

31 March 2021

TO: Standing Committee on Environment and Communications
ATTN: Secretary
VIA Electronic Submission: ec.sen@aph.gov.au
PO Box 6100,
Parliament House,
Canberra ACT 2600

RE: Inquiry: Impact of seismic testing on fisheries and the marine environment

The following are responses from the International Association of Geophysical Contractors (IAGC), to questions taken on notice during the Committee hearing on 18 March 2021.

Question 1:

CHAIR: Are you aware of any scientific studies that have looked at the cumulative impact of long-term seismic noise on fish populations or other marine life?

Mr Van Liew: Not off the top of my head; however, impulsive sound from seismic source arrays does not accumulate in the marine environment.

CHAIR: No, but the cumulative impacts of repeated sonic blasts may have impacts on marine species. It's just come up, even in NOPSEMA's submission to us, that that's one of the areas that there has been no research on. You can take on notice if you know of any research that's looked at long-term exposure.

Mr Van Liew: Yes, I'll take that on notice.

First, it should be noted that the term "sonic blasts" is inaccurate. Seismic surveying does not use a "blast", but rather a release of compressed air – no shockwave is created as would occur in an explosive blast. Second, in order to properly answer this question, it is important to first define "long-term exposure". By their nature, seismic surveys are temporary and transitory, occurring over a period of weeks to months over a given region, but are in constant motion. Both animals and the survey vessel move in relation to each other during the survey, limiting the duration of noise exposure.

Studies examining behavioural responses of fishes to surveys indicate that fish are likely to briefly move away from the survey (either horizontally or vertically), with a return to baseline within hours or days after the vessel passes. For example, Wardle et al. (2001) indicated that

several species of fish did not move away from a seismic survey even at close range, and exhibited only a brief startle response – a normal physical reaction that is unlikely to indicate any biological consequence. Hearing loss is possible in fish species, but generally only following repeated exposure to sound levels in excess of 190 dB re 1 μ Pa rms or prolonged exposures of “tens of minutes or hours,” to intense sounds. Following these types of exposures, it is possible for fish to experience a temporary loss of some hearing (temporary threshold shift, TTS) in the frequency ranges of the signal, but the literature suggests that 1) hearing is recovered because fishes are able to regenerate the hair cells required for hearing functionality; and 2) brief exposure to sounds is unlikely to result in TTS. Prolonged and repeated exposures to sound do not occur during normal seismic surveys, as both the animals and vessel are moving, and free-swimming fishes are able to temporarily avoid stimuli they may find aversive.

Examining the effects of seismic surveys on wild fish populations over time is inherently difficult and expensive to execute properly, requiring substantial investment of time and resources to monitor how the population may or may not respond to survey activity. Further complications stem from obtaining a survey vessel to perform the experiment. Moreover, appropriate experimental controls can be difficult to establish in wild populations. The effort which most accurately represents the responses of fishes to seismic surveys is currently underway at the Australian Institute of Marine Science (AIMS) and awaiting peer-reviewed publication (see below). While numerous studies have examined the effects of “long-term” noise exposure on fishes in a laboratory setting or using caged animals, these studies create unrealistic exposure conditions – lasting hours or days – which simply would never exist in real seismic surveys and are therefore not useful to discuss further here.

Perhaps the best illustration of the successful coexistence of fisheries and seismic surveys is the United States Gulf of Mexico, where G&G activities have extensively occurred for over 50 years. Seafood harvested from the region is worth approximately \$980 million annually and the fishing industry directly supports more than 120,000 jobs, suggesting that G&G activities can occur without negatively impacting commercial fisheries. In fact, numerous commercially valuable fish stocks in the Gulf of Mexico have been rebuilt in the past two decades, despite consistent fishing pressure. Many of these species bear physiological and behavioural similarities to Australian commercially important species (e.g., snappers, groupers).

Question 2:

CHAIR: You also state there's no credible evidence of impacts. Are you aware that only in the last two years there have been the first ever in-field or in situ studies using a full seismic array? It's the first time that's ever been looked at in the ocean rather than laboratory tests.

Mr Van Liew: What specific study are you referring to?

CHAIR: The Australian Institute of Marine Science study and a study recently in the Otway Basin in Victoria that looked at flathead and whiting. You can take it on notice.

IAGC is aware and supportive of field-based efforts in Australia by both the Australian Institute of Marine Science (AIMS) and the Fisheries Research and Development Corporation (FRDC) to examine the potential effects of seismic surveys in a field-based research setting. Properly designed field studies are a valuable resource.

In September of 2020, IAGC Director of Marine Environment & Biology Dr. Alex Loureiro virtually attended the [Northwest Shoals to Shore research symposium](#), where preliminary results from the AIMS study were shared. Dr. Loureiro was impressed with the design of the field study and the rigorous statistical analysis. At the symposium, AIMS requested that preliminary study results not be shared until publication in a peer-reviewed journal. In accordance with these wishes and with great respect for the importance of peer review, we will refrain from further discussion here. Per our understanding, review has concluded and publication is slated for April or May, at which time we would be happy to provide additional analysis of the results.

In July 2020, FRDC published a preliminary report of Phase I of a four-phase program, followed by a summary in October 2020. Both reports are available for public download [here](#). While the July report in particular generated some media attention, in FRDC's own words, "This however, is only the first phase of the research program so should be read as one data set on its own and no long-term conclusions drawn from these results." Phase 1 of the study deals with a limited number of samples that were taken in a few specific locations during the period of acquisition, not over the entirety of the survey area and not over the six-month period of acquisition. The preliminary report omits any mention of Phase 2 sampling, which occurred in May and future planned sampling.

While catch rates were lower in the sampled areas compared to the control sites for both species, there was no evidence to suggest that this lowered catch rate persisted through the 6-month survey or would continue to persist following conclusion of the survey. In fact, actual reported wharf side commercial catch rates were significantly different from the sample catch rates in the research. There was no evidence that lowered catch rate is indicative of population-level effects. It is important to also note that the relative catch indices for both species in the years preceding the survey were highly variable, both temporally and spatially, and that relative catch index is a measure of catch per effort, not an absolute measure of abundance. In addition to the research on fish populations, a parallel study was conducted on Octopi. This research has not been completed but initial observations are consistent with little or no impact from seismic acquisition.

IAGC strongly supports the advancement of independent, peer-reviewed science to enhance our understanding of the potential interactions between seismic and fisheries. To that effect, IAGC has supported the Sound and Marine Life Joint Industry Program (JIP) since its inception. To date, the JIP has invested about \$60M USD into independent academic research on the interaction of oil and gas activities with marine life.

Question 3:

Senator URQUHART: Finally, Mr Van Liew, I'll turn to you. Can you tell me, are there any countries that have prohibited offshore seismic surveying within the whole or part of their jurisdiction? If there are, what kinds of factors have led to those prohibitions?

Mr Van Liew: Thank you for the question. There are likely more examples than I can recall off the top of my head, but I know that your neighbours in New Zealand have banned exploration and geophysical surveys in a general sense outside of existing title areas or leased areas.

Senator URQUHART: Maybe if you have some more information, you could provide that on notice.

Mr Van Liew: Yes, ma'am.

The IAGC appreciates the opportunity to clarify from the outset that no jurisdiction has banned or prohibited offshore seismic surveying that we are aware of, however, the example provided during the hearing – New Zealand – and an additional example below show how countries are banning exploration permits and leasing which creates a *de facto* ban on oil and gas seismic by removing interest in those countries. The examples of New Zealand and Ireland apply to exploration permits and activities, not specifically the permitting of seismic and other geophysical surveys whether for oil and natural gas, academic research, Carbon Capture Utilization and Storage or other purposes. Exploration bans, have a chilling effect on seismic surveys for hydrocarbons as they remove the economic incentive to explore assets for potential future development.

New Zealand:

In April 2018 the New Zealand coalition government announced a cessation of new offshore exploration permits. Subsequently, legislation was passed in November 2018 amending The Crown Minerals Act formalizing a ban on offshore exploration permits for oil and gas.

As a result of the cessation of the Block Offer process, no new petroleum permits will be available in New Zealand (beyond onshore Taranaki). Consequently, both domestic and international companies were presented with the only choice to write off millions of dollars of investment in offshore multi-client seismic data made in expectation and anticipation of future leasing and exploration activities, which will now never be realised. The Government has not provided any compensation or transitional mitigation packages to these companies for this regime change, declining the IAGC's previous request for fair treatment of companies that have invested extensively in New Zealand. This has resulted in a loss of more than NZ\$104 million since 2013 in unrealised investment by IAGC's members in New Zealand's oil and gas industry. This investment relates to data collected for an offshore area of approximately 74,665 km².

Not only has the Bill negatively affected IAGC's members, it will have a significant economic impact on New Zealand and New Zealanders. The Government's own advice is that the fiscal

impact to the Crown will be up to \$23.5 billion, while the negative impact on company profits is estimated to be up to \$199 million¹. The decline of the oil and gas sector will also reduce employment opportunities, will affect the security of oil and gas supplies and, without viable alternatives, will likely involve the importation of fuels and lead to an increase in oil, gas and electricity prices. At a broader level, IAGC confirms that the proposals have undermined offshore investment and business certainty in New Zealand and is removing New Zealand as a destination for investment.

It has been three years since New Zealand banned the issuance of offshore exploration permits, and a major shortage of natural gas and a significant increase in electricity prices² has followed that short-sighted decision.

The purported primary driver for the passage of the Bill was to reduce contributions to climate change. However, there is no analysis supporting the Bill to support this outcome being likely. IAGC understands that to keep up with New Zealand's existing demand it is more likely that low emissions from New Zealand energy sources will be displaced by overseas energy sources with higher emissions. Further, net emissions world-wide are not going to change.

Ireland:

The Taoiseach announced, on 23rd September 2019 that oil exploration was to cease, subsequently a ban on future oil exploration was put into place in October of 2019³. We understand the decision was based on advice from the Climate Change Advisory Council to Minister Bruton⁴ that "exploration for, and recovery of new offshore oil reserves, is not compatible with a low carbon transition", but that no consultation took place with the Department of Communications, Climate Action and Environment, or of course with stakeholders who invested in the industry and in Ireland's energy security. The decision created considerable investment uncertainty. The exploration industry relies upon transparent decision-making and regulatory certainty on which to base business decisions. Despite the decision allowing the exploration for natural gas to continue, IAGC members are now unable to commit to major investments in Ireland.

The oil and gas operators to whom IAGC Members are regularly contracted or to whom they market non-exclusive geophysical are understood to have limited appetite to expand activities, with existing projects now at risk. The decision has resulted in a significant lack of trust that

¹ Ministry of Business, Innovation and Employment Impact Statement: Proposed changes to the Crown Minerals Act 1991, (3 September 2018) at p 5.

² <https://www.energynewsbulletin.net/outlook-analysis/news/1403458/new-zealand-launches-inquiry-into-gas-security>

³ 1 Government Agrees Terms for Oil Exploration Ban; <https://www.dccae.gov.ie/en-ie/news-and-media/pressreleases/Pages/Government-Agree-Terms-for-Oil-Exploration-Ban-.aspx>. Accessed; 07/08/2020

⁴ Programme for Government: Our Shared Future. June 2020.

https://www.greenparty.ie/wpcontent/uploads/2020/06/2020-06-15-ProgrammeforGovernment_Corrected-Final-Version.pdf

further arbitrary decisions won't be taken, again without full and transparent consultations with necessary stakeholders.

Further, the Irish government is now considering a ban on natural gas exploration⁵.

Exploration Bans:

The purported primary driver for the introduction of banning exploration is environmental. Often, the proposed bans aim to assist governments to work towards a goal of a low carbon economy – to reduce fossil fuel consumption and address climate change. However, there is no evidence to show that the approach taken to ban exploration will lead to a reduction in consumption of fossil fuels and achieve this goal.

While there are often claims that foresees “some reduction” in emissions, the net impact on global emissions is more likely to be negative than positive, largely defeating the purpose of the bans. Without a reliable and efficient energy supply source, governments risk creating a net emissions increase because the lower output will be displaced by higher emission output from overseas in order to keep up with the existing demand. Essentially, it does nothing to reduce fossil fuel use but instead changes the location from which a country sources its oil and natural gas.

The IAGC appreciates the opportunity to appear before the Committee and provide the above information in response to questions taken on notice during the hearing. The IAGC remains open to engaging members of the Committee as appropriate while the Inquiry continues and with any future questions that may arise.

Sincerely,

Dustin Van Liew
Vice President
IAGC

References

Popper, A. N., and A. D. Hawkins. 2019. An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes. *Journal of Fish Biology* 2019:1-22. DOI: 10.1111/jfb.13948.

Wardle, C. S., Carter, T. J., Urquhart, G. G., Johnstone, A. D. F., Ziolkowski, A. M., Hampson, G., & Mackie, D. (2001). Effects of seismic air guns on marine fish. *Continental Shelf Research*, 21, 1005-1027.

⁵ <https://www.gov.ie/en/press-release/ee960-government-to-introduce-legislation-to-ban-new-oil-and-natural-gas-exploration-and-extraction/>