The Loop: Episode 14

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David 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.

The north slope of Alaska is about as remote as it gets. There are no roads that connect it to the rest of the state – just tiny airfields. It's a region that's rich in wildlife, and in oil. But even though wells and pipelines are being built up here, it's not clear exactly *how* the region's delicate ecosystem would respond to a major spill.

Suprenand [1;01:00] we wanted to look at in the Arctic, with all the research over the last 40 plus years, how we might be able to put together a snapshot of what we know about the ecosystem. // You know, what is there? How do we manage it? //What happens to a fish at a certain life stage if it's exposed to certain oil or oil byproducts?

Levin: Paul Suprenand is part of a team of scientists who are all trying to answer those questions. How? Stay tuned.

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Levin: In March 1989, the supertanker Exxon Valdez ran aground in southern Alaska, and changed the coastline for decades.

Archival news reports: It's being called the worst oil spill ever in Alaska…
// The supertanker was carrying half a billion gallons, a full load of Alaska crude oil…
//It's by far the largest oil spill in such a remote, pristine area.

Levin: Even 30 years later, oil from the disaster still turns up on the rocky shores of Prince William Sound. Its total environmental impact has been hard to pin down—not least because the region is cold, rugged, and difficult to reach. But understanding the long-term effects of arctic spills like this one could be even more urgent now than ever…

Trump: "This executive order starts the process of opening offshore areas to job-creating energy exploration…."

Levin: In 2017, the Trump administration planned to allow oil exploration on the North Slope of Alaska, including inside the Arctic National Wildlife Refuge. The decision has been tied up in court since then. But…what kind of damage could happen to the area if another disaster strikes?

The 2011 Deepwater Horizon spill offers clues. For the past seven years, a group of scientists called "C-IMAGE" has been studying its impact on the Gulf of Mexico. They built a

computer model of the entire Gulf ecosystem, so they could test how future spills would affect the region. And now, they're applying those tools farther north.

Suprenand [1 – 3:29]_ we started thinking about how the Gulf of Mexico projects we've had //could be then kind of applied // to the Arctic.

Levin: Paul Suprenand is a biological oceanographer and high school science teacher. As a PhD student, he was part of the C-IMAGE consortium, and spent weeks at a time traveling to the far reaches of the Arctic circle with his eight-year-old son. He studied its fisheries, its ecosystem, and its traditions—including a ceremonial whale hunt that he captured on cell phone video.

Suprenand (on video): You're about to eat your first piece of whale. I want you when you eat some to tell us what you think about it.
Suprenand's Son (on video): Tastes oily! [He gags; Suprenand laughs good naturedly]

Levin: He says blubber is an acquired taste. But in northern Alaska, a whale hunt like this more than just a cultural event. The area is so isolated that running out to the grocery store isn't always an option. Most meals come from hunting, fishing, and collecting shellfish.

A major spill here would compromise not just the environment, but the major food sources for locals. Which could play out in any number of ways.

Ainsworth [2; 02:27] Well of course it depends a lot on the nature of the spill, whether it's from an individual tanker like the Valdez, or a chronic leak from an oil pipe or a massive blowout like the Deepwater Horizon.

Levin: Cameron Ainsworth is a fisheries ecologist at the University of South Florida. He worked with Suprenand on the Arctic modeling project. He says that each type of spill can affect a different set of species.

A surface spill like the Valdez will mainly impact the shoreline and salt marshes, which are important habitats for seabirds and shellfish. But a spill from a deep water oil pipeline or a wellhead would affect species living in the open ocean. It could knock out plankton and other animals at the bottom of the food chain, which in turn would starve fish, seals, and whales.

To start teasing out how those populations would be affected, Supernand and the team gathered all the information it could find on as many arctic species as possible.

Suprenand: the whales, the polar bears, the seals…

Levin: clams and mussels…

Suprenand: all different types of fish…

Levin: Sea birds, plankton… just a *lot* of species.

Suprenand: Hundreds! [laughs] – I mean, everything that's there.

Levin: The team combined information on all of those animals' life cycles into a model.

Suprenand: [1;01:43] meaning that, you know, over space and time we're able to look at how // species interact across the entire ecosystem. //

Levin: Then they factored in things like weather, sea ice, and other environmental conditions… and finally, they tested how all those elements would affect four different types of spills that might happen on the Alaskan coast: a cruise ship diesel spill, a pipeline blowout, a surface platform leak, and a tanker spill like the Valdez.

In all four cases, the model found that the spill would have a long-lasting impact on key species—in particular, ones that locals use for food.

Suprenand**: [s;01:20]** What we found is that even years after the hypothetical oil spills, there were very few animals in terms of availability to the communities that fully returned to pre spill levels or populations. [2;04:21] there were drastic reductions in, say, seal populations // for a certain community for a number of years. And those could range from sometimes 20% to much greater than that.

Ainsworth [2;15:29] Probably the number one factor in determining the recovery time is how long the oil is resident in the area.

Levin: Cameron Ainsworth.

Ainsworth: [2;02:27] The Arctic is cold, and so the rate at which the oil is breaking down by composition is much slower. So the oil remains in the system for longer.

Levin: Many months, even, before it degrades. Which means toxic chemicals that break down quickly in warmer climates could be preserved in the arctic—and the longer animals are exposed to those chemicals, the worse the effects.

Ainsworth: [2;20:10]- It can impede the ability of the animals to feed and introduce a sub-lethal impairment, and direct mortality as well.

Levin: Since the north slope of Alaska is so remote, it may not even be possible to respond to spills quickly or effectively on a large scale. That could lead to a prolonged disaster… one that might happen sooner rather than later.

Ainsworth [2- 8:57] I'm afraid it is a matter of time. There's always talk about expanding oil and gas exploration in these areas, and // a spill of the size of the Deepwater Horizon would be a very serious ordeal in this area because the food webs are extremely vulnerable.

Levin: He says this model is just a rough start. But it's one of the first to try to recreate the entire marine ecosystem along the north slope, including the people living there.

Suprenand: [1;04:00]it's one thing to have that theoretical application of what might happen to all the animals. It's another to think about how your science directly connects to the people that are in front of you. // The health of that ecosystem really gives an indication of the health of the community.

Levin: With that in mind, Ainsworth and Suprenand hope their model can do more than just help prepare for future spills. They'd like to see it used proactively, to help shape policy in northern Alaska—and protect the resources that communities along the North slope need to survive.

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For The Loop, I'm David Levin.

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