

Ocean Gazing

Episode 4: Kelly Benoit-Bird

<begin music>

Ari: It's Ocean Gazing, the podcast where we look deeper into the ocean than you may have looked before. I'm Ari Daniel Shapiro.

Benoit-Bird: Hi, Ari.

Ari: Kelly Benoit-Bird is an assistant professor at Oregon State University.

Benoit-Bird: I work on all different kinds of animals in the ocean, everything from the smallest animals – the zooplankton – all the way up to the biggest – the great whales – with lots of animals in between. I find the interactions between things to be the most fascinating part of what we get to study. I get my ideas often from watching the water and seeing what animals are doing and trying to ask why. I guess I'm a naturalist at heart.

Ari: Benoit-Bird is planning on teaming up these naturalist instincts with ocean observatories, and she's gonna tell us about it. The sonic stumper is ahead too. Stay tuned!

<fade up music; music ends>

Ari: Benoit-Bird confronts the complex interactions of ocean life head-on by studying lots of different critters –

Benoit-Bird: Like zooplankton and fish and marine mammals. And I'm interested in why animals end up where they are, why they aren't where they aren't, and how they try to find each other in terms of mating, finding food, and avoiding becoming food: processes that really drive the ecosystem dynamics in the coastal ocean especially.

Ari: It might make sense for us to focus on one species as an example of the kind of work she's doing.

Benoit-Bird: Absolutely. So we've been doing work with the Humboldt or jumbo squid. They are amazing predators.

Ari: And they're pretty tasty too for lots of animals, including tuna, swordfish, sperm whales and...us.

Announcer 1: Now back with the Iron Chef here.

Announcer 2: The challenger told me that the reason why you stuff so much garlic was to add sweetness to the squid. He wants the tasters to enjoy the hot taste and crunchy texture of the garlic as well.

Ari: Okay, back to squid biology.

Benoit-Bird: They grow from the size of your fingernail to 6 feet long in the course of a single year or perhaps two. It's found naturally in the Sea of Cortez, the Gulf of California. But it's expanded its range over the last decade or so to include most of the US West Coast including the Gulf of Alaska, at least during the summer.

Ari: In these new areas, the jumbo squid's considered an invasive species. And Benoit-Bird has been trying to figure out why the squid are expanding the area where they live. The first step was finding a way to count up and determine the size of lots of squid easily. To do so, Benoit-Bird went out on a ship to use its sonar.

Benoit-Bird: So the sonar reflects off of any difference in density between seawater and the target you're interested in.

Ari: Think of sonar like an acoustic strobe light. A sonic pulse <sonar ping> travels through the water –

Benoit-Bird: – and then that sound bounces off things that are in the water column.

Ari: Like animals.

Benoit-Bird: And then we get an echo <sonar ping echo> back from that animal and we record that sound.

Ari: The strength of the echo and what it sounds like tells you something about what it's just bounced off of.

Last year, Benoit-Bird and her colleagues were the first to show that a squid could actually reflect a sonar signal. <fade up sound of vessel> They double-checked their measurements by hauling a few of the squid aboard a vessel like this one. They wrote down their size, sex <squid breath> and maturity. Here's one such squid on the deck. It's about <squid breath> 3-feet long and that noise you're hearing <squid breath> is the squid taking a breath. It's the answer to our last sonic stumper. <fade out vessel noise>

So now Benoit-Bird knows how to translate the sonar echo into how big a squid is. She can also use the sonar to find out where squid are underwater as far down as a third of a mile. Spying on squid like this has churned up even more questions.

Benoit-Bird: How do they use their inshore and offshore habitat, both in their natural habitat and in their invasive habitat? So we'd love to be able to put out

sensors that could give us real-time information on the distribution of these squid and when they show up and when they're present. Since we now can use sonar approaches to study squid, if we could put sonars out on an observatory in those areas, it would really give us a lot of information about their biology.

Ari: Ocean observatories could help Benoit-Bird with her research. Here's an example that involves echosounders, which are instruments that make sonar pulses.

Benoit-Bird: We would have a series of echosounders that were at stationary locations that were then cabled back to shore. So we'd get information in real-time extremely often, probably once every 3 or 4 seconds 24 hours a day for years at a time potentially on what was happening in the water column right over that mooring. So we could be sitting in a lab on the beach and actually be able to tell how many squid were out there and how deep they were and what their behavior was remotely.

Ari: Ocean observatories can measure lots of things at once. Benoit-Bird wants to tap into this too.

Benoit-Bird: Ultimately we'd like to not only measure the squid, but oxygen in the water column because we know these squid are tied very tightly to low-oxygen habitats. Those sorts of environmental variables that we can collect at those same locations at those same times are going to be a really important part of interpreting that data that will really give us insight into the causes of the patterns we're seeing and not just who's where and when but the whys.

Ari: But still, using observatories could take some getting used to for Benoit-Bird.

Benoit-Bird: From my own personal perspective, I find it really hard to work with data that I wasn't there to see collected. We will never be able to retire all of our ships and say, "Great, we never need to go to sea again." I think the advantages of the observatories are that it allows us to connect those sporadic, small location sampling that we can do from a ship to much longer time series and bridge the gaps. So I think they're definitely complimentary approaches.

Ari: And if all goes well, these different approaches may give Benoit-Bird just the clues she needs to figure out why the jumbo squid are slowly taking over more and more of the west coast of North America.

<music transition>

Ari: And now, for this episode's sonic stumper.

<fade up new sonic stumper>

Ari: Do you know what that is? You can leave your guess, or a question for Kelly Benoit-Bird on our voicemail – 508.289.3926, or on our Skype voicemail – username cosee.now (that’s c-o-s-e-e-dot-n-o-w), or by emailing us at podcast@coseenow.net. Find us online at www.coseenow.net and jet over to the podcast link to see photos of jumbo squid and hear Benoit-Bird talk about her work with fish.

<fade out sonic stumper, and fade up outro music>

Also, we’re gathering your stories about times you’ve spent on or near the ocean. So tell us about it. Call or email us to share your memories. They’ll be used in an upcoming episode.

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That’s all for now, unless I’m forgetting something...

Benoit-Bird: I can’t think of anything...

Ari: Okay then. See you next time!

<fade up outro music; music ends>