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**Preliminary information from EU-Spain surveys in Div 3L regarding Commission request #18:
“Provide information to the Commission at its next annual meeting on sea turtles, seabirds, and marine
mammals that are present in NAFO Regulatory Area based on available data”**

by

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Abstract

Since 2003, a stratified random summer bottom trawl survey has been conducted by EU-Spain in the NAFO Regulatory Area, Division 3L (Flemish Pass). This survey is carried out on board the R/V “*Vizconde de Eza*” during July and August using always the same bottom trawl net type “Campelen 1800”, with a mesh size of 44 mm cod-end and trawl doors of 1400 kg. Survey is designed for the assessment of fishery resources. Information on marine mammals (2006-2019) and seabirds (2012-2019) was collected throughout these surveys, as an opportunistic sampling. No sea turtles were observed during the study period.

Keywords: Survey, marine mammals, cetaceans, seabirds, Flemish Pass, incidental catches.

1. Introduction: EU-Spain bottom trawl survey in NAFO Div. 3L

The Spanish surveys in Div. 3L of NAFO Regulatory Area (Flemish Pass) were initiated in 2003. Surveys are conducted in summer (July and August) (Román-Marcote *et al.*, 2020). The Research Vessel “*Vizconde de Eza*” carries out these surveys following the same procedures and using the same bottom trawl gear type “Campelen 1800” (McCallum and Walsh 1994). The survey area was stratified following the standard stratification schemes (Bishop, 1994). All surveys had a stratified random design following NAFO specifications (Doubleday, 1981). Hauls were allocated to strata proportionally to stratum size, with a minimum of two planned hauls per stratum and the trawl positions were chosen at random.

These surveys are designed for the assessment of fishery resources and the characterization of oceanography in Division 3L, where the most important fishery resource is the Greenland halibut (*Reinhardtius hippoglossoides*). In addition to the biological data (age, growth, feeding, etc), oceanographic data, and ecosystem data (VME indicator species, seabed litter), basic information on marine mammals and seabirds was collected since 2006 and 2012 respectively. This complementary activity has been undertaken by the survey leader, from the vessel bridge, and during the period time in which the scientific fishing activity of the research vessel is carried out (from 06:00 am to 23:00 pm).



Results for marine mammals and seabirds in Div. 3L, distribution, behavior and interaction with fishing are presented in this document.

2. Methodology and available information

Data on marine mammals and seabirds were collected from EU-Spain groundfish surveys in NAFO Regulatory Area (Div. 3L): 2006-2019 period (marine mammals) and 2012-2019 period (seabirds) (Román *et al.*, 2013; Román *et al.*, 2015). It is worth to note, that collected data comes from the opportunistic sampling, associated with fishing operations of surveys designed to study fishery resources. All sightings of marine mammals correspond to cetacean species. The main objective of this data collection is having a better knowledge on presence, spatial distribution and behavior of marine mammal (cetaceans) and seabirds in the study area, as well as to provide information about their relationships with the marine environment and interactions with fishing activity. These data has been presented in the WGESA 2019 (NAFO, 2019; Román-Marcote *et al.*, 2020).

Sightings were made during survey hauls (3 knots) and while the R/V was cruising between survey hauls. The survey leader in charge of doing data collection has experience in marine mammal and seabird identification. This knowledge was acquired during the surveys in the NRA and during the collaborations with the department of marine mammals at IEO Vigo laboratory (Román *et al.*, 2013; 2015).

All specimens (cetaceans and seabirds) were identified at the lowest possible taxonomic level by using binoculars, identification guides and observation sheets (e.g. The NOAA Guide to Marine Mammals of the Northwest Atlantic Ocean; López, 2011) and available literature for marine mammals (Carwardine, 1998; Culik, 2004, Eder, 2012; Jefferson *et al.*, 2015; Shirihai, 2006; Walker and Cresswell, 2011) and for seabirds (De Juana and Varela, 2001; Dunn and Alderfer, 2006; Kaufman, 2005; Leyenda and Rumbao, 2005).

Marine mammal (cetaceans) information was collected from 2006 to 2019, including date, presence, position (latitude and longitude), number and behavior of the individuals, as well as oceanographic and meteorological conditions at the time of the sighting. When possible, photos of the specimens were also taken.

Regarding seabirds, information from 2012 to 2019 was collected in terms of date, presence, behavior of the individuals, as well as oceanographic and meteorological conditions at the sighting time. Number of individuals was not collected. When possible, photos were taken.

All sightings were linked to the correspondent scientific haul position or to the cruising between survey hauls.

3. Results

3.1 Marine mammals

For the period between 2006 to 2019, 294 sightings were recorded (see Figure 1), being 39% Northern bottlenose whale (*Hyperoodon ampullatus*); 33% Sperm whale (*Physeter macrocephalus*); 17% Long finned pilot whale (*Globicephala melas*); 5% Unidentified cetaceans; 2 % Dolphins (several species); 1% Killer whale (*Orcinus orca*); 1% Humpback whale (*Megaptera novaeangliae*); 1% Fin whale (*Balaenoptera physalus*) and <1% Common minke whale (*Balaenoptera acutorostrata*) that was sight within 10 meters of the Research Vessel. Bad weather conditions (fog and poor visibility conditions in 50% of sets) made sightings and species identification difficult.

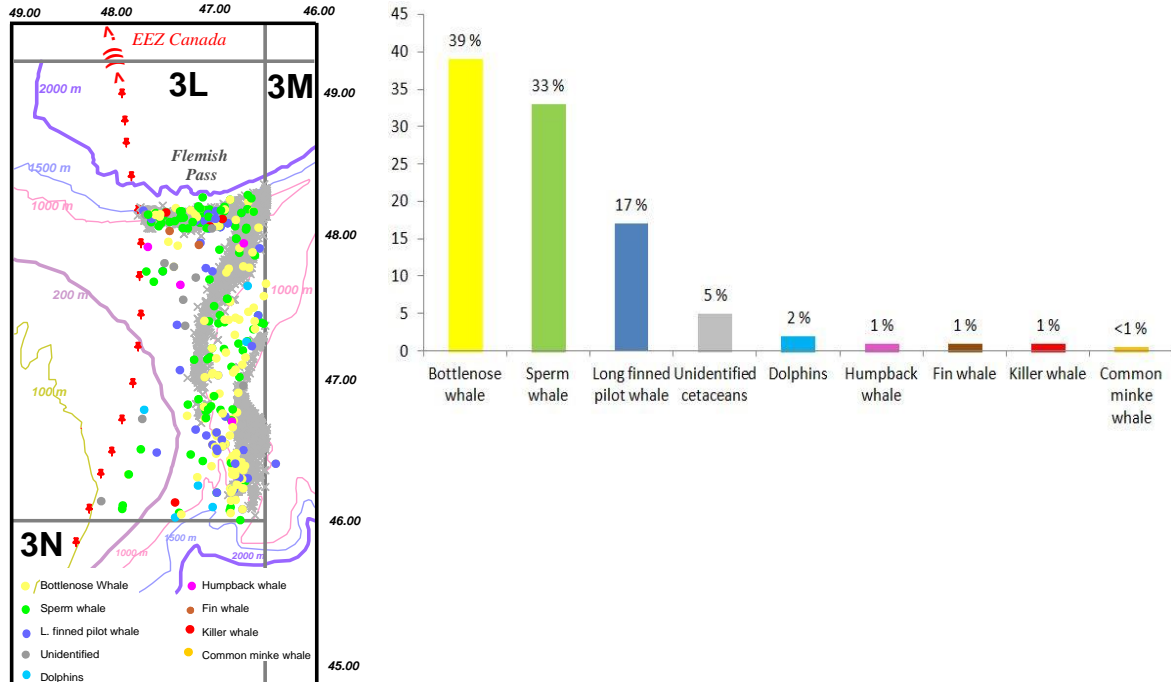


Figure 1. Spatial distribution and species composition of the sightings (period 2006-2019).

The surface temperature of the water during the surveys ranged between 8-18°C (increasing from North to South and East to West). Salinity increased with depth, fluctuating in the surface from 30.3 to 33.8 UPS and reaching more uniform values in deep waters (34.6 UPS). Cetaceans were sighted always East and North of the study area in the warmest waters (8-16 °C) and with the highest salinity.

Sightings of northern bottlenose whales, sperm whales and long finned pilot whales coincide with the fishing area. In most cases, northern bottlenose whales and sperm whales were sighted during the fishing operation, mainly at the end (> 75%) with the vessel stopped while hauling the fishing gear and sometimes when the catch was being thrown into the sea at the end of the haul. The observed behavior seems to indicate that these species interact with ships responding to a dietary pattern.

Sperm whales were mostly isolated individuals (70%) while northern bottlenose whales often occurred in small groups (> 3 individuals). The long finned pilot whales were sighted in large groups and generally while moving. Sightings distribution coincides with the area of higher catches of cephalopods in the survey.

In 2006, a slightly decomposed carcasse of a juvenile individual of a harbour porpoise (*Phocoena phocoena*) was found in a survey haul. In 2016, skeletal remains of two seals were found in two different hauls. The decomposition status in all cases, suggests that these catches were already dead when they were captured.

Figure 2 shows information on cetacean sightings in NAFO Div. 3L for the period 2006-2019, from EU-Spain bottom trawl survey. Table 1 presents the list of cetaceans species found in the study area.

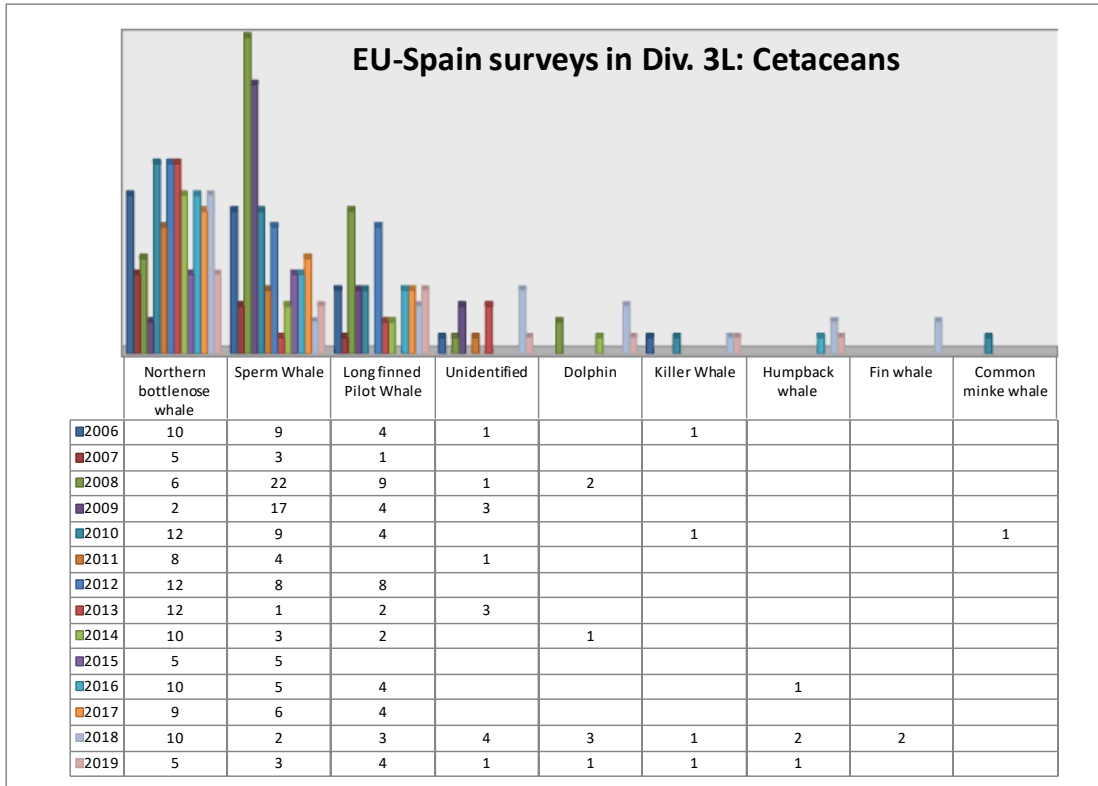


Figure 2. Cetacean sightings in NAFO Div. 3L from EU-Spain bottom trawl survey (2006-2019 period).

Table 1. List of cetacean species observed in Div. 3L. EU-Spain bottom trawl survey (2006-2019 period).

Common name	Scientific name
Northern bottlenose whale	<i>Hyperoodon ampullatus</i>
Sperm whale	<i>Physeter macrocephalus</i>
Long finned pilot whale	<i>Globicephala melas</i>
Dolphins	Several species
Killer whale	<i>Orcinus orca</i>
Common minke whale	<i>Balaenoptera acutorostrata</i>
Humpback whale	<i>Megaptera novaeangliae</i>
Fin whale	<i>Balaenoptera physalus</i>
Unidentified	--

3.2 Seabirds

Regarding seabirds, information about sightings was also collected in the surveyed area. This is useful for getting a better understanding of these species, their relation to the marine environment and the interaction of seabirds with fishing.

The northern fulmar (*Fulmarus glacialis*) and the greater shearwater (*Ardenna gravis*) were the most frequent seabirds, tracking the vessel during the surveys, and mainly concentrated at the end of the hauls in order to

take advantage of the fish wastes thrown back into the sea. Similar results in Flemish Cap area (Division 3M) were observed by Leyenda and Munilla (2005).

During the studied period (2012-2019) only an incidental catch of greater shearwater was observed in 2019.

Figure 3 and Table 2 show information on seabirds in NAFO Div 3L for the period 2012-2019.

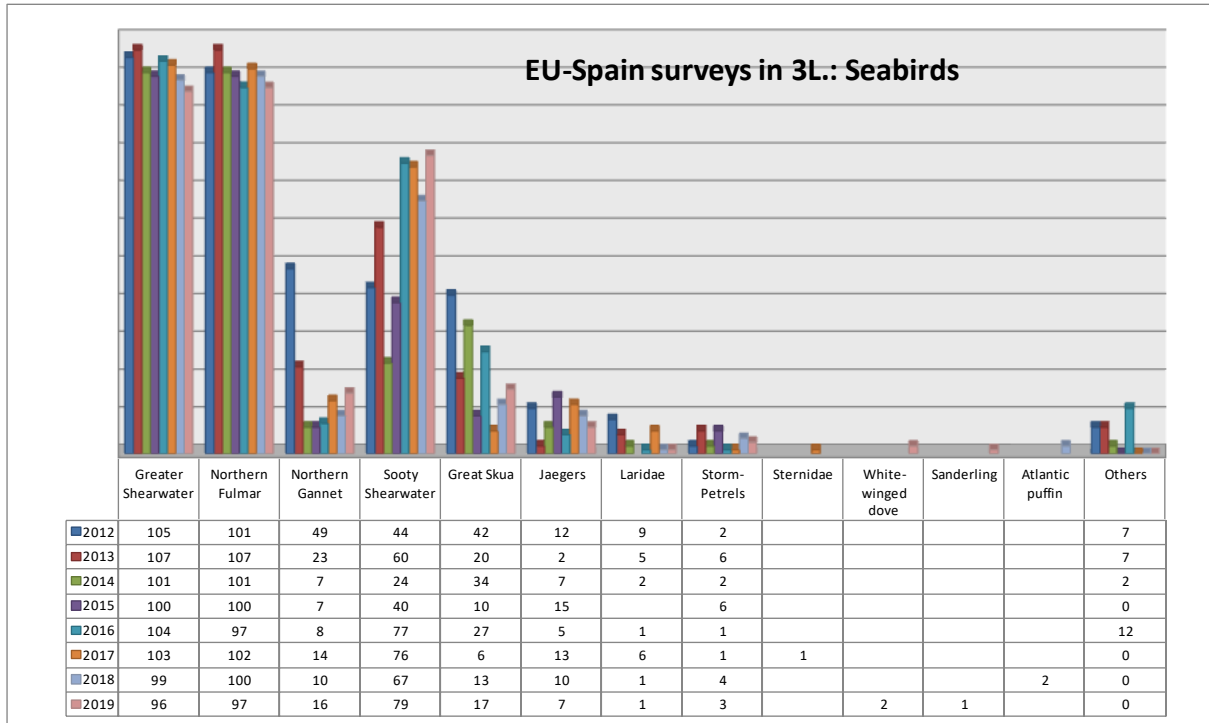


Figure 3. Seabird sightings in NAFO Div. 3L from EU-Spain bottom trawl survey (2012-2019 period).

Table 2. List of seabird species observed in Div. 3L. EU-Spain bottom trawl survey (2012-2019 period).

Common name	Scientific name
Northern Fulmar	<i>Fulmarus glacialis</i>
Greater Shearwater	<i>Ardenna gravis</i>
Sooty Shearwater	<i>Ardenna griseus</i>
Great Skua	<i>Cataracta skua</i>
Pomarine/Parasitic Jaegers	<i>Stercorarius pomarinus/parasiticus</i>
Long-tailed jaeger	<i>Stercorarius longicaudus</i>
Northern Gannet	<i>Morus bassanus</i>
Great Black-Backed Gull	<i>Larus marinus</i>
Lesser Black-Backed Gull	<i>Larus fuscus</i>
Common Stern	<i>Sterna hirundo</i>
Wilson's Storm-petrel	<i>Oceanites oceanicus</i>
Storm-petrel	<i>Oceanodroma leucorhoa</i>
White-winged dove	<i>Zenaida aliblanca</i>
Sanderling	<i>Calidris alba</i>
Atlantic puffin	<i>Fratercula arctica</i>

4. Limitations

As was noted by Leyenda and Munilla (2005), vessels rarely operate far offshore with the specific aim of studying seabirds, thus most data for high seas areas have been obtained from opportunistic observations onboard ships visiting or passing by for other purposes. In the present study, collection of data on marine mammals and seabirds must be taken into consideration as a complementary task carried out opportunistically, in addition to the main objectives of the survey (fish stock assessment).

Nevertheless, survey leader optimizes her time on the vessel bridge being aware of any sighting during the whole day (from 6:00 am to 23:00 pm), sometimes with help of the deck officers but always under the supervision of the survey leader. It is worth to note that sampling methodology is conditioned by the main objective of the survey, which is groundfish stock assessment.

With regards to the human resources onboard, is really difficult to have a specific person exclusively devoted to the study of marine mammals and seabirds as the R/V "Vizconde de Eza" has limited cabins and all scientists onboard are mainly involved with sorting and identification of scientific catches, length and biological samplings and CTD data collection.

5. Conclusions

1. Data presented in this document comes from the opportunistic sampling, associated with fishing operations of bottom trawl surveys specifically designed to study fishery resources.
2. Most of cetacean sightings occurred during the fishing activities, particularly during the hauling process.
3. Spatial distribution of cetaceans coincided with main fishing grounds (interaction with fishing).

4. Most of the sperm whales were observed as isolated individuals. Most of beaked whales and pilot whales occurred in small and large groups respectively.
5. Northern fulmar (*Fulmarus glacialis*) and greater shearwater (*Ardenna gravis*) were the most important seabirds observed in the surveys, following the vessel during the fishing activities, particularly during hauling.
6. During the studied period, only one incidental catch of a seabird (greater shearwater) was found. No incidental catches of marine mammals and sea turtles were found.

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