EMFF Operational Programme 2014-2020

Marine Biodiversity Scheme

Marine Institute Cetacean Monitoring

During the Celtic Sea Herring Acoustic Survey
09th – 28th October 2022

Lead Agency: Marine Institute

Lead Partners: National Parks and Wildlife Service,

Authors: Irish Whale and Dolphin Group

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

EUROPEAN UNION
This measure is part-financed by the European Maritime and Fisheries Fund

Foras na Mara
Marine Institute

IWDG Consulting

Operational Programme	European Maritime and Fisheries Fund (EMFF) Operational Programme 2014-2020
Priority	Union Priority 1 Sustainable Development of Fisheries Union Priority 6 Fostering the implementation of the Integrated Maritime Policy
Thematic Objective	TO 6 - Preserving and protecting the environment and promoting resource efficiency
Specific Objective	UP1 SO1 - Reduction of the impact of fisheries and aquaculture on the marine environment, including the avoidance and reduction, as far as possible, of unwanted catch. UP1 SO2 - Protection and restoration of aquatic biodiversity and ecosystems. UP6 SO1 - Development and implementation of the Integrated Maritime Policy
Measure	Marine Biodiversity Scheme
Project No.	MB/2019/09
EMFF Certifying Body	Finance Division, Department of Agriculture, Food and the Marine
Managing Authority	Marine Agencies & Programmes Division, Department of Agriculture, Food and Marine
Specified Public Beneficiary Body	Marine Institute
Grant Rate	100%
EU Co-Financing Rate	50%
Legal Basis	Article 29, 40 & 80 EMFF
Details	Report to the Marine Institute Irish Whale and Dolphin Group

This project or operation is part supported by the Irish government and the European Maritime & Fisheries Fund as part of the EMFF Operational Programme for 2014-2020

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Contents

Abstract

The Celtic Sea Herring Acoustic Survey aboard RV Tom Crean on 10 October and concluded on 28 October. Line transits were conducted by the vessel, which MMO incorporated into mammal surveying. Vessel generally travelled on north-south lines at 10 knots. Monitoring was conducted from sunrise to sunset where possible.

Mammal monitoring was conducted for 76 hours across 13 days, with 10 full day's and three partial day's monitoring. There were five days with no monitoring due to weather or visiting port. During monitoring, sea state (SS) was in the *SS2* to *SS3* range *41.7%* of stations, in the *SS4* to *SS5* range *47.7%* of stations, and SS6 or higher *10.6%* of stations. Swell was <1 m *58%* of stations, 1 - 2 m *38%* of stations and 2 - 3 m at *11%* of stations.

Seven species were observed. Cetaceans identified were *Balaenoptera acutorostrata*, *Balaenoptera physalus*, *Delphinus delphis* and *phocoena phocoena*. The pinniped *Halichoerus grypus* was also identified. Additionally, the megafaunal fish *Prionace glauca* and *Thunnus thynnus* were observed, and there were four sightings of unidentified cetaceans.

Introduction

Cetaceans and pinnipeds in Ireland are protected under national legislation and several international directives and agreements which Ireland is signatory to. All cetaceans, as well as otters and grey and harbour seals, are protected under the Wildlife Act (1976) and its amendments (2000, 2005, 2010 and 2012). Under the act and its amendments, it is an offence to hunt, injure, wilfully interfere with, disturb or destroy the resting or breeding place of a protected species (except under license or permit). All cetaceans and pinnipeds are protected under the EU Habitats Directive. All cetaceans are included in Annex IV of the Directive as species 'in need of strict protection'.

Ireland is also signatory to conservation agreements such as the Bonn Convention on Migratory Species (1983), the OSPAR Convention for the Protection of the Marine Environment of the northeast Atlantic (1992) and the Berne Convention on Conservation of European Wildlife and Natural Habitats (1979). Despite these designated status, there is limited knowledge on the distribution and relative abundance of cetaceans within the Irish EEZ (NPWS, 2013; Table 1). Under the EU Habitats Directive, there is a requirement on member states to conduct surveillance of cetaceans occurring within their waters.

Conducting marine mammal observations onboard the Celtic Sea Herring Acoustic Survey presents a highly advantageous opportunity to record cetaceans in several key areas of Ireland's, and neighbouring UK's, waters. Ireland's territorial waters and EEZ are highly productive due to the upwelling of nutrients which in turn support an array of species assemblages (Mackey et al. 2004), and thus attract diverse megafauna as well as the primary survey target, herring. Furthermore, fisheries acoustic surveys in general are particularly conducive to hosting cetacean surveys, as the vessel spends the majority of the cruise travelling at a steady speed along pre-determined survey tracks (e.g. Figure 2).

Data collected by IWDG in tandem, and facilitated by, Marine Institute surveys contribute to the identification of important habitats for European cetacean populations and to help devise programmes for their long-term conservation and protection.

Operational Area

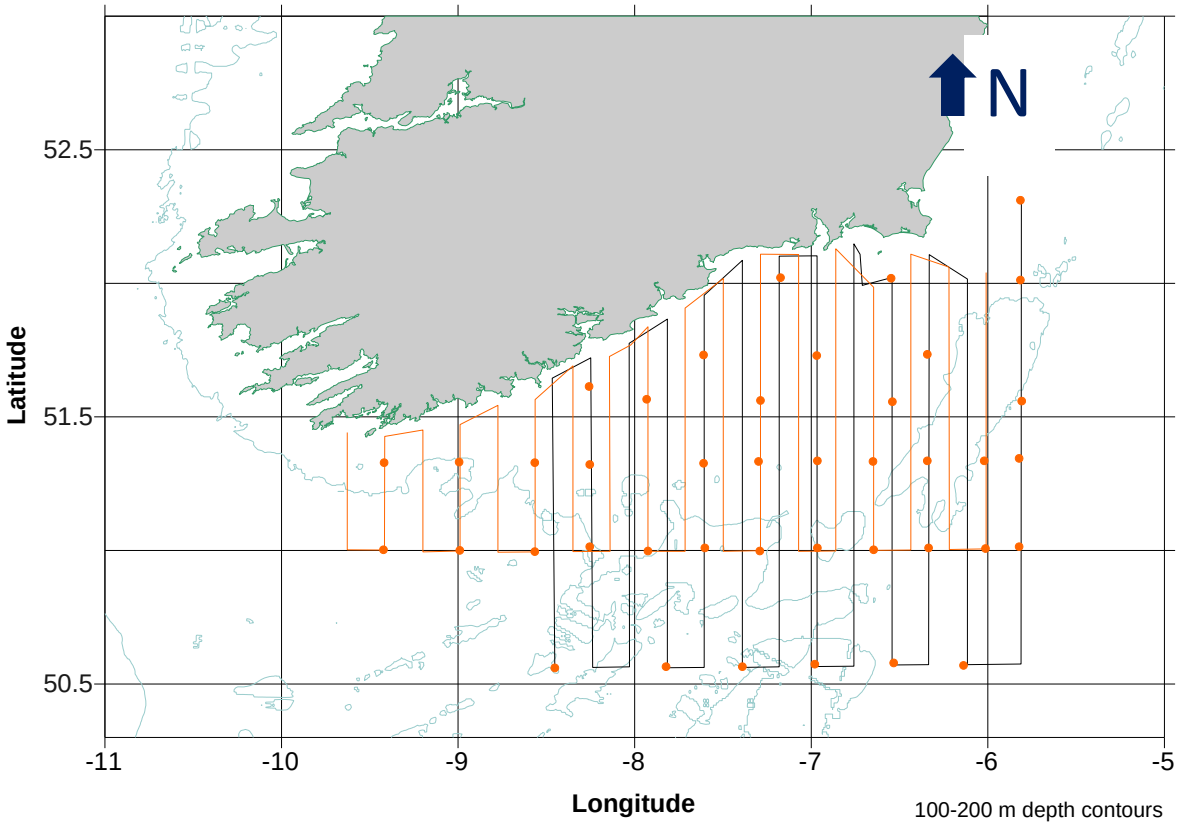


Figure 1. *Planned survey transits, with initial transit in black, operating west to east. Subsequent orange transit operating east to west. Courtesy of Marine Institute.*

After calibration in Dunmanus Bay, vessel will head south east to begin survey along black transit route (Fig. 2). With a crew change in Dublin on the 20th, as much of this section of the survey, as weather and time allows, is to be completed beforehand. Once returning to survey from Dublin, the vessel will begin operating along the orange survey transect. Weather, fishing and other issues will have an impact on exact routes and a dynamic, pragmatic approach will be taken, as is usual. Additional, opportunistic survey lines may also be undertaken should the occasion arise.

Location of MMO

MMO was located on-board the *R.V. Tom Crean* during the survey, utilising a dedicated space for observation on the observation deck at a height of 12.9 m above sea level (14.7m including MMO's height). MMO operated during daylight hours, generally starting at 07:00 and finished at 16:30 (UTC) with exact times being dependant on local conditions. The observation deck gives a commanding view of the surrounding area, as was designed, and MMO was satisfied with positioning for the survey.

Description of Activities

The vessel travelled at an average speed of 10 knots when on survey transects, other than where restricted by heavy weather. Transect lines were punctuated with CTDs or fishing trawls on a semi-regular and opportunistic basis. During these times the vessel would either remain stationary for some minutes for CTDs, or, while trawling, turnabout and revisit areas where fish were observed from the dry-lab at reduced speeds of 3-5 kn. As the focus of this vessel's survey was to sample fish stocks, surveys of cetaceans were conducted in 'passing mode' and general practice was not to deviate from transect, though anything of particular note or interest was relayed to dry lab.

Observer Methodology

Marine mammal observing is generally conducted below sea state 5, as conditions above sea state 4 are considered to create increasingly reduced effectiveness. However, as this project was survey rather than mitigation, MMO judged conditions pragmatically and often continued observing during sea states 5 and 6, when factoring in conditions such as low swell and good lighting.

Waters ahead of the vessel, 270º to 90º, were scanned, watching for dorsal fins and flukes, as well as splashes, blows, and congregating birds. Observer scanned the area by eye and using Olympus 10x50 DPS I and Bushnell Powerview 12x50 Binoculars. Observer utilised Logger 2010 to track GPS and record both environmental and sighting data. A Canon 7D camera was used to photograph animals when possible. Wind and water depth information was not

available on the observation deck, and so wind data was checked before ascending for every watch, and water depth was requested from the dry lab through radio when possible. Environmental data was recorded every ~15 minutes.

Sightings were identified to species level where possible, with species identifications being graded as definite, probable or possible. Where species identification could not be confirmed, sightings were downgraded (e.g. unidentified dolphin / unidentified whale / unidentified cetacean etc.) according to criteria established for the IWDG's cetacean sightings database (IWDG 2022).

Reporting

- Standardised log sheets shall be kept in accordance with NPWS guidelines. Extra log sheets shall be kept for data consolidation and reporting where necessary.
- Summary report shall be provided to survey SIC for inclusion in cruise report.
- A full report on the marine mammal survey undertaken shall be made available.

Results

Summary of Campaign

10/10/2022: Observation began while in Dunmanus Bay for calibration. Upon completion, acoustic surveying began in the bay, before heading to the planned transect route.

11/10 - 14/10/2022: Surveying and monitoring continued.

15/10/2022: Heavy weather did not allow for efficient mammal observation.

16/10 - 19/10/2022: Surveying and monitoring continued.

20/10/2022: Vessel returned to port in Dublin.

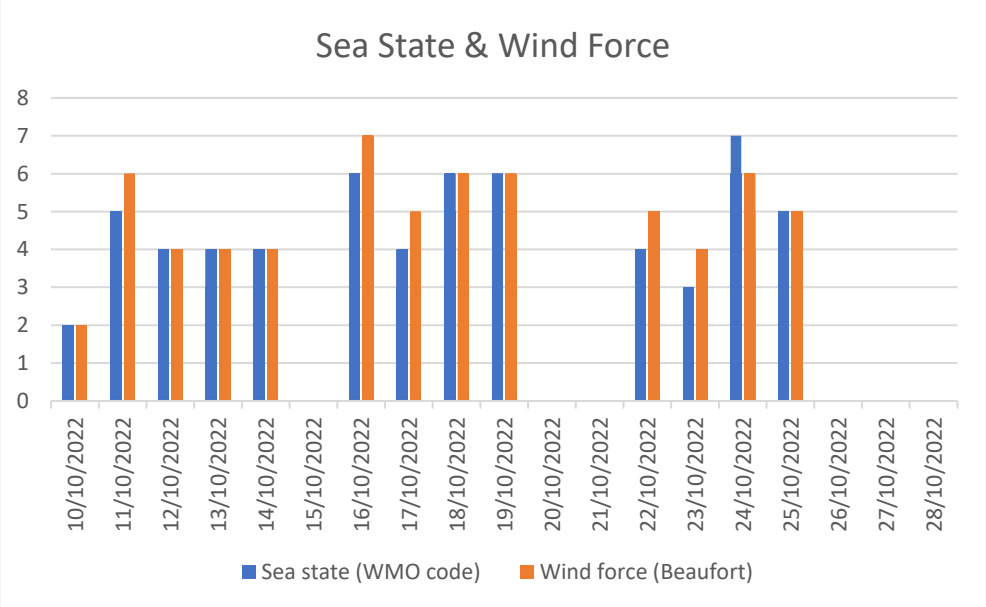
21/10/2022: Vessel took shelter off Fishguard, remaining stationary.

22/10 - 25/10/2022: Surveying and monitoring continued.

26/10 - 27/10/2022: Heavy weather did not allow for efficient mammal observation.

28/20/2022: Vessel arrived into Galway Bay. Survey End

Weather



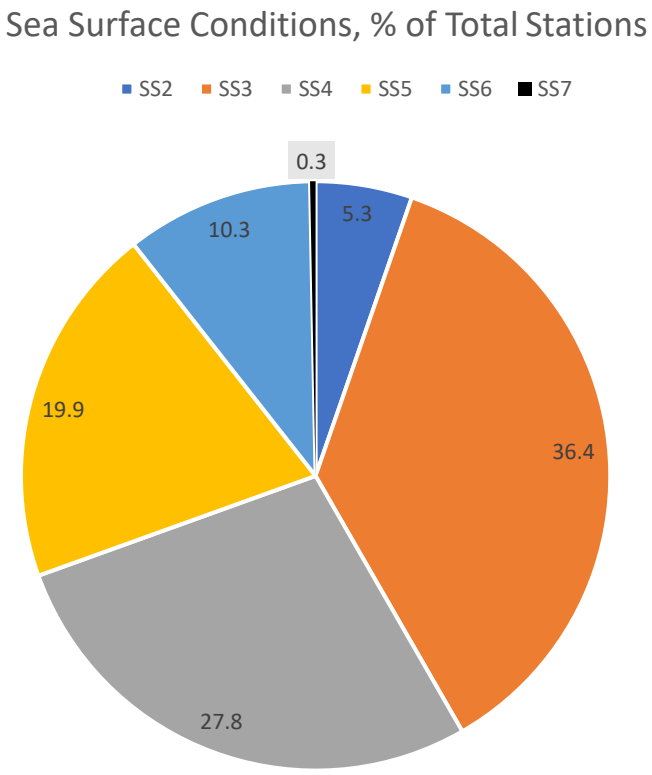
Graph 1. *Overview of conditions throughout survey, no data indicates no watches occurred on that date.*

Monitoring began **10 October** and ended **28 October**. Of these **18** days, monitoring was conducted on **13** days, and across **302** weather stations. Monitoring was not conducted for the remaining six days due to either adverse weather conditions, or scheduled stops. On **21 October**, the vessel steamed from Dublin to north of Fishguard where it remained on weather standby, and all operations were halted. **15, 16** & **17 October,** acoustic survey operations continued, but as winds were B7+ with significant swell, no mammal monitoring was conducted.

Sea state (SS) over the **302** weather stations is presented in *Table 1* and *Graph 3* below. There were **0** stations in the *SS0* to *SS1* range. There were **126** stations, or **41.7%,** in the *SS2* to *SS3* range. **144** stations, or **47.7%,** were in the *SS4* to *SS5* range. **32** stations, or **10.6%,** were *SS6* or higher. Swell height is shown in *Table 2* and *Graph 4*, with swell being up to *1 m* for **51%** of watches, *1 – 2 m* for **33%** of watches and over *2 - 3 m* during **11%** of watches.

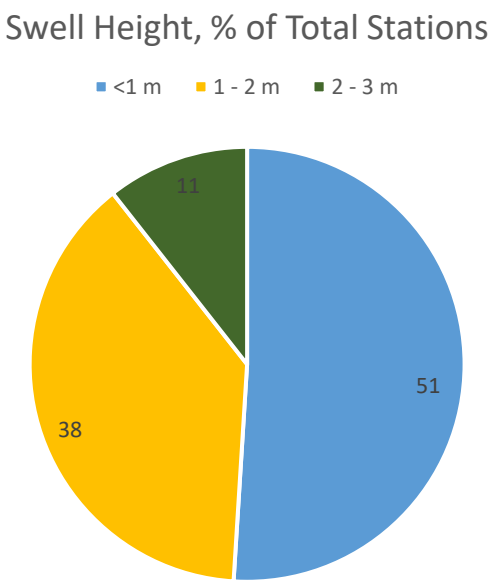
Sea state	Events	% of Total
SS0	0	0
SS1	0	0
SS2	16	5.3
SS3	110	36.4
SS4	84	27.8
SS5	60	19.9
SS6	31	10.3
SS7	1	0.3
Total	*302*	*100*

Table 1 & Graph 2. *Sea surface conditions across 302 weather stations. As no stations recorded as SS0 or SS1, these are omitted for clarity.*



Swell	Events	% of Total
0	0	0
<1 m	154	51
1 - 2 m	116	38
2 - 3 m	32	11
Total	*302*	*100*

Table 2 & Graph 3. *Swell height across 302 weather stations.*



Visibility was recorded on 301 stations, with data not entered on station 296 through human error. Visibility was classed as *High* **19.3%** of stations, *Good* **51.5%** of stations, *Medium* **25.9%** of stations and *Poor* **3.3%** of stations, where heavy fog or precipitation was an issue for effective observation. This is presented in Table 3 and Graph 5 below.

Visibility	Events	% of Total
P	10	3.3
M	78	25.9
G	155	51.5
H	58	19.3
Total	*301*	*100*

Table 3 & Graph 4. *Visibility across 104 weather stations. P = < 1 km, M = 1-5 km, G = 5-10 km, H = >10 km.*

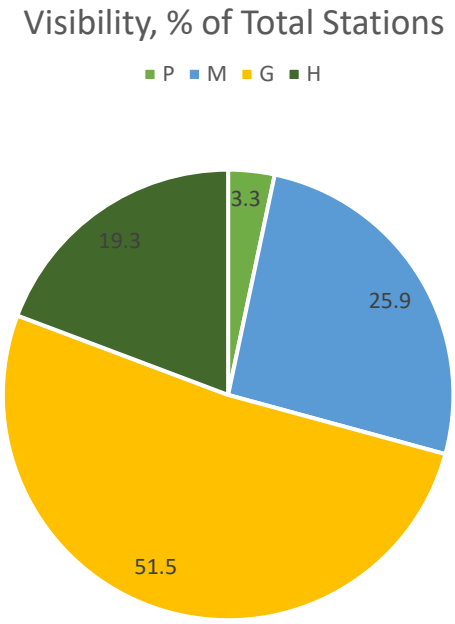
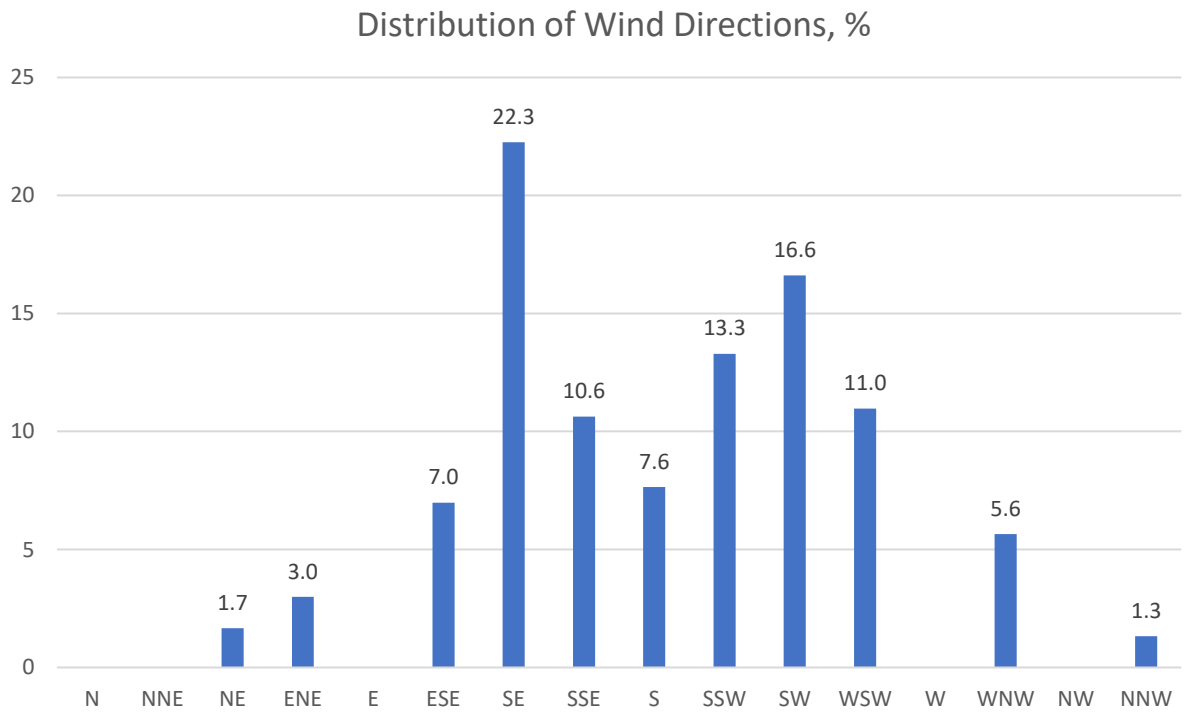


Table 4. *Wind Direction across 302 stations.*

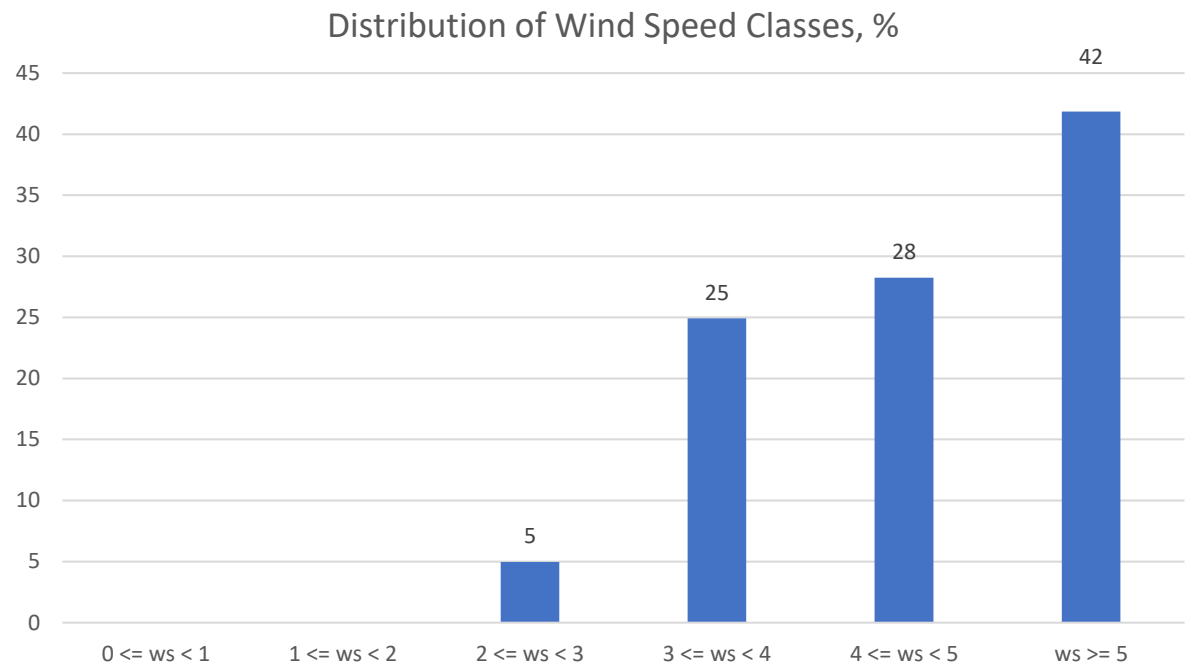
Direction	Number of events	Events (%)
N	0	0.0
NNE	0	0.0
NE	5	1.7
ENE	9	3.0
E	0	0.0
ESE	21	7.0
SE	68	22.3
SSE	32	10.6
S	23	7.6
SSW	40	13.3
SW	50	16.6
WSW	33	11.0
W	0	0.0
WNW	17	5.6
NW	0	0.0
NNW	4	1.3
Total	**302**	**100**

Wind data was not readily available from the observer deck and, due to safety and practicality, observer was unable to visit the bridge and return to observer deck every 15 minutes, as required by Logger. Wind direction and speed were noted from bridge upon ascension to observer deck at the beginning of every watch, and any time observer needed to descend for various reasons, or any time there was a noticeable change. Therefore, while recorded wind data was taken from vessel in situ, it can only be considered approximate across watches.

As per Table 4, wind was somewhat variable, but veered between *ESE* and *WSW* **88.4%** of the time. Wind was recorded at *B2* during **5%** of stations, *B3* during **25%** of stations, *B4* during **28%** of stations and *B5 or above* at 42% of stations.



Graph 5. *Distribution of wind direction across 302 stations.*



Graph 6. *Distribution of windspeed across 302 stations, divided in Beaufort classes.*

Monitoring and Sightings

Table 4. *Total daily hours on days where monitoring was conducted.*

Date of Survey	Total Watch Times
10/10/2022	1:24:32
11/10/2022	6:14:01
12/10/2022	6:51:14
13/10/2022	7:31:02
14/10/2022	7:26:44
16/10/2022	6:34:52
17/10/2022	3:43:18
18/10/2022	6:10:25
19/10/2022	2:12:18
22/10/2022	6:36:40
23/10/2022	7:18:33
24/10/2022	6:24:40
25/10/2022	7:13:12
Total: ***13 days***	**75:41:31**

53 separate watches were conducted over the survey, comprising of **75 hours, 42 minutes** of monitoring time over **13** days. **10** of these days were considered 'full days' while the remaining **3** were partial days – days where adverse conditions either cleared, or set in.

64 sightings were recorded during the campaign. There were **43** confirmed sightings of *Delphinus Delphis*, or **67.2%** of total sightings, **7** sightings of *Thunnus thynnus*, or **10.9%**, *5* sightings of *Balaenoptera physalus*, or **7.8%**, **2** sightings of *Phocoena phocoena* or **3.1%**. There was **1** sighting of *Balaenoptera acutorostrata*, **1** sighting of *halicheorus grypus* and **1** sighting of *Prionace glauca*, or **1.6%** of total sightings each. There were also **3** sightings of unconfirmed dolphin species, or **4.7%**, and **1** sightings of an unconfirmed large whale species, or **1.6%.** In total, an estimated **587** marine mammals were observed, comprising of

585 cetaceans and **2** seals, along with **2** sharks and multiple feeding groups of tuna – subsurface numbers of which are difficult to estimate.

Table 5. *Sightings species and numbers across entire survey. Estimates for age were only entered where observer was reasonably sure. Estimated numbers for* T. thynnus *were entered in situ as a requirement but are omitted here as estimates are likely unreliable.*

Species	# sightings	% of sightings	Estimated Total individuals	Estimated # adults	Estimated # juveniles	Estimated # calves
B. acutorostrata	1	1.6	1	1	-	-
B. physalus	5	7.8	22	-	-	-
D. delphis	43	67.2	545	332	104	63
H. grypus	1	1.6	2	1	1	-
P. glauca	1	1.6	2	-	-	-
P. phocoena	2	3.1	9	7	1	-
T. thynnus	7	10.9	n/a	-	-	-
Unidentified cetacean	1	1.6	1	-	-	-
Unidentified dolphin spp.	3	4.7	7	-	-	-
Totals	**64**	**100**	**589**	**341**	**106**	**63**

Image 1. D. delphis *with healing fluke injury.*

Image 2. *Distal* B. physalus *blows.*

Image 3. T. thynnus *surface rushing.*

Image 4. D. delphis *mother and calf pair.*

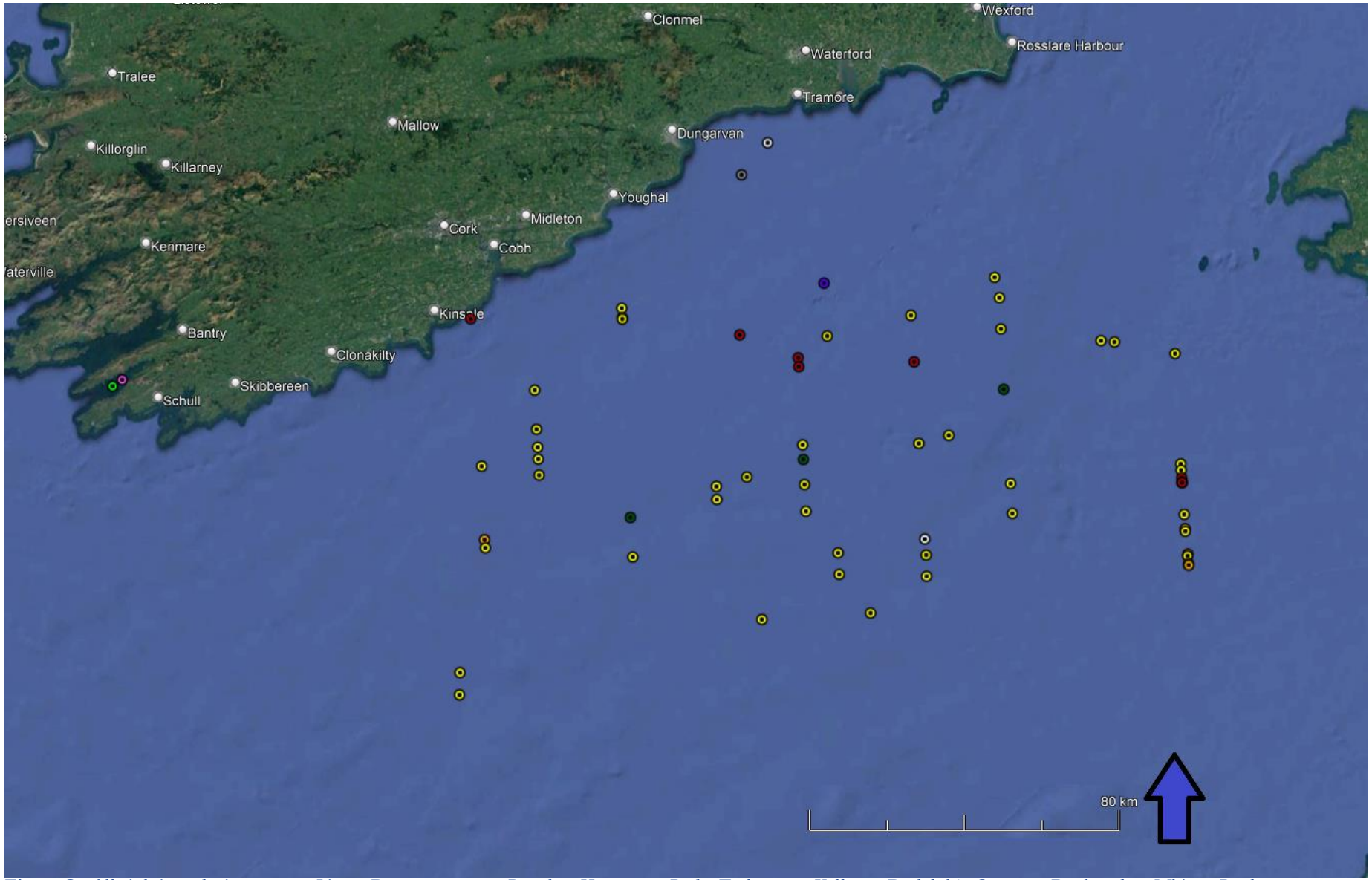


Figure 2. *All sightings during survey. Lime* - B. acutorostrata, *Purple* – H. grypus, *Red* – T. thynnus, *Yellow* – D. delphis *Orange* - B. physalus, *White* – P. phocoena, *Blue* - P. glauca, *Green – Unidentified Dolphin Spp., Grey – Unidentified Cetacean Spp.. Animals observed in Dumanus bay were observed during acoustic survey calibration before acoustic survey began.*

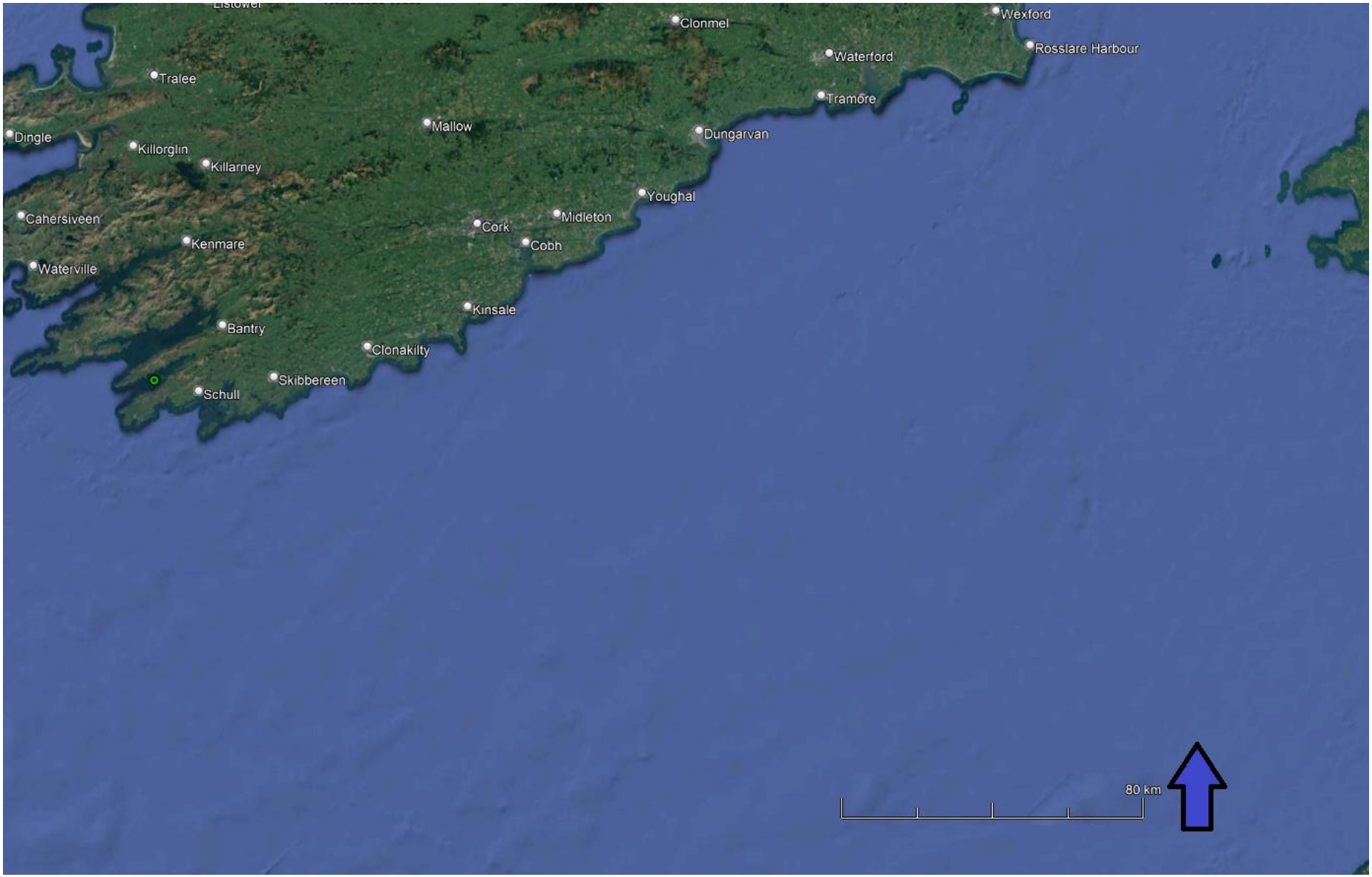


Figure 3. *B. acutorostrata sightings during survey. Sighting number 2.*

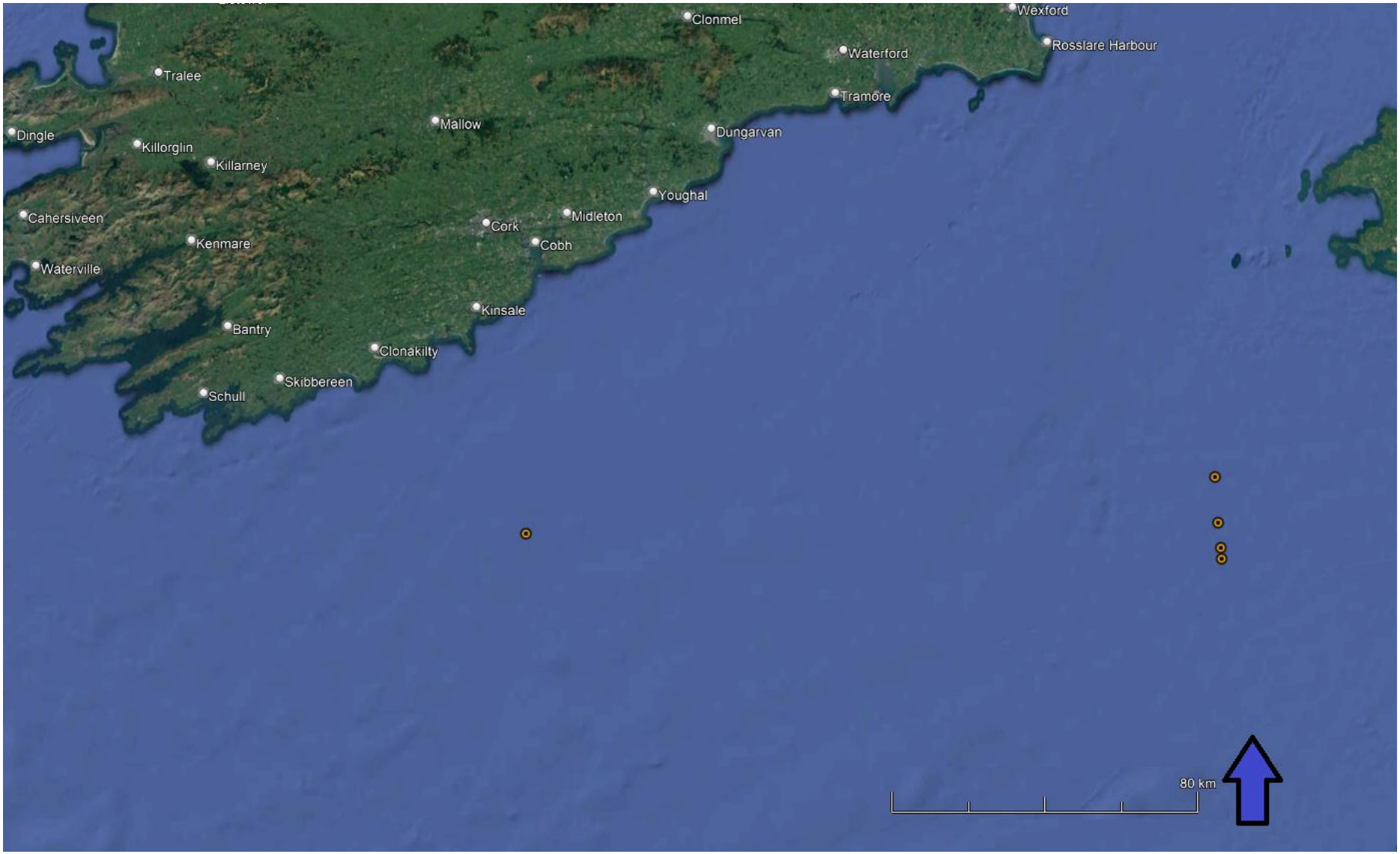


Figure 4. *Location of* B. physalus *sightings during survey. Sighting numbers 27, 29, 32, 35 & 63.*

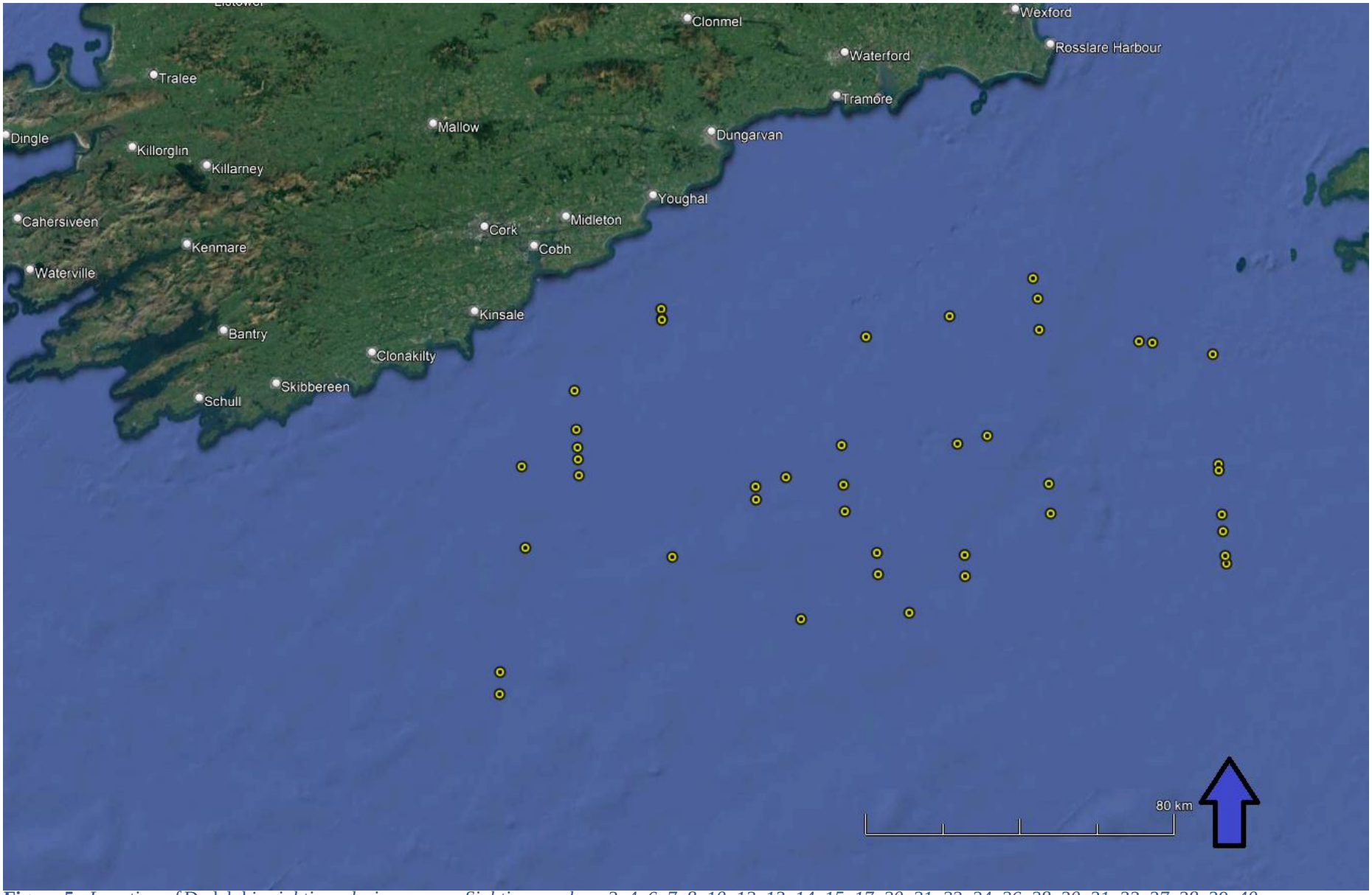


Figure 5. *Location of* D. delphis *sightings during survey. Sighting numbers 3, 4, 6, 7, 8, 10, 12, 13, 14, 15, 17, 20, 21, 22, 24, 26, 28, 30, 31, 33, 37, 38, 39, 40, 41, 44, 45, 46, 48, 49, 50, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62 & 64.*

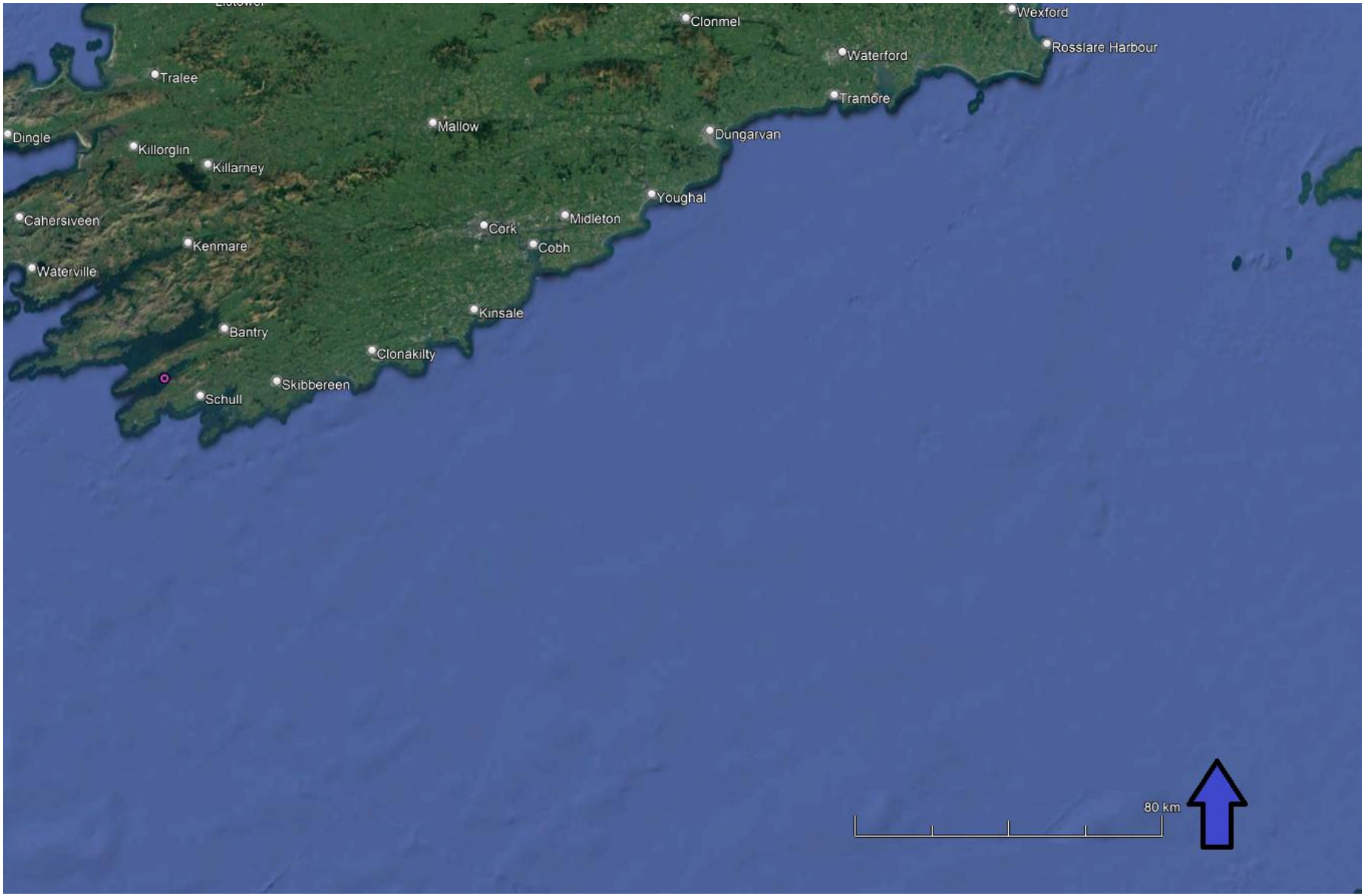


Figure 6. *Location of* H. grypus *sightings during survey. Sighting number 1.*

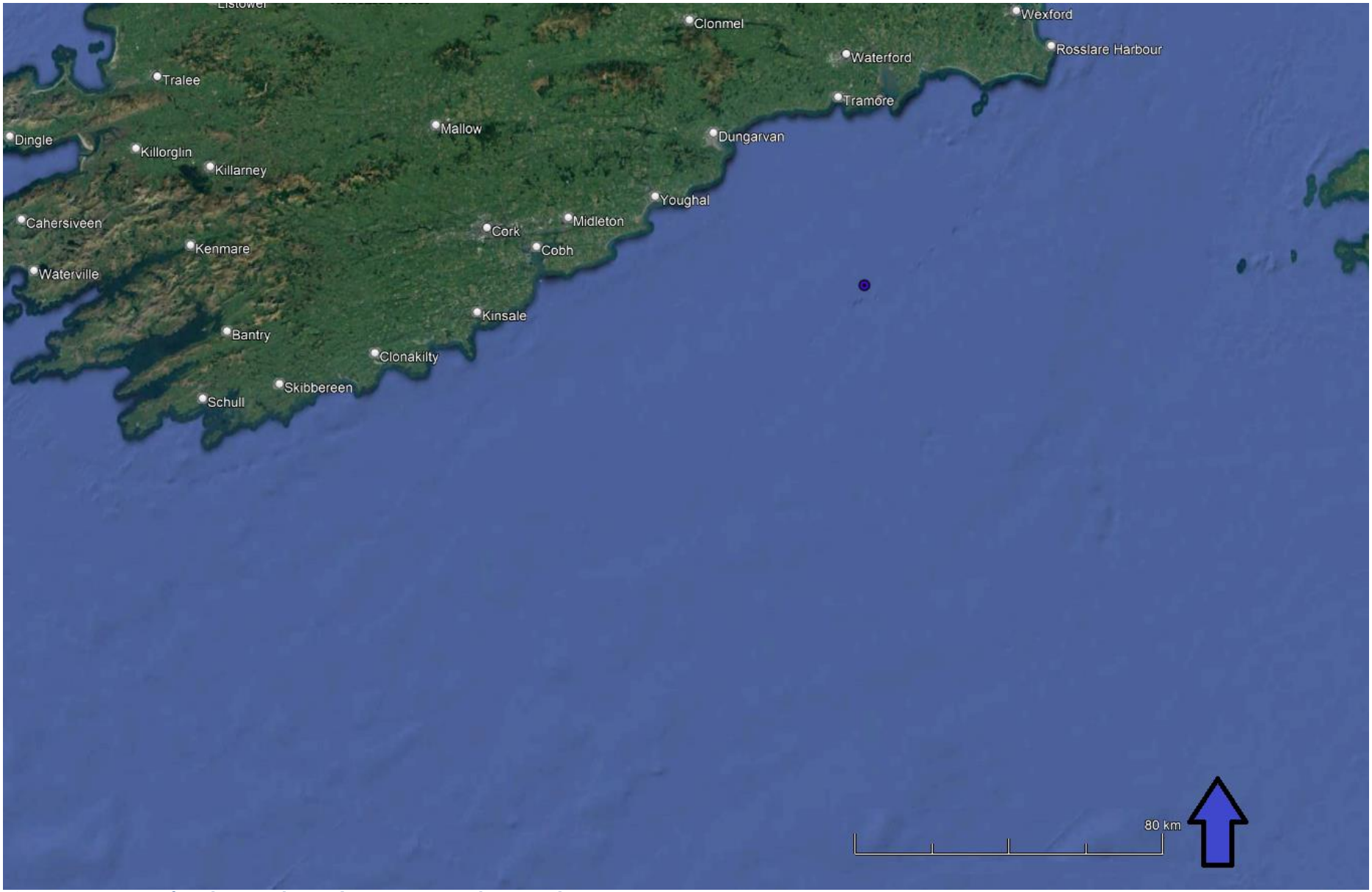


Figure 7. *Location of P. glauca sightings during survey. Sighting number 54.*

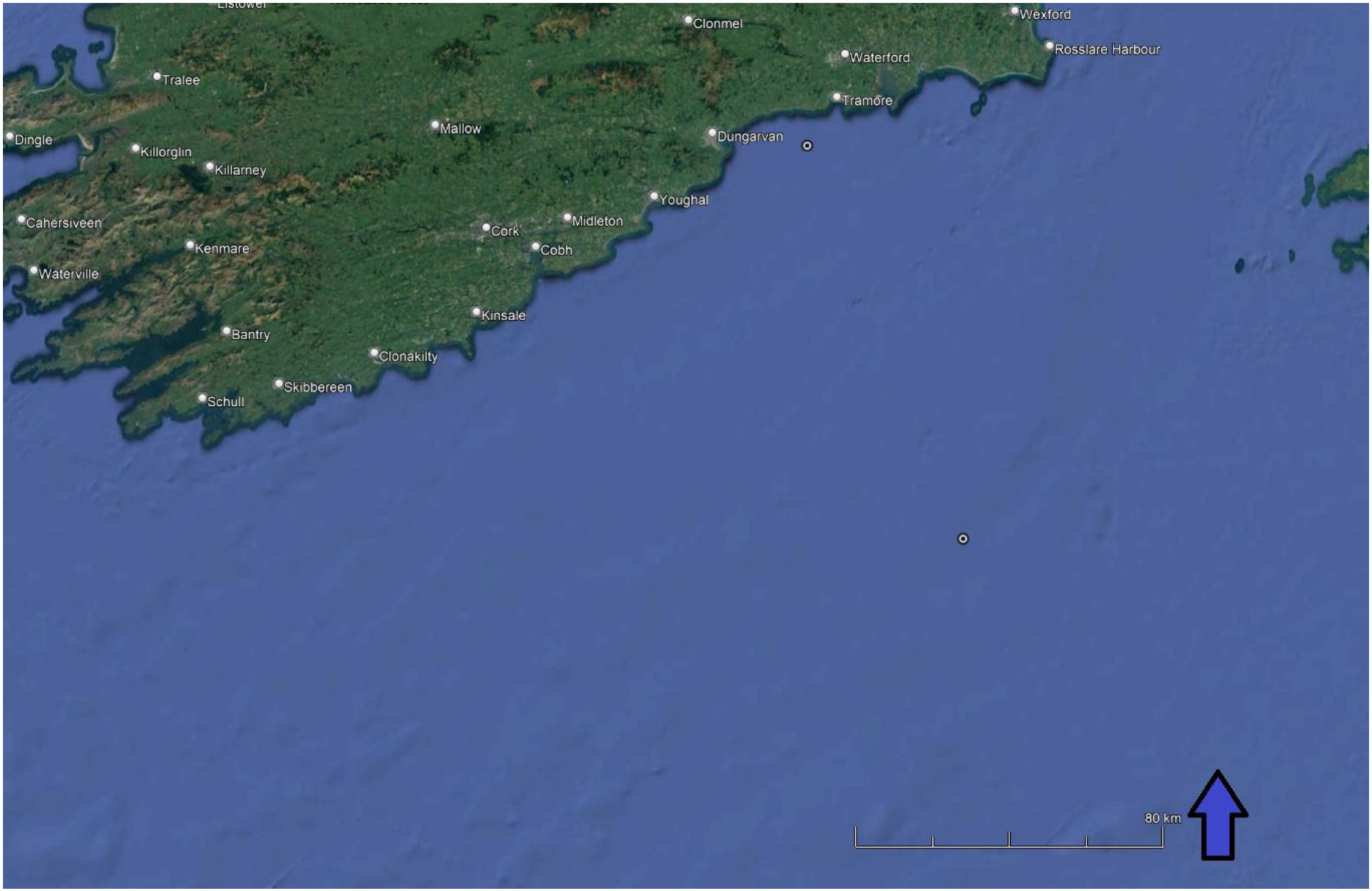


Figure 8. *Location of* P. phocoena *sightings during survey. Sighting numbers 23 & 43.*

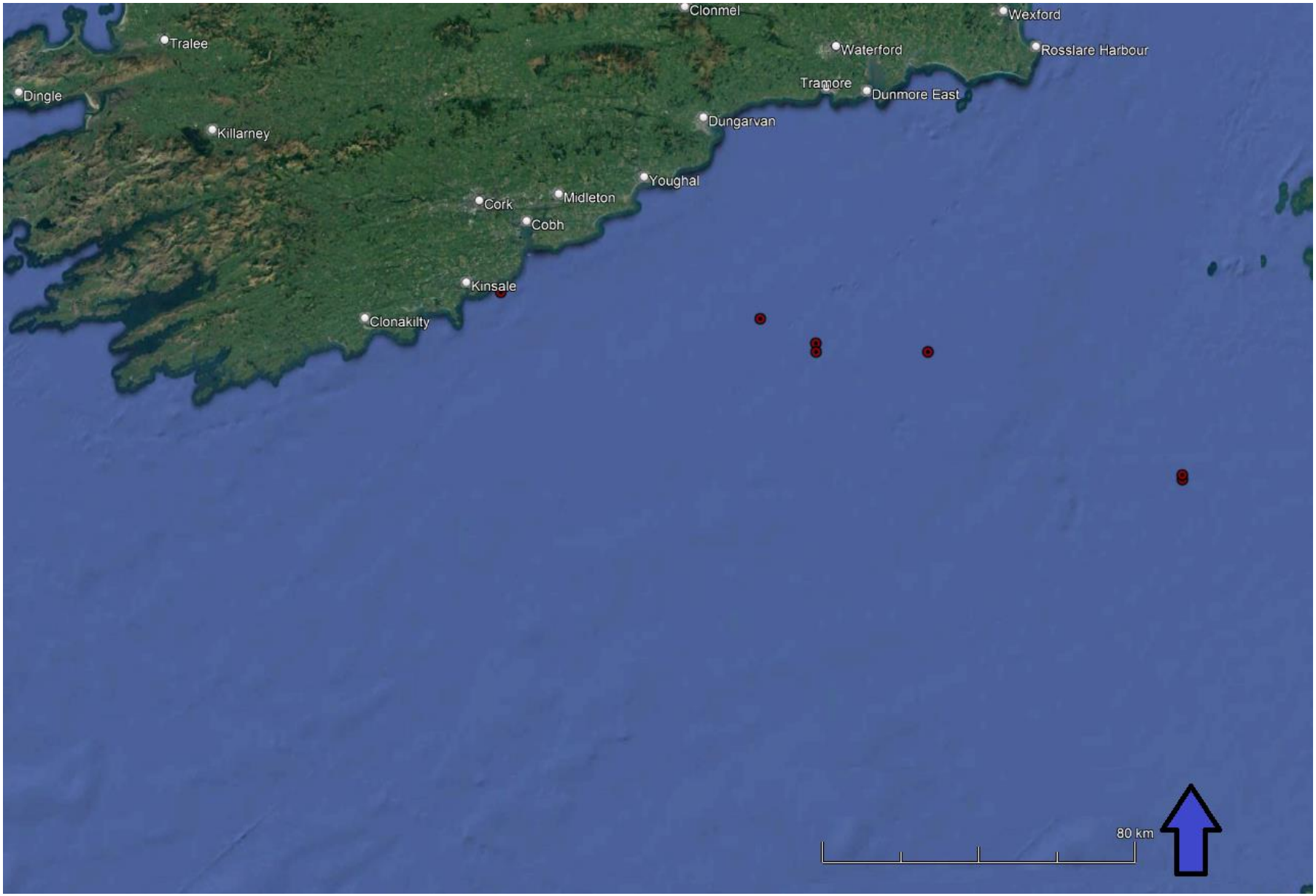


Figure 9. *Location of* T. thynnus *sightings during survey. Sighting numbers 5, 11, 18, 19, 25, 34 & 36.*

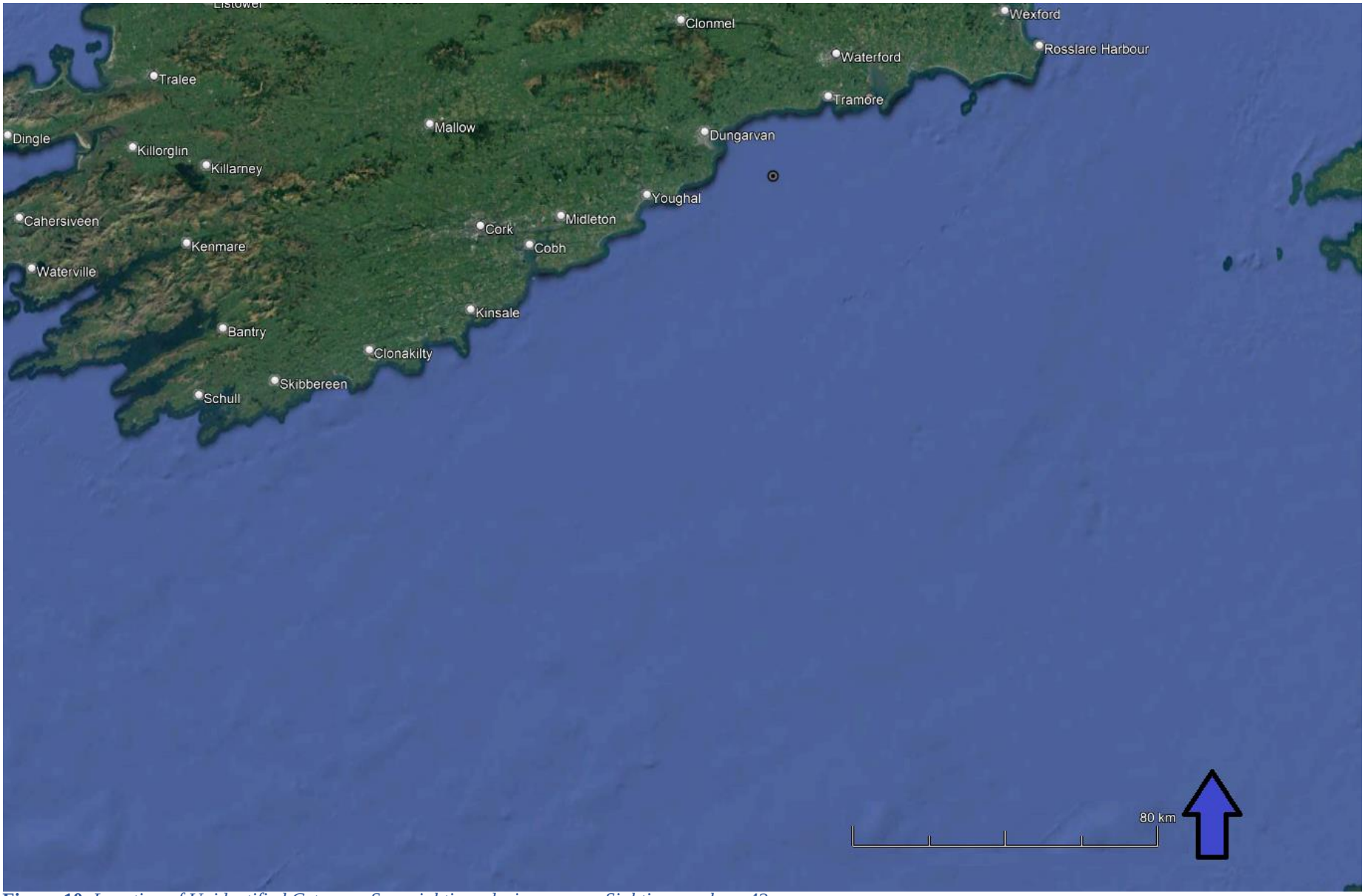


Figure 10. *Location of Unidentified Cetacean Spp. sightings during survey. Sighting numbers 42.*

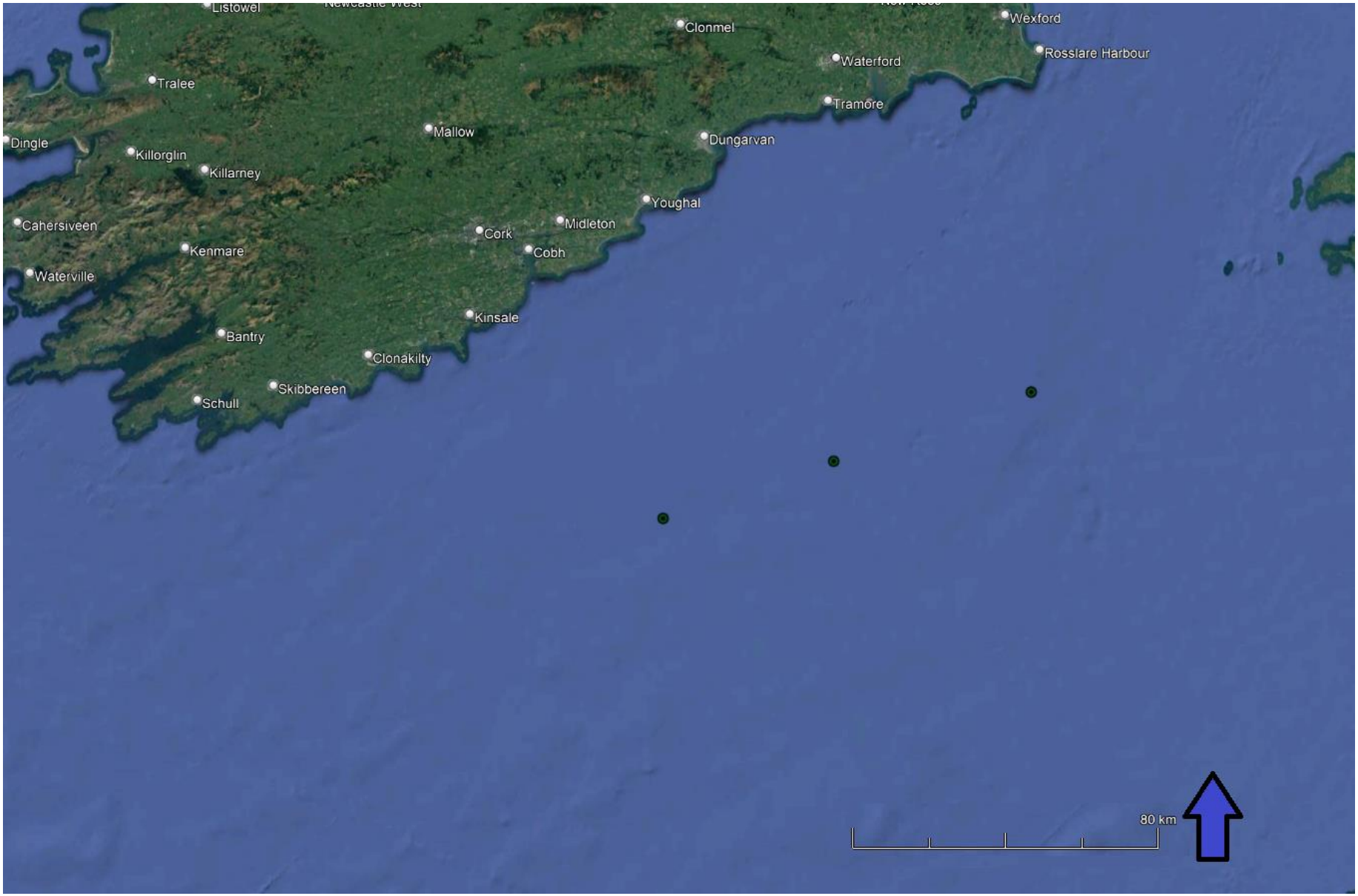


Figure 11. *Location of Unidentified Dolphin Spp. sightings during survey. Sighting numbers 9, 16 & 47.*

Discussion

The cetacean distribution survey carried out during the Celtic Sea Herring Acoustic Survey on board the R.V. Tom Crean yielded 64 sightings, 55 of which were cetaceans. 7 identifiable species were recorded including seals, tuna and sharks. Periods of high sea states and heavy swells would have negatively affected the detection rate of cetaceans by the MMO, particularly those species with more inconspicuous surfacing behaviours, and those who tend to avoid vessels. Two sightings of note were the fin whale sightings 27, 29, 32 & 35 on 16 October, where 14 – 20 of these animals were present in a relatively small area. Second was sighting 24, where close to 200 common dolphins approached the vessel and remained for an extended period. Also of note was the apparent relative lack of activity in areas considered 'hotspots' such as areas south and west of Roches point.

The Celtic Sea Herring Acoustic Survey provides an excellent opportunity for cetacean surveying due to the nature of the main survey – the speed of the vessel and the grid survey pattern is conducive to mammal survey transects, as well as obviously conducting the main survey in areas of high food stocks at this time of year. The survey visits coastal and offshore waters from the west, where the Celtic Sea meets the Atlantic to the east where it meets the Irish Sea. Unfortunately, the nature of the survey time also means more inclement weather, resulting in frequent periods lost to downtime, as well as monitoring and data collection conducted under less-than-ideal conditions – and often conducted approaching the limit of acceptable conditions.

One interesting feature of the RV Tom Crean is the hull camera; dolphins were often spotted swimming in groups under the vessel, as shown below. This indicates the likely presence of a pressure wave under the vessel within which animals can swim. While an interesting behaviour in of itself, it is also something an MMO would not normally see. MMO observed common dolphins on the camera during periods of conditions where traditional monitoring was not possible. Creating a methodology to incorporate this may be advantageous. An additional bow camera would also be advantageous to the MMO, as, due to positioning of observer deck in reference to the bow, it was often difficult to keep track of numbers in larger pods with disparate groups coming to bow-ride, leaving and returning, etc. Being able to observe the bow would be useful in increasing accuracy of estimations in some sightings.

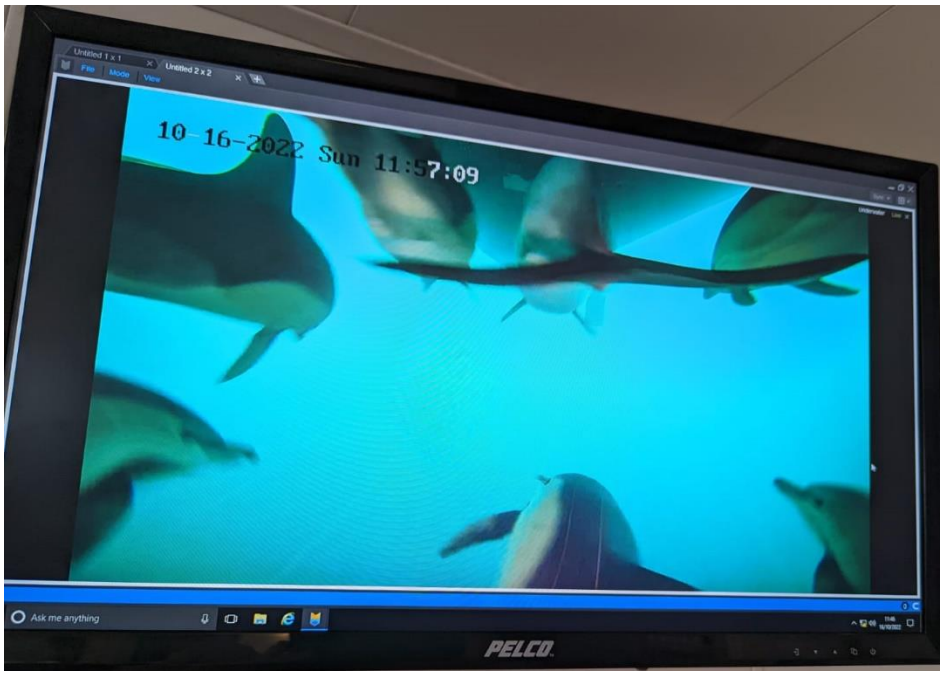


Image 5. *Dolphins on Tom Crean hull camera. Photo credit to Graham Johnston, MI.*

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OSPAR Commission. "OSPAR Convention for the protection of the marine environment of the North-East Atlantic." (1992)

Wildlife Act. "Government of Ireland." (1976)

List of Appendices

Appendix I: Marine Mammal Observer CV

Andrew Shine

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Overview

Self-employed, contracting as an observer for the private sector. Graduated from NUI Galway with a B. Sc. (Hons) in Marine Science, supplementing this degree with an extra-curricular research internship, science-communication/awareness events and research trips at sea. Taken part in a number of international research cruises and private sector projects clocking well in excess of 150 days at sea and >5000 observation hours in the field, land and sea based. Enjoying a voluntary position as Celtic Mist Officer, a dedicated research vessel run by the Irish Whale & Dolphin Group.

Skills and experience include working offshore, marine mammal surveying & mitigation, versed on national and European level regulation with regard to marine mammal mitigation & facilitation of such, passive acoustic monitoring (PAM), fisheries surveying including biological investigations, aerial survey image analysis, deep-sea ROV survey, data consolidation & report writing and public engagement, among others. Proud of ability to integrate well and create excellent working relationships; have regularly joined developed teams as an outsider in high-pressure working environments and always enjoyed great success.

Education

• **B. Sc., Marine Science** National University of Ireland, Galway **2013 – 2017**

Extra Training

• Strategic Marine Alliance for Research & Training (SMART) **2016**
• JNCC Marine Mammal Observation Training **2015**
• Marine Mammal Surveying & Photo Identification **2015**
• Full Irish driver license (van owner), Safe-Pass, Manual Handling

Relevant Work History & Research Experience

Work History

• Aerial Survey Image Analyst, Green Rebel Marine **January 2022 – Current**
• IRIS Subsea Cable Lay Project **July – August 2022**
• MMO, Dinish Island Harbour Extension Project **2018 – 2020, 2021 – 2022**
• ICCAT Bluefin Tuna Observer **Season, 2021**
• MMO, Alexandra Basin Redevelopment Project **October 2020 – October 2021**
• MMO, Port of Cork Maintenance Dredging Campaign **August – October 2020**
• Herring Fishery Bycatch Observer **Season, 2017**
• Foreign Vessel Observer, Marine Institute **Periodical, 2017 - 2018**

Research Experience

• Research Project: *B.Sc. Hons* **2016-2017**

o *'Detecting anthropogenic influence in marine ecosystems: Mytilus edulis as an applied habitat quality bio-assessor.'*

• Research Internship: *Shannon Dolphin and Wildlife Foundation* **2015**

o *Field and office based. Successfully recorded and catalogued dolphin identities, and behaviours for 2015 season, utilising opportunistic and dedicated platforms.*

• Scientific Cruises:

o **CE19008** *'Monitoring change in submarine canyon coral habitats (MoCha_SCan)'* **2019**

o **CE1801** *'Controls of Cold-Water Coral Habitats in Submarine Canyons (CoCoHaCa II)'* **2018**

o **BYPASS9b** *'The unknown role of submarine canyons: Pathways or sinks for organic carbon'* **2018**

o **CEFAS18/17** '*CEFAS Irish Sea Fisheries Abundance Survey*' **2017**

o **WH406** *'Investigating the selective properties of selective codends in the trawl mixed fishery targeting Megrim, Monkfish and Hake'* **2017**

o **CV16023** *'Marine medicines from the Irish Deep'* **2016**

Appendix II: *Record Of Monitoring Effort*

Date	Survey title	Record number/id	Record type	Sample type	Platform type	Platform Name	Observation height (metres)	Platform activity	Observer Name	Observer Code	Transect Start Time hh:mm	Transect End Time hh:mm	Sample Duration minutes	Lat. at start	Long. at start	Lat. at end	Long. at end
10/10/2022	Celtic Sea Herring	2	EFFORT	I	SHIP	Tom Crean	14.7	MMO	Andrew J. Shine	AJS	15:27:06	16:26:42	00:59:36	51.56978	-9.66042	51.56964	-9.66046
10/10/2022	Celtic Sea Herring	4	EFFORT	LT	SHIP	Tom Crean	14.7	S	Andrew J. Shine	AJS	17:14:32	17:39:28	00:24:56	51.56895	-9.6735	51.5381	-9.74802
11/10/2022	Celtic Sea Herring	6	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	06:39:52	08:44:42	02:04:50	50.81002	-8.46517	51.13581	-8.46008
11/10/2022	Celtic Sea Herring	8	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	09:02:09	10:40:54	01:38:45	51.18194	-8.46168	51.45632	-8.4659
11/10/2022	Celtic Sea Herring	-	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	12:45:00	13:24:02	00:39:02	51.71177	-8.24891	51.61317	-8.24815
11/10/2022	Celtic Sea Herring	11	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	13:55:30	14:11:37	00:16:07	51.59953	-8.2474	51.55861	-8.25126
11/10/2022	Celtic Sea Herring	13	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:28:25	15:02:53	00:34:28	51.57775	-8.2494	51.61209	-8.24469
11/10/2022	Celtic Sea Herring	15	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	15:35:23	16:36:12	01:00:49	51.6016	-8.24776	51.42384	-8.24599
12/10/2022	Celtic Sea Herring	17	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	06:58:27	07:48:02	00:49:35	51.76952	-8.05696	51.78152	-7.98033
12/10/2022	Celtic Sea Herring	19	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	08:04:32	08:38:20	00:33:48	51.79749	-7.94501	51.86401	-7.82818
12/10/2022	Celtic Sea Herring	21	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	08:38:45	10:31:20	01:52:35	51.86384	-7.82642	51.55096	-7.81687
12/10/2022	Celtic Sea Herring	23	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	11:52:20	13:06:51	01:14:31	51.3369	-7.81786	51.1591	-7.81278
12/10/2022	Celtic Sea Herring	25	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	13:44:41	14:22:40	00:37:59	51.23601	-7.82022	51.20675	-7.8159
12/10/2022	Celtic Sea Herring	27	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:38:01	16:20:47	01:42:46	51.1943	-7.81222	50.97162	-7.77808
13/10/2022	Celtic Sea Herring	29	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:00:32	09:02:04	02:01:32	51.73363	-7.40184	51.42452	-7.39042
13/10/2022	Celtic Sea Herring	31	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	09:25:19	10:32:36	01:07:17	51.36384	-7.39027	51.18276	-7.39436
13/10/2022	Celtic Sea Herring	33	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	11:40:11	13:42:27	02:02:16	50.99993	-7.39369	51.13592	-7.1821
13/10/2022	Celtic Sea Herring	35	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:08:31	16:28:28	02:19:57	51.20705	-7.18292	51.58362	-7.18161
14/10/2022	Celtic Sea Herring	37	EFFORT	LT	SHIP	Tom Crean	14.7	O	Andrew J. Shine	AJS	06:51:32	07:15:14	00:23:42	50.99089	-6.97402	50.97407	-6.96964
14/10/2022	Celtic Sea Herring	39	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:15:25	07:22:56	00:07:31	50.97406	-6.96965	50.9751	-6.95838
14/10/2022	Celtic Sea Herring	41	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:23:11	10:33:02	03:09:51	50.9751	-6.9577	51.35616	-6.75971
14/10/2022	Celtic Sea Herring	43	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	11:53:13	12:48:08	00:54:55	51.50054	-6.75838	51.45531	-6.75321
14/10/2022	Celtic Sea Herring	46	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	12:48:21	14:13:04	01:24:43	51.45537	-6.75308	51.65125	-6.75893
14/10/2022	Celtic Sea Herring	48	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	15:04:02	15:46:17	00:42:15	51.61905	-6.75601	51.65118	-6.76166

14/10/2022	Celtic Sea Herring	50	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	15:46:20	16:30:07	00:43:47	51.65118	-6.76166	51.75457	-6.75868
16/10/2022	Celtic Sea Herring	52	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:04:13	10:29:32	03:25:19	50.9856	-5.81258	51.32427	-5.81098
16/10/2022	Celtic Sea Herring	54	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	11:54:41	12:26:00	00:31:19	51.48214	-5.78704	51.56371	-5.81072
16/10/2022	Celtic Sea Herring	56	EFFORT	LT	SHIP	Tom Crean	14.7	S	Andrew J. Shine	AJS	12:28:47	13:28:10	00:59:23	51.56422	-5.81277	51.53016	-5.81502
16/10/2022	Celtic Sea Herring	59	EFFORT	LT	SHIP	Tom Crean	14.7	S	Andrew J. Shine	AJS	13:51:11	15:30:02	01:38:51	51.53121	-5.8162	51.56862	-6.18015
17/10/2022	Celtic Sea Herring	61	EFFORT	LT	SHIP	Tom Crean	14.7	S	Andrew J. Shine	AJS	12:47:51	14:50:40	02:02:49	51.83557	-8.27143	51.66712	-8.42559
17/10/2022	Celtic Sea Herring	63	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:50:57	16:31:26	01:40:29	51.66674	-8.42534	51.6755	-8.30982
18/10/2022	Celtic Sea Herring	65	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:01:46	07:36:33	00:34:47	51.97625	-7.48094	52.06604	-7.46528
18/10/2022	Celtic Sea Herring	67	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	07:36:44	08:35:27	00:58:43	52.0662	-7.46564	52.00846	-7.46395
18/10/2022	Celtic Sea Herring	69	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	08:35:45	10:32:04	01:56:19	52.00859	-7.46379	51.94732	-7.35103
18/10/2022	Celtic Sea Herring	71	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	12:00:10	14:40:46	02:40:36	51.8658	-7.24727	52.04734	-7.13781
19/10/2022	Celtic Sea Herring	76	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	15:35:34	16:16:07	00:40:33	51.97666	-7.00859	51.99266	-7.1493
19/10/2022	Celtic Sea Herring	74	EFFORT	LT	SHIP	Tom Crean	14.7	S	Andrew J. Shine	AJS	12:30:26	14:02:11	01:31:45	53.08154	-5.6285	53.20626	-5.73707
22/10/2022	Celtic Sea Herring	78	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	07:36:36	08:11:21	00:34:45	51.73694	-6.43263	51.71465	-6.44845
22/10/2022	Celtic Sea Herring	80	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	08:11:28	10:30:54	02:19:26	51.71472	-6.44833	51.44802	-6.43847
22/10/2022	Celtic Sea Herring	82	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	11:56:48	14:05:25	02:08:37	51.25532	-6.43529	51.12781	-6.6509
22/10/2022	Celtic Sea Herring	84	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:36:06	15:31:33	00:55:27	51.20254	-6.64903	51.3347	-6.64939
22/10/2022	Celtic Sea Herring	86	EFFORT	LT	SHIP	Tom Crean	14.7	O	Andrew J. Shine	AJS	15:52:20	16:16:23	00:24:03	51.3339	-6.64842	51.33381	-6.64952
22/10/2022	Celtic Sea Herring	88	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	16:16:45	16:31:07	00:14:22	51.33415	-6.64943	51.3686	-6.64895
23/10/2022	Celtic Sea Herring	90	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:20:03	09:43:38	02:23:35	50.99329	-7.0612	51.30671	-7.07713
23/10/2022	Celtic Sea Herring	92	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	09:43:46	10:30:02	00:46:16	51.30684	-7.07701	51.26963	-7.07801
23/10/2022	Celtic Sea Herring	94	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	11:55:23	12:58:27	01:03:04	51.32787	-7.07193	51.48014	-7.07186
23/10/2022	Celtic Sea Herring	96	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	12:58:37	13:58:11	00:59:34	51.4804	-7.07168	51.44237	-7.07217
23/10/2022	Celtic Sea Herring	98	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:24:10	16:30:14	02:06:04	51.44645	-7.0721	51.76693	-7.07094
24/10/2022	Celtic Sea Herring	100	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:14:05	09:42:27	02:28:22	51.13883	-7.51216	51.48899	-7.49657
24/10/2022	Celtic Sea Herring	102	EFFORT	LT	SHIP	Tom Crean	14.7	Fi	Andrew J. Shine	AJS	09:42:29	10:20:31	00:38:02	51.48899	-7.49657	51.46321	-7.4985
24/10/2022	Celtic Sea Herring	104	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	11:46:58	14:00:06	02:13:08	51.44348	-7.51081	51.75678	-7.49775
24/10/2022	Celtic Sea Herring	106	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	14:37:38	15:42:46	01:05:08	51.8483	-7.4975	52.00637	-7.4982
25/10/2022	Celtic Sea Herring	109	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	07:18:29	10:30:16	03:11:47	51.72102	-8.13836	51.27888	-8.14207
25/10/2022	Celtic Sea Herring	111	EFFORT	LT	SHIP	Tom Crean	14.7	FiS	Andrew J. Shine	AJS	12:16:19	16:17:44	04:01:25	51.16306	-8.33715	51.65653	-8.3869

Appendix III: *Record Of Weather Stations*

Date (dd/mm/yyyy)	**Time of day (UTC)** hh:mm:ss	**Latitude** (Decimal degrees N)	**Longitude** (Decimal degrees W)	**Visibility** (kilometres)	**Glare** (degrees)	**Swell height** (metres)	**Sea state (WMO code)**	**Wind force (Beaufort)**	**Wind speed** (knots)	**Wind Direction** (degrees)	**Cloud cover** (scale: 0-8)	**Precipitation type**	**Precipitation intensity**	**Water depth** (metres)	**Additional Comments**
10/10/2022	07:07:55	51.5699	-9.66123	10	0	<1m	2	2	5	344	2	None		-	
10/10/2022	15:56:21	51.56962	-9.66025	10	15	<1m	2	2	5	328	2	None		-	
10/10/2022	16:15:09	51.56969	-9.66047	10	10	<1m	2	2	5	335	6	None		-	
10/10/2022	16:26:18	51.56964	-9.66043	8	10	<1m	2	2	5	335	6	None		-	
10/10/2022	17:16:17	51.56752	-9.67987	8	0	<1m	2	2	6	299	6	None		-	
10/10/2022	17:31:04	51.54534	-9.72144	8	10	<1m	2	2	6	300	6	None		-	
11/10/2022	06:48:27	50.83405	-8.45885	8	0	<1m	2	2	6	254	6	None		-	
11/10/2022	07:00:10	50.8619	-8.45618	8	10	<1m	2	2	6	254	6	None		115	
11/10/2022	07:16:05	50.90172	-8.45803	8	30	<1m	2	2	6	255	6	None		115	
11/10/2022	07:31:22	50.94138	-8.45729	8	10	<1m	2	2	6	235	6	None		115	
11/10/2022	07:46:23	50.98048	-8.45768	8	0	<1m	2	3	8	255	6	None		115	
11/10/2022	07:59:34	51.01522	-8.45885	8	0	<1m	2	3	7	254	6	None		115	
11/10/2022	08:15:41	51.0581	-8.4594	8	0	<1m	2	3	7	254	6	None		108	
11/10/2022	08:29:20	51.09484	-8.46031	8	0	1 - 2m	2	3	7	234	6	None		108	
11/10/2022	08:44:35	51.13537	-8.46007	8	0	1 - 2m	2	3	7	234	6	None		108	
11/10/2022	09:03:47	51.18609	-8.46182	8	0	1 - 2m	2	3	10	240	6	None		102	
11/10/2022	09:15:47	51.21938	-8.46217	8	0	1 - 2m	3	3	7	240	6	None		102	
11/10/2022	09:30:58	51.26174	-8.46246	8	0	1 - 2m	3	3	7	241	6	None		98	
11/10/2022	09:48:03	51.30956	-8.46366	8	0	1 - 2m	3	3	7	241	6	None		98	
11/10/2022	10:01:00	51.34539	-8.4643	8	0	1 - 2m	3	4	11	238	6	None		92	
11/10/2022	10:16:13	51.38808	-8.46404	8	0	1 - 2m	3	4	11	238	7	None		92	
11/10/2022	10:30:12	51.42593	-8.4646	6	0	<1m	3	4	11	238	7	None		-	
11/10/2022	11:46:13	51.64216	-8.46703	6	0	<1m	3	4	11	189	8	None		50	
11/10/2022	12:03:34	51.6698	-8.40609	6	0	<1m	3	4	11	189	8	None		36	

11/10/2022	12:15:24	51.68779	-8.36151	6	0	<1m	3	4	11	189	8	None		36	
11/10/2022	12:32:04	51.71286	-8.30018	6	0	<1m	3	4	11	189	8	None		36	
11/10/2022	12:46:33	51.71177	-8.24891	6	0	<1m	4	4	13	189	8	None		36	
11/10/2022	12:50:46	51.70002	-8.24915	6	0	<1m	4	5	18	189	8	None		35	
11/10/2022	13:02:05	51.66848	-8.24829	6	30	<1m	4	5	18	189	8	None		49	
11/10/2022	13:16:53	51.62756	-8.24835	6	0	<1m	4	5	18	195	8	None		50	
11/10/2022	13:57:06	51.59501	-8.24774	6	0	<1m	4	5	18	191	8	None		75	
11/10/2022	14:29:55	51.57918	-8.24928	6	0	<1m	5	5	18	190	8	None		75	
11/10/2022	14:46:58	51.59623	-8.24691	6	0	<1m	5	5	20	191	8	None		-	
11/10/2022	15:01:39	51.61093	-8.24476	6	0	1 - 2m	5	5	18	191	8	None		-	
11/10/2022	15:33:02	51.6083	-8.24769	6	0	1 - 2m	5	6	22	182	8	None		75	
11/10/2022	15:45:06	51.5735	-8.24779	6	0	<1m	5	6	22	181	8	None		75	
11/10/2022	16:03:09	51.52031	-8.24702	6	0	<1m	5	6	22	180	8	None		91	
11/10/2022	16:16:03	51.48234	-8.24715	6	0	<1m	5	5	22	181	8	None		92	
11/10/2022	16:30:29	51.44049	-8.24645	6	0	<1m	5	6	22	181	8	None		89	
12/10/2022	07:05:35	51.77239	-8.04201	4	0	1 - 2m	4	4	10	290	8	None		40	
12/10/2022	07:16:15	51.77472	-8.02682	4	0	1 - 2m	4	4	10	280	8	None		45	DULL, GREY, BANDS OF MIST
12/10/2022	07:32:13	51.77789	-8.0014	4	0	1 - 2m	4	4	10	280	6	None		45	BRIGHTER, SEAS PICKING UP
12/10/2022	08:06:44	51.80202	-7.93733	4	0	1 - 2m	4	3	9	295	6	None		37	BRIGHTER, CALMER
12/10/2022	08:16:33	51.82232	-7.90187	4	10	1 - 2m	3	3	9	295	7	None		37	SEAS EASED, CLOSE SWELL, FADING LIGHT
12/10/2022	08:31:35	51.85189	-7.85157	4	0	1 - 2m	3	3	9	295	7	None		40	
12/10/2022	08:49:00	51.84031	-7.8154	4	10	1 - 2m	4	3	10	295	7	None		26	
12/10/2022	09:02:14	51.80273	-7.81523	4	10	1 - 2m	4	3	10	295	7	None		-	
12/10/2022	09:16:43	51.76182	-7.81494	4	10	1 - 2m	4	3	9	295	7	None		-	LOTS OF WINGS, NO FINS
12/10/2022	09:32:39	51.71722	-7.81612	4	10	1 - 2m	4	3	9	295	7	None		77	
12/10/2022	09:52:52	51.66042	-7.81542	4	10	1 - 2m	3	3	9	295	7	None		-	
12/10/2022	10:16:07	51.59435	-7.81656	4	0	1 - 2m	3	3	9	295	8	None		83	
12/10/2022	10:30:40	51.55291	-7.8169	4	10	1 - 2m	3	3	10	295	8	None		-	
12/10/2022	11:54:00	51.33258	-7.81781	6	0	1 - 2m	4	4	13	256	8	None		90	

12/10/2022	12:16:17	51.27787	-7.83624	6	0	1 - 2m	4	4	13	257	8	None		-	
12/10/2022	12:35:33	51.23265	-7.81642	6	20	1 - 2m	4	4	13	257	7	None		-	HAZEY
12/10/2022	12:48:00	51.20205	-7.81763	6	30	1 - 2m	4	4	13	257	7	None		94	
12/10/2022	13:01:17	51.16888	-7.81661	6	0	1 - 2m	4	4	13	257	7	None		-	
12/10/2022	13:46:51	51.23482	-7.82014	6	0	1 - 2m	4	4	12	234	7	None		95	SHOOTING NET
12/10/2022	14:08:35	51.21726	-7.81831	6	0	1 - 2m	4	4	12	257	7	None		-	DULL
12/10/2022	14:42:20	51.18393	-7.81394	6	0	1 - 2m	4	4	13	240	8	None		-	OVERCAST, CHOPPY, VERY DULL IN PARTS
12/10/2022	15:06:22	51.12644	-7.81642	6	0	1 - 2m	4	4	14	257	8	None		-	
12/10/2022	15:17:04	51.10058	-7.81628	6	0	1 - 2m	4	4	14	288	8	None		100	
12/10/2022	15:32:58	51.06267	-7.81629	6	0	1 - 2m	4	4	14	288	8	None		-	BRIGHTEN A LITTLE, HAZY AFTER 2KM
12/10/2022	15:45:14	51.0331	-7.81648	6	0	1 - 2m	4	4	14	188	8	None		-	HEAVIER CLOUD COMING IN FROM WEST
12/10/2022	16:00:23	50.99736	-7.81555	6	0	1 - 2m	4	4	12	188	8	None		105	
12/10/2022	16:15:33	50.96862	-7.79937	6	0	1 - 2m	3	4	12	188	8	None		-	
13/10/2022	07:02:03	51.73022	-7.40162	10	0	<1m	3	4	12	145	6	None		80	
13/10/2022	07:25:38	51.67114	-7.38949	10	30	<1m	3	4	12	148	6	None		80	
13/10/2022	07:52:20	51.60414	-7.38938	10	30	<1m	3	4	12	145	5	None		80	
13/10/2022	08:30:29	51.50653	-7.38806	10	20	<1m	3	4	12	144	5	None		80	
13/10/2022	08:47:23	51.463	-7.38956	10	20	<1m	3	4	12	144	5	None		84	
13/10/2022	09:00:59	51.42752	-7.39045	10	30	<1m	3	4	12	144	5	None		85	
13/10/2022	09:27:19	51.35854	-7.39029	10	20	<1m	3	3	8	164	5	None		90	
13/10/2022	09:47:40	51.30416	-7.39007	10	30	<1m	3	3	8	164	5	None		80	
13/10/2022	09:59:56	51.27092	-7.3911	10	30	<1m	3	3	8	164	5	None		85	
13/10/2022	10:17:22	51.22377	-7.39414	10	30	<1m	3	3	8	164	5	None		85	
13/10/2022	11:42:07	50.99468	-7.39385	10	20	<1m	3	3	9	188	5	None		-	
13/10/2022	12:02:23	50.97283	-7.33896	10	20	<1m	3	3	8	188	5	None		100	
13/10/2022	12:19:33	50.97362	-7.27121	10	20	<1m	3	3	9	188	5	None		100	
13/10/2022	12:30:40	50.97445	-7.2275	10	20	<1m	3	3	9	188	6	None		100	
13/10/2022	12:56:46	51.01528	-7.1823	10	0	<1m	3	3	9	188	6	None		100	
13/10/2022	13:16:00	51.06633	-7.18334	10	0	<1m	3	3	9	188	6	None		95	
13/10/2022	13:32:26	51.10975	-7.18766	10	0	<1m	3	3	9	188	6	None		95	

13/10/2022	14:09:07	51.20853	-7.18286	10	0	<1m	3	4	11	195	7	None		95	GETTING DULLER
13/10/2022	14:33:31	51.27473	-7.18258	10	0	<1m	3	4	11	195	7	None		90	
13/10/2022	14:48:14	51.31442	-7.18195	10	0	<1m	3	4	11	195	7	None		85	VERY DULL IN PARTS
13/10/2022	15:07:12	51.36552	-7.18154	10	0	<1m	3	4	11	195	7	None		85	CLOUD INCREASING, LOW CLOUD INCREASING
13/10/2022	15:24:40	51.41317	-7.18066	10	0	<1m	3	4	12	195	7	None		-	
13/10/2022	15:45:23	51.46875	-7.18238	10	0	<1m	4	4	13	220	7	None		-	
13/10/2022	16:00:47	51.50961	-7.18114	10	0	<1m	4	4	13	220	7	None		80	
13/10/2022	16:17:58	51.55597	-7.1807	10	0	<1m	4	4	13	225	7	None		80	
14/10/2022	07:05:48	50.974	-6.96955	10	0	<1m	4	3	10	255	7	None		95	
14/10/2022	07:18:13	50.97414	-6.96946	10	0	<1m	4	3	10	255	4	None		95	LIGH CLOUD OVER VESSEL, HEAVY OVERCAST 270' -320', BIRGHTENING
14/10/2022	07:35:49	50.97353	-6.90519	10	55	<1m	3	3	10	255	5	None		95	CLOUD INCREASING, OVERCAST 340' - 90'
14/10/2022	07:45:22	50.97252	-6.86457	10	10	<1m	3	3	10	255	5	None		95	
14/10/2022	07:59:35	50.97148	-6.80207	10	20	<1m	3	3	10	255	5	None		104	
14/10/2022	08:18:21	50.9968	-6.75775	10	0	<1m	3	3	9	255	4	None		105	
14/10/2022	08:34:51	51.04127	-6.75933	10	0	<1m	3	4	12	244	4	None		105	
14/10/2022	08:56:10	51.09932	-6.75714	10	0	<1m	3	4	12	244	4	None		100	
14/10/2022	09:22:16	51.16965	-6.75938	10	0	<1m	3	4	13	244	4	None		100	
14/10/2022	09:31:05	51.1933	-6.75952	10	0	<1m	4	4	13	244	4	None		100	
14/10/2022	09:45:44	51.23232	-6.7587	10	0	<1m	4	4	13	244	5	None		100	
14/10/2022	09:59:38	51.26862	-6.75904	8	0	<1m	4	4	13	244	5	None		90	HAZEY
14/10/2022	11:55:31	51.49849	-6.75852	8	0	<1m	3	3	7	170	5	None		90	
14/10/2022	12:19:40	51.47599	-6.75965	8	0	<1m	3	3	8	144	8	None		80	
14/10/2022	12:32:24	51.46433	-6.75952	8	0	<1m	3	3	8	144	8	None		80	
14/10/2022	12:45:24	51.45662	-6.7551	8	0	<1m	3	3	9	144	8	None		-	SQUALLS AND SHOWERS, QUITE DULL

14/10/2022	13:03:10	51.48415	-6.7568	8	0	<1m	3	3	10	144	8	None		-	
14/10/2022	13:16:33	51.51645	-6.75849	1	0	<1m	3	3	9	144	8	None		80	RAIN, DULL, PORT AND PORT FRONT WINDOWS OBSTRUCTED (WET)
14/10/2022	13:30:37	51.55047	-6.75876	4	0	<1m	3	3	10	144	8	None		80	BRIGHTENING SLIGHTLY
14/10/2022	13:47:33	51.59129	-6.76016	8	0	<1m	3	3	9	144	6	None		80	BRIGHT, CALM
14/10/2022	14:05:43	51.63387	-6.76179	8	0	<1m	3	3	9	144	6	None		-	
14/10/2022	15:04:31	51.6194	-6.75608	8	0	<1m	3	3	8	244	6	None		70	
14/10/2022	15:15:12	51.62897	-6.75995	8	0	<1m	3	3	8	244	6	None		70	
14/10/2022	15:31:03	51.64159	-6.76362	8	0	<1m	3	3	8	244	6	None		70	
14/10/2022	15:45:11	51.6497	-6.76359	8	0	<1m	3	3	9	244	6	None		70	
14/10/2022	16:03:37	51.69069	-6.75803	8	0	<1m	3	4	9	244	6	None		70	
14/10/2022	16:19:14	51.72843	-6.75839	8	0	<1m	3	3	9	244	5	None		70	
16/10/2022	07:07:09	50.98555	-5.81254	8	0	2 - 3m	3	2	6	184	5	None		90	Bright, fresh, messy sea with crossing swells
16/10/2022	07:16:50	51.0027	-5.81133	8	10	2 - 3m	3	2	6	84	5	None		90	
16/10/2022	08:11:18	51.04029	-5.80776	8	0	2 - 3m	3	2	6	185	5	None		90	
16/10/2022	08:43:17	51.05397	-5.80989	8	0	2 - 3m	3	3	10	150	5	None		90	
16/10/2022	09:03:56	51.10536	-5.81214	8	0	2 - 3m	3	3	9	150	5	None		90	
16/10/2022	09:22:20	51.15208	-5.81176	8	0	2 - 3m	3	3	9	150	5	None		90	
16/10/2022	09:31:00	51.17393	-5.81164	8	0	2 - 3m	3	3	9	150	5	None		90	
16/10/2022	09:57:03	51.24034	-5.81136	8	0	2 - 3m	3	3	9	150	5	None		90	
16/10/2022	10:16:33	51.29082	-5.81063	8	0	1 - 2m	4	4	11	150	5	None		85	
16/10/2022	11:55:40	51.48442	-5.78554	8	0	1 - 2m	4	5	17	130	5	None		85	
16/10/2022	12:16:02	51.53683	-5.81038	8	0	2 - 3m	5	5	18	140	8	None		85	hazy & dull
16/10/2022	12:30:40	51.56361	-5.81321	8	30	2 - 3m	5	5	18	140	8	None		85	FAIRLY POOR, BUSTERY, DULL, HAZEY, INTERMITTENT GLARE AHEAD
16/10/2022	12:58:47	51.54639	-5.81405	8	15	2 - 3m	5	5	18	140	8	None		85	
16/10/2022	13:16:28	51.53541	-5.81101	8	0	2 - 3m	5	5	18	140	8	None		85	
16/10/2022	13:33:22	51.53087	-5.8144	8	0	2 - 3m	5	5	20	140	8	None		85	
16/10/2022	13:49:24	51.53097	-5.81465	8	0	2 - 3m	6	7	28	125	8	None		85	

16/10/2022	14:10:04	51.53997	-5.88166	8	0	2 - 3m	6	7	2	120	8	None		-	
16/10/2022	14:20:11	51.54365	-5.91362	8 4	0	2 - 3m	6	7	30	144	8	None		-	DRY LAB GONE FOR BISCUITS, NO DEPTH
16/10/2022	14:29:40	51.5471	-5.95039	8 4	0	2 - 3m	6	7	30	140	7	None		-	
16/10/2022	14:46:05	51.55314	-6.01359	8 4	30	2 - 3m	6	7	30	140	7	None		-	
16/10/2022	15:01:58	51.55926	-6.07371	8 4	30	2 - 3m	6	7	30	140	6	None		-	
16/10/2022	15:18:06	51.5652	-6.13462	8 4	20	2 - 3m	6	7	33	140	6	None		-	
17/10/2022	12:49:57	51.83006	-8.2728	8 4	55	<1m	3	5	18	220	3	None		-	
17/10/2022	13:02:23	51.80059	-8.26097	8 4	35	<1m	4	5	18	220	3	None		-	
17/10/2022	13:23:16	51.75451	-8.25221	8 4	20	<1m	4	4	12	200	3	None		30	
17/10/2022	13:48:06	51.73792	-8.24589	8 4	0	<1m	4	4	12	220	2	None		30	BRIGHT BUT HAZEY AND LOTS OF GLARE
17/10/2022	14:06:21	51.71668	-8.28871	6	30	<1m	4	4	12	220	2	None		30	haze reducing effective vis
17/10/2022	14:29:16	51.69079	-8.35976	6	30	1 - 2m	4	4	12	220	2	None		30	
17/10/2022	14:53:47	51.66179	-8.42503	6	20	1 - 2m	4	4	12	220	2	None		30	
17/10/2022	15:16:42	51.61039	-8.42545	10	20	1 - 2m	3	4	10	220	2	None		60	HAZEY AND DAZZLING 0' -90', GOOD FROM 270' - 360'
17/10/2022	15:33:01	51.5836	-8.40681	10	0	1 - 2m	3	3	10	220	1	None		60	VESSEL TURED EAST, CONDITIONS GOOD BAR SWELL
17/10/2022	15:47:12	51.58476	-8.34856	10	0	1 - 2m	3	3	10	220	1	None		70	GOOD, HAZE LANDSIDE
17/10/2022	16:00:08	51.59613	-8.30954	8	0	1 - 2m	3	3	10	220	1	None		70	TURNED NORTH, VERY HAZEY 2KM AWAY 270' - 45'
17/10/2022	16:17:38	51.64044	-8.30822	8	0	1 - 2m	3	2	10	220	3	None		-	
17/10/2022	16:31:21	51.6755	-8.30982	8	0	1 - 2m	3	3	10	220	3	None		-	
18/10/2022	07:03:47	51.97625	-7.48094	6	0	<1m	3	4	15	100	8	None		55	VERY DULL, LOW OVERCAST & HAZE
18/10/2022	07:20:37	52.02583	-7.46501	6	0	<1m	3	4	15	100	7	None		55	LITTLE BRIGHTER, HAZEY

18/10/2022	07:29:46	52.04934	-7.46473	6	0	<1m	3	4	15	100	7	None		55	DULL, RELATIVELY FLAT WATER
18/10/2022	07:45:24	52.05109	-7.46617	6	0	<1m	3	4	15	100	7	None		-	HEAVIER CLOUD SETTING IN
18/10/2022	08:01:29	52.03662	-7.46538	6	0	<1m	3	4	15	100	7	None		-	BRIGHTER, HAZY, LOT OF SPRAY
18/10/2022	08:15:03	52.02431	-7.46399	6	0	<1m	4	4	15	100	7	None		-	BRIGHTER, VIS INCREASING
18/10/2022	08:34:27	52.00854	-7.46465	6	0	<1m	4	4	15	100	7	None		45	
18/10/2022	08:45:10	52.02655	-7.44617	6	0	<1m	4	4	15	100	7	None		45	
18/10/2022	09:01:49	52.06182	-7.41099	6	0	<1m	4	5	17	95	7	None		45	
18/10/2022	09:16:10	52.09201	-7.38004	3	0	<1m	5	5	17	95	8	None		45	ROUGH SURFACE, LITTLE SWELL, VERY HAZEY FROM 2KM
18/10/2022	09:40:53	52.06483	-7.35292	3	50	<1m	5	5	17	95	8	None		-	VIS LOW, ENTERING AREA WITH HEAVY CLOUD
18/10/2022	10:00:11	52.02023	-7.35362	3	0	<1m	5	5	17	95	8	None		55	DULL, POOR VIS, VERY CHOPPY
18/10/2022	10:15:52	51.984	-7.35267	6	0	<1m	5	5	17	95	8	None		-	VIS INCREASING
18/10/2022	10:31:59	51.94732	-7.35103	6	0	<1m	5	5	17	95	8	None		60	
18/10/2022	12:01:06	51.86824	-7.24733	6	0	<1m	5	5	17	95	8	None		95	
18/10/2022	12:16:05	51.90509	-7.24712	4	0	<1m	5	5	17	95	8	None		-	VERY DULL & HAZEY
18/10/2022	12:33:29	51.9478	-7.24787	4	0	<1m	5	5	17	95	8	None		65	
18/10/2022	12:58:03	52.00842	-7.24873	3	0	<1m	5	5	17	95	8	None		60	
18/10/2022	13:18:35	52.05819	-7.25027	3	0	<1m	5	5	17	95	8	None		50	
18/10/2022	13:36:31	52.1009	-7.24937	6	0	<1m	5	5	17	95	7	None		50	
18/10/2022	13:48:35	52.10565	-7.2119	6	0	<1m	5	5	17	95	7	None		-	
18/10/2022	14:01:42	52.108	-7.16471	6	0	<1m	5	6	23	70	7	None		35	
18/10/2022	14:24:17	52.08192	-7.13807	10	15	<1m	6	6	25	70	7	None		-	
18/10/2022	15:05:15	51.99235	-7.13725	10	15	<1m	6	6	25	70	7	None		-	RESCUE CHOPPER

18/10/2022	15:09:56	51.98824	-7.12525	10	0	<1m	6	6	25	70	7	None		-	TURNED WEST
18/10/2022	15:36:36	51.97612	-7.00396	10	0	<1m	6	6	25	70	7	None		60	
18/10/2022	15:46:06	51.98183	-7.0292	10	10	<1m	6	6	25	70	7	None		60	TURNED WEST TO GO BACK ON LINE AFTER CHOPPER
18/10/2022	16:00:04	51.98701	-7.09372	8	10	<1m	6	6	25	70	7	None		60	HEAVY HAZE INCREASING FROM WEST
18/10/2022	16:15:09	51.99255	-7.14764	8	0	<1m	6	6	25	70	7	None		60	
19/10/2022	12:27:27	53.07726	-5.62947	8	0	<1m	6	6	22	45	7	None		30	
19/10/2022	12:53:11	53.11166	-5.65189	4	0	<1m	6	6	22	45	8	None		30	HEAVY CLOUD AND REMAINDER OF THUNDERSTORM 270' - 360', BRIGHTER TO STARTBOARD
19/10/2022	13:18:13	53.14626	-5.68439	4	0	<1m	6	6	22	45	8	None		-	
19/10/2022	13:37:52	53.17264	-5.70861	4	0	1 - 2m	6	6	22	45	8	None		-	
19/10/2022	14:02:08	53.20626	-5.73707	2	0	2 - 3m	6	6	22	45	8	None		-	
22/10/2022	07:37:46	51.73593	-6.4333	6	0	2 - 3m	4	5	18	210	8	None		70	HEAVY SWELL, HAZEY, NOT IDEAL
22/10/2022	08:00:39	51.71883	-6.44556	3	30	2 - 3m	4	5	18	210	8	None		70	HAZE, RAIN, DULL, BIG SWELL
22/10/2022	08:16:09	51.72362	-6.43993	4	0	2 - 3m	4	5	18	210	8	None		70	BIT BRIGHTER AND CLEAREER, BUSY SEA
22/10/2022	08:34:18	51.70487	-6.43194	4	0	2 - 3m	4	5	18	210	8	None		-	
22/10/2022	08:50:57	51.67065	-6.43211	4	0	2 - 3m	4	5	18	210	8	None		-	
22/10/2022	09:02:02	51.64639	-6.43265	6	0	2 - 3m	4	5	18	210	6	None		-	
22/10/2022	09:17:56	51.61152	-6.43372	6	10	2 - 3m	4	5	18	210	6	None		-	
22/10/2022	09:29:37	51.58525	-6.43516	6	10	2 - 3m	4	5	18	210	6	None		-	
22/10/2022	09:47:15	51.54586	-6.43718	6	10	1 - 2m	4	5	18	210	7	None		-	
22/10/2022	10:00:14	51.51696	-6.43779	4	10	1 - 2m	4	5	18	210	7	None		-	
22/10/2022	10:18:21	51.4762	-6.43852	4	0	1 - 2m	4	5	18	210	7	None		-	
22/10/2022	10:30:15	51.44954	-6.43846	4	10	1 - 2m	4	5	18	210	7	None		-	

22/10/2022	11:57:59	51.25286	-6.43531	4	0	1 - 2m	4	5	17	160	8	None		120	HEAVY HAZE ALL ROUND, REDUCED VIS
22/10/2022	12:15:48	51.2139	-6.43484	4	20	1 - 2m	4	5	17	160	8	None		120	
22/10/2022	12:32:17	51.17799	-6.43558	3	0	1 - 2m	4	5	17	160	8	None		120	
22/10/2022	12:46:59	51.14645	-6.43687	1	20	1 - 2m	4	5	17	160	8	None		120	RAIN
22/10/2022	13:02:32	51.12975	-6.45708	2	0	1 - 2m	4	5	17	160	8	None		-	RAIN TOPEED, HEAVY HAZE ALL ROUND
22/10/2022	13:16:16	51.12862	-6.49812	2	0	1 - 2m	4	5	17	160	8	None		-	
22/10/2022	13:31:00	51.12857	-6.54334	3	0	2 - 3m	4	5	17	160	8	None		-	
22/10/2022	13:46:01	51.12838	-6.59023	2	0	2 - 3m	4	5	17	160	8	F	CH	-	
22/10/2022	14:00:44	51.12743	-6.6367	3	0	2 - 3m	4	5	17	160	8	F	CH	-	
22/10/2022	14:37:19	51.20565	-6.64898	5	0	1 - 2m	4	5	17	180	7	None	CH	105	STILL HAZEY BUT LESS SO
22/10/2022	14:45:13	51.22526	-6.64892	5	0	1 - 2m	4	5	17	180	7	None	CH	105	
22/10/2022	15:03:35	51.27163	-6.64876	4	0	1 - 2m	4	5	17	180	6	None	CH	100	
22/10/2022	15:15:37	51.30185	-6.64889	4	0	1 - 2m	4	5	17	180	6	None	CH	100	
22/10/2022	16:05:56	51.33395	-6.64844	4	0	1 - 2m	4	5	17	180	6	None	CH	-	
22/10/2022	16:16:11	51.3337	-6.64946	4	0	1 - 2m	4	5	17	180	6	None	CH	-	
22/10/2022	16:30:56	51.36819	-6.64893	6	0	1 - 2m	4	5	17	180	6	None		-	
23/10/2022	07:30:17	50.99318	-7.06665	6	0	1 - 2m	3	4	12	175	4	None		100	WIND VARIABLE 160 - 190, INTERMITTENT LARGE SWELL, HAZE TO HORIZON, BRIGHT AND CLEAR WITHIN VIS
23/10/2022	07:49:43	51.03589	-7.07227	6	30	1 - 2m	3	4	12	175	4	None		100	REDUCED VIS BOTH SIDES, AHEAD CLEAR
23/10/2022	08:00:48	51.06213	-7.07449	5	0	1 - 2m	3	4	12	175	4	None		-	HAZE HEAVY TO EAST
23/10/2022	08:03:51	51.06909	-7.07484	5	0	1 - 2m	3	4	12	180	4	None		-	haze to East

23/10/2022	08:16:25	51.09892	-7.07463	5	0	1 - 2m	3	4	12	180	6	None		-	
23/10/2022	08:32:31	51.13707	-7.0746	5	0	1 - 2m	3	4	12	175	6	None		-	
23/10/2022	08:45:08	51.1676	-7.07483	5	0	1 - 2m	3	4	12	180	6	None		-	
23/10/2022	09:00:39	51.20514	-7.07495	5	0	1 - 2m	3	4	1	180	6	None		-	
23/10/2022	09:15:45	51.24131	-7.07514	6	0	<1m	3	4	12	180	7	None		-	BRIGHT CLEAR, HAZEY STRONG DISTALLY
23/10/2022	09:31:44	51.28019	-7.07625	5	0	<1m	3	4	12	180	5	None		-	HAZE INCREASING, PARTICULALRLY 45-90'
23/10/2022	09:48:27	51.30418	-7.07561	3	20	1 - 2m	3	4	12	180	5	None		-	STRONG GLARE AND HAZE
23/10/2022	10:04:01	51.29253	-7.07574	3	20	1 - 2m	3	4	12	180	6	None		-	
23/10/2022	10:18:19	51.27978	-7.07675	5	20	1 - 2m	3	4	12	180	6	None		-	
23/10/2022	11:56:19	51.33018	-7.07192	5	0	1 - 2m	3	3	7	120	7	None		90	
23/10/2022	12:16:52	51.38046	-7.07183	4	0	1 - 2m	3	3	7	120	7	None		90	HAZEY ALL ROUND
23/10/2022	12:31:06	51.41523	-7.07177	4	0	1 - 2m	3	3	7	120	7	None		90	
23/10/2022	12:48:14	51.45713	-7.07169	4	0	1 - 2m	3	3	7	120	7	None		85	
23/10/2022	13:00:21	51.48211	-7.06983	4	0	1 - 2m	3	3	7	120	7	None		85	
23/10/2022	13:16:43	51.4777	-7.07333	4	20	1 - 2m	3	3	7	120	7	None		85	
23/10/2022	13:30:55	51.46448	-7.07198	4	20	1 - 2m	3	3	7	120	5	None		85	
23/10/2022	13:46:30	51.45075	-7.07212	4	25	1 - 2m	3	3	7	120	5	None		-	
23/10/2022	14:24:50	51.4481	-7.07202	4	0	1 - 2m	3	3	7	120	5	None		85	
23/10/2022	14:47:16	51.50439	-7.07216	4	0	1 - 2m	3	3	7	120	5	None		-	
23/10/2022	15:00:13	51.53746	-7.07173	4	0	1 - 2m	3	2	7	120	5	None		80	
23/10/2022	15:15:12	51.57554	-7.071	6	0	1 - 2m	3	3	7	120	5	None		80	
23/10/2022	15:31:02	51.6155	-7.07097	6	0	1 - 2m	3	3	7	120	5	None		80	
23/10/2022	15:45:37	51.65288	-7.07255	6	0	1 - 2m	3	3	7	120	5	None		-	
23/10/2022	16:00:47	51.69154	-7.07236	6	0	1 - 2m	3	3	7	120	5	None		-	HEAVY CLOUD, DULL AND REDUCED VIS TO EAST
23/10/2022	16:16:12	51.73088	-7.07136	6	0	1 - 2m	3	3	7	120	7	None		80	
23/10/2022	16:30:07	51.76667	-7.07096	6	0	<1m	3	3	7	120	7	None		80	CLOUD TO EAST LIFTED

24/10/2022	07:16:00	51.14397	-7.51165	10	0	1 - 2m	4	4	14	225	5	None		100	GENERALLY BRIGHT BUT DULL UNDER BIG CLOUDS, SEA IS DARK
24/10/2022	07:30:28	51.17809	-7.50155	10	0	1 - 2m	4	4	14	225	5	None		100	SQUALLS AND REDUCED VIZ 0 - 90'
24/10/2022	07:45:42	51.21379	-7.50313	10	0	1 - 2m	4	4	15	225	4	None		100	BRIGHT, DARK SEA, VERGING ON SS5
24/10/2022	07:46:40	51.21604	-7.50313	10	0	1 - 2m	4	4	15	225	4	None		100	BRIGHT, DARK SEA, ALMOST SS5
24/10/2022	08:02:43	51.25345	-7.50278	10	0	<1m	4	4	15	225	5	Rain	IL	-	PASSING SQUALL
24/10/2022	08:16:55	51.28721	-7.50196	10	0	<1m	5	5	17	225	5	None		-	
24/10/2022	08:34:45	51.32922	-7.50204	10	0	<1m	5	5	17	225	5	None		-	
24/10/2022	08:47:10	51.35854	-7.50193	10	0	<1m	5	5	17	225	5	None		90	
24/10/2022	09:00:36	51.39019	-7.50022	10	0	<1m	5	5	17	225	5	None		90	
24/10/2022	09:21:47	51.44057	-7.4987	4	0	<1m	5	5	17	225	5	Rain	IL	90	
24/10/2022	09:30:21	51.46087	-7.49875	0	0	<1m	5	5	17	225	5	None	IL	90	SQUALL PASSED, VIS30'-60' <2KM
24/10/2022	10:00:01	51.48185	-7.48531	0	0	<1m	5	5	20	230	5	None	IL	90	
24/10/2022	10:15:58	51.46696	-7.49634	0	30	<1m	5	6	22	230	3	None		90	
24/10/2022	11:49:15	51.44512	-7.50692	10	0	<1m	6	6	24	240	4	None		80	SKY IS BRIGHT, SEA IS DARK AND VERY BUSY, LOW OBS EFFICIENCY
24/10/2022	12:03:18	51.47635	-7.49824	10	0	<1m	6	6	24	240	4	None		80	DULLER, POOR OBS CONDITIONS.
24/10/2022	12:22:21	51.52161	-7.49823	6	0	<1m	6	6	24	240	4	None		-	POOR
24/10/2022	12:34:43	51.55137	-7.49787	6	0	<1m	6	6	24	240	4	None		-	
24/10/2022	12:47:44	51.58228	-7.49749	6	0	<1m	6	6	24	240	4	None		-	SEA INCREASING
24/10/2022	13:00:21	51.61232	-7.49745	.4	0	<1m	6	6	24	240	7	None		-	HEAVY SQUALLS, DARK, VERY REDUCED VIS INTERMITTENTLY
24/10/2022	13:24:05	51.6696	-7.4982	6	0	<1m	6	6	24	240	4	None		-	
24/10/2022	13:47:11	51.72541	-7.49785	6	0	<1m	7	6	24	240	4	None		-	

24/10/2022	14:38:24	51.8502	-7.4975	6	0	<1m	6	6	24	240	4	None		-	
24/10/2022	15:09:42	51.92709	-7.49815	6	0	<1m	6	6	24	240	4	None		-	
24/10/2022	15:21:28	51.9564	-7.49755	4	0	<1m	6	6	24	240	4	None		55	
24/10/2022	15:30:32	51.97869	-7.49798	4	0	<1m	6	6	24	240	4	None		50	
24/10/2022	15:47:06	52.00275	-7.50385	4	40	<1m	6	6	24	240	4	None		-	gLARE, SQUALLS, DULL, SS6, CALLING IT QUITS
25/10/2022	07:07:55	51.65653	-8.3869	.5	0	<1m	4	4	16	135	8	Rain	IH	-	HEAVIER RAIN, VERY DECREASED VIZ
25/10/2022	07:19:24	51.71904	-8.13848	6	0	<1m	4	5	19	165	7	None		50	VERY DULL, HEADING INTO WIND AND SWELL
25/10/2022	07:31:52	51.6906	-8.14074	6	0	<1m	5	5	19	165	7	None		50	DULL
25/10/2022	07:44:15	51.66257	-8.14313	6	10	<1m	5	5	19	165	7	None		55	
25/10/2022	08:05:14	51.61377	-8.14501	6	0	<1m	5	5	19	165	7	None		-	
25/10/2022	08:16:58	51.58605	-8.14472	6	0	<1m	5	5	19	165	8	None		-	FULL CLOUD COVER BUT THIN IN PARTS. VERY DULL, DARK SEA, DIFFUSE REFLEC. HAZE&REDUCED VIS TO WEST
25/10/2022	08:30:55	51.55319	-8.14512	6	20	1 - 2m	5	5	19	165	8	None		-	HAZE TO WEST LIFTED SLIGHTY
25/10/2022	08:46:44	51.51667	-8.14656	6	20	1 - 2m	5	5	19	165	8	None		-	
25/10/2022	09:00:27	51.48468	-8.14827	6	20	1 - 2m	5	5	19	165	8	None		-	
25/10/2022	09:16:46	51.44733	-8.14672	6	20	1 - 2m	5	5	21	160	8	None		90	FULL CLOUD COVER BUT THINNNING AND HIGH
25/10/2022	09:31:35	51.41316	-8.14495	6	20	1 - 2m	5	5	21	160	8	None		90	
25/10/2022	09:46:53	51.37797	-8.14406	6	20	1 - 2m	5	5	21	160	8	None		90	
25/10/2022	10:00:24	51.34727	-8.1435	6	20	1 - 2m	5	5	21	160	8	None		90	
25/10/2022	10:15:42	51.31233	-8.1426	6	20	1 - 2m	5	5	21	160	8	None		85	
25/10/2022	10:30:04	51.2793	-8.14206	6	25	1 - 2m	5	5	21	160	8	None		-	
25/10/2022	12:17:07	51.16308	-8.34018	6	20	1 - 2m	5	5	17	135	8	None		105	
25/10/2022	12:31:36	51.17631	-8.34467	6	35	1 - 2m	5	5	17	135	8	None		105	
25/10/2022	12:47:28	51.18547	-8.35016	6	0	1 - 2m	5	5	17	135	8	None		105	

25/10/2022	13:00:51	51.22029	-8.34991	6	0	1 - 2m	5	5	17	135	8	None		105	
25/10/2022	13:18:41	51.26664	-8.34981	6	0	1 - 2m	5	5	17	135	8	None		100	
25/10/2022	13:30:08	51.29616	-8.35017	5	0	1 - 2m	5	5	17	135	8	None		-	HEAVY HAZE IN DISTANCE ALL ROUND
25/10/2022	13:49:26	51.34609	-8.35036	4	0	1 - 2m	5	5	17	135	8	None		-	
25/10/2022	14:00:32	51.37461	-8.34968	4	0	1 - 2m	5	5	17	135	8	None		-	
25/10/2022	14:16:01	51.41445	-8.34954	3	0	1 - 2m	5	5	17	135	8	None		92	HEAVY, LOW CLOUD WITH MISTY HAZE, VERY DULL, DECR. VIS
25/10/2022	14:30:52	51.45201	-8.34955		0	1 - 2m	5	5	17	135	8	None		90	DULL, DREARY, CLOSE, GREY
25/10/2022	14:39:47	51.47446	-8.35	4	0	1 - 2m	5	5	17	135	8	Rain	IL	90	RAIN FROM EAST, STILL HEAVY AND DULL ALL ROUND
25/10/2022	15:01:23	51.52959	-8.34984	2	0	<1m	5	4	16	135	8	Rain	IL	-	
25/10/2022	15:16:44	51.56936	-8.35042	4	0	<1m	5	4	16	135	8	Rain	IL	-	
25/10/2022	15:31:52	51.60967	-8.34979	1	0	<1m	4	4	16	135	8	Rain	IL	65	
25/10/2022	15:46:31	51.64901	-8.3495	1	0	<1m	4	4	16	135	8	Rain	IL	65	VERY DULL, VIZ 500M TO EAST, HEAVY OVERCAST
25/10/2022	16:00:25	51.67927	-8.34964	.5	0	<1m	4	4	16	135	8	Rain	IL	-	RAIN, MIST, DULL, 500M VIS IN ALL DIRECTIONS
26/10/2022															
27/10/2022															
28/10/2022															

Appendix III: *Record Of Sightings*

Sighting #	Time of day UTC	Lat.	Long.	Species (Latin name only)	Min #	Max#	Best Est.	# adults	# juveniles	# calves	Direction travelling	Most common behaviour	Second most common behaviour	Cue	Photos	Birds Ass?	Bearing to Sighting	Sighting distance m	Visibility km	Sea state (WMO code)	Water depth m	Additional Comments
1	10/10/2022 15:32	51.56967	-9.660477	*H. grypus*	2	2	2	1	1		290	SW	M	H	N	N	320	700	15	1		Large seal in front, smaller seal behind, 200m apart traveliing in same direction
2	10/10/2022 17:51	51.55529	-9.696389	*B. acutorostrata*	1	1	1	1			90	SW		BA	N	N	270	600	10	2		MINKE SEEN SURFACING TWICE
3	11/10/2022 06:44	50.83158	-8.461805	*D. delphis*	4	6	5	5			70	FS	L	BA	N	Y	240	20	4	2		ANIMALS CAME TO VESSEL SWIFTLY, LIKELY BOWRIDING
4	11/10/2022 07:07	50.88196	-8.457055	*D. delphis*	8	12	10	8	2		20	FS		SP	N	Y	0	600	6	2	115	
5	11/10/2022 12:04	51.68414	-8.370416	*T. thynnus*	1	2	2				270	L		SP	N	Y	90	1000	6	3	35	BLUE FIN TUNA, LEAPING, ONLY ONE SEEN AT ANY ONE TIME.
6	12/10/2022 09:34	51.69367	-7.815897	*D. delphis*	3	5	3	3			210	FS	BR	BA	N	N	320	50	8	3	80	DIFFICULT TO SEE/PHOTO ONCE BOWRIDING
7	12/10/2022 09:42	51.67225	-7.81547	*D. delphis*	2	4	3				120	FS		BA	N	N	60	400	8	3	-	DIFFICULT TO SPOT IN SWELL
8	12/10/2022 09:47	51.66901	-7.81546	*D. delphis*	3	5	4				210	FS	BR	SP	N	N	320	50	8	3		-
9	12/10/2022 13:57	51.21851	-7.818479	*Unidentified dolphin spp.*	1	0	1	1			999	M		BI	N	Y	90	600	6	4	-	FOLLOWED DIVING GANNE, SAW SMALL FLUKE ONCE
10	12/10/2022 14:59	51.12855	-7.816468	*D. delphis*	4	6	5				250	FS		BR	N	Y	0	1500	6	4		INITIALLY ENERGETIC, MUCH LESS SO

																						ONCE CAMERA READY
11	13/10/2022 07:25	51.62029	-7.389563	*T. thynnus*	10	30	20				999	B	F	SP	Y	Y	10	4000	10	3	80	INITIAL DISTAL, DISPERSE BIRDS AND SPLASHING, TUNA EXTREMELY ENERGETIC
12	13/10/2022 09:36	51.29742	-7.390124	*D. delphis*	15	25	20				60	T	L	BA	Y	Y	20	3000	10	3	80	GROUP CAME ACROSS BOW AND INTO GLARE, ACTIVE FAST TRAVELLING, CLOSEST 1.5KM
13	13/10/2022 11:50	50.97292	-7.361737	*D. delphis*	2	5	3				999	T		BA	N	N	45	700	10	3	-	2/3 DOLPHINS, SLOW MOVING&BARELY SURFACING, SILHOUETTED, SHORT SIGHTING AS VESSEL WAS TURNING
14	13/10/2022 14:07	51.21281	-7.182685	*D. delphis*	10	15	11	9	2		180	FS	L	SP	N	N	270	2000	10	3	95	
15	13/10/2022 14:13	51.27345	-7.182571	*D. delphis*	25	32	29	25		3	225	T	L	SP	Y	N	45	500	10	3	90	
16	13/10/2022 14:52	51.33047	-7.181887	*Unidentified dolphin spp.*	3	6	4				0	T	L	SP	N	N	300	3500	10	3	-	VERY DISPERSE & ANIMALS BACKLIT BUT LIKELY D. d
17	13/10/2022 14:55	51.36372	-7.181571	*D. delphis*	5	8	6	4	1	1	225	T	BR	BA	N	N	45	200	10	3	85	
18	13/10/2022 15:24	51.54138	-7.180242	*T. thynnus*	1	2	2				999	FO	L	SP	N	N	0	1500	10	3	-	TUNA, TWO LEAPS, HUGE ANIMALS
19	13/10/2022 16:12	51.56154	-7.180897	*T. thynnus*	4	10	6				999	FO	B	BR	N	N	270	300	10	4	80	TUNA, MULTIPLE SEEN AT SAME TIME
20	14/10/2022 06:51	50.97401	-6.969541	*D. delphis*	3	99	2	1	1		180	FS	BR	BA	N	Y	90	10	4	3	95	SEEN FROM PORTHOLE BEFORE EFFORT, RIDING SIDE WAVES, MOVED

																						TO BOW. MORE ALREADY @ BOW?
21	14/10/2022 08:22	51.04985	-6.759943	*D. delphis*	13	17	14	10	3	1	225	FO	FS	SP	Y	Y	45	300	10	3	105	GROUP OF 8 CAME INITIALLY, THEN TWO INDIVIDUALS,THEN GROUP OF FOUR FROM PORT
22	14/10/2022 08:47	51.09809	-6.757104	*D. delphis*	1	1	1	1			180	BR		BA	N	N	10	50	10	3	100	SINGLE CAME DIRECTLY AT US TO BOW RIDE
23	14/10/2022 09:05	51.13456	-6.75851	*P. phocoena*	8	9	8	7	1		22	L	BR	BA	N	N	45	100	10	4	100	6 FROM 45', 2 FROM 310' AT SAME TIME
24	14/10/2022 10:10	51.35214	-6.759346	*D. delphis*	150	250	180	120	30	30	225	FS	L	SP	Y	Y	45	600	8	4	85	LOTS OF SMALL GROUPS AND INDIVIDUALS, COMING FROM 45 AND 315, LOTS OF PLAYING AND MIXING
25	14/10/2022 13:23	51.53753	-6.758712	*T. thynnus*	1	999	2				999	FO		SP	N	Y	20	50	3	3	80	FEW SURFACE RUSHES, NO BREACHING, POSSIBLY ONE ANIMAL
26	14/10/2022 14:05	51.64341	-6.759885	*D. delphis*	5	8	6	4		2	200	T		SP	N	Y	320	2000	10	3	-	SMALL DISPERSE GROUP, QUICK SURFACE TRAVEL
27	16/10/2022 07:28	51.06065	-5.808466	*B. physalus*	3	4	4				999			BI	Y	Y	270	2500	8	3	90	multple tall blows. rolling whitewash, likely lunge, pics of blow only
28	16/10/2022 07:39	51.03858	-5.808027	*D. delphis*	12	20	15	10	3	2	30	FS	BR	BA	N	N	230	50	8	3	90	SMALL GROUPS CAME FROM MULTIPLE DIRECTIONS, HUNG AROUND A WHILE, SURFING ON VESSEL SIDEWAVE
29	16/10/2022 07:39	51.03522	-5.808451	*B. physalus*	11	14	11				999	F		BL	Y	Y	110	3000	8	3	90	BLOWS ONLY. 4 GROUPS OF 3,4,3,1. ALL

																						DISTAL. STRONG, HIGH BLOWS AND LUNGING.220200 180170
30	16/10/2022 07:53	51.0565	-5.810268	*D. delphis*	25	35	33	25	5	3	999	L	BR	SP	N	N	300	100	10	4		90
31	16/10/2022 08:43	51.11274	-5.811955	*D. delphis*	3	5	4	3	1		220	BR		BA	N	Y	45	100	10	3	90	
32	16/10/2022 08:46	51.11866	-5.811899	*B. physalus*	3	5	4				180	T		BL	Y	Y	300	200	10	3	90	BLOWS IN A LINE, SEEN AGAIN @200' SO MOVING SWIFTLY SOUTH
33	16/10/2022 09:03	51.1513	-5.811769	*D. delphis*	10	18	14	8	2	4	999	SW	BR	BA	Y	N	999	150	10	3	90	ANIMALS MILLING AROUND BOAT FOR SOME TIME, COMING FROM REAR OFTEN, DIFFICULT TO TELL NEW ANIMALS
34	16/10/2022 09:14	51.22386	-5.811226	*T. thynnus*	5	999	999				999	F		SP	Y	N	0	50	10	3		90
35	16/10/2022 09:35	51.22422	-5.811258	*B. physalus*	1	1	1				999			BL	N	Y	10	2000	10	3	90	TWO BLOWS SEEN, TUINA SIGHTING IN DISTANCE
36	16/10/2022 09:38	51.2348	-5.811318	*T. thynnus*	10	50	25				999	F		BI	N	Y	10	2000	10	3	90	VIGOROUS FEEDING CAME RIGHT BY VESSEL, 20M, LOTS OF BIRDS
37	16/10/2022 09:49	51.25229	-5.811378	*D. delphis*	8	12	10	8	2		45	L	FS	BA	N	N	270	40	10	3		90
38	16/10/2022 10:01	51.26646	-5.811015	*D. delphis*	9	15	11	8		3	180	L	BR	BA	N	N	20	200	10	4	85	
39	16/10/2022 11:57	51.51794	-5.802215	*D. delphis*	8	12	9	8	1		160	L	BR	BA	N	N	300	100	6	4	85	group of 5 came to bow, 5 mins later disperse group of 4 from same direction joined them

40	16/10/2022 14:41	51.5539	-6.021465	*D. delphis*	9	10	9	6	1	2	225	L	BR	BA	N	N	45	100	2	6		2 GROUPS 1- 2X MOTHER/CALF PAIRS. 2 - GROUP OF 5
41	16/10/2022 14:52	51.55894	-6.070462	*D. delphis*	8	12	10	10			270	FS	L	BA	Y	N	90	100	4	6	-	TWO GROUPS, FIRST FROM 90', SECOND FROM 140', TO BOW
42	18/10/2022 10:13	51.98376	-7.352647	*Unidentified cetacean*	1	1	1				999	B		SP	N	N	310	4000	5	5	-	HUGE SPLASH SEEN DISTALLY,NO FURTHER CLUES OR ACTIVITY, LIKELY LARGE CETACERAN BREACHING
43	18/10/2022 13:10	52.05364	-7.25019	*P. phocoena*	1	2	1				10	T		BA	N	Y	330	400	3	5	50	ANIMAL PORPOISING, LOST IT WHEN POSITIONING FOR PHOTOS
44	22/10/2022 08:06	51.71833	-6.444826	*D. delphis*	5	15	7	3	2		999	F	L	SP	N	Y	30	500	4	4	70	ANIMALS SCATTERED,FEEDING, GANNET ACTIVITY. CAME TO BOW RIDE BUT VESSEL STOP TO TURN ABOUT
45	22/10/2022 08:39	51.67144	-6.432096	*D. delphis*	20	25	3	15	10		120	SW	FS	BA	Y	N	350	30	6	4	-	INITIAL GROUP OF 3 JUVES, SLOW SWIM ALONG VESSEL, FOLLOWED BY LOTS OF SMALL GROUPS, HIGH ENERGY
46	22/10/2022 09:19	51.60023	-6.434291	*D. delphis*	2	2	2	1		1	227	L	FS	BA	N	N	60	200	6	4	-	
47	22/10/2022 10:20	51.46286	-6.438557	*Unidentified dolphin spp.*	2	2	2	1	1		999	M		BA	N	N	45	100	3	4	-	TWO ANIMALS SEEN MOMINTARILY. SEEMED OF A DARK GREY HUE, NOT CONVINCED

																						THEY WERE COMMONS
48	22/10/2022 11:50	51.24825	-6.435208	*D. delphis*	5	10	7	5	2		180	L		BR	N	N	90	50	4	4	120	SEEN WHILE ASCENDING FOR EFFORT WATCH
49	22/10/2022 12:08	51.18029	-6.435553	*D. delphis*	1	25	18	10	5	3	180	L	T	BA	Y	N	90	200	3	4	120	~6 CAME TO BOW RIDE, REST STAYED ~200M OUT KEEPING SPEED
50	22/10/2022 16:26	51.36614	-6.64886	*D. delphis*	9	10	9	4	1	4	250	T	BR	BA	N	Y	45	300	6	4	-	
51	23/10/2022 07:55	51.06564	-7.074618	*D. delphis*	9	15	11	5	6		180	L	BR	SP	N	Y	10	250	5	3	-	
52	23/10/2022 08:19	51.11449	-7.074455	*D. delphis*	1	1	1				10			BR	N	N	280	400	5	3	-	single animal seen leaping once, not seen again
53	23/10/2022 15:22	51.60727	-7.070708	*D. delphis*	2	3	2		1		220	L	T	BA	N	N	45	150	5	3	80	CAME ACROSS BOW, DIDNT STAY
54	23/10/2022 16:11	51.72766	-7.071311	*P. glauca*	1	3	2				999	M		BA	N	N	90	100	5	3	-	POTENTIAL BLUE(?) SHARKS. 3 SHAPES, INIT. ASSUMED AUKS BUT UNUSUAL MOVMNT, GONE BEFORE BINS USED
55	24/10/2022 07:56	51.24994	-7.502861	*D. delphis*	10	25	15				270	FS	L	SP	N	Y	0	600	10	4	-	GROUP SWIMMING VERY FAST, LIKEY HUNTING, FLOCK OF BIRDS OVERHEAD
56	24/10/2022 08:03	51.27952	-7.502132	*D. delphis*	4	5	4		4		2	FS	F	BA	N	Y	45	100	10	5	-	TWO P[AIRS OF JUVES FEW MINS APART, LIKELY TRAILING FORMER SIGHTING, BIRDS FOLLOING & DIVING
57	25/10/2022 08:40	51.51644	-8.146566	*D. delphis*	8	15	10				70	L	FS	BA	N	N	270	80	6	5	-	GROUP OF ABOUT 6 FOLLOWED BY

																						GROUP OF 4 CAME TO BOWRIDE
58	25/10/2022 09:19	51.42751	-8.14558	*D. delphis*	6	8	6		6		999	T		BA	N	N	330	20	6	5	90	ANIMALS SWIMMING ALONGSIDE BOW, ~5M OUT, RATHER THAN BOWRIDING. APPROACHED FROM REAR?
59	25/10/2022 09:39	51.38674	-8.144191	*D. delphis*	1	1	1				320	F	FS	SP	N	N	0	100	6	5	90	ONE ANIMAL SEEN CHASING FISH,SUB-SURFACE RUSHING, OUT OF VIEW UNDER VESSEL VERY QUICKLY
60	25/10/2022 09:50	51.35963	-8.143855	*D. delphis*	8	15	11	6	3	2	180			BA	Y	N	270	150	6	5	90	CHIN SLAP ANIMALS SWIMMING PARALLELTO VESSEL
61	25/10/2022 10:05	51.32328	-8.142901	*D. delphis*	10	15	12	5	5	2	60	FS	BR	SP	N	N	270	50	6	5	90	POSSIBLY PREVIOUS SIGHTING EVENTUALLY CAUGHT UP WITH VESSEL AFTER GOING OUT OF SIGHT
62	25/10/2022 12:15	51.16303	-8.348173	*D. delphis*	1	5	2				0	FS	F	SP	N	N	270	200	6	5	105	
63	25/10/2022 12:38	51.18154	-8.350159	*B. physalus*	2	3	2				180	T		BL	N	Y	230	3000	6	5	105	ANIMALS SEEN JUST BEFORE VESSEL TURNED, SEEN @200' ONCE TURNED(END TIME STAMP)
64	25/10/2022 13:47	51.34085	-8.35034	*D. delphis*	5	8	7	2	5		90	T		BA	N	Y	270	200	5	5	-	

Further details available on www.emff.marine.ie

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Department of Agriculture, Food and the Marine

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