

Species that live in marine and freshwater environments feed, spawn, migrate, settle or orient themselves in relationship to ambient EM fields. Industries using artificial EM are moving into aquatic regions for power generation (wind farms, wave and tide harvesting), development of underwater weaponry, resource-location and mining, and tagging of species for study. We need to understand how delicate ecosystems and threatened species might be affected. This map introduces the topic with studies and reports from agencies and organizations examining EMF issues.

[TETHYS: EMF SEARCH](#)

[NOAA FISHERIES EMF SEARCH](#)

**SOME SENSITIVE SPECIES**

- Eels
- Krill
- Sea slugs
- Crayfish
- Manatees
- Salmon, trout, carp
- Whales, dolphins
- Sea turtles, lobsters
- Sharks, rays, sturgeon, tuna
- Tadpoles of terrestrial frogs
- Mussels, urchins, barnacles

**A FEW REPORTED EFFECTS ON MARINE AND FRESHWATER SPECIES**

- Feeding orientation
- Habitat alteration
- Cochlear sensitivity
- Cable entanglement
- Spawning interference
- Sensitivity to stranding
- Delayed metamorphosis
- Cascade of biodiversity loss
- Interaction with tissue magnetite
- Attraction, repulsion, behavioral taxis
- Fertility and developmental changes
- Migration and navigation disorientation
- Combined effects of EMF and sound waves
- Interference with settlement of mobile larvae

**EFFECTS OF EMF ON MARINE SPECIES**

**NAVY'S EM WEAPONS WILL CAUSE INJURY TO LIVING BEINGS**

**BEES, BUTTERFLIES, WILDLIFE, EMF**

**BIRDS, BEES AND THE DESTRUCTION OF NATURE**

**BIRDS AND WILDLIFE: IMPACTS OF EMF**

**EMF AND MARINE SPECIES: A LITERATURE REVIEW**

Sharks, salmon, and some other species are sensitive to AC electric fields. Eels and some benthic species (starfish, scallops, mussels, etc.), and some marine mammals are more sensitive to magnetic fields.

[Military and Marine Life](#)

[Ocean EMF killing field, mammals](#)

[Pulsed MW, fish kills, manatee deaths](#)

[Webinar: Effect of EMF on Marine Animals](#)

**POSSIBLE MITIGATION**

- Shielding cables
- Burying cables, equipment
- Equipment in faraday cages

**SOME EMF STRESSORS**

- Satellites to ships
- Offshore wind farms
- Wave energy devices
- Underwater AC cables
- Search magnetometers
- Underwater sound generators

Underwater electric fields may be shielded, but not magnetic fields.

**Articles and Reports**

- [EMF tagging of fish](#)
- [Wave-power, marine life](#)
- [Endangering Nature's GPS](#)
- [Reedsport WAVE study plan](#)
- [Cook Island WAVE draft letter](#)
- [Effects of wave energy devices](#)
- [Cell tower, fish die in classroom](#)
- [Letter re: Naval Weapons, EMF](#)
- [Effects of cables on elasmobranchs](#)

**ECOLOGICAL EFFECTS OF WAVE DEVELOPMENT IN PACIFIC NW**

**PRESENTATION: OFFSHORE WIND FARMS, EFFECTS ON MARINE MAMMALS AND FISH**

**EMF EFFECTS: MARINE AND FRESHWATER LIFE**

**EMF Studies**

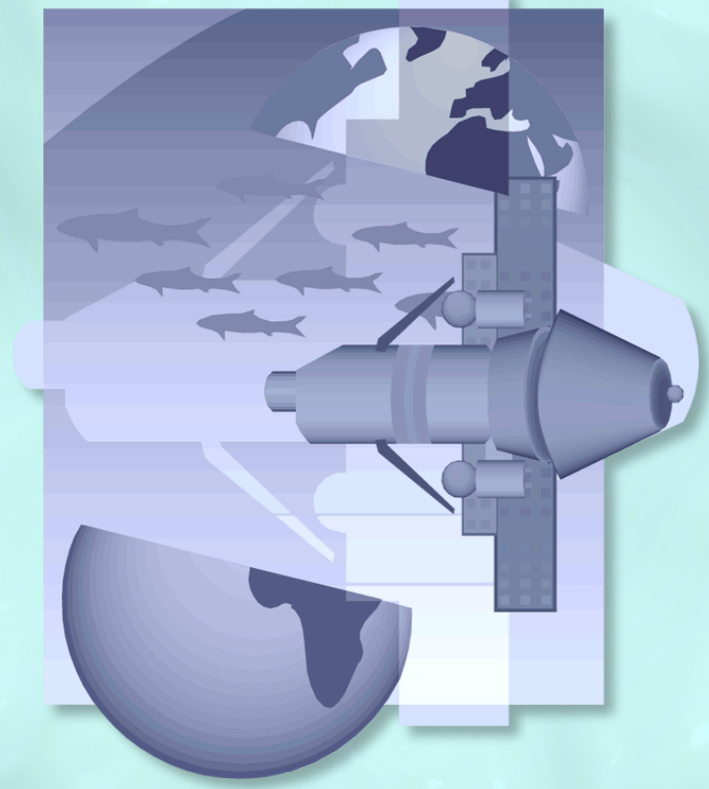
- [Krill, disorientation in weak RF](#)
- [Tadpoles, metamorphosis delay](#)
- [ELF, adverse effects rainbow trout](#)
- [ELF, developmental toxicity, zebrafish](#)
- [Many studies: sea turtles, other marine life](#)
- ★ [Weak RF, amphipod orientation disturbed](#)
- ★ [EMF, stray electrical currents, coral bleaching](#)
- [Tree frog tadpoles, mobile phones, city as laboratory](#)
- [Tragedy of Commons, High Tech Risk of Wireless World](#)

Because sharks are electrosensitive and attracted to electric fields produced by underwater cables in power generation projects, there is concern about an increase in attacks.

**Related Maps**

- [EMF and Birds](#)
- [Living Antennas](#)
- [EMF and the Bees](#)
- [EMF and Magnetite](#)
- [EMF, Calcium, Water](#)
- [EMF, Living Systems](#)
- [EMF, Trees and Plants](#)
- [EMF and the Environment](#)
- [EMF and Physiologic Water](#)

**INDEX OF ALL MAPS RELATED TO EMF AND THE ENVIRONMENT (PDF)**



Home: [Oscillatorium](#)  
Newest version [this map](#)  
Date of this update: 08-24-17

"EMF consists of both E- and B-fields. The presence of magnetic B-fields can produce a second induced component, a weak electric field, referred to as an induced electric (iE) field. The iE- field is created by the flow of seawater or the movement of organisms through a B-field... both E- and B-fields, whether anthropogenic or naturally occurring, rapidly diminish in strength in seawater with increasing distance from the source." SAIC

"The ability to detect E- and B-fields starts in the embryonic and juvenile stages of life for numerous marine species." SAIC

