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Marine Biodiversity

Underwater Television Survey

Marine Mammal Observer Report

R.V. *Tom Crean*

13 – 23 August 2022

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Marine Institute Report Series

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Foras na Mara
Marine Institute

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1 Executive summary

The Underwater Television Survey (UWTV) on the Porcupine Bank took place from the 13th to the 23rd of August, 2022 on board the Marine Institute's *R.V. Tom Crean*. The research survey covered an area on the Porcupine Bank *Nephrops* grounds. A marine mammal dedicated survey was carried out by an observer on board following a standard single platform line-transect methodology aiming to collect relative abundance and distribution of marine mammals in the area of interest.

The marine mammal survey was conducted during 8 days. The total amount of time the marine mammal observer spent on effort was 64 hours, 1 minute and 1 second.

Environmental conditions varied between survey days. Visibility was overall good, with most time spent on effort under visibility 5 (*i.e.* from 16 to 20 km) accounting for 32.13% and visibility 6 (i.e. >20 km), accounting for 28.44% of the time. On the other hand, sea state conditions were not favourable, since most of the effort was carried out under sea state 5 (45.62% of the time). Swell height was recorded as higher than 2 m during most of the time spent on effort (62.75% of the total time). Marine mammal survey effort was carried out during all days while traveling, with the exception of the 19/08/2022, when effort had to be interrupted due to adverse weather conditions.

A total of 10 sightings of marine mammal species were recorded over the course of the survey, with common dolphins accounting for 60% of these sightings.

2 Introduction

Starting in 2013, the Underwater Television Surveys (UWTV) on the Porcupine Bank have been carried out every year on board the Marine Institute's *R.V. Celtic Voyager*. This was the first UWTV survey conducted on board the *R.V. Tom Crean*.

The main objectives of this research survey were to assess the current status of the *Nephrops* stock on the Porcupine Bank by estimating burrow densities at different UWTV stations (Aristegui *et al.*, 2021). The methodology used consisted of deploying an UWTV sledge equipped with a HD camera system at each sampling station. Once on the seabed, the sledge was towed during 10 minutes. Subsequently, the recorded *Nephrops* burrows were counted by trained scientists on board.

Given the relevance of this waters for different cetacean species, the UWTV survey provides a great opportunity to gather data on cetacean relative abundance and distribution within the study area. This was the first underwater TV survey bringing a Marine Mammal Observer on board. Data collected by the observer will be added to the ones from previous surveys carried out by the Marine Institute.

3 Materials and methods

3.1 Data collection

The cetacean-dedicated survey was carried out by a Marine Mammal Observer (MMO) on board the *R.V. Tom Crean* during the Underwater Television Survey 2022, from the 13th to the 23th of August, 2022.

Cetacean survey effort was conducted during daylight hours mainly from 07:00 to 19:00, with small breaks about every two hours in order to prevent fatigue and ensure high quality data collection. Watches were conducted from the monkey island, located at 13.5 m above sea level. The methodology followed was a standard single platform line-transect survey when travelling and a point survey when the UWTV sledge was being deployed or retrieved. The general approach was that, under unfavourable environmental conditions, *i.e.* sea state ≥ 6, swell > 2 m and/or visibility < 1km, the MMO should stop the effort. However, effort was carried out under these conditions when the observer deemed it appropriate.

Effort was focused in an arc of 60º at both sides of the vessel's track and up to 1 km distance in priority. However, sightings outside this arc and at further distance from the vessel were also logged. Watches were conducted with the naked eye and the help of high quality Nikon Monarch 7 binoculars when needed, to confirm species identification and/or group size as well as the behaviour of the animals encountered. Photographs of the sightings were taken when possible using a Canon 77D digital camera with Sigma 100-400mm telescopic lens, used to verify species identification when needed.

Distance and bearing of the animals encountered from the vessel were estimated using a range-finding stick (Heinemann 1981) and an angle board, respectively. Species identification, group size, age composition, heading and behaviour of the animals were also recorded for each sighting. All sightings were identified to species level when possible. However, whether the identification could not be confirmed, appropriate taxonomic levels and associated confidence levels were assigned to the animals observed. All cetacean sightings that occurred off effort and were reported to the MMO were also recorded as auxiliary sightings in an independent form within the database.

Environmental variables were also recorded every 15 minutes approximately and when a change in one of the parameters took place. These variables included sea state (from 0 to 6), visibility (with 1 = <1km, 2 = 1-5 km, 3 = 6-10 km, 4 = 11-15 km, 5 = 16-20 km, 6 = >20 km), cloud cover (from 1 to 8), swell height (with 0 = no swell, 1 = light 0-1 m, 2 = moderate 1-2 m, 3 = heavy >2 m), precipitation (type and intensity), wind speed and direction.

Vessel position, sightings and environmental data were recorded by the MMO using the software IFAW Logger 2000 ™ (IFAW 2000), which logged the data into a Microsoft Access database. GPS position of the vessel was recorded every 10 seconds into the database using an external GPS receiver with USB connection. All records were time-stamped and assigned a unique GPS index. The time recorded by the software corresponds to the Greenwich Mean Time (GMT).

3.2 Data treatment

The GPS data recorded into the database was examined and the GPS index of all the sightings, as well as of the environmental stations recorded were verified prior to mapping.

Cetacean survey effort and the sightings recorded were mapped using ArcGIS Pro, version 2.5.0 (ESRI 2020).

Photographs of some of the sightings submitted together with this report were coded using the following format: [Sighting No.][letter if more than one photograph of the same sighting]_[Date in yyyymmdd]_[SpeciesID] (*e.g.* 021a_20201006CD

4 Results

4.1 Marine mammal survey effort

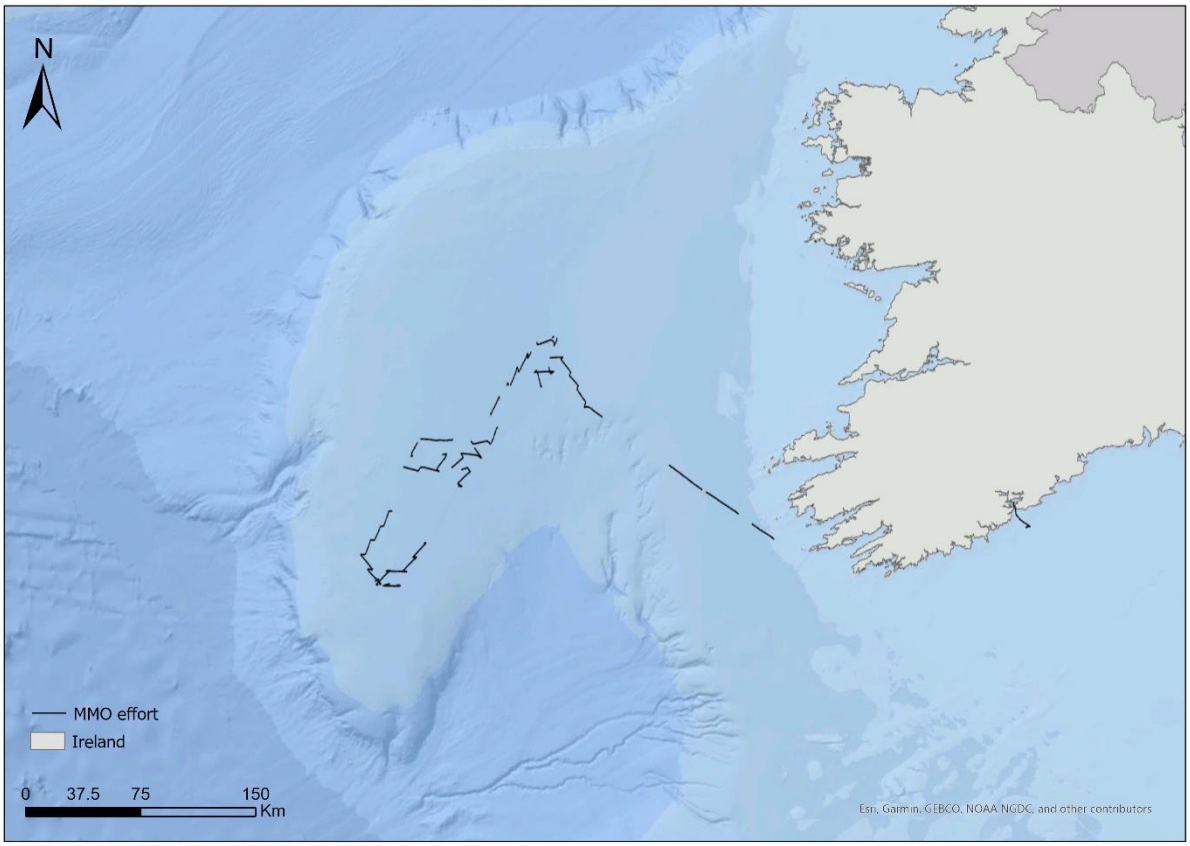

Figure 1. Marine mammal survey effort during the UWTV 2022 survey.

The scientists boarded the *R.V. Tom Crean* on the 13/08/2022 and departed Cork during the evening of the 14/08/2022, at 17:00 local time. The observer started her watch on that evening. During the next morning, the observer continued her watch while travelling towards the Porcupine Bank until it has to be interrupted due to adverse weather conditions at 11:20 Irish time. Watches continued from the 16/08/2022 to the 18/08/2022, when they were interrupted at 17:30 due to adverse weather conditions (swell>2m; sea state=6) until the 20/08/2022. Cetacean survey effort was resumed on the morning of the 20/08/22 until the end of the survey, during the evening of the 22/08/2022 (Table 1).

Effort was carried out form the monkey island, approximately from 07:00 to 19:00. However, effort had to be interrupted in different occasions due to unfavourable weather conditions (*i.e.*, sea state > 6, visibility < 1 km and/or swell > 2m). Marine mammal survey effort amounted to 64 hours 1 minute and 1 second.

Table 1. Daily details of MMO survey effort including start and end times, duration, transects, and platform from which watches were carried out. Times correspond to those entered via the software IFAW Logger 2000 in GMT. (MI = Monkey island).

Date	Start time	End time	Duration	Transects surveyed	Platform
14/08/2022	17:31:23	19:43:43	02:11:52	Travelling	MI
15/08/2022	05:42:02	10:20:01	03:49:55	UWTV Stations in Porcupine Bank	MI
16/08/2022	06:09:23	19:17:24	09:46:21	UWTV Stations in Porcupine Bank	MI
17/08/2022	06:25:24	17:43:29	08:52:44	UWTV Stations in Porcupine Bank	MI
18/08/2022	06:51:06	16:30:29	09:04:15	UWTV Stations in Porcupine Bank	MI
19/08/2022	-	-	-	Adverse weather conditions	-
20/08/2022	06:59:17	17:56:28	10:01:22	UWTV Stations in Porcupine Bank	MI
21/08/2022	07:03:08	16:31:30	09:47:04	UWTV Stations in Porcupine Bank	MI
22/08/2022	06:22:12	18:23:41	10:27:28	UWTV Stations in Porcupine Bank	MI
Total survey			**64:01:01**		

4.2 Environmental conditions

Environmental conditions encountered during the cetacean-dedicated survey effort were logged at 260 stations.

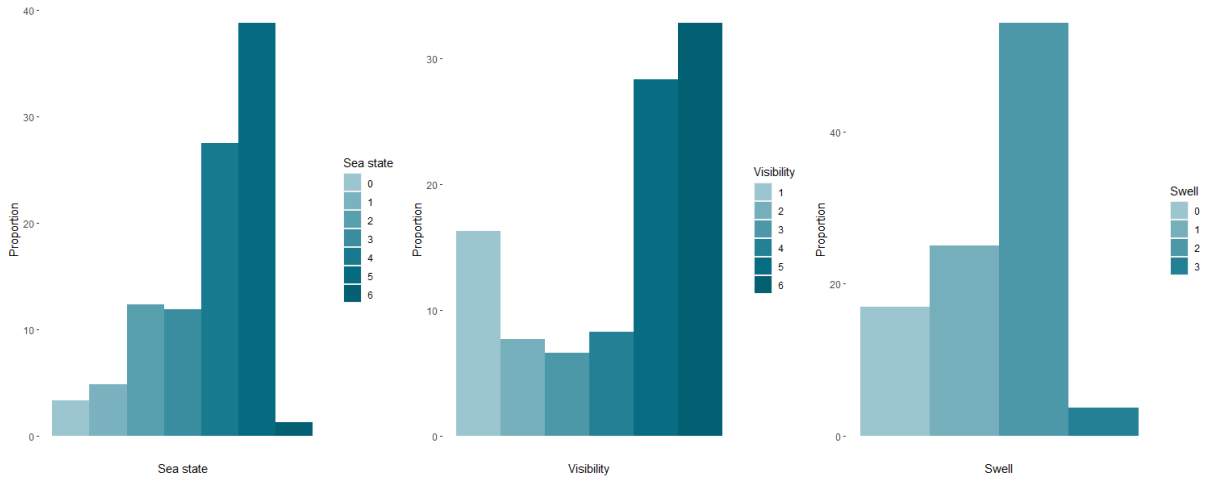

Figure 2. Overall environmental conditions: sea state, visibility, and swell height encountered during the UWTV 2022 survey. Data is presented as the proportion of time spent on effort under each sea state category for the entire survey.

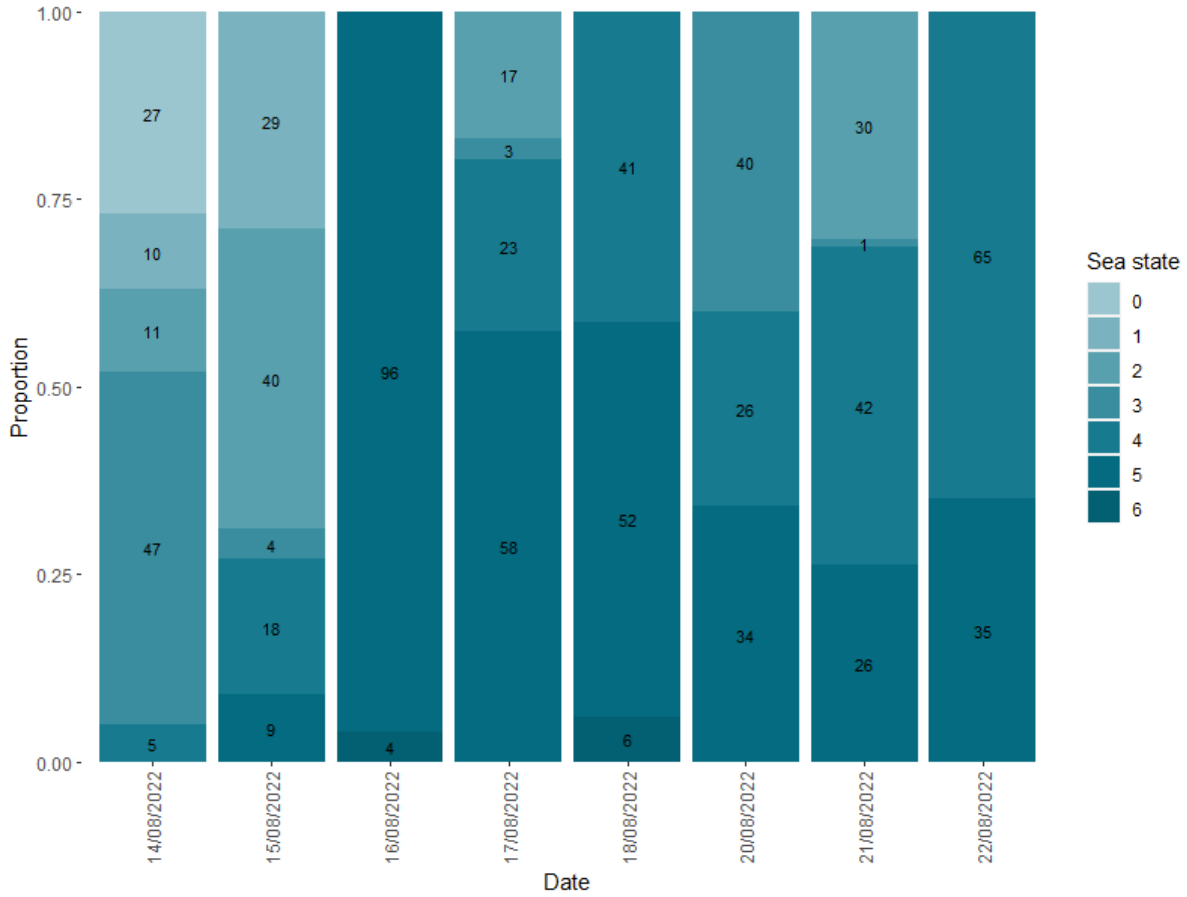

Figure 3. Daily sea state conditions encountered during the UWTV 2022 survey. Data is presented as the proportion of time spent on effort under each sea state category for each day.

Sea state conditions ranged from 0 to 6 during the survey (Figure 2 and 3), with most effort carried out under sea state 5 conditions, accounting for 45.62% of the total time spent on effort,

followed by sea state 4 (31.41%), and 3 (8.69%). Effort was carried out under favourable sea conditions, *i.e.* sea states 2, 1 and 0 only during 9.77%, 2.08% and 0.91%, respectively. Sea state 6 was only recorded during 1.5% of the total time, since the general approach was that cetacean effort was conducted under sea states 0 to 5.

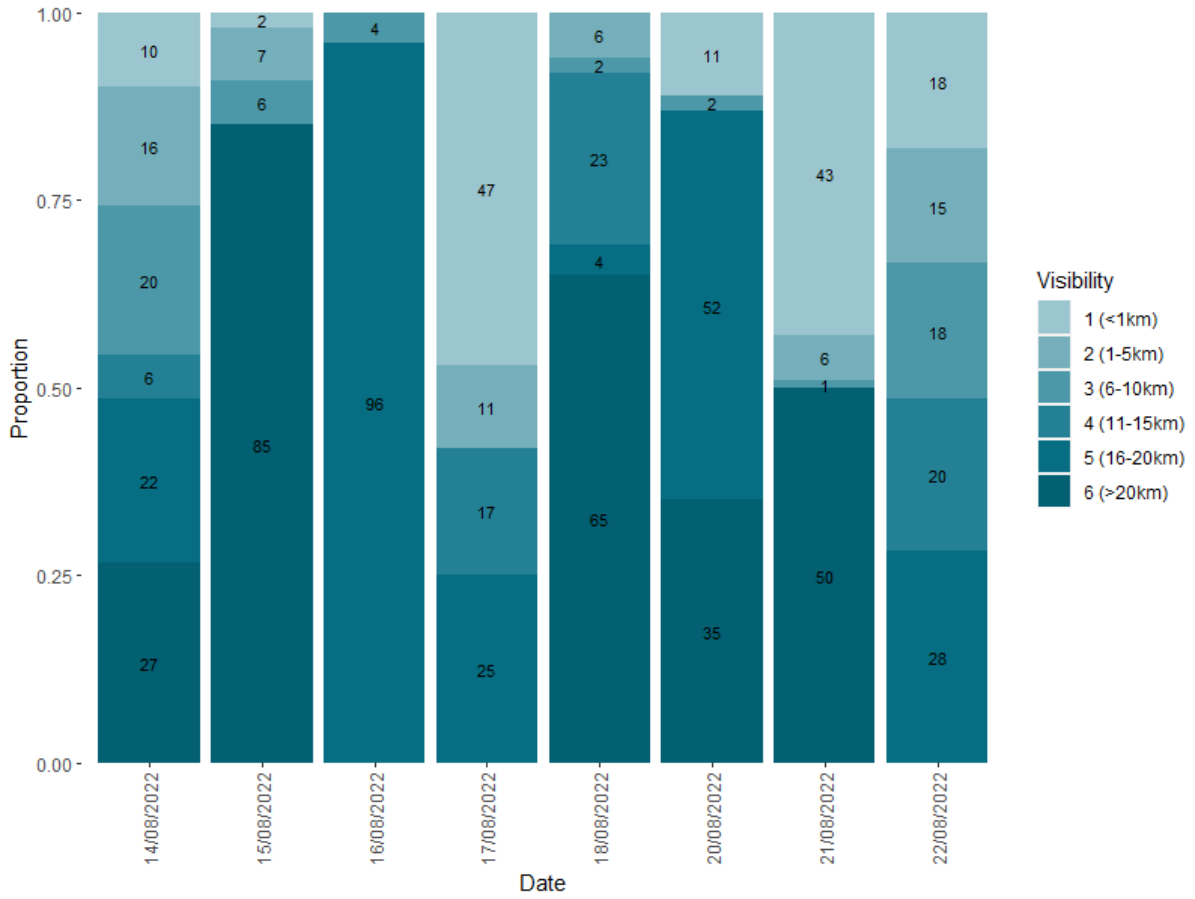

Figure 4. Daily visibility conditions encountered during the UWTV 2022 survey. Data is presented as the proportion of time spent on effort under each visibility category for each day.

Visibility ranged from 1 (less than 1 km) to 6 (more than 20 km) during the course of the survey (Figure 2 and 4). Visibility conditions were at times unfavourable, recorded as less than 6 km during 24.92% of the time. Most effort was conducted under visibility 5 (*i.e.* 16-20 km), accounting for 32.13% and visibility 6 (*i.e.* >20 km), accounting for 28.44% of the time. Although the general approach was that, effort would stop when visibility was less than 1 km, it was recorded for 18.20% of the time.

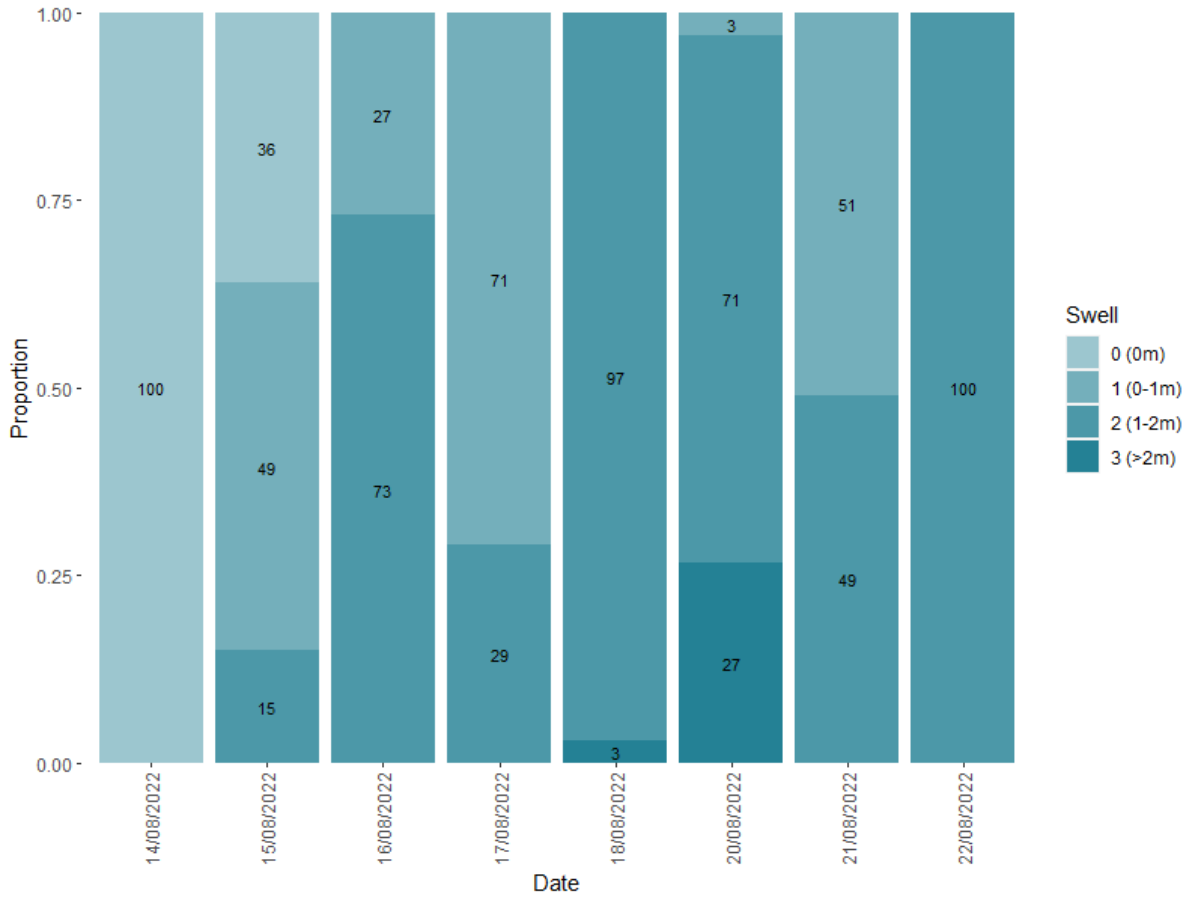

Figure 5. Daily swell height conditions encountered during the UWTV 2022 survey. Data is presented as the proportion of time spent on effort under each swell height category for each day.

Swell height ranged from 0 to 3 (Figure 2 and 5) throughout the course of the survey, with most time spent on effort under swell 2, (*i.e.* from 1 to 2 m), accounting for 62.75% of the total time. Swell 1 was recorded during 25.08% of the time, followed by swell 0 and 3, recorded during 5.57 and 4.60% of the time, respectively.

Precipitation was recorded for a total of 8 hours, 21 minutes and 56 seconds while on effort. Continuous light rain accounted for most of this time, recorded for 4 hours, 56 minutes and 46 seconds. Continuous heavy rain was recorded for 2 hours, 31 minutes and 31 seconds and intermittent light rain for 53 minutes and 39 seconds.

Unfavourable sea conditions were encountered during some days. Effort had to be interrupted in the morning during the 15/08/2022 and in the evenings during the 16/08/2022 and the 18/08/2022. No watches could be conducted during the 19/08/22 due to high swell conditions.

4.3 Sightings

A total of 9 sightings and 1 auxiliary sighting, on effort and off effort, respectively were recorded over the course of the UWTV survey with a total of 72 individuals. Three cetacean species of odontocetes were identified (Table 2; Figure 6).

Table 2. Species of cetaceans encountered during the UWTV 2022 survey (recorded on and off effort). Number of sightings, individuals and group size (minimum, maximum and average values) are included.

	Species	Sightings	Individuals	Group size
Odontocetes	Common dolphin	6	36	2-10(6)
	Harbour porpoise	1	1	1
	Bottlenose dolphin	1	30	30
	Unidentified dolphin	1	4	4
Other sightings	Unidentified cetacean	1	1	1
Total marine mammals		**10**	**71**	**-**

The odontocete species encountered during the survey were common dolphin (*Delphinus delphis*), harbour porpoise (*Phocoena phocoena*), and bottlenose dolphin (*Tursiops truncatus*) (Table 2, Figure 6). Common dolphins were the most abundant species encountered, with six sightings recorded and a total of 36 individuals (60% of the total sightings and 50.70% of all the animals). Bottlenose dolphins presented the largest group size, with a sightings of 30 individuals observed. A sighting of harbour porpoise (10% of the sightings) was recorded of 1 individual. One sighting of unidentified dolphins and one of unidentified cetacean were also recorded.

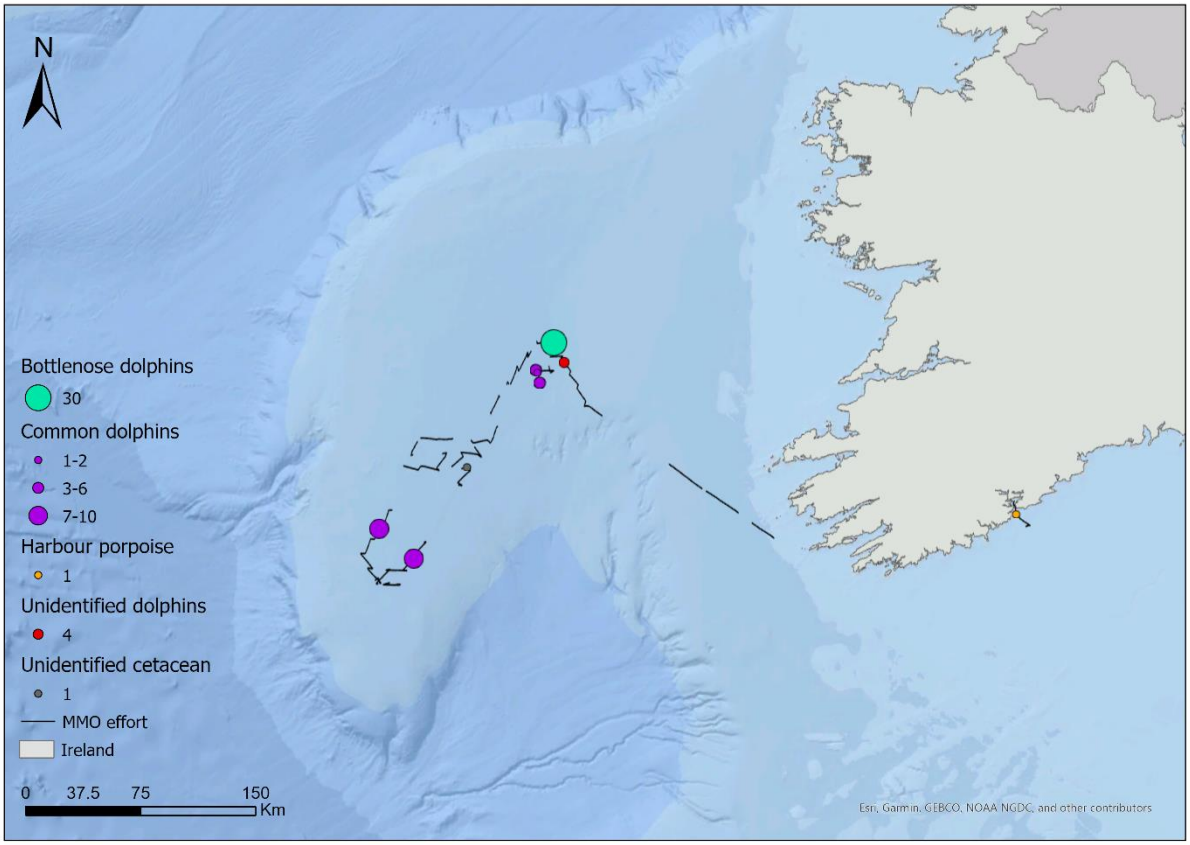

Figure 6. Sightings and group size of marine mammal species (bottlenose dolphin, common dolphin, harbour porpoise, unidentified dolphin, and unidentified cetacean) recorded during the UWTV 2022 survey. Marine mammal survey effort is also represented.

5 Discussion

During the UWTV 2022 survey, all sightings except one were concentrated on the Porcupine Bank, where the underwater TV survey took place.

Common dolphin was the species the most frequently observed and the most abundant, accounting for 60% of the total sightings and 50.70% of all individuals recorded. Bottlenose dolphins presented the largest group size, with 30 individuals recorded in waters off Co. Cork. These observations are in accordance with cetacean species recorded in the area (Wall *et al.* 2013)

No mysticetes were recorded during the course of the survey and, overall, the number of sightings recorded was low. This could be due to the survey covering a relatively small area, with the vessel travelling slow when survey stations were being conducted. Furthermore, unfavourable environmental conditions (*i.e.*, sea state >3, swell >1m, and visibility <1km) were commonly encountered during the survey.

These data collected on relative abundance and distribution of the species encountered in the Porcupine Bank will be added to time-series data from previous surveys conducted by the Marine Institute.

6 References

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