



Reference Document

Marine Environment

- Australia's marine or offshore Exclusive Economic Zone (EEZ) is one of the largest in the world, and is larger than Australia's land area.
- The oil and gas industry has been operating in offshore Australia for more than six decades.
- The industry directly funds a substantial scientific research program to better understand and demonstrate a commitment to the Australian marine environment
- The offshore oil and gas industry is established and responsible. The industry works to highest standards and has a long history of responsible environmental management.

1. Australia's offshore oil and gas industry

Australia's marine or offshore Exclusive Economic Zone (EEZ) is one of the largest in the world. It extends 200 nautical miles from the coast and covers a total marine area about 10 million square kilometres, considerably larger than Australia's 7.69 million sq.km land area. Regions from the low tide baseline to three nautical miles from the coast are regulated by the states and the Northern Territory. The Commonwealth Government regulates areas from three nautical miles to the outer limit of the EEZ.

The Australian Institute of Marine Science (AIMS) has estimated that Australia's marine industries are worth more than \$50 billion a year and that oil and gas is the largest single contributor to Australia's marine economy.¹

Several new petroleum projects are being developed now in Australian waters.

For example, the \$43 billion [Chevron-operated Gorgon Project](#), is developing gas fields 200km off the Western Australian coast. This is the largest resource development in Australia's history and one of the largest natural gas projects in the world.

Australia's first offshore oil and gas well was Barracouta 1 in Bass Strait. Using the Glomar III drillship, Esso Exploration Australia began drilling in 45 metres of water on 27 December 1964.



Seals on infrastructure in the Bass Strait

In February 1965, the well intersected a gas reservoir and reached a total vertical depth of 2,638 metres. This discovery was later declared the Barracouta gas field.²

Following this initial success, Australia entered its first rush of offshore exploration and drilling. By November 1967, six floating rigs had entered Australia and were operating in depths of up to 60 metres.

¹ [AIMS Index of Marine Industry](#) (2014). Accessed from www.AIMS.gov.au

² Australian Academy of Technological Sciences and Engineering, [Technology in Australia 1788-1988](#)



2. Government regulation

The Australian offshore oil and gas industry is subject to some of the world's most stringent and rigorous environmental regulation.

The primary legislation regulating the offshore oil and gas industry in areas more than 3 nautical miles from land is the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (the OPGGS Act) and associated regulations³. This implements the legal framework covering all oil and gas operations in Australian waters.

The OPGGS Act requires oil and gas operators to comprehensively demonstrate that all environmental risks from their activities are reduced to a level that is as low as reasonably practicable (ALARP) and that this risk is also at an acceptable level.

This means that the operator must justify to an independent regulator, through reasoned and supported arguments, that no additional practical measures that could reasonably be taken to further reduce risks and that the residual risk is still acceptable.

This process encourages the petroleum industry to continually improve its performance, and results in standard practices that outperform many other industry standards and conventions, such as water discharge or ballast water management.

The OPGGS Act is regulated and administered by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

This Commonwealth agency regulates the health and safety, structural integrity, and environmental management of all offshore petroleum facilities in Commonwealth waters, as well as in coastal waters where states have conferred relevant powers to the Commonwealth.

NOPSEMA is a useful source of information on regulation of oil and gas operations in Australian waters.⁴

3. Safeguards

The Australian oil and gas industry goes to great lengths to use international best-practice environmental safeguards when undertaking its marine activities. When planning offshore projects, companies identify and examine potential risks to people and the environment. Procedures are established to reduce or eliminate any hazards, and to train employees to identify and respond to potential incidents.

Environmental safeguards are developed to consider in detail the specific activity and environment that the operation is working in. For instance, an operator may design a marine seismic survey to avoid a particular time of the year where a sensitive marine species may be migrating.

Operators regularly review their capabilities and assess new research and technologies in order to improve environmental protection. The APPEA Code of Environmental Practice⁵ provides an outline of environmental objectives and guidance on key aspects of good environmental practice in the petroleum industry.

³ <http://www.industry.gov.au/resource/UpstreamPetroleum/OffshorePetroleumRegulatoryRegime/Pages/default.aspx>

⁴ <http://www.nopsema.gov.au/about/>

⁵ http://www.appea.com.au/wp-content/uploads/2013/05/Code_of_Environmental_Practice.pdf



4. Oil spill preparedness and response

Oil spill preventing is a major priority throughout the life-cycle of all exploration and production activities.

Spill prevention is achieved by sound design, construction and operating practices; maintenance of facilities; and high levels of environmental awareness, training and commitment among staff, contractors and managers.

Australia's offshore petroleum safety, well integrity and environment regulatory regime is comprehensive and robust. It is considered to be leading practice among mature, developed petroleum-producing countries.

The industry assesses possible spill scenarios and works to reduce the risks.

An oil spill "risk" covers both the likelihood of a spill occurring and the impact of any such spill. Each spill is a unique event that varies according to oil type (e.g. light, medium or heavy oil), season and location.

Identifying *potential* spills and reducing risk is integral to the initial design phase of any oil and gas facility.

For example, oil pumps are engineered to prevent leakage. As a failsafe measure the design also incorporates shutdown devices that prevent spills if leakage does occur. The pumps are also contained within bund walls so that if a leak occurs the oil will not enter the marine environment. Risk management is used in appraising, engineering and installing all production equipment on offshore oil and gas platforms.

The Australian Marine Oil Spill Centre

Based in Geelong, Victoria, the Australian Marine Oil Spill Centre (AMOSOC) provides services and equipment to safeguard the Australian coastline in the event of a major oil spill.

AMOSOC is financed by 10 participating oil companies and other subscriber companies. These companies carry out the vast majority of the oil and gas production, offshore pipeline, terminal operations and tanker movements around the Australian coast.

AMOSOC operates Australia's major oil spill response equipment stockpile on 24 hour stand-by for rapid response anywhere around the Australian coast. The Geelong location places the response centre at the heart of oil movements in Australian coastal waters and provides excellent access to road and air transport.

Subsea First Response Toolkit

Based in Perth, the Subsea First Response Toolkit (SFRT) provides specialised equipment in Australia for immediate use at the start of a loss of subsea well control.

Funded by an industry consortium, the SFRT contains equipment to clean around the wellhead, enable intervention and prepare for relief well drilling and installation of a capping device. As part of this initiative, the Australian oil and gas industry also established a 500 cubic metre stockpile of dispersant for use as part of a well source control system.

Learning from oil spills

The Montara (Timor Sea, 21 August 2009) and the Macondo (Gulf of Mexico, 20 April 2010) spills prompted a significant collective response from the Australian upstream petroleum industry.

The Australian Government strengthened regulatory arrangements, and the industry expanded and strengthened its preparedness and capacity to prevent and respond to major incidents.

The industry remains focused on continuously improving its collective safety performance and accepts it must work with governments beyond just implementing regulation.

It is committed to oil spill response mutual aid arrangements under the Western Australia State Emergency Management Plan for Marine Oil Pollution, and the National Plan for Maritime Environmental Emergencies.



5. Marine seismic surveys

Explorers use seismic surveys to produce detailed images of local geology to determine the location and size of possible oil and gas reservoirs. Sound waves are bounced off underground rock formations and the waves that reflect back to the surface are captured by recording sensors for later analysis. Analysing the time the waves take to return provides valuable information about rock types and possible gases or fluids in rock formations. This is similar to the use of ultrasound in medicine.

Seismic information is used to accurately plan locations for wells, reducing the need for further exploration, which minimises environmental impact. More than four decades of seismic surveying and numerous research projects have shown no evidence that offshore seismic surveys harm marine species. All Australian whale populations are increasing. For example, humpback whale populations are increasing at close to their biological maximum – more than 10 per cent a year. There is much more offshore oil and gas activity on Australia's west coast than on its east coast, but the rates of increase are almost identical.

For a more detailed discussion of seismic surveys, see [this APPEA website](#) and the related fact sheet, reference document and reference links found at [this webpage](#).

6. Operating in sensitive environments

Australia's offshore petroleum industry works in a wide variety of environments, from the cold seas of Bass Strait, to the tropical waters of Northern Australia.

Australia's state and federal governments have committed to a series of marine reserves to enhance protection of Australia's marine ecosystems. The largest of these schemes is the Commonwealth Marine Reserve system.⁶

Since the system was first proposed in the 1990s, the oil and gas industry has worked closely and productively with all stakeholders and governments to develop the Commonwealth Marine Reserve network.

These marine reserves are intended to support conservation of habitats and species, including threatened and endangered species, while also enabling continued sustainable use of the marine environment.

Once a Commonwealth marine reserve is proclaimed, Parks Australia has to develop a management plan for the reserve. Management plans can also be developed that cover more than one reserve. Management plans have a maximum life of 10 years and set out how the reserves are to be managed including what activities are allowed and the zones of the reserve in which they are allowed.

The system of marine reserves provides a framework to assist governments, stakeholders and researchers to make informed future management decisions, both inside and outside the reserves, and to better develop targeted research. This encourages industry to adopt innovative concepts and new technology to explore and develop potential resources without presenting a threat to conservation objectives.

⁶ <http://www.environment.gov.au/topics/marine/marine-reserves>



7. Marine science and research

The Australian oil and gas industry directly funds a substantial scientific research program to improve understanding of the Australian marine environment.

Most of this work is undertaken with specialist academic researchers. The AIMS report – [Marine Nation 2025: Marine Science to Support Australia's Blue Economy](#) – shows the importance of such collaboration. Marine science is multidisciplinary; marine systems are vast and interconnected; and the challenges of operating in marine environments are complex. No one institution or company can build the evidence base or tools required to adequately address marine science priorities.

Recent examples of collaborative industry marine science and conservation include:

- [APPEA Environmental Research Compendium](#) (2013), which provides simple summaries of 49 research projects undertaken by Australian petroleum companies.
- A \$20 million four-year collaborative [Great Australian Bight Ecosystem Study](#) between BP, CSIRO, South Australian Research and Development Institute (SARDI), the University of Adelaide and Flinders University.
- The SERPENT ([Scientific and Environmental ROV Partnership using Existing iNdustry Technology](#)) deep-sea research project, which makes advanced ROV technology and data more available to the world's scientific community, shares knowledge and progresses deep-sea research.
- More than \$91 million in environmental and social offsets funded by the Inpex-operated Ichthys Project. These offsets include comprehensive surveys along the Northern Territory coastline to identify distribution and abundance of coastal dolphins, turtles and dugongs, and developing and implementing management plans to protect important areas identified by these surveys.
- In addition, INPEX has published internationally significant research on the islands and surrounding waters of the Bonaparte Archipelago and Browse Basin. These studies included site-specific investigations into the terrestrial flora and fauna, birds, and subterranean fauna on selected islands in the Bonaparte Archipelago. Investigations of marine noise and coral abundance and diversity have been conducted across the Bonaparte Archipelago and Browse Basin. Aerial and vessel-based surveys of whales, as well as regional and site specific surveys of marine turtles, have also been undertaken. These studies have significantly improved the understanding of biodiversity in the Bonaparte Archipelago and Browse Basin and have been used by government agencies to identify areas of conservation significance in the Kimberley region.
- The Ichthys Project and Shell Development Australia have entered into a \$15 million, five-year [applied research program](#) with the AIMS to establish and maintain an environmental baseline in the Browse Basin. AIMS and its partner organisations – which include CSIRO, University of Western Australia and Monash University – will collect biological and population information on regionally significant seabird breeding and foraging locations, selected coral and seabed communities, and commercially and ecologically important fish species.



Environmental Scientist
Source: ExxonMobil 2015.



- The [Barrow Island Flatback Turtle Conservation Program](#). The Gorgon LNG project is contributing around \$1 million per year over 60 years to increase protection of flatback and other turtles. It is also funding the monitoring and auditing of marine activities during the project's dredging and marine construction phase.
- The Industry and Government Environmental Metadata project (I-GEM), is an industry and government collaboration to collate and present geospatial metadata on key baseline environmental datasets relevant to monitoring oil spills and assessing their impacts.
- Woodside and AIMS have undertaken a long-term [extensive research project on Scott Reef](#). Working with Woodside let researchers study this normally inaccessible atoll. This project showed how corals and fish depend on each other for survival; how corals and their symbiotic algae can adapt to extreme changes in depth; how water movements affect the flow of nutrients and larvae, and how the reef is important for migratory turtles and whales.



Gorgon Flatback Turtle Monitoring

There are many more examples of collaborative industry and academic research initiatives. Such partnerships are crucial in the ongoing understanding of the marine areas and their effective management.

8. Summary

In Australia, exploration and production operations are conducted in a wide range of onshore and offshore environments. The industry works to the highest standards and has a long history of responsible environmental management. Companies are committed to sound resource and environmental management practices as an integral part of industry operations.