

## Ocean Gazing: Episode 49

### *Slick of oil*

<intro music>

**Ari:** This is Ocean Gazing. It's the podcast where we soak in the ocean, swimming amongst all the information floating in its depths. I'm Ari Daniel Shapiro.

**Daly:** I think everybody has been affected by the impact of this oil spill, and what it represents. Certainly life in the Northern Gulf is going to change for a long time.

**Ari:** Kendra Daly is a professor in the College of Marine Science at the University of South Florida. She's one of thousands of dedicated researchers who've been examining the fate of the Gulf of Mexico following the Deepwater Horizon oil spill. The spill is one of the most significant human-caused environmental disasters in the history of our planet. And the Gulf's become a swarm of scientific activity. Stay tuned.

<fade up intro music and sustain>

**Ari:** The Deepwater Horizon was a drilling rig leased by BP 50 miles off the Louisiana coast. On April 20, 2010, methane gas from the well shot up and through the drill column, billowed out onto the rig platform, and then ignited and exploded. <news music> The fire couldn't be extinguished. A day and a half later, the rig sank.

**News montage:** Survivors of this horrible accident say their last moments aboard this rig were marked by chaos, confusion, and a breakdown in the chain of command. // We're talking about a lot of noise, a lot of fire, a tremendous amount of heat, people panicking, and, you know, the fear of losing your life.

**Ari:** It wasn't long before a large oil slick started to spread from the rig site. A damaged wellhead was gushing oil into the Gulf.

**News montage:** We're talking this major story along the Gulf coast – the massive oil spill. // Both the US Air Force and the US Navy have both already sent assets down there to help in the cleanup effort. // President Obama plans to visit the Gulf Coast tomorrow to see how bad the damage is.

**Ari:** And it continued for 3 months straight before it was capped. Official estimates report 62,000 barrels of oil leaked into the waters of the Gulf every *day*. The environmental and economic impacts have been severe.

**News montage:** Emergency crews are doing everything they can to protect the state's fragile coastline from that massive oil slick. // The fragile ecosystem along the Gulf. // Threatening the coastline's delicate wildlife. // Crews are considering setting fire to some of the oil. // Day 70 of the oil disaster. Is this what it is? What do you make of this? I'm an animal lover, and I'm an Earth lover. I know a lot of people like Senator Inhofe that think

the oil's a hoax, but I happen to think it's real and I'd like to keep it. // The oil slick in the Gulf of Mexico is growing so large, it can be seen from space.

**Ari:** The oil didn't stay put. It's impacted numerous states bordering the Gulf of Mexico. And there've been a lot of unknowns...like where the oil would go, and what its impacts would be. On a calm summer morning, I sat with Kendra Daly in a park near a traffic rotary on Cape Cod. She told me about her participation in a research cruise along the west coast of Florida – a region where – when we spoke – the oil hadn't yet arrived. The goal of the cruise was to study all the interlocking pieces of the marine ecosystem.

**Daly:** Exactly. The physics, chemistry and biology as a whole to assess what the impact of oil might be if it flows down in our direction in the future.

**Ari:** They were collecting baseline observations before the oil arrived. A baseline against which Daly and her team could look for changes. For example:

**Daly:** Changes in...certainly hydrocarbon concentrations.

**Ari:** Meaning oil?

**Daly:** Oil. You might see a change in the species composition of the microscopic plants – the phytoplankton, or the zooplankton. Or there can be sub-lethal effects where we might see changes in the size of organisms so it might affect growth patterns, reproductive success.

**Ari:** So are you concerned about the oil at the surface or subsurface?

**Daly:** Both. Particularly the subsurface oil because that will be a much greater challenge to deal with. And it's likely to be very dispersed in varying concentrations. And it's not something like the tarballs that wash up on the beach that you can just pick up. The subsurface oil, I think, potentially could have a large effect on the marine ecosystem in the Gulf.

**Ari:** Effects that could easily ripple up and through the food web, from plankton or fish to birds and whales. One of Daly's colleagues at the University of South Florida – David Fries – has also been keen on studying the oil spill in the Gulf of Mexico.

**Fries:** It became really this mother of all dispersion experiments. There was a lot of ship-based observation, and we did not participate in that. We were focused on trying to think of what would be the next technology solution.

**Ari:** Fries' technology solution looks like a torpedo attached to a flat solar panel.

**Fries:** We've been fusing together a solar autonomous underwater vehicle – so a mobile platform that basically runs on renewable energy – with a robotic platform that essentially emulates all the steps that a human does at the chemical or biochemical bench side in a lab, but does it in the water.

**Ari:** And all this equipment, that can detect oil and the amounts and types of life in the water, it all fits into a canister as wide as a cantaloupe and as tall as a skateboard.

**Barton:** Overall, it's a technician in a can is what we like to call it. A grad student in a can.

**Ari:** That's Geran Barton, an *actual* technician working for David Fries.

**Barton:** Since we can put this thing out for a month at a time, it can do things that grad students normally don't want to do...you know, bad weather, and heaving over the side of the boat, that kind of stuff. Let me, I'll move it – make it move a little bit for ya.

<background noises of SAUV moving and cycling>

**Ari:** This device can collect measurements continuously, and beam them back to shore.

**Barton:** The syringe pump is what actually pulls in the sample.

**Ari:** Fries hasn't used it in the field yet. But in a little less than a week, it'll head to the Gulf for its first mission.

It's just one example of devices that can collect data remotely, in real-time and without interruption – that is, ocean observing systems – that are being used in the Gulf of Mexico. Sam Walker works for the Integrated Ocean Observing System within NOAA – the National Oceanic and Atmospheric Administration. For Walker, ocean observing systems make a lot of sense in the context of trying to understand and respond to an oil spill.

**Walker:** Well, certainly one of the greatest benefits is their ability to relay information quickly. I mean, in the response realm, decisions – tactical-level decisions – are being made everyday, often multiple times a day. And so having the best available information repeatedly updated is something that's very valuable. Those decisions have very real implications.

**Ari:** An ocean observing approach lets these decisions happen faster. They end up being better informed, too. Using these technologies, Walker and his team can watch the oil in action.

**Walker:** Oil doesn't maintain, you know, one single phase or form. People have to get over the idea that there's some big glob of oil sitting around. It just doesn't do that. It breaks apart, it's weathered naturally. It becomes dispersed because of currents that are moving around, and it's attacked by the microbial community as well. And so things become more and more dilute as time goes on. And so we've actually been able to measure that.

**Ari:** The Gulf of Mexico still has a long way to go, but Walker's seen the situation slowly improve. David Fries agrees it's not all bad news.

**Fries:** Hopefully from this, we'll learn both on a technology side and a science side to be prepared for the next event. The other positive thing in terms it centered people around the importance of the ocean. It really diffused inland about how important the oceans are in people's everyday welfare from their gastank to their tabletop where they eat seafood.

**Ari:** I asked Kendra Daly what lesson she took from the spill.

**Daly:** I think many of us have seen maybe natural disasters, certainly on TV we've seen what nature is capable of. But when a disaster is caused by humans – something that would've been preventable – I think we have a responsibility to do everything we can to be careful stewards of this world that we're living in. And the ocean in particular, because we can't see below the surface of the ocean...it's this sort of vast unknown that people tend to ignore. And we just assume that it can handle anything, and that's not true. I mean, I think most people have to appreciate that this planet is really ocean, it's not Earth so much. And ultimately man is a part of this ecosystem, and it will affect us, and I think we're ignoring that aspect of it. And this oil spill is just one more reminder that we really do need to go that extra length to be as careful as possible with the technology that we have developed.

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**Ari:** Check out [oceangazing.org](http://oceangazing.org) to see photos of the scientists featured here. We've also got a clip of Kendra Daly talking about what it was like to study the 1979 Ixtoc oil spill in the Mexican waters of the Gulf of Mexico.

**Daly:** It was a very uncomfortable cruise, one of those cruises that you think afterwards I never want to go to sea again.

**Ari:** You can also send Kendra Daly, David Fries or Sam Walker a note. [Oceangazing.org](http://Oceangazing.org), Ocean Gazing, it's a product of COSEE, and we get our financial support from the National Science Foundation.