

The Sea Grant Files

Air Date: April 11, 2017

Sea Grant! What Have You Done?!

Hi, my name is Jesse Schomberg and you are listening to The Sea Grant Files. Typically, I cover topics related to freshwater on this show. Today, though, I'm going to share three stories from some of America's saltier coastlines. They reveal Sea Grant's spirit of innovation and commitment to solving coastal challenges. And, I'm hoping the stories will inspire you to learn more about what federally-funded science has achieved and how critical it is to the future of the U.S. and, humans in general.

Including the one I work for in Minnesota, there are 33 programs in the Sea Grant Network. Each has unique ... sometimes funny ... sometimes thought-provoking ... stories to tell. Today I'm going to start with a tale from Washington Sea Grant. (insert Labrador dog barking)

Tucker is a black Lab but more to the point, he is a Conservation Canine ... or C-K-9 ... and a valuable member of the University of Washington's Center for Conservation Biology. Tucker and other dogs like him, have been trained to detect the scat of over a dozen endangered species. As far as collecting evidence of the physiological, toxicological and dietary state of an animal goes, dogs tend to be far less biased than remote cameras, radio-collaring, hair snags and other methods, and so far, no other technique can give researchers such a vast amount of reliable information in so short a time.

Tucker has a particular gift for sniffing out orcas. Tucker, a ball-obsessed former shelter dog who ironically loathes water, is able to smell orca scat from a mile away. He's helping Sea Grant researchers study the Salish Sea orca population, which is not doing well.

Tucker and his human colleagues are collecting fecal samples to untangle the mystery of what might be done to reverse the decline of the Salish Sea orca population. Scientists can find out more than you might imagine from the poo of an endangered killer whale. They can determine the animal's genetic identity, gender, diet and hormone levels, including whether a whale is pregnant and how soon the baby is due. The researchers can also find information about accumulated contaminants, like DDT and PCBs. Orcas spend a vast majority of their life underwater so you can imagine that getting hold of their ... um ... excrement ... is like finding a needle in a haystack.

The findings point to nutrition – specifically, Chinook salmon runs – as key to the orcas' recovery. They reveal high rates of pregnancy failure and accelerated releases of persistent organic pollutants from fat tissue in malnourished whales. As one of my Sea Grant colleagues in Washington said, "To save its killer whales, the region must save its salmon." NOAA Fisheries and others are working to that end through a Puget Sound Chinook Recovery Plan that benefits

the endangered orcas, recreational and subsistence fisheries, ocean health and the region's coastal communities. Part of the equation is controlling urban stormwater runoff more effectively. The runoff is a lethal brew carrying heavy metal and petroleum byproducts to the rivers where salmon spawn.

Next I'm going to tell you a story about oysters and how studying them has led to a new paint that prevents biofouling in marine environments.

Partly funded by the South Carolina Sea Grant Consortium, Clemson University's Andrew Mount has been studying the cellular and molecular biology of marine organisms from a materials perspective for two decades. Over those years, Mount identified the process oysters use to build and repair their shells, which involves specialized blood cells capturing ingredients from ocean water and forming calcium carbonate crystals.

Following a trail of inquiry, the researchers worked on ways of applying what they knew about cellular adhesion to prevent biofouling on boats and structures left in salt water. Biofouling from oysters ... and for that matter, zebra mussels ... can result in higher fuel costs to overcome increased drag on ship hulls, and higher maintenance and repair costs as water pipes become encrusted. Mount recently earned a patent for a coating that deters marine larvae from building up on underwater surfaces.

And now, Mount, who is also the director of the university's Okeanos Research Lab, is working with a company to create and test a new marine paint that capitalizes on what they know about the cellular-based biofouling process. The paint isn't quite ready for commercial use but when it is, it promises to be a more environment-friendly alternative to common biofouling products made with copper components that can be toxic as the paint wears off.

Mount aptly said, "The point is simple, good science yields fundamental insight into many applied fields."

Lastly, I want you to know the sea vegetable business is taking off in New England! Worldwide, seaweed production eclipses the production of cultured shellfish, finfish and other marine organisms, but in the U.S. it contributes only ~1%.

For nearly 30 years, Sea Grant-sponsored researchers have investigated the physiology, genetics and growth of economically important seaweeds. This early and ongoing work has led to advancements in mass-scalable seaweed aquaculture to the point where now native seaweeds, like sugar kelp, are being cut up and sold for noodles, slaws and salads. From another angle and with additional support from the U.S. EPA, Sea Grant researchers, have also found that seaweed cultivation improves water quality in urban coastal waters by removing nitrogen and phosphorus.

And then, picture this! ... An aquaculture raft! After about a year of design work, a University of New Hampshire team along with Sea Grant has built an aquaculture raft to house steelhead trout, blue mussels and sugar kelp, potentially valued at \$70,000 annually. The idea is that such rafts will provide a four-season source of local fish and shellfish, increasing revenue for struggling fishermen while removing excess nitrogen from the water.

As you might have heard, Sea Grant could be terminated depending on what happens during Congressional discussions about the federal budget in the coming months. I told you some stories from the Sea Grant Network today and hope you will follow up by reading more about Tucker, biofouling, seaweed aquaculture and other Sea Grant endeavors, online. Don't let this be a case of "you don't know what you've got until it's gone." This is a moment to recognize what federally funded research has achieved and to continue to stand up for science, Sea Grant and the future. Thanks for listening.

(insert Labrador dog barking)

This episode of the Sea Grant Files was produced by The NOAA Sea Grant Network, Sharon Moen, Mariah Schumacher, Maija Jenson, KUMD, and me, Jesse Schomberg. To listen to more episodes of The Sea Grant Files and to subscribe to our podcast, visit the Minnesota Sea Grant website at www-dot-seagrant-dot-umn-dot-edu. You can also follow Minnesota Sea Grant on Facebook, Twitter and Instagram. Thanks for listening.