**Hawaii Molasses Spill: Better or Worse Than Oil?**

*It takes time and a little organic chemistry to scrub molasses from seawater.*

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**A dark, viscous liquid seeps through the ocean.**

**An oil spill? No, it's molasses—and it has created an environmental catastrophe that so far has killed thousands of fish that dwelled in Honolulu Harbor.**

Last week, a pipeline owned by shipping magnate [Matson](http://www.matson.com/) carrying molasses from Hawaii to cargo ships bound for California [leaked as much as 233,000 gallons of molasses](http://health.hawaii.gov/news/files/2013/05/13-050-Molasses-Spill-in-Honolulu-Harbor-Causes-Fish-Kill.pdf) into the waters of Honolulu Harbor. The amount is equivalent to more than 5,500 barrels of oil.

Hawaii state officials said [there was little they could do to clean up](http://usnews.nbcnews.com/_news/2013/09/12/20454733-nature-will-have-to-clean-up-hawaii-molasses-leak-that-killed-thousands-of-fish?lite) the spill, warning the public to stay out of water in the area. Matson pledged to cover costs associated with the spill response.

**Sticky, But Soluble**

The density of the molasses proved immediately deadly for the harbor's marine life, which suffocated as the sticky substance sank to the ocean floor. But at least one aspect of the composition of molasses could mean the environmental impact is less than that of an oil spill.

The sugar in the molasses may help restore the harbor to its previous state, says [Grieg Steward](http://www.soest.hawaii.edu/oceanography/faculty/steward.html), associate professor of oceanography at the University of Hawai'i at Manoa and a researcher who has been involved with monitoring the water chemistry of the harbor after the spill.

"Sucrose is table sugar, and it's something even we can degrade," Steward said. "We oxidize that carbon and turn it into carbon dioxide."

Bacteria acts as an indicator for the cleanup, removing oxygen from the water and producing carbon dioxide, creating an environment that will help resident bacteria absorb the spill. Bacteria have been multiplying due to the presence of molasses.

"When you add this molasses, which is rich in the organic material [that bacteria] can easily digest, they grow more quickly," Steward said. "The elevated abundance and growth rates we are seeing are good in the sense that it means the bacteria are responding and helping to clean up."

Molasses has another advantage that will help the ocean absorb the spill's impact: Whereas everyone knows that oil and water do not mix, molasses and water do—at least scientifically.

"It's an issue of surface area," Steward said. "If you have globs or clumps of oil droplets, and if they're not dissolved in water, it makes it harder for the bacteria to access. There are fewer types of bacteria that can degenerate the compounds found in oils."

Steward sums up the difference between an oil spill and a molasses spill: "A molasses spill can be cleaned up faster by natural processes, not only because molasses dissolves in water, but because so many bacteria can digest sugars. Only specialized types of bacteria can break down oil."

**The Boston Molasses Disaster**

The molasses spill has caught both the state and Matson, which[admitted it had no contingency plan](http://www.washingtonpost.com/business/hawaii-expects-thousands-of-fish-to-die-after-molasses-spill-honolulu-harbor-turning-brown/2013/09/11/ab01fbbc-1b59-11e3-80ac-96205cacb45a_story.html) for such an event, off guard. But the spill is not without precedent.

In 1919, a huge storage tank exploded on an unusually warm January day, flooding the streets of Boston with 2.3 million gallons of molasses.

In retrospect, the [Boston Molasses Disaster](http://en.wikipedia.org/wiki/Boston_Molasses_Disaster), as it came to be called, was in some ways worse than the molasses in Honolulu Harbor.

"When you look at it, [the spill in Honolulu Harbor] was one-tenth the size of the molasses spill," [Stephen Puleo](http://www.stephenpuleo.com/), author of [*Dark Tide*](http://www.stephenpuleo.com/book/dark-tide-2/), a historical account of the disaster, which killed 21 people and injured 150.

The molasses rushed through the streets at 35 miles an hour, creating a swath of destruction.

"It pick[ed] up carts, automobiles, animals, horses, rats, anything in its path," Puleo said. "A little over 20 horses were killed, some in the initial flood, some shot [by police] to put them out of their misery since they were so enmeshed in molasses."

The molasses that spilled in Boston wasn't the type you could just buy off grocery shelves. Previously used as an ingredient in rum, molasses had become a key input in industrial products like turpentine, paint thinner, and lacquer dyes.

The molasses in Honolulu Harbor is of similar composition, which might slow the recovery, according to Steward.

"This particular type of molasses is more depleted of sugar than the molasses you buy in the store," he said.

Less sugar means less of the carbon that aids the bacterial process—and more time for recovery.

Still, molasses with a lower sugar content is easier—and quicker—for sea environments to rebound from than oil, though the aftereffects are similar.

"There's a localized dead zone [because the carbon is consuming the oxygen]," Steward said. "That area has moved to the west of Honolulu Harbor. It's working its way out to sea and the bacteria is breaking it down. The currents are moving it out."

**"Letting Nature Take Its Course"**

In 1919, Puleo said, a firefighter's idea to dilute the Boston molasses spill with neighboring seawater helped ease cleanup.

"They pumped millions of gallons into Boston Harbor, which was stained brown for months," he said. "That was a huge, monumental effort. All of the damage on the North End side was probably a six-month cleanup."

The options for officials in Hawaii are limited, and efforts to speed the harbor's recovery can sometimes be problematic.

"What we've learned from oil spills is that trying to help the process can do more damage than letting nature take its course," Steward said, stressing that it might make sense to not overdo the recovery process.

One possibility is to pump oxygen into the water to allow animals to breathe—a possibility if the problem persists. But natural processes seem to be doing well, and experts are wary of introducing more oxygen into the local ecosystem.

Steward is sad about the loss of marine life, but remains optimistic.

"I have high hopes," he said. "It's a matter of time. It looks devastating, essentially wiping out everything. So it is pretty bleak at the bottom right now. But because of the nature of the compound, in the long term, it's going to clean itself up, and [do so] more quickly than an oil spill."

Name:

Period

1. What danger does the molasses spill pose to marine life?
2. Why are the bacteria growing faster after the molasses spill?
3. Why would molasses be able to dissolve in water, but oil is unable to?
4. Why was the Boston Molasses Disaster worse than the one in Honolulu Harbor?
5. Why is the type of molasses in both spills harder for the bacteria to break down?
6. How did they clean up the molasses spill in Boston?
7. What are people proposing to do to help the marine life?
8. Summarize why a molasses spill would be easier to clean up than an oil spill.
9. Do you think that humans should get involved in the clean up the molasses spill? Write a paragraph explaining your stance