

Project Spotlight

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What is the topic of your research within the CWC?

We are studying how the Deepwater Horizon oil spill affects the ecology of terrestrial animals in the salt marsh. We've worked mostly with Seaside Sparrows. These birds provide a great research system because they are common residents of salt marshes. They eat a variety of invertebrate prey and some seeds, which links them to other organisms in the marsh. We've also been working with Marsh Rice Rats, another common vertebrate in Louisiana salt marshes.

What methods are you using to answer your questions?

We're interested in individual condition and population processes for birds and rats. We track their abundance (how many) and reproductive success. My co-investigator, Dr. Sabrina Taylor, is a geneticist. She's coordinated work on genetic responses of birds living in contaminated marsh. We've also collaborated with other CWC researchers to study food webs. Our team spends a long season in the field sampling birds each year, which yields a lot of material for lab analysis.

What results have you gotten thus far?

We know that birds ingested oil from contaminated prey and because of this carbon from that oil is getting into their feathers. This was an important result, as it shows long-term exposure in a terrestrial animal. Sparrow metabolism also changed in response to this stress. On the other hand, although Seaside Sparrow abundance and nesting success may be initially affected following the spill, it looks like their populations remain large in the vast Louisiana salt marsh ecosystem.

Did any of these results surprise you?

We had an unplanned change to our study when Hurricane Isaac put our study sites underwater. This gave us a chance to see the remarkable colonization ability of Seaside Sparrows and, surprisingly, Marsh Rice Rats. Their population numbers dipped for a year, but after that they were back to high numbers. A more troubling result from the storm was apparent recontamination of oil in our research sites, which we found based on birds expressing a gene associated with PAH detoxification (this happens only when the birds are exposed to oil).

What are the next steps in your research?

Now we're doing mostly genetic analysis. We're reconstructing the diet of Seaside Sparrows from DNA in diet samples (bird poop) collected over the years. We're also looking at the genome-level response to contamination in birds and rats. Marsh Rice Rats harbor bayou virus, which can be fatal to humans. We're looking at how prevalence and resistance to the disease might be affected by processes on the marsh, including oil spills.

What are the "big picture" implications of your study?

Seaside Sparrows reveal contamination leaving the aquatic system and affecting a terrestrial species that was not directly oiled. Unfortunately, human exposure could follow a similar mechanism. Our work also reveals just how difficult marsh life can be for a vertebrate. New techniques give us the chance to integrate ecological information from the field with metabolic processes. We are learning how organisms persist when battered by multiple stressors.

