BOEM
Bureau of Ocean Energy Management

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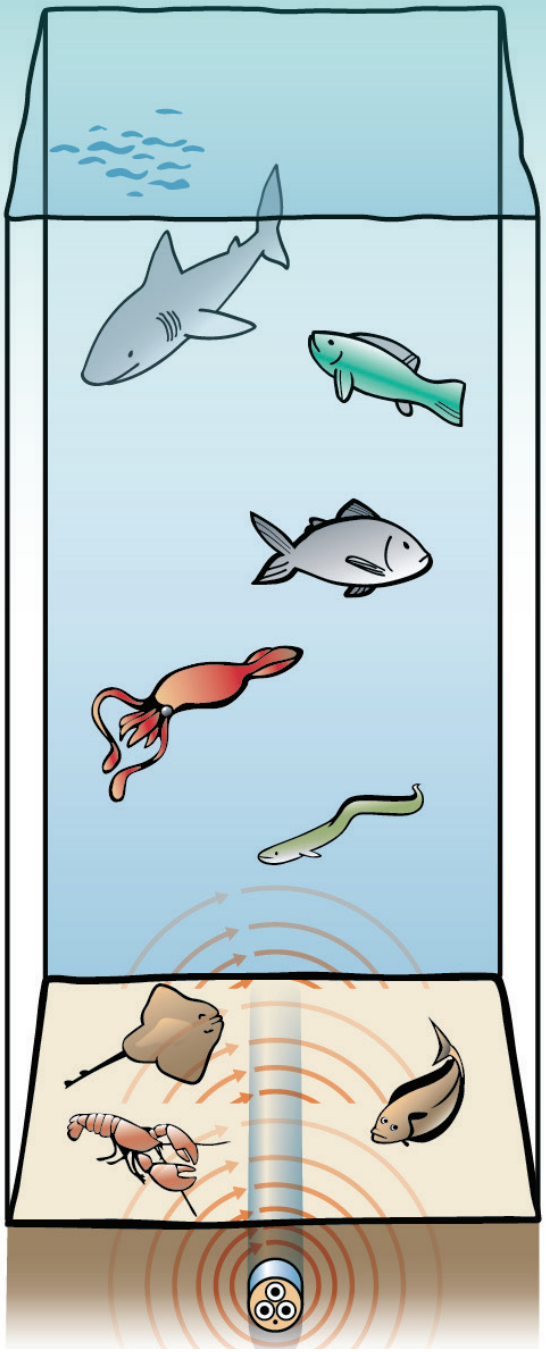
ENVIRONMENTAL STUDIES

Electromagnetic Fields (EMF)

& Marine Life



Naturally occurring EMF are present everywhere in the oceans. Undersea cables used for power transfer are known sources of EMF, but telecommunication cables and undersea communication cables also generate alternating current (AC) and direct current (DC) EMF.

Impacts to Marine Life

Three major factors determine the exposure of marine organisms to magnetic and induced electric fields from undersea power cables: 1) the amount of electrical current being carried by the cable, 2) the design of the cable, and 3) the distance of marine organisms from the cable.

The sensitivity of fish to EMF is based on the basic functions of their sensory organs. While some fish have the ability to detect water motion with their lateral lines, some species can also detect magnetic and sometimes electric fields with specialized sensory organs.

Electrosensitive and Magnetosensitive Fish

Electrosensitive fish have specialized organs that perceive naturally occurring electric fields and use them to locate prey or detect the presence of predators.

The range over which these species can detect electric fields is limited to ***centimeters****, not meters, around these species.*

An animal's ability to detect and respond to the Earth's natural magnetic field is called magnetosensitivity. Many fish species, including bony fishes and sharks, use the Earth's natural magnetic field for guidance during migration and to navigate in the oceans.

AC undersea power cables associated with offshore wind energy projects within the southern New England area will generate weak EMF at frequencies outside the known range of detection by electrosensitive and magnetosensitive fishes.

Fish species in the southern New England area and their reported abilities to detect EMF

PELAGIC

Bony Fish

	Albacore tuna	H
🧲	American eel	A
	Atlantic bluefin tuna	H
	Atlantic butterfish	M
	Atlantic herring	N
	Atlantic mackerel	M
	Striped bass	A
🧲	Atlantic salmon	N
	Atlantic skipjack tuna	H
🧲	Atlantic yellowfin tuna	H
	Bluefish	M
	Cobia	A
	King mackerel	A
	Spanish mackerel	A

Sharks

🧲⚡	Basking shark	H
🧲⚡	Blue shark	H
🧲⚡	Common thresher shark	H
🧲⚡	Dusky shark	H
🧲⚡	Porbeagle shark	H
🧲⚡	Sandbar shark	H
🧲⚡	Sand tiger shark	H
🧲⚡	Shortfin mako shark	H
🧲⚡	Smooth dogfish	H
🧲⚡	Spiny dogfish	M
🧲⚡	Tiger shark	H
🧲⚡	White shark	H

Invertebrates

Longfin inshore squid	M
Northern shortfin squid	M

A	Atlantic States Marine Fisheries Commission
H	Highly Migratory Species
M	Mid-Atlantic Fishery Management Council
N	New England Fishery Management Council
🧲	Magnetic Sense
⚡	Electric Sense

DEMERSAL

Bony Fish

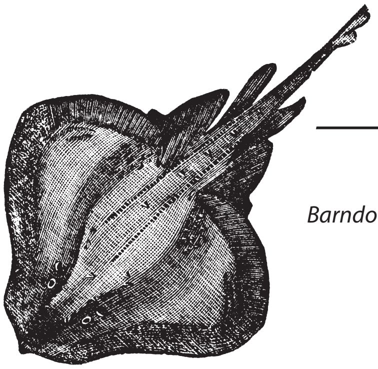
Acadian redfish	N
American plaice	N
Atlantic cod	N
Atlantic halibut	N
Atlantic wolffish	N
Black seabass	M
Haddock	N
Monkfish	N
Ocean pout	N
Offshore hake	N
Yellowtail flounder	N
Pollock	N
Red hake	N
Scup	M
Silver hake	N
Summer flounder	M
Tautog	A
Weakfish	A
White hake	N
Windowpane	N
Winter flounder	N
Witch flounder	N

Skates

🧲⚡	Barndoor skate	N
🧲⚡	Clearnose skate	N
🧲⚡	Little skate	N
🧲⚡	Smooth skate	N
🧲⚡	Thorny skate	N
🧲⚡	Rosette skate	N
🧲⚡	Winter skate	N

Invertebrates

	Atlantic sea scallop	N
	Deep-sea red crab	N
	Atlantic surfclam	M
	Ocean quahog	M
🧲	American lobster	A
	Jonah crab	A


Barndoor skate

Pelagic fishes such as striped bass, bluefish, weakfish, and Atlantic mackerel have habitat preferences above the seafloor and away from the EMF field, while bottom-dwelling fishes are most likely to encounter EMF from undersea power cables associated with offshore wind energy projects.

Skates (Family Rajidae) have the greatest potential effects from EMF from undersea power cables because they combine electrosensitivity with a bottom-dwelling life history.

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For More Information:
https://www.boem.gov/environment/environmental-studies/renewable-energy-research

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