

POTENTIAL ENVIRONMENTAL IMPACTS OF FLOATING OFFSHORE WIND IN CALIFORNIA'S FEDERAL LEASE AREAS

Impacts from Electromagnetic Fields



THE PRODUCTION AND TRANSMISSION of electricity, including via floating offshore wind farms, generates electromagnetic fields (EMFs). The suspended cables that connect floating offshore wind turbines to each other (inter-array cables) and that transmit electricity to shore (export cables) will generate EMFs that decrease in strength with distance from the cable. Animals that are receptive to electrical and/or magnetic signals—such as certain species of sharks, rays, skates, crustaceans, whales, dolphins, porpoises, bony fish, and turtles—may be able to detect the EMFs depending on their distance to the cables.¹



BLUE SHARK

Research Shows

- **Human sources of EMFs may distort the Earth's naturally occurring EMFs and affect an animal's ability to use them for navigation, migration, and/or locating prey species.**^{2,1} This could lead to changes in movement and foraging behaviors as well as potential developmental impacts.^{3,4,1} The extent of these impacts would depend on the sensitivity of the organism, likelihood of encountering the EMF, and the amount of power carried in a cable which determines the intensity of the EMF.¹
- **Some frequencies of EMFs produced by offshore wind turbines may be detected by certain species depending on intensity and distance.** Offshore wind turbines generate alternating current (AC) electricity, and the electrical cables carrying this power back to shore can use either direct current (DC) or AC cables.⁵ Each type of power transmission produces different forms of electric and magnetic fields at different frequencies.⁶ In the U.S., AC cables for electric power transmission operate at 60 Hz⁵, which may be outside the detection range of many species.⁶ However, low frequency EMF from DC cables could potentially be detected by some species depending on the EMF intensity and distance from the cable.⁷
- **Overall, the effect of human sources of EMFs on marine life appears to be minor, but more research is needed in a floating offshore wind farm context.**^{8,9} Studies to date have focused on experiments to understand the sensitivity of various species to EMFs, mostly in a fixed-bottom

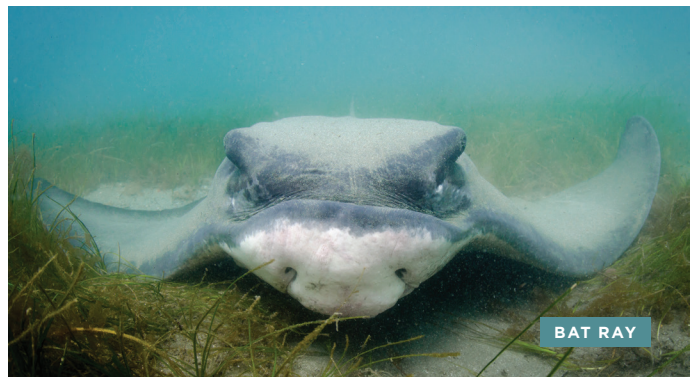
RESEARCH SHOWS CONTINUED

offshore wind farm context.^{3,17} For example, one study in Southern California found no significant difference between the response of rock crabs placed in cages along unenergized and energized subsea cables,^{10,11} while another study on the East Coast found increased foraging behavior of a skate species near a subsea DC cable.¹²

- **Technical and design standards can be used to reduce the strength of EMFs and mitigate potential impacts from subsea cables.** Options include the use of helically twisted cables or burial of cables to increase the distance of most species from the EMF source¹, although this implies physical disturbance to the seafloor.



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BAT RAY

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