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Proposed oil drilling off Alaska coast prompts studies of environmental impact

By [Steven Mufson](#), Published: August 22

WAINWRIGHT, ALASKA — Beneath the placid, summertime surface of the Chukchi Sea here on the northwest coast of Alaska, an underwater canyon acts like a bathtub drain. From the south, three currents wash in from the Bering Strait, carrying loads of nutrients.

Plankton make tasty treats for bowhead whales, sea birds and fish. Benthos, organisms that live near the ocean floor, nourish walrus, diving ducks, gray whales, bearded seals and various fish.

“If you eat food in the water column, if you’re a ringed seal, that’s where you want to be,” says A. Michael Macrander, an environmental ecologist at Shell Oil.

That also happens to be where Shell wants to explore for oil. Located north of the Arctic Circle, this prospect has been called “the biggest next opportunity” in U.S. oil exploration by Shell’s president, Marvin Odum. Including leases bought in 2005 and 2008, his company has already wagered about \$4 billion preparing. It hopes to drill three wells about 70 miles offshore here next summer.

The company faces three daunting issues: Is there a way to drill here without hurting sea life? How can the company build a pipeline that can withstand the ice and shifting shoreline? And if there were a spill, where would the water currents carry the oil?

Environmental groups and many Alaska Natives believe that Shell can’t provide satisfactory answers to

those questions. They argue that there is a lack of data needed for the type of science-based decisions that the Obama administration has vowed to pursue.

“We don’t have the science . . . that would make people comfortable,” says Brooks Yeager, executive vice president for policy at the group Clean Air-Cool Planet and a former Interior Department official. “We just don’t know what we’re about to disturb.”

[Shell has responded](#) by collecting information needed for drilling permits and adding to the slim volumes of research about this remote corner of Alaska. This work will also help Shell predict what nature might throw at a big oil company in what can be a very inhospitable environment.

A small team of hydrologists, soil experts and oceanographers recently spent more than two weeks collecting data. Other scientists are working from boats to study the feeding and migratory habits of sea life that Alaska Natives in the area, the Inupiat, depend on for food.

Since the Chukchi Sea is frozen most of the year, the scientists don’t have much time.

Companies have been producing oil in northern Alaska for more than three decades, pumping crude from Prudhoe Bay east of here and carrying it out through the Trans Alaska Pipeline System.

But the Chukchi Sea is an unusual place, teeming with sea mammals, and many of its unique features make Shell’s job more delicate.

Earl Kingik, an Alaska Native from Point Hope to the south, who opposes drilling, uses a common phrase when he says the Chukchi “is the garden that provides food for our community.” In Wainwright, people have chests and storage caves full of food from whales, seals, walruses and caribous.

Kingik started whaling when he was 12, learning from his uncles and father. “I know the weather patterns and when animals are going to come,” he said. The coast along Point Hope, he says, “is very special. We don’t have to go elsewhere. The animals come to us.” The warm currents are the reason why.

Even without offshore drilling, climate change may threaten the migratory and feeding patterns of sea mammals here.

The year 2007 was a record for “ice recession,” prompting large numbers of walruses, which normally do their sunbathing on icebergs, to come ashore to warm up. If frightened, they could stampede; in 2009, 100 young walruses were trampled south of Wainwright. This year, at least 8,000 walruses have come ashore on a beach about 50 miles southwest of Wainwright, an event that World Wildlife Fund biologist Geoff York said was a result of “extreme Arctic sea ice melt caused by climate change.”

Shell has instructed its helicopter pilots to steer clear of any walrus “haulouts” they see or hear about. Every morning before setting out from Wainwright, Shell’s science team holds a conference call with local guides who recommend places to avoid based on reports from hunters from the village.

But if helicopter noise is a concern now, noise from drilling, seismic surveys and shipping is a concern for the future.

“One of the critical issues is sound,” Macrander says. “Most marine mammals rely on sound to communicate.” He acknowledges that any industrial activity offshore “has the potential to disrupt and

interfere” with those mammals. Shell has placed 45 acoustic listening devices in the Chukchi Sea and 35 others farther northeast in the Beaufort Sea.

A draft of a report the company has commissioned found little effect from seismic surveys — which involve the firing of sound and impulses through the water — for bowhead or beluga whales. The [bowhead population](#) is estimated to have risen to more than 10,000, roughly doubling over a quarter-century, Macrander says.

But in 2009 and 2010 consultants to Shell did find effects on walrus populations. Their report said that in 2009, walrus calls overheard at three recording stations in the vicinity of seismic tests “stopped, with few exceptions, each time air gun pulses were detected.” In 2010, the report said, “nearly all acoustic detections stopped when sound levels reached about 140 decibels”

The report said that while it had previously been thought that walrus would simply swim away from the man-made noise, it appeared that they may have instead just stopped issuing their calls. “Repeated disruptions of vocal communications could potentially affect the maintenance of mother-pup bonds and herds’ integrity,” it said. “Both rely almost exclusively on calls to remain in contact when separated by larger distances.”

Shell says that it is studying [how to muffle some of the noise](#) from drilling operations, such as by wrapping undersea equipment in plastic spheres or using generators to create a curtain of air bubbles the size of tennis balls.

Macrander says that Shell has been mapping migration patterns of sea mammals tagged with tracking devices and can plan its exploration program to minimize its impact.

For at least eight months a year, the Chukchi is largely iced over. While oil companies have drilled in similar icy regions, off Sakhalin Island in Russia and in the Norwegian North Sea, Chukchi ranks among the toughest such environments.

Erling Westlien, a Shell environmental engineer, said that during the long, dark winter, the ice could stay still and then in one day move 40 miles.

Shell’s drilling platforms would operate during the summer four-month open water window, but the fast-moving ice of the winter would pose a challenge for a production platform, which the company says would be specially designed to withstand such stress.

One positive factor is that the water is only about 160 feet deep where Shell plans to drill, a wading pool compared with the mile-deep waters plied by oil giants in the Gulf of Mexico. So the platform, like the exploration rig, would stand on the sea floor. But ice could make it hard to detect a spill, environmentalists argue, because for most of the year it would be impossible to see any surface sheen.

The ice also affects plans for transporting the oil. In the Gulf of Mexico, pipelines usually lie on the sea floor. In the Chukchi, at least part of the line would probably run under the sea floor, particularly close to shore, where ice that reaches all the way to the bottom of the sea could tear up a pipeline.

One of the other pipeline perils sounds like a dessert but is even more lethal for pipelines. It’s called the “strudel scour.” These effects happen when rivers inundate sea ice during spring breakup. Large volumes of fresh water noodle through the ice, creating holes and cracks (known as strudels) and opening up depressions (scouring) in the sea floor more than 13 feet deep and 65 feet across.

The shift in sediments that routinely occur along the Chukchi coast can also complicate Shell's job, says John Atkinson, a fluid dynamics expert at Arcadis, a consulting firm hired by Shell.

Each year this coastline changes its shape. During wintertime, ice can shove its way onshore, ripping apart a section of coast and allowing salty water to flow into a new inland pond when summer comes. Sediment can quickly wash away in one place and get deposited elsewhere, damaging one barrier island and repairing another.

"It looks like someone baked brownies and left some in the pan," says Atkinson as he flies over a bluff in a helicopter.

He points to scallop shapes along the shore. "If you want to put a dock or anything here," he says, "it would be hard to engineer because the sediment would erode on one side and pick up on the other very quickly and could undermine the dock."

A new pipeline would have to cross about 280 miles of soggy, brownish-green tundra, pockmarked by thousands of ponds and lakes, to connect with an existing pipeline. So Shell is also collecting data more than a mile inland. There, clumps of plants and roots form balls known as tussocks and make hiking there similar to walking on top of basketballs.

Last month, a team of soil experts was surprised to find brackish water on the tundra, suggesting that the ocean or ice had found its way farther inland than expected. While permafrost, the solid earth frozen all year round, lies not far below, the surface in this area is changing constantly.

"The land here is just so naked," Atkinson says, "and the barrier islands are very vulnerable because there is so little vegetation to protect them."

Last year when oil spewed forth from BP's Macondo well in the Gulf of Mexico, many people feared the oil would hitch a ride on the so-called loop current, escape from the gulf and spoil beaches along the East Coast.

That didn't happen, but it showed how uncertainty about currents made it difficult to track the spill.

In the Chukchi, Shell is trying to map currents that would be vital to understand in the event — an unlikely event, in Shell's view — of an oil spill. Surface currents could carry oil one way, underwater currents could carry it another. And in winter, environmentalists say, the ice could act as a sponge making it difficult to collect spilled oil, as happened in a tanker accident near Norway recently.

Shell has provided funding for Tom Weingartner, a professor of physical oceanography at the University of Alaska in Fairbanks, to launch underwater gliders and [collect data from radar along the coast to create colorful real-time maps of currents](#). Weingartner has also examined underwater fronts, similar to weather fronts, which could block the movement of an oil spill.

"From the point of view of an oil company, they're interested in knowing if they spill something where it might show up," Weingartner says.

Can Shell convince critics that it can drill safely and with modest impact in the Chukchi Sea? It will be difficult.

Shell and many of its allies in Congress are trying to get the Environmental Protection Agency, the U.S.

Fish and Wildlife Service and the Interior Department to hurry up and issue permits for drilling.

Environmental groups, however, have been trying to mobilize people such as Earl Kingik. Last year, he and five other Alaska Natives were flown by environmental groups to the Gulf of Mexico to see the BP oil spill. "I had the chance to have my hand in the water, to feel how an animal would feel, like the seagulls who were trying to wash themselves off and could not," Kingik said.

The root of the problem is that no matter how many precautions Shell and other oil companies take, there is an element of risk and uncertainty.

Lois Epstein, Arctic program director of the Wilderness Society, says "the business community wants predictability, but predictability and science are sometimes in conflict."

In the end, the decision on whether to allow drilling in the Chukchi will be at least partly a political one, since clearly it would be safer for the environment not to have any activity there at all.

[A report this year by the U.S. Geological Society said that](#) "Opinions on development run the gamut from 'there is already enough science' to 'there will never be enough science.' There are areas of significant scientific research that form a sound basis upon which to make decisions; there are areas where additional science is needed; but there also is an area in which more than science is needed."

The USGS added that "while there is a growing base of scientific and technical information for the Arctic . . . many of the challenges emerging in Arctic oil and gas development decision making are beyond the ability of science alone to resolve."

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