



COEXISTENCE BETWEEN FISHING  
AND OIL AND GAS  
AND DEEP SEA MINING INDUSTRIES

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## 1) EXECUTIVE SUMMARY

Energy demand is increasing year after year, for this reason oil and gas companies, due to the depletion of the resources, are increasing the number of exploratory surveys to find new reservoirs at sea. For many years, offshore natural gas and oil production was restricted to shallow waters. However, as many older deposits have become exhausted, companies have increasingly moved into deeper waters, into areas where fishery based activities have traditionally played a dominant role in local and global socio-economy.

As well as fisheries industry is an important economy at global level, an employment-generating activity and a valued source of food; oil and gas industry is one of the main sources for the global economy. For this reason, at present, oil and fishing industries need coexist by sharing the ocean space. In order to make this coexistence harmonious and fruitful there is the need to develop clear legislation and efficient maritime spatial plans.

Healthy oceans and healthy marine resources are essential to life and world socio-economy, then the development of protection and management policies regarded to maritime industries and the utilization of marine areas are absolutely necessary. Policies and regulations based not only on scientific data but on socio-economic analysis of industries operating in marine areas that depend on marine natural resources for survival.

## 2) INTRODUCTION

According to FAO, if it was a country, the ocean economy would rank as the seventh largest economy in the world, with a GDP of US\$2.5 trillion<sup>1</sup>. The oceans have long been considered an unlimited resource but they are not; consequently mismanagement of renewable and non-renewable ocean resources leads to progressive resource depletion, causing serious economic and social damages at global level.

Fisheries, oil & gas and seabed mining industries are growing and competing for the use of certain marine areas. Fishery industry is a great economic power at a global level, a source of employment and wealth, and a source of high nutrition value food for millions of people around the world.

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<sup>1</sup> FAO. September 2016. *Integrated ocean management - Fisheries, oil, gas and seabed mining*, by Melanie Torrie. Globefish Research Programme Volume 122. Rome, Italy.

Fishing is a really important activity for areas highly dependent on fisheries in developed countries and for small coastal communities in developing countries.

There are important fishing grounds for our fleet that are essential to its viability and play an important role for employment. There are sensitive fisheries that are regulated with temporary closures. There are fisheries areas regulated for the protection of vulnerable ecosystems such as deep water corals and sponge ecosystems. What would happen to these areas if oil and gas or seabed mining industries set their sights on them?

This question leads us to consider that it's essential to develop clear regulations focused on all areas of activity undertaken in the sea, regulations that are integrative, that take into account not only fisheries but all the activities with an interest on marine areas. The development of these regulations and policies is crucial for peaceful coexistence and for the viability of the resources.

### 3) INTERACTION OF OFFSHORE OIL AND GAS AND DEEP SEA MINING INDUSTRIES WITH FISHERIES

Seas and oceans are drivers for the European economy, “blue economy” – economy of maritime-related industries - represents roughly 5.4 million jobs and generates a gross added value of almost €500 billion a year<sup>2</sup>. However, further growth is possible. Within these sectors, fishing industry holds second place in terms of employments, after maritime and coastal tourism, generating about 732.239 jobs, and it holds the third place in terms of economic value, after tourist and maritime transport, generating about €22.900 million.<sup>3</sup>

Fishing is an essential activity for Spanish socio-economy. Spain holds the first position in terms of fisheries production by catch with the 16% of EU global production, and possesses more than the 11% of EU fleet, being 3th after Italy and Greece<sup>4</sup>. Spanish fleet operates in national, European and international waters from Atlantic Ocean to Pacific and Indian Ocean, and holds the 20th position at world level in terms of catches with the 1,2% of world catches<sup>5</sup>.

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<sup>2</sup> Commission Staff Working Document. Report on the Blue Growth Strategy Towards more sustainable growth and jobs in the blue economy. Brussels, 31.3.2017. SWD(2017) 128 final.

<sup>3</sup> Blue Growth Infografic 2014. EU Infographics. <http://ec.europa.eu/assets/mare/infographics/>

<sup>4</sup> La pesca europea en cifras. Fichas técnicas de la Unión Europea - 2017

<sup>5</sup> FAO. World fisheries production, by capture and aquaculture, by country, 2014

EU fishing activity is subject to dozens of regulations at national, European and international level. Regulations to protect stocks, benthic fauna, sea birds and marine environment. Compliance with these regulations has led our fleet to be one of the more sustainable fleets in the world.

Seabed is rich in minerals and oil and gas deposits, this led mining and oil and gas companies to set their sights on it. Many of marine areas that are rich in mineral and fossil resources are biologically-rich ecosystems, and some of them are traditionally associated with fishing activity and are important for fishing survival. This should be taken into consideration when developing management plans and granting licenses for seabed mining or oil and gas activities.

**Deep sea mining**, with little regulations, most of them based on environmental effects of prospecting and exploration for polymetallic sulphides and nodules<sup>6</sup>, is starting to take off in some marine areas, and *presumably because deep-sea mining has yet to take place, it is to be noted that deep-sea mining does not appear to be subject to the EIA Directive*<sup>7</sup>. Some seabed mining activities was carried out over the last decades such as diamond mining in Namibian waters, tin mining in Indonesian or experimental mining in New Guinea.

A diamond mining company has a license to mine about 9,000 squares Km at 12 miles off Namibia's coast at around 120 to 140 metres below sea level. They only have mined 3% of that by 2020 and they estimated that in the future 95% of diamonds will come from the sea bed off the coast of south West Africa.

The Environment Ministry of Namibia approved an application by an Arab-majority owned company to extract marine phosphate from the sea at about 130 km off Walvis Bay. Currently the Government of Namibia has placed a suspension on planned marine phosphate mining off the country's coastal waters due the appeal lodged by four fishing entities against the granting of the phosphate mining licence because they consider the licence invalid based on an argument that the company did not correctly lodge an application for an environmental clearance certificate in terms of the Environmental Management Act. Cabinet Committee on Trade and Economic Development (CCTED) of Namibia discussed issues related to the Moratorium on Phosphate, Prospecting, Exploration, Mining and Processing thereof at its first meeting for 2017. *The CCTED noted that concrete expression on phosphate mining would be done after The High Court has expressed itself on the matter.* The Chairman of the Confederation of Namibian fishing Association think that *"if Namibians lightly agree to see mining without thorough research and appropriate legislation in place, Namibia*

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<sup>6</sup> *The mining code*. International Seabed Authority. Link: <https://www.isa.org/im/mining-code>

<sup>7</sup> Study to investigate the state of knowledge of deep-sea mining. Final Report under FWC MARE/2012/06 – SC E1/2013/04. Client: European Commission - DG Maritime Affairs and Fisheries. Rotterdam/Brussels, 19 November 2014

*will become the experimental ground for the international sea mining companies, closely watched by the world” and that “It cannot be, that a country so dependent on the fishing industry becomes the trial laboratory for marine phosphate mining”.*

The cases presented above are only a little sample of seabed mining situation around the world. The number of applications to obtain licences for experimental and commercial seabed mining is expected to increase year after year due to the increasing demand for minerals such as gold, copper, zinc or tin, by technology industry.

There have been limited deep sea mining operations and thus the impacts of these operations are not yet known. Research is now being conducted to determine what the impacts of mining activities will be and their severity but the main expected impacts from seabed mining are changes in the seabed landscape by removing nodules from the sea floor, changes in the habitat for marine life; sediment plumes, which will cause a reduction of oxygen and light in the water column and an introduction of metals into the water column and very slow ecosystem recovery from the changes to the seafloor and displacement of marine life<sup>8</sup>.

We strongly believe that regulations that govern this activity all over the world should be developed as soon as possible. Just as bottom trawling operations are regulated due to its possible impact on seabed and areas for the protection of vulnerable marine ecosystem were created, Seabed mining activities must be regulated due to the possible impact on the sea bottom.

About **oil and gas industry** there is a case that is a concern for the fleet which has prompted us to discuss about the coexistence between fisheries and oil and gas industry, this is the case of Porcupine fishing ground. This is an important fishing ground for our fleet which has established temporary closures for the protection of fisheries resources. During 2016 oil and gas seismic surveys were carried out around this area and currently a drilling survey is being developed. This oil and gas exploratory surveys are temporary and therefore the possible impacts on marine species and environment are supposed to be temporary. But we have to bear in mind that exploratory surveys are the doorway to the installation of platforms and economic oil exploitation. Due to the installation of the platform the temporary impact would not be temporary, it would be permanent and the temporary closure for the protection of fisheries resources would not be a closure for all industries operating in that waters.

Porcupine is not an isolated case; there are similar situations in other areas such as Rockall Trough and other areas in NE Atlantic and NW Atlantic (NAFO).

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<sup>8</sup> FAO. September 2016. *Integrated ocean management - Fisheries, oil, gas and seabed mining*, by Melanie Torrie. Globefish Research Programme Volume 122. Rome, Italy.

Several scientific studies indicate that seismic surveys, drilling, location of petroleum platform and ongoing operations related to oil and gas activities at sea, have impact on fisheries in the area.

In the “*Integrated ocean management - Fisheries, oil, gas and seabed mining*”<sup>6</sup> report by FAO, there is a list of the known or suspected impacts of oil and gas marine activities on fish, some of them are listed below:

- Surveying for oil – seismic surveys: temporary displacement of marine life due to loud noises; temporary displacement can have a major impact if seismic surveys are carried out in spawning grounds during spawning season.
- Location of petroleum platform: permanent or temporary displacement of marine life from areas around platform; potentially a major impact if platform is located near or in spawning grounds.
- Ongoing operations: Displacement, avoidance, change of navigation patterns for marine life around the platforms. Constant water discharge from platform creates local impacts. Level of impact depends on type and concentration of chemicals/pollutants in water. Potential small oil spill near platform has local impacts, can cause displacement and have negative developmental effects on larva, eggs and juveniles.
- Oil spills/blowouts: oil spilled that comes into contact with fish larva, eggs and juveniles can have fatal or non-fatal impacts. Oil spills have negative impacts on marine life habitat, ecosystems and ecosystem services. The use of dispersants to help oil break down has a more negative impact on the environment locally, but minimizes the impact at further distances. Since dispersants are highly toxic, they can have a more negative impact than an oil spill if not mixed with oil. The impact on larva and eggs also depends on the temperature of the water; higher temperatures result in more active larvae, and therefore more impact. Further, at higher temperatures, more of the oil will evaporate from the sea surface and there may also be a faster microbial degradation of the oil components.

The report “*Cetáceos, pesca y prospecciones petrolíferas en Canarias*”<sup>9</sup> (University of La Laguna, Canarias, Spain) collects scientific papers on the effect of oil and gas activities on fisheries. It’s mentioned in the report that Skalski *et al* (1992)<sup>10</sup> examined the concern of commercial fishermen that the sounds generated by acoustic geophysical survey devices result in decreased commercial

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<sup>9</sup> Universidad de La Laguna, febrero de 2002. “*Cetáceos, pesca y prospecciones petrolíferas en Canarias*”. Informe elaborado por Natacha Aguilar de Soto y Alberto Brito Hernández.

<sup>10</sup> Skalski, J.R., Pearson, W.H., & Malme, C.I. 1992. *Effects of sounds from a geophysical survey device on catch-per-unit effort in a hook-and-line fishery for Rockfish (Sebastes)*. *Canadian Journal of Fisheries and Aquatic Science*, 49: 1357-1365.

catches. In blind experimental trials, a test of effects was performed on the rockfish (*Sebastes* spp.) hook-and-line fishery located along the central California coast.

There was an average decline in catch-per-unit-effort of -52.4% (90% confidence interval -27.9%, -76.9%) under emission conditions relative to control trials. Fathometer recordings during the study showed no significant change in an index of aggregation size as the result of air-gun emissions. However, aggregation height appeared to change as the result of emission after adjustment for species composition of the catch.

Engas *et al* (1993)<sup>11</sup> detailed an experiment using an array of seismic airguns with a source level of 250 dB to test the avoidance reactions of cod and haddock. Acoustic mapping of the density of fish in the surrounding area was performed before and after the seismic shooting. The reduction in catch rates of cod by longline was lower than by trawl. The decrease was 44% in the seismic shooting area, with a gradually declining influence on the catches toward the border of the investigation area. For the longline fleets set furthest away from the shooting area (16-18 nautical miles), no decline in catch rates for cod was observed. For haddock the weight reduction per longline haul was about 50% over the entire investigation area.

In a study conducted by Fewtrell y McCauley (2012)<sup>12</sup> various species of captive marine fish and one species of squid were exposed to the noise from a single air gun. Noise levels received by the animals ranged between 120 and 184 dB re 1 IPa<sup>2</sup>.s (SEL). Behavioural observations of the fish and squid were made before, during and after air gun noise exposure.

Results indicate that as air gun noise levels increase, fish respond by moving to the bottom of the water column and swimming faster in more tightly cohesive groups. Significant increases in alarm responses were observed in fish and squid to air gun noise exceeding 147-151 dB re 1 IPa SEL. An increase in the occurrence of alarm responses was also observed as noise level increased.

The paper also indicates that *“the behavioural responses observed in this study do not provide conclusive evidence for the responses that air gun noise may have on the behaviour of wild, unrestrained fish and squid. However, the consistency between the types of behaviours induced by air gun noise in this study and in other reports suggests that to some level we can predict the behavioural response of fish to air gun noise and hence, seismic surveys. Therefore, as there is no*

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<sup>11</sup> Engas, A., Lokkeborg, S., Ona, E., & Sodal, A.V. 1993. *Effects of seismic shooting on catch and catch-availability of cod and haddock*. *Fisken Og Havet*, 9: 1-177.

<sup>12</sup> J.L. Fewtrell and R.D. McCauley. *Impact of air gun noise on the behaviour of marine fish and squid*. *Marine Pollution Bulletin* 64 (2012) 984-993



*such thing as a typical seismic survey, mitigation techniques should be developed and appropriate risk assessment needs to be undertaken prior to commencing a survey.*

*Further research into the effects of seismic surveys on marine fish and invertebrates is important so that results can be used to design effective mitigation techniques that benefit the surrounding aquatic life and commercial fisheries, without compromising the economic value of offshore seismic exploration”.*

We consider that it´s necessary to take into account not only the impact on marine environment but also the effect on socio-economic aspects of the fisheries in the area when granting licenses for oil and gas or seabed mining operations.

#### 4) COEXISTENCE BETWEEN FISHERY AND OIL AND GAS AND DEEP SEA MINING INDUSTRIES

We can disregard the fact that in the same way that fishery industry is an important industry at global level that generates employ and high nutritional value food, oil and gas industry is also an important income source for the world economy.

We are a society dependent on sea products but also dependent on oil and gas and petroleum products. Ideally, a clean, economical and efficient energy should be used to propel our ships and our industry, but nowadays fishing and oil and gas operations must coexist. In order to achieve an harmonious coexistence it´s essential a good understanding between both sides and take steps to minimize the negative impact of oil operations on fishing industries, as well as to adopt, jointly and individually, measures to protect the marine environment with the aim of ensuring the sustainability of marine resources.

Since its creation in 2007, the Integrated Maritime Policy (IMP) has sought to enhance the *sustainable development of the European maritime economy and to better protect the marine environment by facilitating the cooperation of all maritime players across sectors and borders*<sup>13</sup>.

One of the significant achievements of the debates and negotiations within the framework of the Integrated Maritime Police was the adoption of the Directive 2014/89/UE<sup>14</sup> after more than one year of complex negotiation between Council, Commission and European Parliament. *This Directive*

<sup>13</sup> Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. *Progress of the EU's Integrated Maritime Policy*. Brussels, 11.9.2012. COM (2012) 491 final.

<sup>14</sup> Directive 2014/89/UE of the European Parliament and of the Council of 23 July 2014 *establishing a framework for maritime spatial planning*.

*establishes a framework for maritime spatial planning aimed at promoting the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources.*<sup>15</sup>

*Within the Integrated Maritime Policy of the Union, the framework of this Directive provides for the establishment and implementation by Member States of maritime spatial planning and it shall not interfere with Member States' competence to design and determine, within their marine waters, the extent and coverage of their maritime spatial plans.*<sup>12</sup>

*Through their maritime spatial plans, Member States shall aim to contribute to the sustainable development of energy sectors at sea, of maritime transport, and of the fisheries and aquaculture sectors, and to the preservation, protection and improvement of the environment. Member States shall establish means of public participation by informing all interested parties and by consulting the relevant stakeholders and authorities, and the public concerned, at an early stage in the development of maritime spatial plans.*<sup>12</sup>

*Marine Strategy Framework Directive<sup>16</sup> indicates that marine strategies shall apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while enabling the sustainable use of marine goods and services by present and future generations.*

As regards the foregoing, knowing that it's not an easy task, it's urgent that governments at national and international level develop marine spatial plans according to the recommendations made in the Directives. Marine spatial plans which are inclusive, clear and precise, taken into account the marine environment and the needs of different industries that depend on the sea. On the basis not only of technical and scientific reports but also in socio-economic analysis of the industries that operates at seas and that depend on marine resources for their survival.

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<sup>15</sup> *Siete años de Política Marítima Integrada de la Unión Europea.* Teresa Molina Schmid, Subdirectora General Adjunta. Dirección General de Coordinación de Políticas Comunes y de Asuntos Generales de la Unión Europea, Secretaría de Estado para la UE. Madrid, 18 de febrero de 2015.

<sup>16</sup> Directive 2008/56/CE of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive)

## 5) CONCLUSIONS

- Fisheries industry is one of the main economic activities developed at sea. In Europe fishing industry holds second place in terms of employments, after maritime and coastal tourism, generating about 732.239 jobs and it holds the third place in terms of economic value, after tourist and maritime transport, generating about €22.900 million.
- Energy and mineral resources demand is increasing year after year, for this reason oil and gas and mining companies, due to the depletion of the resources, are increasing the number of exploratory surveys at sea, into areas where fishery based activities have traditionally played a dominant role in local and global socio-economy.
- Several scientific studies indicate that seismic surveys, drilling, location of petroleum platform and ongoing operations related to oil and gas activities at sea, have direct and indirect impact on fisheries in the area.
- It's expected that deep sea mining also have direct and indirect impact in marine environment and therefore in fisheries.
- Further research into the effects oil and gas and seabed mining operations on marine fish and invertebrates is important so that results can be used to design effective mitigation techniques that benefit the surrounding aquatic life and commercial fisheries, without compromising the economic value of oil and gas and seabed mining explorations.
- When granting licenses for oil and gas or seabed mining operations it's necessary to take into account not only the impact on marine environment but also the effect on socio-economic aspects of the fisheries in the area.
- It's essential to develop clear regulation focused on all areas of activity undertaken in the sea which is integrative and that it take into account not only fisheries but all the activities with an interest in marine areas. The development of regulations, policies and marine spatial plans is crucial for peaceful coexistence between industries dependent on sea and for the viability of the marine resources.