

**The Sea Grant Files, Season 7, #7
Oil and Water – It's Complicated
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Hi, I'm Jesse Schomberg and you are listening to The Sea Grant Files.

Today I'm going to talk about oil and water, and I don't mean salad dressing. Over this last year, many thoughtful conversations have focused on oil and how it should ... and could ... move through the Great Lakes Region.

There have been a fair share of contentious conversations on this topic, too, some of which ended in protests and arrests.

This Thursday, Minnesota state regulators are scheduled to hold a hearing on Enbridge's Line 3 pipeline replacement program. Enbridge delivers energy in North America by operating the longest crude oil and liquid transportation system in the world. The company's Line 3 brings crude oil from the tar sands of Alberta to the western edge of Lake Superior. The line is about 50 years old and it's corroding. Enbridge would like to replace this line with larger, safer pipes but some Minnesotan's are wary. They question the likelihood and consequences of oil spills and leaky lines. Some question the social, ecologic and economic wisdom of even mining tar sands.

In other oil headlines ... last week, the Governor of Michigan announced an agreement between the state and Enbridge over the Line 5 pipeline, which runs from Superior, Wisconsin, into Ontario, carrying hundreds of thousands of barrels of oil and natural gas liquids under the Straits of Mackinac per day. Among other things, the agreement calls for shutting down segments of the line if waves at the Straits exceed 8 feet for an hour. People are concerned the pipeline joints could fail due to powerful currents in the Straits, especially when high winds pull lakes Huron and Michigan together in a turbulent tango.

Sea Grant has been discussing the movement of oil in the Great Lakes in a serious way since 2015. In a symposium earlier this year, facilitated by my colleague Dale Bergeron, Minnesota Sea Grant's maritime extension educator, and other Great Lakes Sea Grant staff, about 130 people spent two days examining how crude oil is moved throughout the region with a goal of improving hazard management and decision-making while recognizing the costs and benefits associated with different modes of transport ... and of crude oil in general.

Bergeron said his take-home message from the symposium was this: “many things in the 21st century are so complicated that you have to know a lot just to be undecided.” He likes to ponder the idea that the United States’ use of petroleum-based products might have saved the whales ... noting that whale oil helped power the lives of our ancestors. He said, “There was a time before crude oil and there will be time after crude oil, too. But for now, we’re still coming around that curve. We don’t need to hurtle off that curve in a crash-and-burn catastrophe; if we are going to use crude oil, we need to engage our best technology and most equitable processes to move oil safely throughout the Great Lakes.”

He explained that though the nation is transitioning to alternative forms of energy and we can anticipate a day when crude oil becomes obsolete, we currently still rely on crude oil, an energy-dense material, to do things like propel airplanes and manufacture products. While we’re waiting for that future day when we don’t require massive amounts of crude oil to function, Bergeron said a wise society might work to develop a better understanding of risks and benefits and of interconnected systems, themselves. “There’s no solution, only adaptive management,” he said. “Finding the best path will only be possible if we keep learning and changing our awareness.”

Minnesota Sea Grant is creating some of that changed awareness through a research project being conducted by Dr. Lian Shen, director of the University of Minnesota’s St. Anthony Falls Laboratory and professor of mechanical engineering. Dr. Shen is refining simulations that predict how oil might move if it spilled in a lake like Superior. He studies flow systems in nature by mimicking them with super-computing power. He says what happens at the water’s surface and the nature of the oil droplet can drive where the oil ends up. Where the oil ends up influences how it can be cleaned up. Dr. Shen said this line of research... modeling the behavior of oil in water ... is relatively young and reflects the aftermath of the Deepwater Horizon disaster, which killed 11 workers and started the largest marine oil spill in U.S. history.

The National Oceanic and Atmospheric Administration's Office of Response and Restoration is the lead science agency for coastal oil spills and they needed to scramble after Deepwater Horizon. Shen as well as a graduate student and a post-doc on the project are excited about creating a new generation of tools to help NOAA and others tackle such accidents.

When oil spills in water, weather matters. High winds and severe conditions can make the damages worse by spreading oil faster. Shen said, “To capture wind and to capture waves and to understand the currents beneath is a complicated problem. We have learned a lot by mimicking different natural conditions, like wind, waves, eddies and currents, with computers. Learning these things in the field isn’t practical ... or possible ... or for that matter, ecologically safe.”

What can you do about oil and oil movement in the Great Lakes region? Travel thoughtfully ... buy strategically ... recycle more. When you can, favor wind, solar, geothermal, and appropriately designed hydroelectric and biomass energy. Seek products, activities and opportunities that minimize your and your community’s carbon consumption. Logic suggests the less crude oil we use, the less crude oil we need to transfer, so let’s all go lighter on the petroleum-based products, eh?

This episode of the Sea Grant Files was produced by Sharon Moen, Kristian Erickson, Maija Jenson, KUMD, and me, Jesse Schomberg. To find more information on crude oil or 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 and Twitter. Thanks for listening.