NOPSEMA

AT A GLANCE
MARINE SEISMIC SURVEYS

November 2018

What are marine seismic surveys?

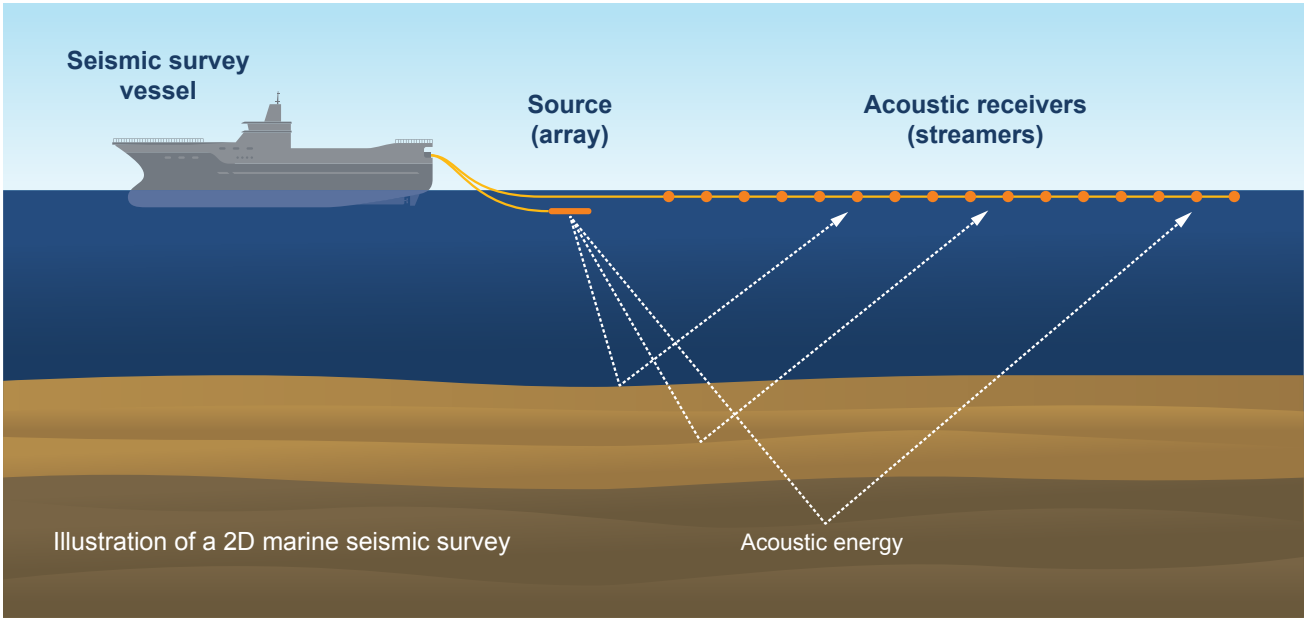
Marine seismic surveys are one of the first steps in the offshore petroleum exploration process and conducted as part of the process to identify potential hydrocarbon reservoirs below the sea floor. They typically involve a vessel towing an acoustic source (array) of different sized chambers, filled with compressed air across a survey area. The release of compressed air from the source sends a pulse of high pressure acoustic energy into the water that penetrates into the various rock layers under the seafloor. The returning soundwaves are then captured by hydrophone receivers that are towed behind the vessel on a series of cables referred to as streamers. By analysing the collected soundwaves, geophysicists and geologists are able to build a picture of sub-seabed geological layers, and more accurately define where hydrocarbon reservoirs might be.

What are the different types of survey techniques?

A two-dimensional (2D) survey uses one seismic source and streamer along a single line to produce a 2D image of a single cross-section through the Earth. This technique may consist of more than one line generating several cross sections of geological formations within a defined survey area.

A three-dimensional (3D) survey uses one seismic source and multiple streamers to produce a highly detailed 3D image of a specific area. This technique uses multiple lines, normally several hundred metres apart within a defined survey area.

A four-dimensional survey (4D) is a 3D survey repeated over the same location over time and generally occurs during the production phase. Comparing the 4D survey results to the survey undertaken during exploration or pre-production provides valuable insight into the changes to the reservoir.



Environmental impact

Marine seismic surveys, as with any other human activity, have some level of impact on the environment. The type and degree of environmental impacts from a seismic survey is influenced by the ecological, biological, social, economic and cultural features of the area the activity is proposed to occur in. There is a large body of international and Australian scientific research into the effect of underwater sound generated from seismic surveys. The research indicates there are a range of potential impacts such as physiological and temporary behavioural or acoustic disruptions to some marine species. Evidence shows that, when properly managed, seismic surveys do not result in serious or irreversible environmental damage.

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FACT SHEET

Evaluating and managing noise impacts

Conducting a comprehensive environmental impact assessment is a vital first step in understanding and managing the potential impacts of a particular seismic survey. Part of the assessment includes consultation with people who may be affected by the proposed activity and applying relevant scientific research in the context of the specific survey and the environment in which the survey is proposed to occur. Once the potential environmental impacts of a seismic survey are identified and evaluated, the oil and gas company proposing the survey applies management actions to eliminate or reduce those impacts to as low as reasonably practicable and to acceptable levels to ensure the environment is protected.

Management actions may include implementing internationally recognised controls such as:

- designing the survey to limit impacts in environmentally sensitive areas
- avoiding particularly important periods (e.g. migration, fishing season, breeding) for sound sensitive marine species
- deploying marine fauna observers to ensure sound emissions are ceased if marine mammals are detected
- implementing exclusion zones to protect environmental receptors (e.g. offshore reefs)
- reducing the duration of the survey or changing the way it is conducted to limit the acoustic energy that is emitted into the marine environment
- effectively communicating with other marine users prior to, during and post survey.

What role does NOPSEMA play?

NOPSEMA assigns a team of environment specialists to assess each proposed seismic survey through the submission of an environment plan. NOPSEMA's assessors will undertake a compressive assessment of the proposal to ensure the impacts of the survey are going to be managed to acceptable levels and there is no long-lasting or widespread damage to the environment. NOPSEMA's assessments take into consideration all factors specific to the survey being proposed, contemporary and relevant scientific research as well as information provided by stakeholders. If NOPSEMA determines an oil and gas company is not taking appropriate action to protect the environment NOPSEMA will not accept the proposal and the survey will not be able to commence in the way it was proposed.

For more information

NOPSEMA publishes policies, guidance notes, guidelines, information papers and brochures at **nopsema.gov.au.**