Episode 10: The Risks for Fish

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Levin: You're listening to The Loop, an audio series about the mud, microbes, and mammals in the Gulf of Mexico. I'm David Levin.

Wetzel:. We need to understand, when a spill occurs, who's at risk? How long are they at risk?

Levin: Dana Wetzel is biochemist at the Mote Marine Laboratory in Sarasota, Florida. She's leading a new experiment that'll help her understand the effects of oil spills on fish in the Gulf of Mexico. It all starts with a tank the size of a swimming pool, 20 miles inland from the coast. Stay tuned.

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Levin: Driving inland of Sarasota, Florida, the landscape changes. *Fast*. Strip malls and office parks give way to quiet farmland and Live Oak trees dripping in Spanish moss. But crops aren't the only thing growing out here. In a small cluster of buildings tucked along a gravel path, a team of scientists is raising thousands of fish.

[Ambi up; gravel crunching underfoot at Mote Aquaculture Park]

Levin: [walking outside]: Hey, Kevan!
Kevan Main: [faintly at first; walking up from a distance] How are you? We're getting going. We have a hectic start, but we're getting there.
Levin: So what's first?
Main: You will see. We'll get you indoctrinated in here.

[ambi: door opens, Levin and Main walk inside to a noisy aquaculture lab]

Levin: Kevan Main is the director here, at the Mote Aquaculture Park. It's both a commercial fish farm *and* a research lab—a jumble of pipes, tanks, and laboratories tucked into a long, aluminum-sided buildings.

Normally, Main looks into new ways to raise fish for food. But today, she's helping figure out how an oil spill might affect adult fish in the wild.

After the Deepwater Horizon spill in 2010, many fisheries across the Gulf of Mexico were closed for months. But it's not clear if that oil had a long term impact on the species living there. That's what Main and her team are hoping to find out.

Main: 30:05 We can go out and test animals and determine that they're safe to consume, and that gives you one piece of information that allows you to reopen a fishery. But what we don't know is what is the effect on the next generation? And what are the long-term impacts that will affect the breeding of those animals off into the future?

Levin: Studying how oil affects the way fish breed is a challenge. Only *adult* fish can reproduce… and a lot important commercial species in the Gulf are *huge* when they're fully grown. Just two or three fish would take up a tank the size of an oil drum. So growing them in most labs, which have limited space, isn't really feasible. Here at Mote, though, that's not a problem.

Main: So it all starts here, with the breeding systems…

Levin: Main leads me to a tank that looks like an above-ground swimming pool. Inside, gigantic fish are circling. Slowly.

Main: And so these are adult Red Drum…
Levin: They're enormous!
Main: They're huge, aren't they. …
Levin: 20:30 - they're almost, what, 3 feet long, 4 feet long?
Main: Oh yes. Mmm hmm. And quite a good girth on them. I mean, look at some of those girls there.

Levin: Main is raising hundreds of fish like these, from three different species: pompano, red drum — also known as redfish, and flounder.

Wetzel: The reason we wanted those three species was that they represent not only important recreational and commercial fisheries, but they also represent three potentially different types of exposure scenarios that could have happened.

Levin: This is Dana Wetzel, a marine biochemist leading the research. The three fish live in three different environments, and each is affected differently by a spill. Pompano, for example, live in open water, so they're mostly exposed to oil droplets under the surface. Then there's redfish…

Wetzel: …and the redfish is a more coastal fish.

Levin: So in a spill, they're hit with contaminated water, *and* contaminated food…

Wetzel: …because the redfish are going to be picking and feeding along the contaminated shoreline sites.

Levin: And finally, there's flounder. They spend most of their time in silty bays, which means they're exposed to oily water, food, *and* mud after a spill. Wetzel is planning to recreate all three settings here at the Mote Aquaculture Park, and put each one through a simulated oil spill.

The goal is to get a better understanding of what the oil really does to these species in the wild—and whether its effects stick around long after a spill is cleaned up.

Wetzel: Of those who survived, are they perfectly happy and normal? Uh, I don't know about that. // because right now, it's the adults that are in charge of reproduction. So if we are impairing the adults, maybe we're impairing them for one season. Maybe we're impairing them for life. we don't know this.

Levin: To find out, Wetzel and Main are systematically exposing the fish, a few at a time, to oil in nine small tanks. Redfish are put into oily water. Pompano are fed oily food. And eventually, flounder will go into tanks with oily sediments. The group can only work with a few fish at a time, and today, it's the pompano's turn. That means South Louisiana sweet crude is on the lunch menu.

[ambi: Fish food prep]

In a back room, biologist Matt Resley whips up a new batch of food in a disposable metal pan. It's a pile of smooth brown pellets, each about the size of a pea. And they're coated with a thin sheen of oil.

Resley: After we've topcoated everything, it is a little bit darker, but you can see it's pretty porous.
Levin: It kind of looks like my cat's food.
Resley: It basically is. Purina actually makes fish food.
Levin: I… did not know that.
Resley: Yeah, it's all made the exact same way.

Levin: Resley has been feeding this stuff to this group of pompano for more than two weeks – and today's the last day the fish will have to eat it.

Now the Mote team needs to determine whether the oil had any effects on the fish—and there's only one way to do that. They'll need to euthanize them with a heavy sedative, dissect them, and send their body parts to the lab. A *bunch* of labs, actually. Scientists around the country are partnering with Mote, and each one needs a few tissue samples.

[AMBI: dissection chatter, instruments clanking]

Wetzel: Next up on our hit parade is removing its internal organs. See all this white right here under the skin? That's fat. This is a fat little guy.

Levin: Dana Wetzel and a few biologists are already working up the latest batch of pompano.

Wetzel: Right now, I'm dissecting out heart muscle tissue, and that along with some other tissues are going to be sent to our colleagues down at Texas A&M university.

Levin (0N MIC): So how many different people have a stake in this fish?

Wetzel: I would say a dozen people at least are working on this one particular fish right here!

Levin: Some will look at bile samples to see if oil compromised its immune system. Others will test the blood for toxins. Or comb through samples of liver. Kidneys. Gills. Muscle. Reproductive organs. Even microbes living on its skin. All the pieces of these deconstructed fish go into hundreds of tiny glass jars, and eventually, into the mail.

Wetzel: So as you can see, this fish has contributed a lot to science.

Levin: Over the next year, the Mote team will repeat this process with hundreds more fish, spanning multiple generations. The team is already seeing that fish exposed to oil aren't reproducing as well as fish kept in clean water, but right now, they're not able to say for sure if that's due to the oil, or if it's just a fluke.

Wetzel: 95 percent of all commercial and recreational marine species spend part of their life in the Gulf of Mexico. It is such an important area. This information should be able to help decision makers, managers, decide, how long should we close an area? What sort of mitigation strategies should we attempt to do? Unless you have the information to know how you may have damaged these organisms, and for how long, you can't make those informed decisions.

Levin: Regardless of how the study turns out, Wetzel says that understanding what happens to fish during an oil spill is essential for knowing how to respond to disasters like the Deepwater Horizon in the future.

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For The Loop, I'm David Levin.

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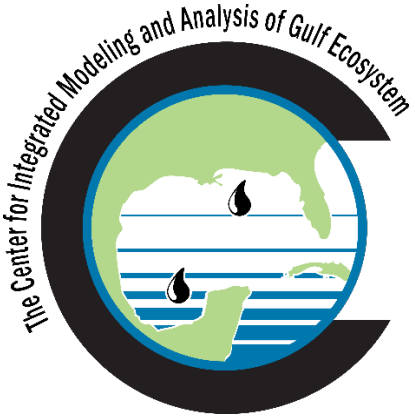
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