



GOVERNEMENT

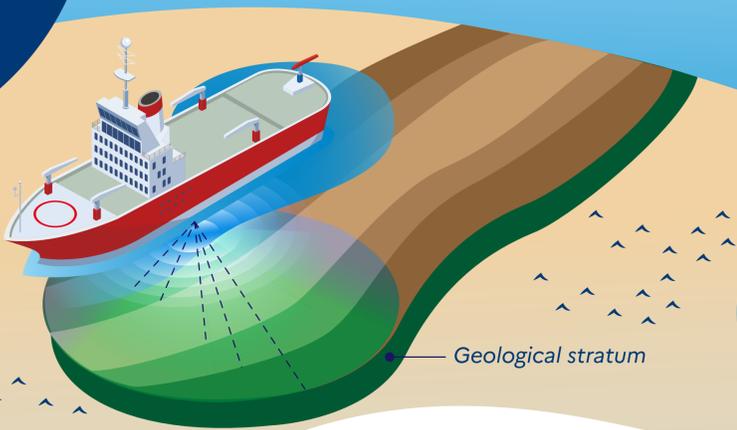
Liberté
Égalité
Fraternité

UNDERWATER NOISE

LINKED TO SEABED EXPLORATION

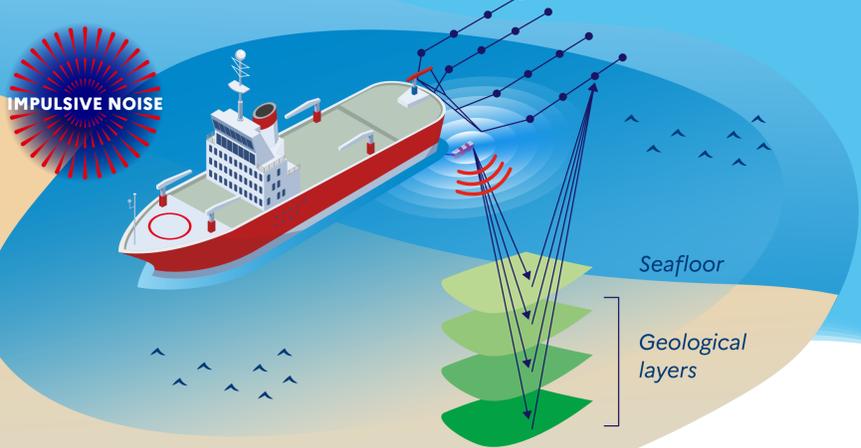
SOURCES

Geophysical seabed survey operations (topography, geology) and marine oil and gas exploration use acoustic and seismic sources to map the subsoil of the seabed.



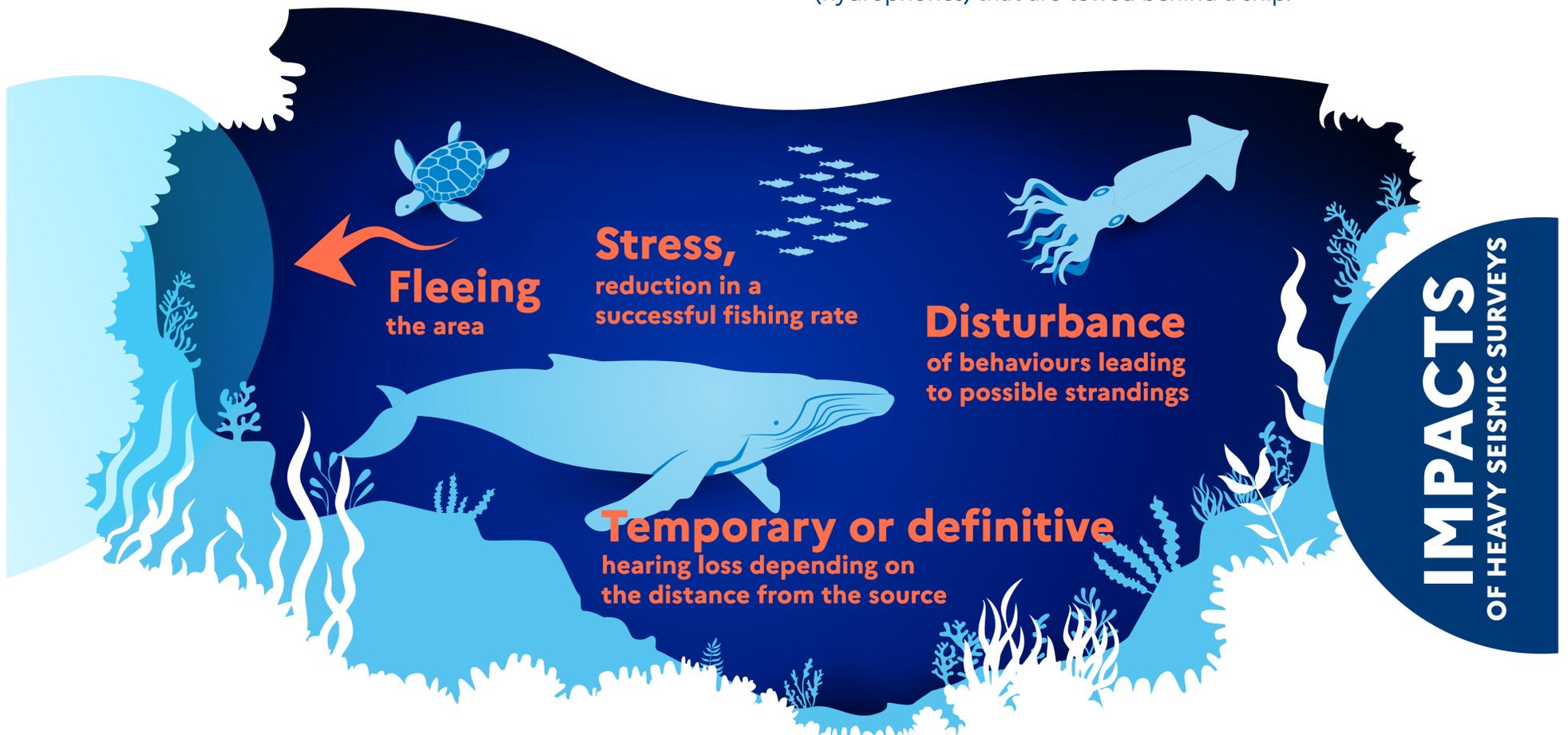
Vertical beam echo sounding technique

Sediment echo sounders are low frequency acoustic systems used for high-resolution exploration of surface subsoil and to visualise sediment strata at seabed depths of up to several dozens of metres.



Marine seismic surveys

Marine seismic surveys are widely used in oil and gas exploration to examine beneath the oceanic crust at great depths. These systems consist of several airguns that produce sound by releasing very high pressure air aimed at the seabed, combined with a set of receivers (hydrophones) that are towed behind a ship.



Fleeing
the area

Stress,
reduction in a
successful fishing rate

Disturbance
of behaviours leading
to possible strandings

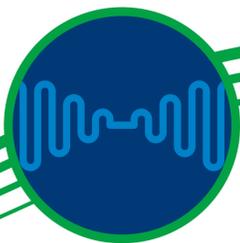
Temporary or definitive
hearing loss depending on
the distance from the source

IMPACTS
OF HEAVY SEISMIC SURVEYS

SOLUTIONS



Spatial & temporal planning
Sensitive areas and/or periods for marine species are defined, in which noisy activities are avoided or forbidden.



Limiting the noise footprint
The volumes and emission levels of sources are optimised and reduced to what is strictly required in order to limit the noise footprint of seismic campaigns.



Onboard observers
During campaigns considered to be high-risk, visual and/or acoustic observations are carried out in order to detect the marine animals in the area and, if necessary, stop seismic emissions.



Soft Start
The intensity of emissions is increased gradually so as to give the animals present in the area time to leave.



In France, operators are mobilised to use quieter vessels and reduce the impact of the acoustic equipment used. The French **National Institute for Ocean Science, IFREMER**, applies its own regulations during high-risk oceanographic campaigns and forbids the use of high-impact equipment during **ecologically important periods**. It uses up to 5 **onboard observers** and **operators** and systematically applies **soft-starting** for sound emissions used in marine seismic surveys.



On an international level, anthropogenic underwater noise is now considered as a type of **pollution** as defined in Article 1 of the **United Nations Convention on the Law of the Sea (UNCLOS)**. The topic is part of an informal consultative process at the UN. Several countries, such as Canada and Norway, apply the **precautionary principle** concerning the granting of authorisations for seismic activities at sea on the basis of potential impacts on marine animals. These authorisations restrict the **period**, **area** and **duration** of seismic exploration.

MOBILISATION OF STAKEHOLDERS

Currently being developed!

Optimised impulsive sound sources

Several avenues of research are being investigated to reduce the environmental impacts of impulsive sound sources. For example, work is being carried out to optimise seismic sources so that they do not emit high-frequency signals, which are of no use for imaging the subsoil of the seabed.

