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Combating Bay Invaders



Post on Apr 15, 2011 by Lauren Sommer
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Hundreds of invasive species have been found in San Francisco Bay, according to biologists. That makes the bay one of the most invaded estuaries in the world.

Hoping to restore native fish and wildlife, California has passed the strictest rules in the country to prevent ocean freighters from introducing more foreign species to the bay. But the standards are so tough, officials may not be able to enforce them.

"Let's see we've got one, two, three exotic organisms, four exotic organisms..."

On a muddy beach in Alameda, Biologist Andrew Cohen of the Center for Research on Aquatic Bioinvasions

San Francisco Bay is home to hundreds of invasive species. Many arrived in the ballast water of large ships.

scoops up a clump of seaweed that's home to clams, snails, and strange globs.

"Those yellow dots are the eggs, the egg mass of a Japanese sea slug which show up here a few years ago." Almost all of the animals in Cohen's hands are **invasive species** – originally from places like China, Australia, and the Atlantic.

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"Anytime I go out in the bay, there's a reasonable chance I'm gonna find something I've never seen in the bay before – something no one has seen on the Pacific coast before. That's just astonishing," says Cohen.

Most of these marine invaders arrived as international hitchhikers. Ships that carry cargo on the open ocean have to be balanced, so they don't tip over. To do that, they fill massive onboard ballast tanks by pumping water in at one port and pumping it out at the next.

"For a long time, people didn't think too much about this, cause it was just water. But eventually, we found that we were moving virtually everything that lived in the sea," Cohen says.

Marine organisms like crabs and snails have tiny free-floating larvae. So, a tank full of ballast water is like a soup of marine life. "They're so effective at dispersing because a single individual might produce a million young."

Some invaders have brought parasites that cause swimmer's itch at local beaches. Other foreign species, like the Asian clam, have altered the entire food web in San Francisco Bay. Millions of dollars have been spent trying to eradicate the worst invasive species. But Cohen says those efforts rarely work. So, the strategy has turned to prevention.

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Testing New Treatment Technology

Inside the **Golden Bear**, a 500-foot ship at the California Maritime Academy in Vallejo, Engineer Bill Davidson switches on the ballast pumps. "The ballast tanks we use are right above us, which are our treatment and control tanks," says Davidson.

Davidson is testing new ballast water treatment technology. The idea is pretty simple – kill the organisms in the water, so they don't spread when the ballast is released. The system has two steps. First the ballast water is filtered. Then, chlorine is added. "And you take this chlorine and you feed it back into the ballast stream and so that will ideally oxidize or kill any live organisms," says Davidson.

The chlorine is neutralized before it's released by the ship. But getting this system to work is trickier than it seems, because the organisms are very, very small.

In a lab on the ship, Julie Kuo of Moss Landing Marine Labs looks through a microscope at a tiny, cone-shaped plankton. "So right in your center field of view... That's a tintinnid and those guys pretty much get to as large as that."

"As large as that" is about half the width of a human hair. As part of the tests, Kuo counts the organisms in water samples from the treatment process – and, most importantly, sees if they're dead. "If they're kind of sitting there and you don't know if they're alive or dead, you poke them with a probe," says Kuo.

The Frontlines of Regulation

This treatment system is designed to meet international standards that limit the number of living organisms in ballast water. Right now those standards are voluntary.

But California has adopted a goal that's a thousand times tougher. It applies to all newly-constructed ships starting next January. The only problem is – the technology to meet California's higher standard isn't quite ready for prime time.

"We aren't going to be able to go out there right now and say well, 100% you met the standard no matter what," says Nicole Dobroski with the **California State Lands Commission**, the agency overseeing the regulation.

She says none of the treatment systems being developed consistently meet California's standards yet. Still, the state is moving ahead with the regulation.

"We recognize that that's a challenge, but there's a good reason we wanted it to be a challenge. We wanted them to be innovative. We wanted them to think out of the box."

But ship operators may not have much to worry about if past enforcement policies are any indication. Ships are currently required to exchange their ballast water at least 230 miles from shore if they plan on discharging it in port. But even though hundreds of ships a year are not complying with these requirements, the State Lands Commission has only fined two ships in the past ten years.

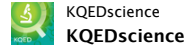
"Our goal isn't just to come in and slap a fine on these vessels because we find that isn't necessarily the best approach. We try to work with them as much as possible, make sure they're educated about all the necessary regulations," says Dobroski.

California's progress is likely to have a big impact on federal efforts as both the US Coast Guard and the EPA develop new national ballast water standards.

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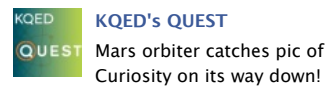
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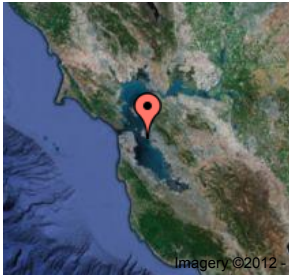
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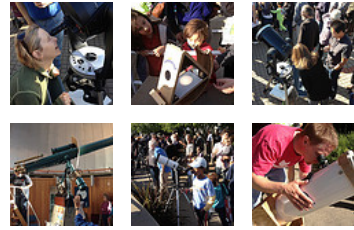
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