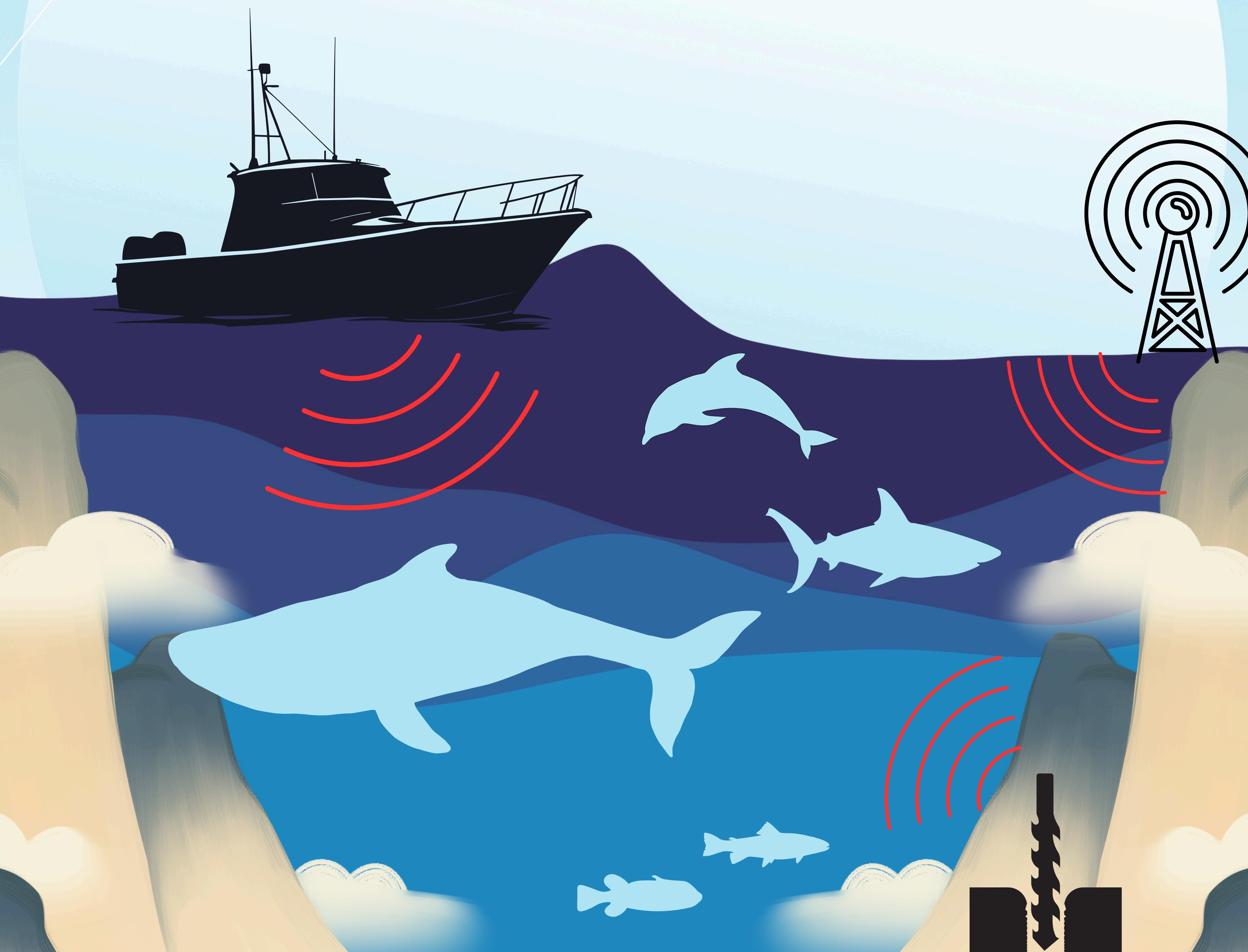


IMPACTS OF UNDERWATER NOISE ON MARINE ANIMALS



WHAT IS UNDERWATER NOISE AND WHAT CAUSES IT?

Underwater noise is either natural or human-made. Most human-made sounds are referred to as underwater noise pollution.

Source: [NOAA Fisheries](#)

Examples of Natural Sounds:

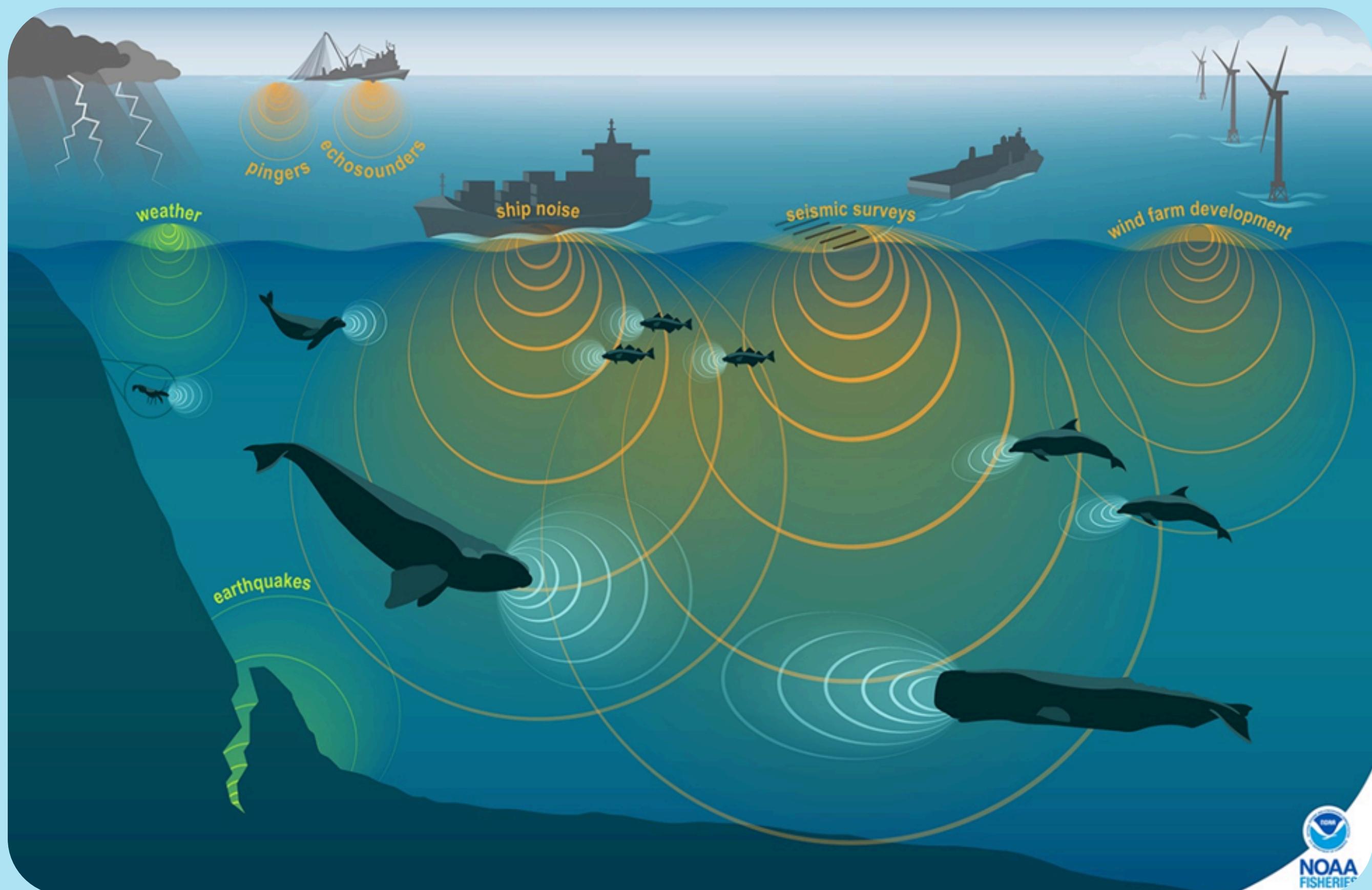
- Marine species
- Storms
- Earthquakes.

Source: [NOAA Fisheries](#)

Examples of Human Sounds:

- Boats
- Military sonar
- Underwater construction

Source: [NOAA Fisheries](#)



Source: [NOAA Fisheries](#)



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DIFFERENT SOUND SOURCE TYPES!

Impulsive:

- Short, sharp sounds with high peak pressure
 - explosions
 - seismic air guns
 - impact pile driving

Source: [NOAA Fisheries](#)

Non-Impulsive:

- Smoother sounds, continuous or varying, without sharp peaks
 - vibratory pile driving
 - drilling
 - some sonar

Source: [NOAA Fisheries](#)

Impact Pile Driving



Figure from: [esdenizcilik](#)

Vibratory Pile Driving



Figure from: [omsvibro](#)

Intermittent - Sound occurs in bursts, with quieter gaps in between.

Source: [NOAA Fisheries](#)

Continuous - Ongoing sound above background levels

Source: [NOAA Fisheries](#)



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KEY HEARING GROUPS OF MARINE SPECIES!

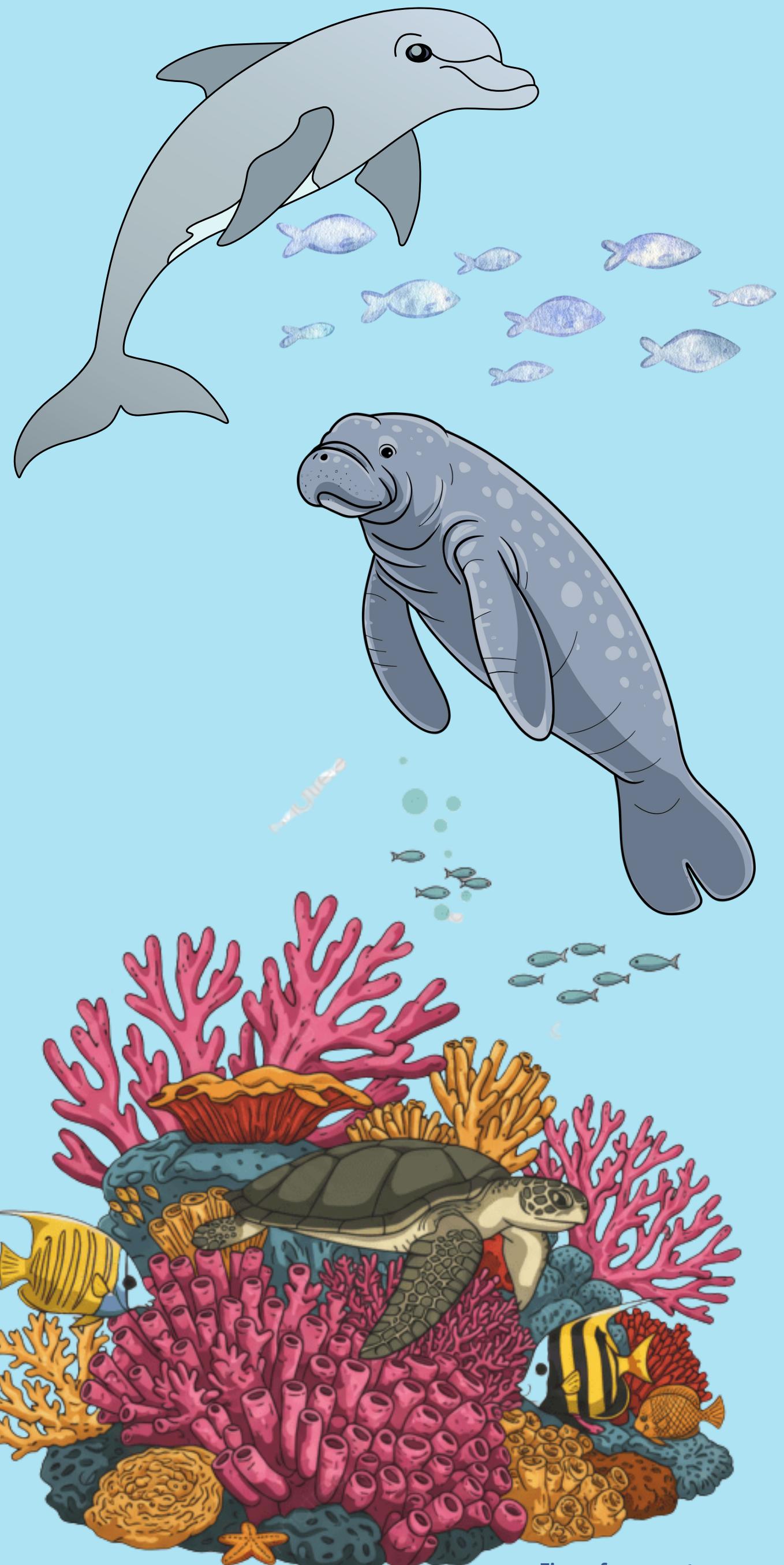
Marine Mammals:

Low-Frequency (LF) cetaceans
(e.g., baleen whales)

High-Frequency (HF) cetaceans
(e.g., dolphins, toothed whales,
beaked whales)

Manatees

Source: [NOAA Fisheries](#)



Sea Turtles:

Thresholds are given generally (all sea turtles) with distinctions for source type (impulsive vs non-impulsive).

Source: [NOAA Fisheries](#)

Fish:

For fish, thresholds are not divided by species groups because of limited data.

Source: [NOAA Fisheries](#)

Figure from: [pngtree](#)



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OVERALL IMPACTS ON MARINE SPECIES!

Hearing Damage: temporary or permanent hearing loss, affecting animals' ability to find food, avoid predators, locate mates, or navigate.

Source: [NOAA Fisheries](#)

Behavioral Disruption: Noise may cause animals to avoid important habitats, interrupt feeding or mating, alter migration paths, or interfere with vocal communication.

Source: [NOAA Fisheries](#)

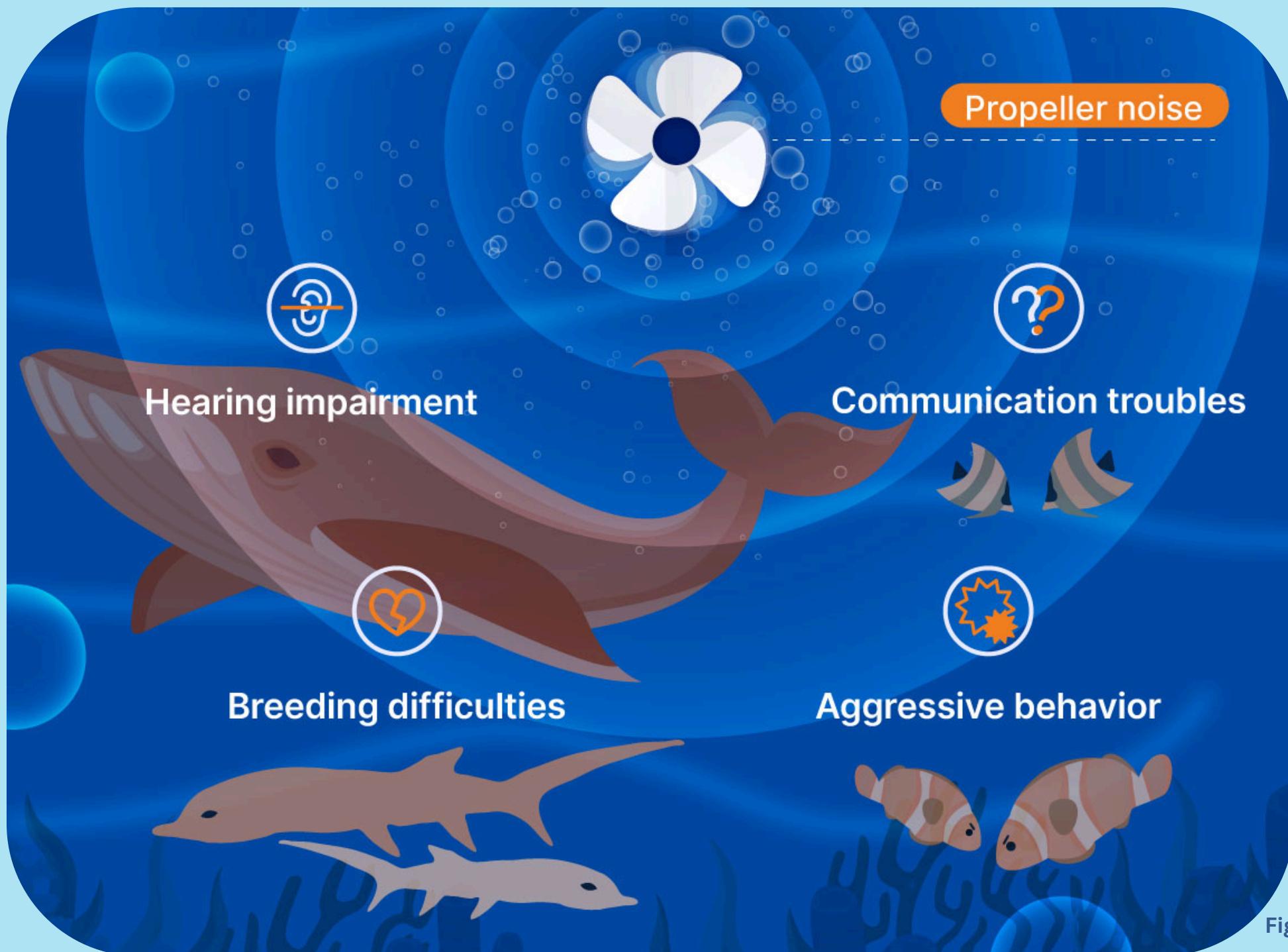


Figure from: [hanwha.com](#)

Physical Harm: Intense or repeated noise—especially from explosions—can cause stress, internal injuries, or even death in extreme cases.

Source: [NOAA Fisheries](#)

Species-Specific Effects: Fish and sea turtles may suffer damage to sensitive organs (e.g., inner ears, lungs), become disoriented, or face higher mortality, especially among young or small individuals.

Source: [NOAA Fisheries](#)



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WHAT ARE MARINE LIFE HEARING THRESHOLDS?

Effect Type:	Animal Group:	Example Threshold Level:	Meaning:
Behavioral Disturbance	High Frequency Cetaceans	Peak sound pressure: ~160dB	Can cause disturbances in communication with others and with location of food items
Auditory Injury	Low Frequency Cetaceans	Peak sound pressure: ~222dB	Very high levels; this is the point at which hearing damage could start from an impulsive sound
Behavioral Disturbance	Manatee	Continuous: ~120dB Intermittent: ~160dB	Can cause changes in behavior (avoidance, changes in vocalizations)
Auditory Injury	Sea Turtles	Peak sound pressure: ~232dB	For sea turtles very intense impulsive sounds could cause PTS at these levels
Temporary Threshold Shift (TTS)	Sea Turtles	~200db for over 24 hours depending on source type	TTS is less severe but still may reduce hearing sensitivity
Behavioral Disturbance	Fish	~150dB for all sources	can have ecological consequences (feeding changes)

Source: NOAA Fisheries



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WHAT CAN YOU DO TO HELP?

Slow Down!

- Fast and large ships produce much noise. Reducing vessel speed can help in the immediate reduction of underwater noise

Source: [Oceancare](#)



Figure from: [safety4sea](#)



Figure from: [Ridesharing](#)

Oil and Gas!

- Help reduce the need for more oil and gas. Carpool, walk, and reduce idling.

Source: [Oceancare](#)

Create Quiet Zones!

- Important marine regions must be protected and kept quiet. Indorse federal regulations for protected marine regions.

Source: [Oceancare](#)



NATIONAL MARINE SANCTUARIES

Figure from: [nautiluslive](#)



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