jennifer Stock: So, as far as...it's been a couple years now of gathering data and starting to put some trends together month to month of abundance and diversity. Where...how can this data help the sanctuary in regards to management?

Michael Carver: In getting an idea of when, you know, birds are coming off the nest and when they're over Cordell Bank, for example, if there was an oil spill a lot of times what they look to is, "Do we use dispersants or do we not?" And in knowing what birds are out there and when and their behavior will really allow the sanctuary superintendent and others to make the call on whether to use, for example, like a dispersant and, you know, that would be a good thing.

- Jennifer Stock:* I suppose for future proposed activities too we have more of an idea of the time of year and areas of the sanctuary that would be more vulnerable than others.
- Michael Carver:* That as well.
- Jennifer Stock:* Cool. So, where are you seeing the future of this program go? This has been an exciting year in that we've been able to test doing the monitoring program on the larger sanctuary research vessel, the Fulmar, do you think you'll be able to continue using the Fulmar for...during surveys?
- Michael Carver:* It's my hope that this program will continue regardless of the vessel into the future. You know, in looking to other biological data sets which go on for an extended period of time, you know, 10, 20, 30 years, such as the Farallon Islands, they really start to gather a lot of power, so to speak, when you have that time series and we see BOMP being federally funded...if we continue to get funded in the way that we are, my hope is that it would continue and we'll really be able to start to speak to sort of the larger trends and once El Nino comes and goes and, sort of, correlate the local activity
- Jennifer Stock:* So, we also have another oceanographic tool on board that we just put in the water last month, this oceanographic buoy number 46025 coming soon to the NCD...I always mess this up...
- Michael Carver:* NDBC.
- Jennifer Stock:* ...NDBC website where folks can find buoys and get weather information. This is an important buoy for all the oceanographic studies, I hear. What is it going to be able to tell us in regards to data and long-term trends?
- Michael Carver:* Well, one of the things that I know the fishermen are going to love about 46095 is chlorophyll and sea surface temperature. A lot of times when they're looking at, you know, where the fish are, sea surface temperature and gradients are really helpful for them and unlike terrapin and other sites where they'll have to pay for it, they can just go to NDBC and get this information for free and its very beneficial for us at the sanctuary in trying to understand the influence of not only San Francisco Bay and the freshwater, which might be coming up this way, but also looking at Cordell Bank as a possible energetic input for, sort of, the Gulf of the Farallones.

- Jennifer Stock:* For food, you mean? Like, energetic input in the sense of food production?
- Michael Carver:* Well, the idea that maybe there's retention going on around here allowing there to be blooms and then that's sort of feeding several bays downstream and...to allow blooms and that's sort of working its way up the food web and being able to document that, having, again, a strong time series with the buoy collecting data every hour continuously, you know, all year long, we'll be able to look at that in, sort of, conjunction with CTD casts we do off...during our CBOMP cruises to really get a good picture of what's going out here oceanographically. Up until now, the West Project was one of the few that really looked at, sort of, larger scale what's going on and there haven't been direct studies just over Cordell Bank.
- Jennifer Stock:* That's so exciting.
- Michael Carver:* Yeah, it really is we....our research coordinator is already working on grants to try and describe some of the convergent zone which we started to look at during CBOMP, but really haven't, sort of, delineated or defined and, yeah, it's going to be an exciting time.
- Jennifer Stock:* Who...is...are there any other partners involved in regards to wanting to study this area and help correlate the data?
- Michael Carver:* Yeah, John Largier of Bodega Marine Lab has been a huge supporter. I know he was on one of your previous shows. Yeah. He's wonderful and he's been working closely with us both on 46095, the buoy project that we're doing in collaboration with Bodega Marine Lab as well as with Lisa and I think he's going to be maybe a co-author on a future paper.
- Jennifer Stock:* That's exciting.
- Michael Carver:* Yeah.
- Jennifer Stock:* So, what's the time period of when you think that...I know there's always lots of logistics of, you know, putting an instrument in the ocean and expecting it to function right away and, of course, there's lots of little details to settle. When do you think that buoy will be live online that the public would be able to view it and be able to see the wind speeds out at Cordell Bank and the Chlorophyll?
- Michael Carver:* Yeah. Well, you know we just launched it just a little less than a month ago and our programmer is working furiously to, you know,

get the data populated and transferred to NDBC. We have it live on the web right now, but it's just on a test site. We want to make sure it's very stable. So, our hope is by the end of the summer that data will be available into perpetuity for the public.

Jennifer Stock: Cool. We'll definitely make it available when we know that it's functioning and live. Well, thanks Michael for spending a few minutes. This has been a really fun day...going to try to get Steve and Peter...hear some of their observations. It's been a little slow in the last few minutes. We had a really exciting transect early on with the orcas and fur seals and hundreds of auklets. So, maybe we'll catch a few more on the way back.

Michael Carver: Well, thanks again, Jenny.

Jennifer Stock: You bet.

Male voice: Black-footed albatross. One flying, 1-40, zone 2. 1-40.

Jennifer Stock: Generally impressions about, I mean, Steve and Peter, both of you have spent many, many hours, many days, months at sea and there's days where there's lots to see and there's days where there's nothing to see. What is the general impression of the near-shore versus offshore? I mean, way offshore, like, 200 miles as far as abundance of life in California.

Peter Pyle: Well, the California current and the upwelling is...are both relatively coastal events and the influences of those events usually extend out to maybe 60 or 80 miles, but it's variable. That's where the ocean productivity is in the higher biomass and, of course, the higher abundances of birds and then once you get into that central Pacific water mass starting anywhere from 50 to 150 miles offshore once you get fully into it, productivity drops off a lot and so does bird density.

Jennifer Stock: So, a lot of times when you're doing this there's a lot of moments where you're just watching and watching, you were commenting on that earlier, Steve, but I'd have to really record a lot of silence to get an active description of monitoring out here.

Steve Howell: Yup. That's true. You can go six hours without a bird sometimes.

Jennifer Stock: Yeah? Six hours.

Peter Pyle: My worst day was 14 hours, 2 birds.

Jennifer Stock: Wow. In California? California Current?

Peter Pyle: Yeah, it was offshore California. It was 200 miles off of southern California.

Jennifer Stock: Wow. Gotta keep looking. There's always that hope. You never know what's going to happen. Steve, has there been other areas where there's long transits of lack of life? You said you just came back from a cruise recently Japan to New Zealand or New Zealand to Japan?

Steve Howell: Yeah, New Zealand to Japan goes through a lot of tropical water. Generally, the two biggest deserts on the planet are the Tropical Pacific and the Tropical Atlantic Oceans. Even though they're water, they're deserts with oases of land where the little islands are, but the water is just dead, blue water, flying fish, not much food, just blue and very few birds, hours with...one day with zero birds and I spent all day looking. Another day...the next day, two birds only one of which was close enough to identify. So, there's some pretty dead time transiting those waters.

Jennifer Stock: That's what's amazing. The ocean is so dynamic day-to-day, minute-to-minute. You never know what's going to be there, but there are certain areas that are a little bit less productive than others. Well, we're going to keep transiting along here and we'll keep our eyes open for more birds and mammals.

What a great day on the water. It was really exciting to participate on the Cordell Bank Ocean Monitoring Program that specific day with so many wildlife sightings. I want to just thank Peter Pyle and Steve Howell, our two seabird experts that come out on the cruise and help identify the birds, for their time and Michael Carver, our operations coordinator. Also, wanted to just mention thanks to the folks on the earlier part of the...our first half of the show, Dan Howard, our sanctuary superintendent, Dale Roberts, the cruise leader, and Bob Lee, who is the fish expert with State Fish and Game, also, Shannon Lyday for spending some time helping identify birds. It was great out with all of these folks in the field. I'm always honored to be able to spend time with folks that really know the wildlife and what's going on and studying it.

So, all these cruises that we do and all the research we're doing is really helping to understand this ecosystem that is so dynamic and changing throughout the days, year to year, large-scale, small-scale, and it's going to only help us to understand global events as they go on over time and what the effects could have on the

ecosystem through these research programs. So, stay tuned listening to Ocean Currents. We'll bring in other scientists to talk about some of these findings throughout this session here at 5:30 to 6:30. Thanks again for joining me today on Ocean Currents. I hope you've enjoyed hearing a little bit behind the scenes of what goes on out there. I'll hope to do that again with other research expeditions.

Ocean Currents is brought to you by West Marin Community Radio on KWMR and Cordell Bank National Marine Sanctuary. Thanks for listening.