

# OUTCOMES OF THE IOGP SOUND AND MARINE LIFE JIP

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A successful joint programme of any kind requires all participants to define and agree to key objectives on which all commissioned work is based. The objectives of the Sound and Marine Life (SML) Joint Industry Programme (JIP) are threefold:

- Support planning of exploration and production (E&P) projects and risk assessments;
- Provide a basis for appropriate operational measures;
- Inform policy and regulatory development.

The Objectives help guide planning actions throughout the execution of the programme, aligning a core of companies representing oil and gas activities in existing and emerging basins of the world's oceans. From the Objectives and the outcome of an initial multi-stakeholder conference in Halifax, the JIP participants produced a set of 'key questions' grouped into broad research categories:

- sound source characterization;
- physical and physiological impacts;
- behavioural response and biological significance;
- mitigation and monitoring;
- technology development.

The key questions list is maintained and iterated throughout the programme to ensure that the JIP priority subjects captures emerging business needs.

Building on the objectives, the JIP partners developed a set of policies ensuring:

- A fully transparent approach
- Commissioned research is global (i.e., research does not address 'local' issues relevant for individual or a subset of companies)
- The topic of 'sound and marine life' is viewed by all as 'non-competitive'
- Soliciting research projects is done via an openly-advertised 'Requests for Proposals' process where submissions are submitted for anonymous external peer review before awards are announced
- Research studies are not directed by the JIP, once objectives for work have been agreed;
- Researchers are encouraged wherever possible to submit the findings of their research for publication in peer-reviewed journals and to share findings through scientific conferences, and are given a period of up to two years to prepare submissions
- JIP participants employ a 'no censorship' approach to the conduct of research and where results suggest a need to change or modify industry projects, these changes or modifications would be implemented
- Collaborations and funding partnerships strongly encouraged

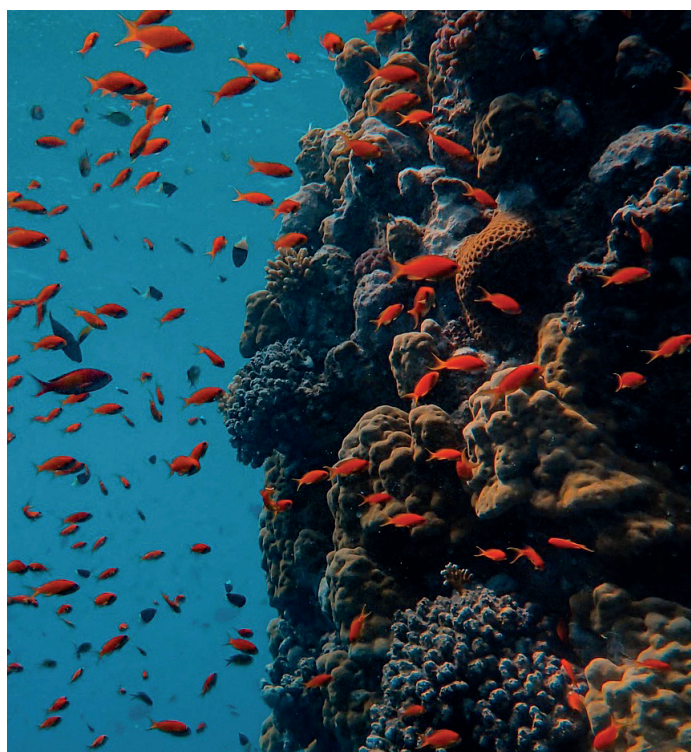


## Successful Objectives?

The JIP has been successful in terms of its output of scientific publications from commissioned studies. More than 142 research papers have been published in the peer-reviewed literature as of mid-2022 further papers are in the publication process and new studies are being developed. In addition, 61 project reports are also available through the JIP web site. By far, the greater proportion of these publications has addressed physical and physiological aspects (essentially hearing sensitivities across a range of species) and biological responses. These include the outcome of the behavioural responses of humpback whales, the largest privately funded behavioural response study yet undertaken. Publications on mitigation and monitoring are supplemented by the development and release of PAMGuard, open-source software that assesses signals from hydrophone sensors to detect, identify and estimate the location of marine mammals within the vicinity of an activity. Work on sound measurement reporting and 'standardization' has clarified the baseline on how sound in the marine environment is presented, analysed and understood. This provides a common basis for discussing sound sources and how sound propagates in the sea.

The volume and breadth of research commissioned by the JIP has improved the knowledge base on which the wider international industry, as well as the regulatory, academic and NGO communities can evaluate potential impacts not only of new and ongoing oil and gas projects, but also other offshore industry activities. Results of studies are available to be incorporated into the Environmental Impact Assessment (EIA) processes that are an integral part of gaining regulatory approval of offshore activities. As a result of the JIP and other research funding mechanisms, future assessments can evaluate the risks associated with developments and on-going operations on a more rigorous, quantitative basis.

Through successful scientific collaborations, the JIP has become a recognized, trusted, and respected presence in this field of study by the regulatory and academic communities. It has succeeded in attracting and engaging many of the leading scientists. In addition, the JIP conducts Programme Review meetings and invites funded researchers along with members of the regulatory and conservation spheres to provide status overviews on individual projects and help inform the direction of the Programme. JIP policies on transparency and a hands-off approach to publication is a model for industry sponsorship of environmentally sensitive issues.



## The regulatory 'seascape'

While many initiatives amongst countries have focused on what is loosely described as 'chemical pollution', in the past twenty years there has been an increasing focus on marine sound. Sound is often considered as a potential marine pollutant<sup>1</sup>. However, it is recognized that not all inputs of acoustic energy (sound) will lead to marine pollution, as defined, as exposure to sound may not result in deleterious effects. The point of transition will require a judgement on when a perceived effect becomes 'biologically significant': the distinction is frequently ignored.

In addition to national regulatory control exerted on development of offshore oil and gas resources, there is a substantial body of regional and global regulation. Much of the international regulation flows from the International Convention on the Law of the Sea, which provides encouragement to signatory states to take action jointly as well as individually to tackle the challenge of marine pollution. This action leads to what is often described as

<sup>1</sup> Pollution means the introduction by man, directly or indirectly, of substances or energy into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for use of sea water and reduction of amenities". GESAMP is the Joint IMO, FAO, UNESCO, WMO, WHO, IAEA, UN, UNEP Group of Experts on the Scientific Aspects of Marine Pollution (renamed to "Marine Environmental Pollution"). GESAMP is run under the auspices of the Intergovernmental Oceanographic Commission (IOC).



‘soft environmental law’, producing recommendations for policy direction and guidelines on how these policies might be implemented.

IOGP is an accredited Observer at many of the international and regional agreements including the UN Convention on Biodiversity, the International Maritime Organization, regional seas conventions (formed under the banner of the United Nations Environment Programme) for the Mediterranean (the Barcelona Convention) and the offshore waters of West Africa (the Abidjan Convention) as well as OSPAR (for the North East Atlantic), and the Helsinki Convention (for the Baltic Sea). Specialists and scientists from JIP member organisations have also been invited to participate as experts in the technical discussions of the International Whaling Commission (IWC), European Union (EU) as well as to the occasional meetings of the International Offshore Petroleum Regulators Forum (IOPER). This engagement has allowed JIP participants to provide regular briefings on the overall status of the JIP and project activities as well as being an integral part of the development of Guidelines and Recommendations on marine sound. Such participation has been vital to ensure that national regulatory frameworks are informed by the latest, most robust and rigorous scientific results. It has also reinforced the view of the industry as a credible stakeholder and a valued member of the scientific community.

A key output for the JIP is information that contributes to addressing recognised knowledge gaps and therefore the continuation of industry’s ‘environmental and social licence to operate’. Central to this aim are the conversations operators have with individual national regulators, which have a broad spectrum of familiarity with industry operations and sound in the marine environment. Countries with an established offshore oil and gas industry often have an informed regulator with its own research capability and data associated with marine environment areas, such as species distribution and abundance. In contrast, countries with a new or developing offshore sector may have limited administrative and technical development, as well as local research and data capacity. These nations often draw extensively on the knowledge developed and systems implemented in either or both neighbouring countries and mature administrations as well as input from independent consultants from the conservation world.

It would be unreasonable to expect that individual pieces of JIP research drive the development of regulation at a national regional or international level. Nonetheless, the outcomes from JIP supported projects provide substantial technical information that contributes to informing regulations. For example, sound exposure criteria first published in 2007 has been updated just over a decade later (by essentially the same authorship) with additional





papers on hearing responses, which now contribute to the basis for the use of the criteria in a regulatory context. Moreover, across the broad range of studies on hearing (along with other non-JIP research), none were able to provide conclusive evidence of permanent hearing impairment. This has reduced regulator concern regarding potential hearing damage (on a broad range of species) as critical elements. In recent years the focus has been shifting towards behavioural responses, masking, cumulative impacts, and translating potential effects on individual animals to the consequence for a group of animals or whether those consequences can affect entire populations.

In these areas the JIP has much to contribute. The large-scale, multi-year behavioural response study on Humpback Whales in Australia (which also attracted a substantial funding partnership with the United States Bureau of Ocean Energy Management), set a benchmark for the design and multifaceted nature of such studies. Scaling impacts on individual animals or groups of animals to the risk<sup>2</sup> of population impacts required new areas of study. The JIP has supported the further development of an existing conceptual model called “Potential Consequences of Acoustic Disturbance” (PCAD) which sets to develop the linkages between exposure to an acoustic stressor and feeding, reproduction and population-level consequences. The model which has been described more generally as “Population

Consequences of Disturbance” (PCoD) forms a major part of the conversations taking place between industry (through individual companies as well as collectively) and the regulatory and academic research community. The discourse with the regulatory community (which has a general focus on ecosystem health) has also broadened from discussions on large marine mammals (such as Mysticete whales) to include potential consequences to fish, a particular and overriding concern in some countries, drawing on the results of one of the first studies of acoustic disturbance on free ranging wild fish. The general PCoD model now offers the possibility of wide and effective application as opposed to being merely conceptual.

Substantial effort of the JIP has been directed to answering key questions on potential impacts of compressed air sound sources used for geophysical surveys (‘airguns’) on marine mammals (and to a lesser though important degree) on fish. The JIP has also investigated potential impacts associated with alternative sound sources for geophysical surveys. For example, the marine vibrator (MV) has been viewed by many as the most viable alternative to airguns. These sources are not yet available for widescale commercial application, and a smaller group of companies have formed a separate JIP to develop a prototype source. While MVs may be viewed as a preferable and relatively benign alternative source for geophysical surveys, their impacts to marine life have

<sup>2</sup> ‘Risk’ is traditionally defined in terms of both consequence or impact and the likelihood or probability of the impact happening. So, it is important to understand that while some level of impact may be predicted to happen due to exposure to sound from an activity, such an impact may be highly unlikely to happen.

not been comprehensively studied. Sound and Marine Life JIP funding has begun to answer this important question even before a commercially useful source is available for example with studies focusing on potential masking, given that MV sources produce sounds that are closer to being more continuous rather than impulsive.

When the JIP framework was established in 2005-2006, we used the analogy of a jigsaw puzzle. At that stage, there were many pieces on the table, but few were linked. It was unclear whether the pieces were applicable, and the overall picture was not clearly defined. There is now much more clarity, both for the industry, as well as for the regulatory and academic community. Not all key questions have been answered and new approaches to solving parts of the puzzle are still in development. Nonetheless, the broader picture is now clearer with some of the missing jigsaw pieces identified. Some areas of concern such as injury have been greatly reduced; others, such as masking and behavioural impacts have become greater areas of focus. There is now, however, greater independently derived, quantitative and verifiable information to provide the basis of an informed discussion within industry and with the regulatory community nationally, regionally and globally. This informed discourse would not have been possible without the investment of time and effort by the JIP and other programmes.

## For the future...

More research is always needed; in the area of low frequency hearing in large whales and the relative importance of particle motion as a vector for impacts on a range of species, for example. JIP participants remain committed to the Programme though as participants create a commodity product, future resources and justification may be influenced by future market conditions. The value of the JIP is more than the results its research studies have produced. Opening and sustaining a dialogue with the regulatory, conservation and academic communities based on robust science rather than supposition has given industry greater confidence in its ability to operate safely. It has given the other participants in the dialogue clear sight of a credible body of research on which they can rely as they exercise their respective roles.

## ABOUT THE JIP

***One of the most extensive environmental industry research programmes bringing together the world's foremost experts across industry, academia and independent research centres.***

This fact sheet has been produced by the IOGP E&P Sound and Marine Life Joint Industry Programme (JIP). The JIP was founded in 2005 and supports research to help increase understanding of the potential effect of sound generated by oil and gas exploration and production activity on marine life.

To learn more about the JIP and our research, please visit [www.soundandmarinelife.org](http://www.soundandmarinelife.org)

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