
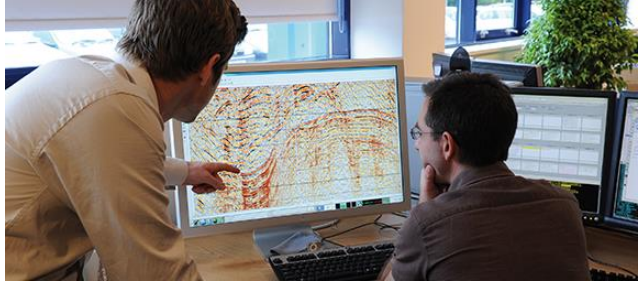


Seismic Surveys and Fisheries in North Western Waters

[A presentation to the NWWAC: Dublin, Ireland; 12 September 2018]

Dr. Robert Gisiner

Vice President, Marine Environment & Biology

www.iagc.org

Irish Offshore Operators' Association

International Association of Geophysical Contractors

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About the IAGC

IAGC MISSION

IAGC optimizes the business and regulatory climate and enhances public understanding to support a strong, viable geophysical industry essential to discovering and delivering the world's energy resources.

IAGC VISION

IAGC's vision is to be the most credible and effective voice for promoting and ensuring a safe, environmentally responsible and competitive geophysical industry.

About the IAGC

The IAGC engages governments and stakeholders worldwide on issues central to geophysical operations and exploration access:

* Prioritizing timely, accessible data acquisition throughout the life of the asset;
* Providing predictability & competition;
* Promoting regulatory & fiscal certainty;
* Promulgating risk- & science-based regulations; and
* Prolonging the life of the asset.

The IAGC supports and fosters science- and risk-based regulations consistent with existing practices that are proven to be environmentally responsible, effective and operationally feasible.

Irish Offshore Operators Association (IOOA)

Who We Are

Representative organisation for the Irish offshore oil and gas industry.

- Members are companies licensed by the Government to explore for and produce oil and gas in Irish waters.
- 14 members: AzEire Petroleum, Cairn, CNOOC Nexen, ENI, Equinor, Europa Oil & Gas, ExxonMobil, Faroe Petroleum, Kinsale Energy, Providence, Serica Energy, Shell, Vermillion Energy, Woodside

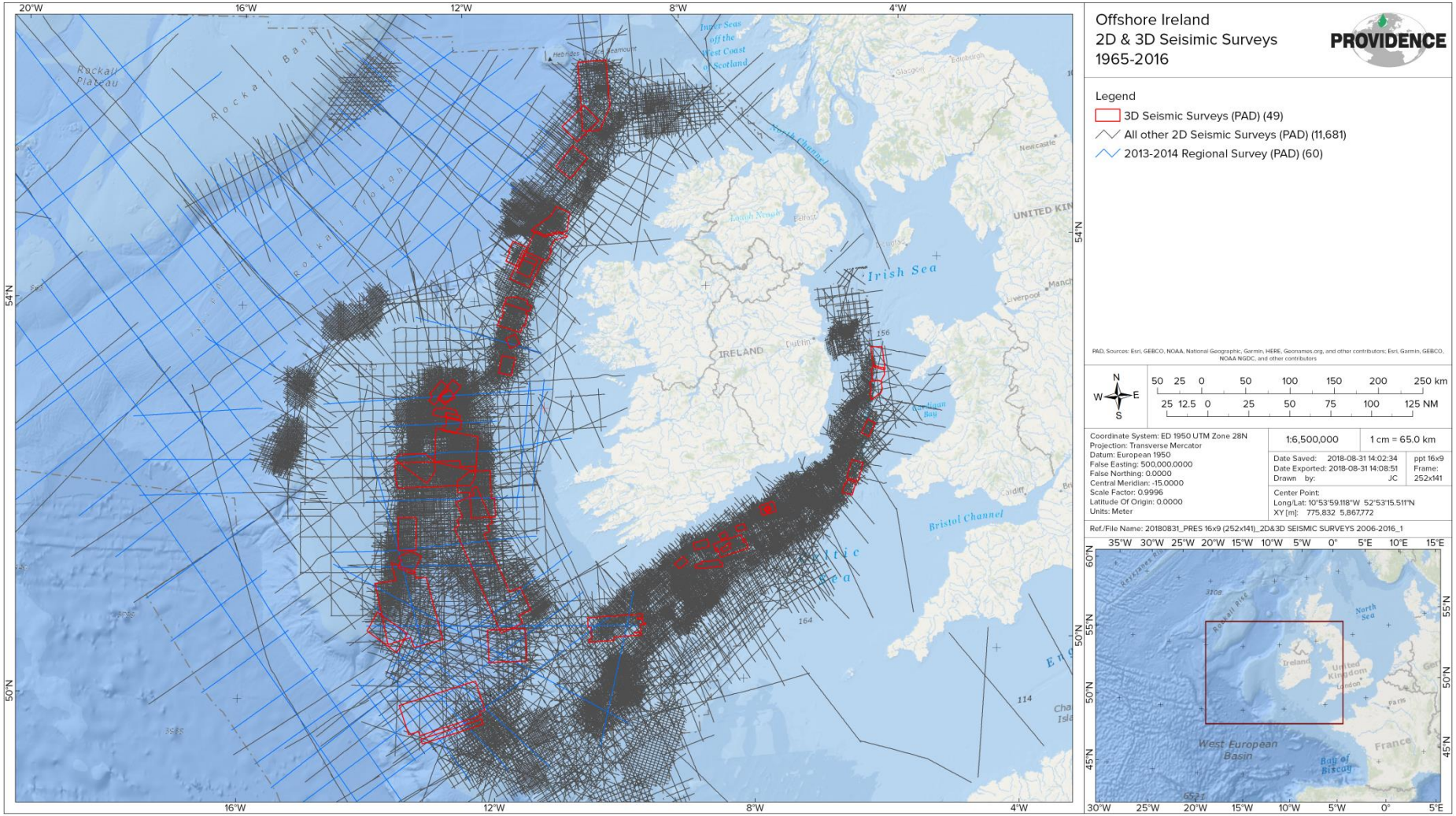
What We Do

Cooperate to provide a common approach to issues such as safety, the environment, legislation and employment, the IOOA pro-actively assists in the development of oil and gas exploration and production in Ireland's waters.

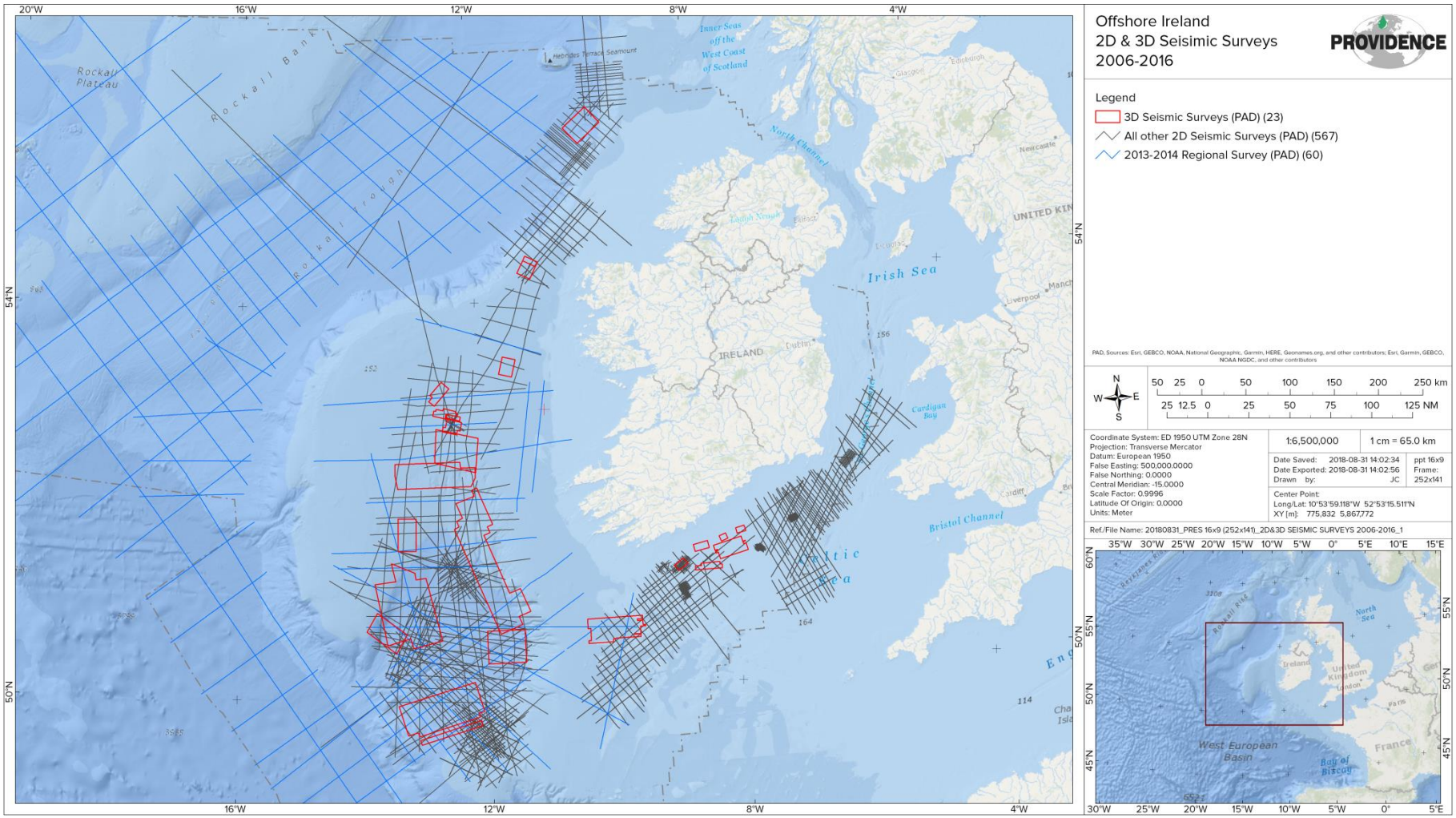
External Engagement

The Association aims to provide a focal point for liaison between companies participating in Ireland's oil and gas industry and other stakeholders and organisations

Seismic Surveys in North Western Waters



Seismic Surveys in North Western Waters



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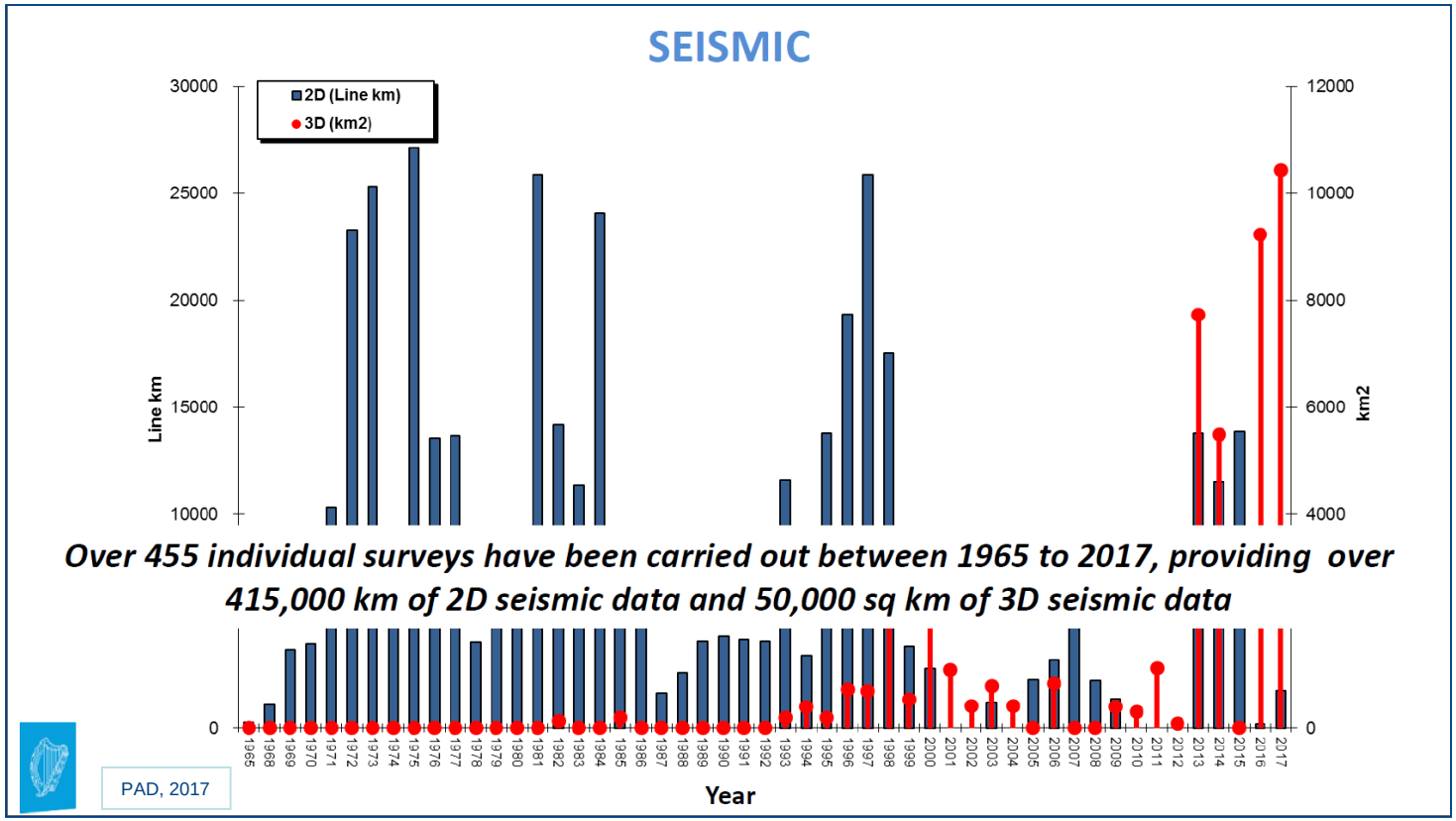
Seismic Surveys in North Western Waters



- Cyclical level of activity in Ireland
- Renewed activity & increase in 3D from 2013 –focus on the Porcupine Basin
- No surveys in 2018. Expect relatively more drilling than seismic in the coming years
- Majority of surveys are May-September

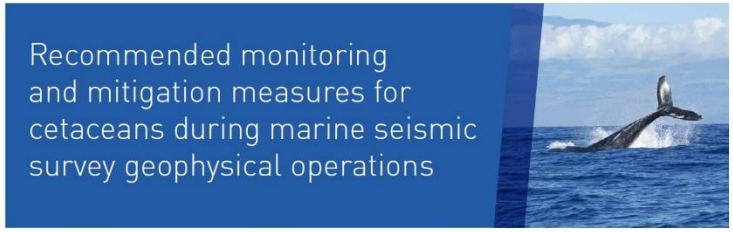
Industry Standards & Protocols

- Our Statements of Principles
  - https://www.iagc.org/statements-of-principles--model-mla.html
- Joint IAGC/IOGP Position Paper, *Seismic Surveys and Marine Mammals*
- Joint IAGC/IOGP *Recommended Monitoring & Mitigation Measures*
- IAGC Fishing Industry Interaction Checklist (coming soon!)
  - Communications, Coordination and Outreach: Before, During and After
  - Fishery Liaison Officer (FLO) qualifications and responsibilities
  - And more ….
- https://www.iagc.org/resources.html

International Association of Oil & Gas Producers

International Association of Geophysical Contractors

REPORT 579 | MARCH 2017



Liaison With Stakeholders

Industry follows a prescribed regulatory process with respect to stakeholder engagement in Ireland

Application Phase

- Pre-Survey Fisheries assessment
- Environmental Risk assessment
- Application submitted approx. 90 days prior to survey to several mandated bodies

Operations Phase

- On-board Fisheries Liaison Officer
- On-board Marine Mammal Observer (MMO)

Post-Operations

- Post Survey Fisheries report
- Final MMO report

Statutory Consultees

Irish Coast Guard
GARDA CÓSTA na hÉIREANN

SEA-FISHERIES PROTECTION AUTHORITY

Marine Institute
Foras na Mara

An Roinn Iompair Turasóireachta agus Spóirt
Department of Transport, Tourism and Sport

- Marine Radio Affairs Unit
- Maritime Safety
- Marine Survey Office
- Maritime Services Division
- Marine Transport Division
- Sea Fisheries Policy & Mgmt Division

Roinn Cumarsáide, Gníomhaithe ar son na hAeráide & Comhshaoil
Department of Communications, Climate Action & Environment

An Roinn Talmhaíochta, Bia agus Mara
Department of Agriculture, Food and the Marine

An Roinn Cultúir, Oidhreachta agus Gaeltachta
Department of Culture, Heritage and the Gaeltacht

An Roinn Cosanta
Department of Defence

National Parks & Wildlife Service

Results of Impact Studies on Fish & Invertebrates

Recently, some political advocacy groups opposed to offshore energy have made claims that seismic surveys harm fish and fisheries.

Their message to the fishing community and other stakeholders is part of a divide-and-conquer strategy that pits one ocean user against another. While they may find the fishing community an ally of convenience today, make no mistake; they don't want commercial fishing in our oceans either.

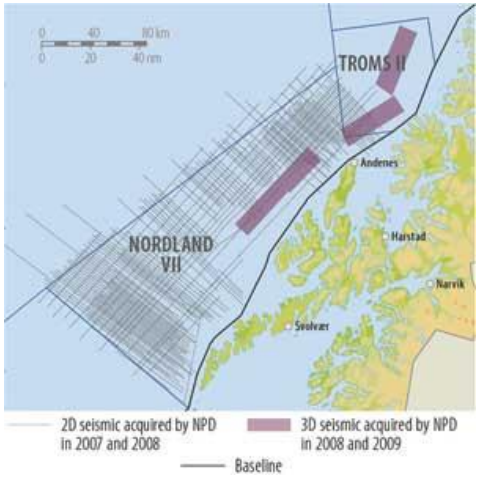
These claims are not often backed by specific references, but their key talking points can be traced to a few scientific studies that they (mis)interpret as supporting their agenda. I will discuss a few of the more frequently used studies and reveal the scientific reality behind the false and exaggerated claims.

“Fish Catches May be Reduced by 50%!”
(based on Skalski *et al*, 1992)

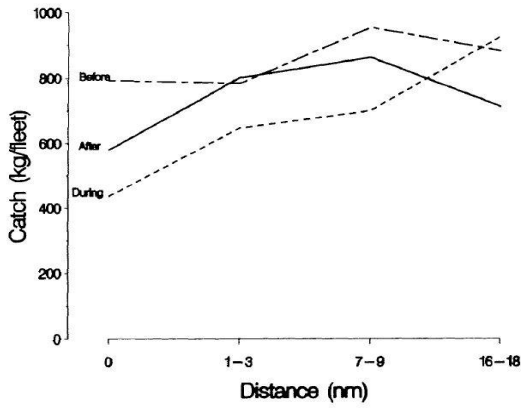
- A study of a hook-and-line fishery for *Sebastes spp*. (“rockfish”) in California.
- A (very large) seismic sound source was towed in circles around the fishing boat continuously for hours, at a distance of less than 200 m.
- Catches (CPUE) decreased by approximately 50% during sound exposure.
- No effort to assess fishing success after the sound source left, but a related study (Pearson et al, 1992) found that fish returned to pre-exposure behavior in a matter of minutes.
- Fish did not disperse, but simply stopped biting and moved a little closer to the bottom.

“Fish Catches May be Reduced by 71% and the effect extends for >20 km!” (based on Engås et al, 1993)

- Neither the seismic survey effort nor the fishing effort were normal
  - The seismic survey tracks were confined to a 3x10 nm (6x19 km) box, producing 360nm (670 km) of trackline inside that box over 5 days. Normal survey lines would be longer and more separated over time, reducing the amount of acoustic exposure the fish would have experience.
  - Within a 40x40 km box, eight to ten trawls and eight to nine longline sets were made every day for 17 consecutive days (7 before, 5 during, 5 after). This is a far greater level of fishing effort for an area of that size than normal.
- Effects on longline catch were much less than effects on trawl, suggesting that the fish did not move but changed their behavior, affecting trawl catchability.
- Catch rebounded immediately after cessation of sound exposure, but the rebound did not reach pre-trial numbers, likely due to exhaustion of the resource during the previous 12 days of effort.
- Effects were confined mainly to the 1-3 km immediately around the survey vessel.



https://www.offshore-mag.com/articles/print/volume-72/issue-1/departments/geosciences/big-gom-seismic-survey-leads-list-of-projects-under-way.html



“Seismic Kills Scallops and Larvae!”

(Aguilar de Soto et al, 2013; Day et al, 2017; Przwslawski et al, 2017)

- Aguilar de Soto *et al* (2013) attempted to kill scallop larvae by exposing them to continuous sound playbacks for up to 90 hours from a speaker 9 cm from the larvae. They failed to kill the scallop larvae but did cause unspecified ‘malformations’.
- Day *et al* (2017) similarly attempted to kill scallops by repeatedly passing over the top of scallops in less than 10 m of water. Despite the excessive sound exposure they failed to kill the scallops. They did find some differences from controls in liver enzymes and immune system function and speculated that the effects might affect survival.
- Przwslawski *et al* (2017) reviewed seven years of actual scallop harvest data from sites where real seismic surveys were conducted and found no effect on scallop abundance or catch rates.

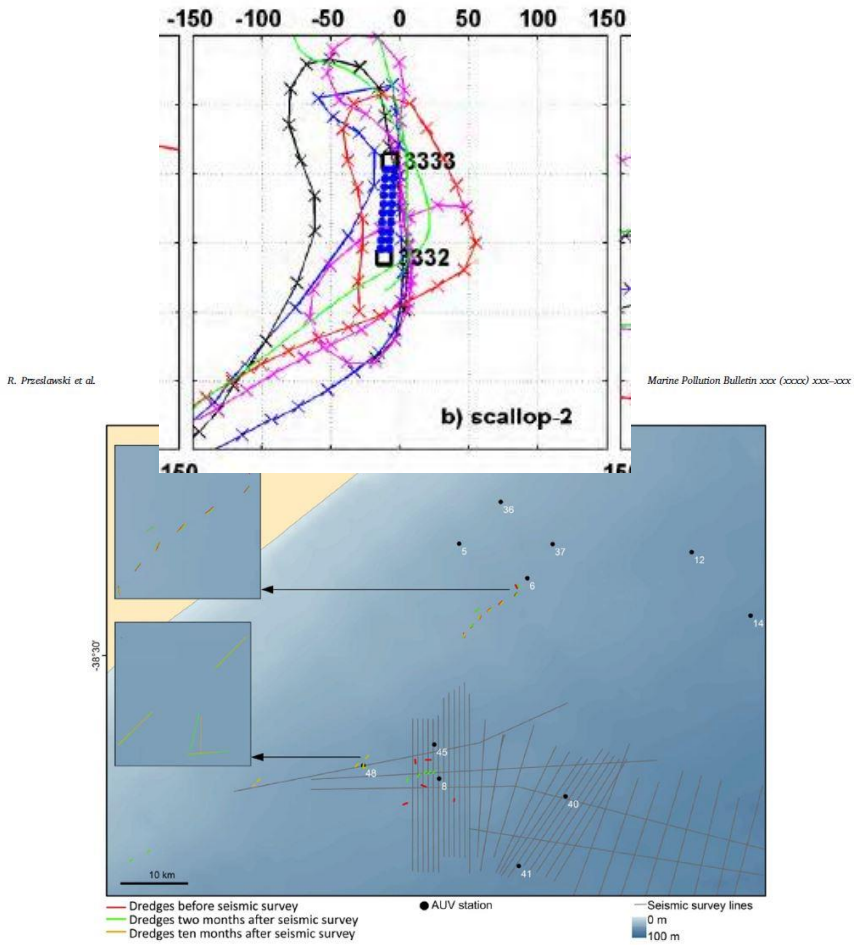
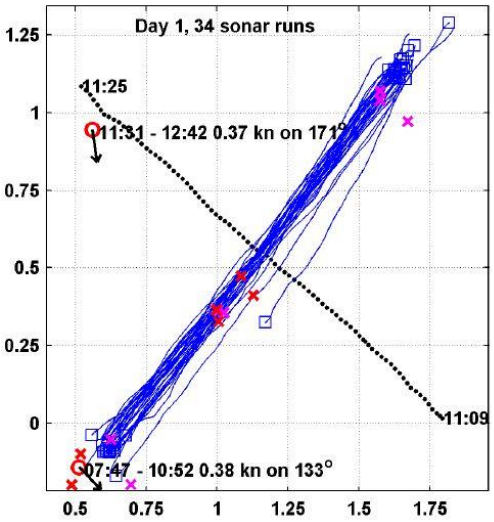


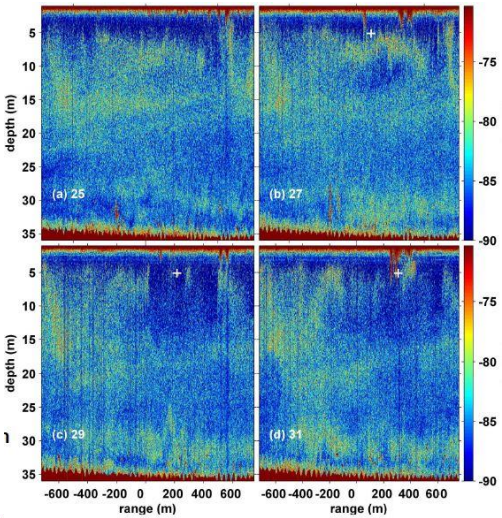
Fig. 2. Map of dredging and AUV operations. AUV operations were conducted in the same location among all surveys, while dredging locations changed among surveys to optimise scallop collection. Insets magnify regions with multiple dredges adjacent to each other from which shell assemblages were analysed.

“Seismic Kills Plankton!”

(McCauley et al, 2017)

- At least eight studies prior to McCauley et al (2017) found no evidence of effects on plankton at ranges greater than 10-100 m.
  - (Booman et al, 1996; Dalen & Knutsen, 1987; Kostyuchenko, 1971; McCauley, 2008; Nedelec, et al, 2014; Payne, 2004; Payne et al, 2009; Saetre & Ona, 1996)
- McCauley *et al* (2017) drove a seismic source over a shallow test site at a higher than normal exposure rate and claimed a 1 km “hole” in the plankton biomass. Problems with the study:
  - plankton abundance on Day 2 was only 1% of Day 1 (i.e. normal day-to-day fluctuation call for a larger sample size);
  - net and acoustic systems sampled two different plankton size classes,
  - nets were towed improperly and clogged,
  - The model for water flow was incorrect (effects of drag near bottom),
  - people scoring samples were not blind to test condition of sample,
  - numerous inconsistencies in data refute the neat picture that McCauley et al (2017) postulated.
- Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) modeled McCauley claims and found that the postulated effect still had no effect on plankton abundance.
  - the rapid population replacement rates characteristic of this part of the ocean food chain and due to the patchy, mobile nature of plankton populations.
- Scientists await planned 2019 replication of McCauley et al study, using a real seismic survey protocol, proper methodology and larger sample size.





Summary: Results of Impact Studies on Fish & Invertebrates

- No convincing evidence of significant or lasting effects on fish, shellfish, plankton or fishery catch from normal seismic operations.
- What to look for when someone tells you there is an effect:
  - What are your references?
  - Was the research done with a real seismic source operated in a realistic manner?
  - Was the fishing effort realistic?
  - Was there a reasonable period of post-exposure monitoring to assess recovery if there was a temporary disturbance to fish or fishing?
  - Was the scientific methodology good? Blind control trials? Good sample sizes?
- Bottom Line:
  - No harm from actual seismic ops after >60 years, e.g. Gulf of Mexico.
  - A long history of working cooperatively with fisheries to reduce potential issues or concerns.
  - The industry remains committed to taking concerns seriously and addressing them through best practices in independent research, and stakeholder engagement.

Our Commitments & Priorities:

Stewardship ◊ Transparency ◊ Partnership

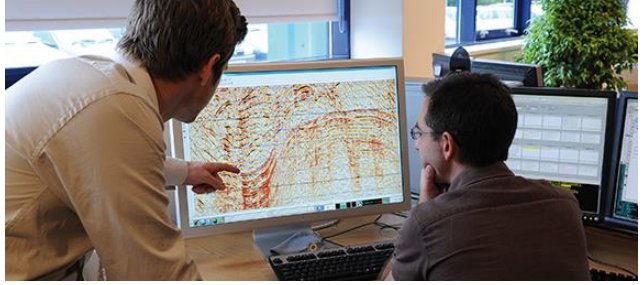
The geophysical industry is committed to:

- Responsible environmental stewardship,
- openness & transparency about what we do, why we do it, and how we do it,
- Partnership, coordination and communication with fellow ocean stakeholders.

Our priorities are:

- Ensuring the industry's global access and freedom to operate is the IAGC's #1 priority.
- Elevate geophysical data acquisition as a priority for national energy policies.
- Advance frameworks for public engagement and education to attract and maintain support for and investment in future exploration.

For more than 50 years, our industry has demonstrated our ability to conduct geophysical surveys in a manner that protects marine life and respects the needs and values of others who rely on our oceans for their lives and livelihoods.


Thank You!

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Back-Up Slides

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Prescribed Notification Bodies (Ireland)

Technical Section, Petroleum Affairs Division

The Irish Coast Guard (IRCG)

National Maritime Operations Centre (NMOC) of the Irish Coast Guard

Marine Radio Affairs Unit of the Maritime Safety Directorate

Sea Fisheries Protection Authority

Sea Fisheries Policy Division

Marine Survey Office (MSO)

Maritime Safety Policy Division

Maritime Services Division

Marine Institute

Department of Defence

Killybeg Fishermen's Organisation (KFO)

Irish South & West Fish Producer Organisation (IS&W)

Irish South & East Fish Producer Organisation (IS&E)

Irish Fish Producers' Organisation

National Inshore Fisheries Forum (NIFF)

Anglo-North Irish FPO Ltd

National Federation of Fishermen's Organisations (England, Wales & Northern Ireland)

North Sea Regional Advisory Council

North West Waters Regional Advisory Council

Pelagic Regional Advisory Council

Bord Iascaigh Mhara

Environmental Application Process (Ireland)

- An Environmental Risk Assessment (EIA Screening) of the proposed activity in relation to the sensitivities of marine mammals. The E.I.A. screening process determines whether EIA/AA is required under the applicable legislation in connection with planned seismic survey.
  - Risk assessment of the impact of the proposed survey on Annex IV species will be carried out . Addresses area-specific cetacean sensitivities, both in timing and spatial extent, which might be present during the course of the proposed survey.
  - Observe Program results will be available to inform this from Q4 2018
- Appropriate Assessment (Natura Impact Statement Screening Report) of the likely significant effects of a planned seismic survey on Natura 2000 sites within the survey area.
- Current best industry practices are applied with regard to impact mitigation and monitoring measures in relation to marine mammals and specifically the National Park and Wildlife Service (NPWS) 2014 “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters” are followed.
  - On-board Marine Mammal Observers to minimise potential impacts to marine fauna from underwater noise
  - Passive Acoustic Monitoring is not prescribed but commonly deployed
  - Specific requirements on soft start procedures and prevention of ingress on seismic turns

Environmental Application Process (Ireland)

- An Environmental Risk Assessment (EIA Screening) of the proposed activity in relation to the sensitivities of marine mammals in the area to the proposed operations outlining specific impact mitigation and monitoring practices that will be applied during the survey in relation to marine mammals. The E.I.A. screening should discuss whether EIA/AA is required under the applicable legislation in connection with planned seismic survey.
- Appropriate Assessment (Natura Impact Statement Screening Report) of the likely significant effects of a planned seismic survey on Natura 2000 sites within the survey area.
- An underwater Archaeological Assessment and interpretation of marine geophysical survey data acquired.
- In addition, a risk assessment of the impact of the proposed survey on Annex IV species will be carried out and submitted at least 21 days before commencement of the survey. This risk assessment should address area-specific cetacean sensitivities, both in timing and spatial extent, which might be present during the course of the proposed survey.
- To ensure compliance with EU Habitats Directive 92/43/EEC Article 12 regarding Annex IV species protection (which include all cetaceans) during seismic surveys, the Operator will ensure that current best industry practices are applied with regard to impact mitigation and monitoring measures in relation to marine mammals and specifically that the NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish waters are followed.
- On-board Marine Mammal Observers to minimise potential impacts to marine fauna from underwater noise.

Fisheries Stakeholder Process (Ireland)

- Pre-survey fisheries assessment to identify potential interactions with fishing fleets
- Pre-survey notification to Maritime Safety Policy Division and the Maritime Services Division of the Maritime Safety Directorate and the National Maritime Operations Centre (NMOC) of the Irish Coast Guard, Irish Maritime Administration of the Department of Transport, and the Sea Fisheries Protection Authority
- Pre-Survey notification and consultation with fisheries organisations including details of location, timing and duration
- Notifications to mariners before the survey commences and during the survey as Radio Navigation Warnings
- A dedicated Fisheries Liaison Officer (FLO) on board for the duration of the survey
- Post – Survey Fisheries Report

Fisheries Stakeholder Process (Ireland)

- The Operator is required check in advance with the Maritime Safety Policy Division and the Maritime Services Division of the Maritime Safety Directorate and the National Maritime Operations Centre (NMOC) of the Irish Coast Guard, Irish Maritime Administration of the Department of Transport, and the Sea Fisheries Protection Authority that the proposed survey will not be carried out in an area and at a time that would conflict in particular with other shipping and fishing operations, including both floating and stationary gear, with consequential disruption of both such activities.

- In the case of a survey planned in an area of intensive fishing, discussions with the Sea Fisheries Protection Authority shall be initiated as early as possible, and, in any case, at least **45 days** before the planned date, in order that the implications can be fully considered and that a possible delay in obtaining approval to conduct a Geophysical or Other Exploration Survey, Site Survey or Route Survey is avoided.

- It is required that a fisheries liaison officer (FLO) should be on board the vessel for the duration of the survey. The FLO should carry out a pre-survey assessment of fishing activity in the proposed survey area.

UK – Application Phase

- Portal Environmental Tracking System (PETS) – replacement for old 'PON14A' application
- Consultations;
  - Joint Nature Conservation Committee (JNCC) – establishment of proximity to protected areas and both cetacean and commercial fishery sensitivities
  - Review of Fishery Sensitivity Maps, collated by Marine Scotland and the Centre for Environment, Fisheries and Aquaculture Science (CEFAS)
- Required details of application;
  - Type of survey
  - Location and timing (earliest possible start and latest possible finish dates) of survey
  - Details of equipment and vessel
  - License details
  - Consultations undertaken
  - Spawning areas of commercial fish species
  - Seismic sensitivities
  - Cetacean distribution relative to survey area

Department for Business, Energy & Industrial Strategy

JNCC
Joint Nature Conservation Committee

Scottish Government
Riaghaltas na h-Alba
gov.scot
marinescotland

Cefas

European Protected Species (EPS) Licence

- EPS licence required where risk cannot be removed or sufficiently
  - EPS disturbance an offence under EU Offshore Marine Conservation Regs., 2009
- Granted where purpose of ‘over-riding public interest’ and ‘scientific and educational purposes’
  - Details of the species that will be affected by the work and what the details of the planned work are. This include details of the mitigation work that is planned to be carried out which will affect European protected species.
  - Justification for carrying out the proposed work including explaining why the proposed work is necessary. This is the legal basis of the application.
  - Consideration of why there is no satisfactory alternative

UK – Operations and Close-Out

- On-board FLO
  - Liaison with Scottish Fisheries Federation (SFF) and National Federation of Fisherman's Organisations (NFFO)
- On-board JNCC qualified MMOs and Passive Acoustic Monitoring (PAM) Operators
  - Requirements detailed in guidance, but subject to variation depending upon licence stipulations following review of application
- Survey Close-Out Report submitted to BEIS
- MMO/ PAM compliance report submitted to JNCC