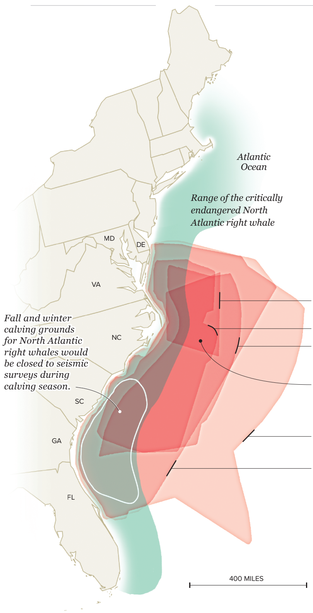


Updated Jan. 22, 2019

Trump Poised to Permit Controversial Surveys off the Atlantic Coast

Fossil fuel prospectors may soon get a green light from BOEM to begin seismic testing in the Atlantic Ocean. The surveys — conducted with airguns that blast sound waves into the seabed — are known to disrupt fisheries and harm or kill sea life, including everything from microscopic plankton to endangered whales.

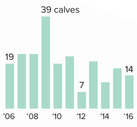
Five companies, millions of air bursts

BOEM is processing permits for five companies wanting to conduct 850 combined days of "resource evaluations" in one year. The surveys will include months-long, around-the-clock series of about 5 million underwater air blasts, the sounds of which will echo off geological structures deep below the sea floor. In the ocean, noise from the operations can travel as far as 2,000 miles.

The National Marine Fisheries Service has authorized five permits for seismic surveys, despite the service's own estimate that the surveys will injure and disturb dolphins and whales.

North Atlantic right whales are in decline, with fewer than 420 remaining. Scientists say the whales are afflicted by entanglements with fishing gear, underwater noise and other human-caused stressors.

KNOWN NORTH ATLANTIC RIGHT WHALE CALF PRODUCTION



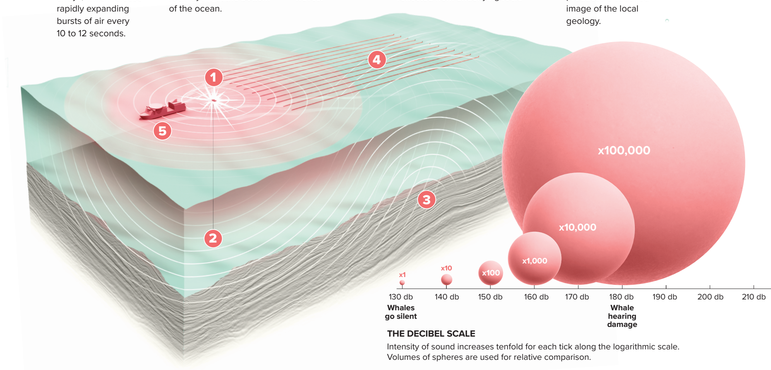
Sounding below the depths

Seismic surveys decipher echoes generated from air gun blasts — bursts of highly pressurized air into the water — that reveal the geology beneath the sea, including the location of gas and oil reservoirs. NRDC says the blasts are "as loud as dynamite," but British Columbia Ministry of Energy and Mines likens an air gun to an "underwater pop-gun."

Scientists and conservation groups, as well as an ongoing December 2018 federal court challenge on behalf of 16 coastal South Carolina municipalities and the SC Small Business Chamber of Commerce, often refer to seismic testing as "sonic blasting." But Gail Adams, vice president of Communications and External Affairs at the International Association of Geophysical Contractors, objects to the term, calling it a characterization that "extreme environmental groups use to misinform stakeholders. Sound source arrays are not explosive or similar to explosives in any way." she said in an email to POLITICO Pro DataPoint.

How marine seismic surveys are conducted:

1. A seismic vessel tows a series of air guns, or sound source arrays, which release rapidly expanding bursts of air every 10 to 12 seconds.
2. **230-decibel sound waves** travel easily through water, penetrating rock layers at the bottom of the ocean.
3. Various layers of the underlying geology reflect the waves.
4. The vessel also tows an array of hydrophone cables sensitive enough to collect and record waves reflected from underlying rock.
5. An onboard computer gathers the information and produces a stratified image of the local geology.



THE DECIBEL SCALE

Intensity of sound increases tenfold for each tick along the logarithmic scale. Volumes of spheres are used for relative comparison.

Damage to Life Beneath the Waves

Scientific studies detail the toll that seismic surveys exact on marine ecosystems.

EFFECTS ON ZOOPLANKTON
The smallest and most numerous of marine animals, include larval crabs, shrimp and shellfish. Zooplankton are a primary food source for much of the ocean ecosystem, from small fish to right whales, which use baleen to strain them out by the millions.

The percussion from an air gun can reduce populations by as much as two thirds within 1.2 kilometers (0.75 miles) of the blast.

MOLLUSCS
Include snails, oysters, scallops and squid. In an Australian study, repeated exposure to airgun blasts significantly increased mortality in scallops, which also exhibited behavioral changes and alterations in haemolymph (invertebrate blood) chemistry.

In response to noise, some molluscs stop feeding and burrow deep into the sea bottom. Squid exposed to air gun blasts have developed lesions in their sensory cells.

CRUSTACEANS
Include crabs, lobsters and shrimps.

Crustaceans can suffer damage to the sensory hairs that help them with balance.

In one study, lobsters exposed to airgun blasts experienced a significant reduction of haemolymph cells. Repeated exposure to seismic sounds slows the development rate of larval crabs. Prawns exposed to continuous noise produce stress hormones that degrade their health.

EFFECTS ON FISHES
Known to sustain organ damage from acute sounds similar to air gun blasts, fishes exposed to seismic noise have elevated levels of stress hormones; noise can significantly reduce reproduction rates.

Fishes are driven from areas undergoing seismic surveys.

In a 2017 study, air gun blasting reduced fish numbers by 78 percent on a North Carolina reef that was 7.9 kilometers (4.9 miles) away from the survey.

A seismic survey in the arctic Barents Sea off the northern coasts of Norway and Russia, reduced catches of cod and haddock by as much as 70 percent and reductions persisted for at least 5 days after the survey. Catch reductions were detected as far as 18 nautical miles away from the blasting.

SEA TURTLES
The marine reptiles could suffer auditory damage from seismic testing. Scientists also warn of potential behavioral changes and exclusion from critical habitats.

MARINE MAMMALS
Some species within 200 km of seismic blasting are known to reduce or cease vocalizations. Noise from seismic surveys as far away as 3,000 kilometers (1,864 miles) can disrupt marine mammal communications by masking their calls. Sounds louder than 180 decibels can damage marine mammal hearing.

Blasting can interrupt feeding, breeding and other social activity, drive mammals from their breeding grounds for extended periods and has been linked to reduced whale calf survival.

Beaked whales, which occur in high densities off the North Carolina Coast, are highly sensitive to human noise, and have been found dead and injured after Navy sonar exercises.

INDUSTRY'S PERSPECTIVE: "More than 50 years of extensive surveying and scientific research indicate that the risk of direct physical injury to marine mammals is extremely low, and currently there is no scientific evidence demonstrating biologically significant negative impacts on marine life."
— Gail Adams, IAGC

Federal protective measures

BOEM and NMFS say that protection of marine animals is a high priority, and both agencies have policies in place that they claim will protect certain animals from harm. But scientists and environmental advocates say the measures are inadequate.

Select BOEM and NMFS policies versus ...

Monitoring-based mitigation, requires trained protective species observers onboard seismic vessels. Testing is stopped if a mammal is seen within a short distance of the ship.

Passive acoustic detection uses underwater microphones to listen for marine mammals.

Time-area closures prohibit seismic testing from important habitat on a seasonal or year-round basis.

Ramping up airguns would allow marine animals to clear the survey area.

160-decibel limits for survey sounds at borders of protected habitats.

Prohibition of blasting within 200 meters of sea turtles or marine mammals, or farther if animals are subjected to sounds louder than 180 decibels. Surveys must be halted for at least 1 hour if a turtle or marine mammal enters an exclusion zone — except for dolphins that voluntarily approach the survey, a common occurrence.

Required minimum distances from turtles and marine mammals, to help reduce strikes:

... an expert's perspective on marine mammal protection

Monitoring-based mitigation
"Marine mammals are often difficult to spot under the best of circumstances, even in clear weather and calm seas," said Michael Jasny, director of marine mammal protection at Natural Resources Defense Council. "And of course the seismic industry doesn't suspend its operations when the visibility turns poor; they operate at night, in fog, in higher seas, in conditions that reduce their ability to spot marine mammals to something approaching nil."

Passive acoustic detection
Acoustic detection only works when species are vocalizing. But many marine mammals, including beaked whales, go silent when confronted with disruptive human noise, Jasny said.

Time-area closures
Right whales can be found in excluded areas during all seasons, not just during the summer months. "The big problem is that seismic airgun noise travels very far underwater at levels that can harm marine mammals" Jasny explained. "Airgun blasts have been shown to silence and displace baleen whales (of which right whales are an example) at distances of tens to hundreds of kilometers, interfering with their foraging, migration, and breeding."

Fish and invertebrates
"None of the agencies' measures would mitigate impacts on fish and invertebrates," Jasny said, "which is another serious concern."

Sources: Michael Jasny, Natural Resources Defense Council; Bureau of Ocean Energy Management; National Marine Fisheries Service; Smithsonian Institution; Oceana; Ecological Society of America; Nature Ecology and Evolution; Fisheries Research and Development Corporation; Marine Policy; Canadian Journal of Fisheries and Aquatic Sciences; BC Ministry of Energy and Mines; PLOS One, Biology Letters; Biological Conservation; IAGC

By Patterson Clark, POLITICO Pro DataPoint