



Bowdun Offshore Wind Farm, Offshore EIA Report

Volume 3, Technical Appendix 14.2: Shipping and
Navigation Vessel Traffic Survey Report 2024

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NASH

MARITIME

BOWDUN OFFSHORE WIND FARM

Survey Report – Summer/Winter 2023

RPS Energy Ltd

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ABBREVIATIONS

Abbreviation	Detail
AIS	Automatic Identification System
CCTV	Closed Circuit Television
EIA	Environmental Impact Assessment
GT	Gross Tonnage
kts	Knot (unit of speed equal to nautical mile per hour, approximately 1.15 mph)
kW	Kilowatt
L	Litres
LOA	Length Overall
LNG	Liquefied natural gas
m	Metre
MCA	Maritime and Coast Guard Agency
MGN	Marine Guidance Note
nm	Nautical Mile
NLB	Northern Lighthouse Board
NRA	Navigation Risk Assessment
OREI	Offshore Renewable Energy Installations
OWF	Offshore Windfarm
UTC	Coordinated Universal Time
VHF	Very High Frequency (radio communication)

1. INTRODUCTION

1.1 OVERVIEW AND DOCUMENT OBJECTIVE

NASH Maritime Ltd (NASH Maritime) have been contracted by RPS Energy Ltd to undertake a Shipping and Navigation study for Thistle Wind Partner's proposed Bowdun Offshore Windfarm (OWF). The objective of this document is to provide a factual record of the primary marine vessel traffic datasets collected by NASH Maritime using Automatic Information System (AIS), marine radar and visual observations to support the Navigation Risk Assessment.

Full details on the assessment and data requirements, together with the data collection methodology is contained within the document titled '0285_Ayre_and_Bowdun_VTS_Methodology_R01-00'.

Additional project shipping and navigation datasets will be collected to assist in the characterisation of vessel traffic in the project area and will be integrated with the data presented in this document during the Navigation Risk Assessment.

It should be noted that this document does not extend to interpretive analysis of the data collected which will be undertaken during the Navigation Risk Assessment being undertaken as a component of the Environmental Impact Assessment (EIA).

1.2 GUIDANCE

Marine vessel traffic data for the proposed Bowdun OWF has been collected in accordance with requirements of Marine Guidance Note (MGN) 654 titled 'Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response'.

4.6 Navigation Risk Assessment (NRA) – Traffic Survey

a. An up to date, traffic survey of the proposed development area concerned should be undertaken within 12 months prior to submission of the EIA Report. This should include all the vessel and craft types found in the area and total at least 28 days duration but also take account of seasonal variations and peak times in traffic patterns and fishing operations. AIS data alone will not constitute an appropriate traffic survey; radar, manual observations, other data sources (e.g. for fishing and recreation) and stakeholder consultation will ensure those vessels that are not required to carry and operate AIS are included, and it provides an appropriate representation of the base line marine traffic.

NASH Maritime consulted with the Maritime and Coastguard Agency (MCA) and Northern Lighthouse Board (NLB) in May-2023, to discuss and confirm the survey strategy.

2. MARINE VESSEL TRAFFIC SURVEY METHODOLOGY

2.1 SURVEY AREA AND DATA EXTENTS

The study area and survey areas have been defined within the Bowdun Offshore Wind Farm Offshore Scoping Report¹ and data was therefore collected for the OWF site with a 10 nm buffer. The nominal vessel location for the surveys is also shown in **Figure 1**.

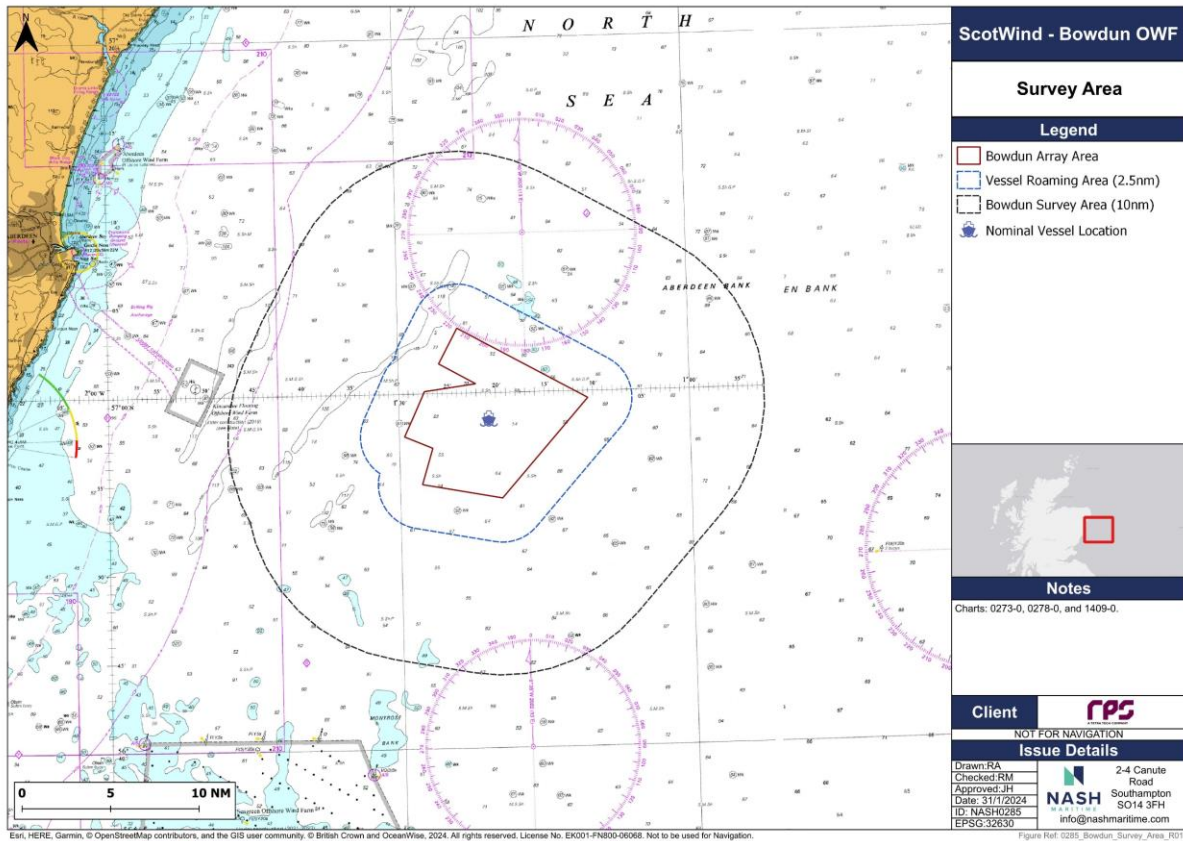


Figure 1: Survey Area

2.2 SURVEY VESSELS

The vessel based marine vessel traffic survey was undertaken using the Karelle survey vessel for both the summer and winter survey (see **Table 1** and **Figure 2**).

Table 1: Karelle Specifications

Feature Name	Value
Callsign	n/a
Date built	1996
Hull	Steel

¹ Bowdun Offshore Wind Farm Offshore Scoping Report – document number: TWP-BOW-RPS-OFS-RPT-00004 / FINAL

Feature	Value
Length	27.85 m
Breadth	8.7 m
Depth	4.8 m
Tonnage	338 GT
Main Engine	Man Alpha 588 kW
Auxiliary Engine	Cummings 155BHP/Mitsubishi D622TC 214 kW
Speed	12 kts cruising 14 kts max
Fuel Oil Capacity	50,000 L
Freshwater Capacity	19,000 L



Figure 2: Karelle Survey Vessel.

2.3 SURVEY EQUIPMENT

Survey equipment was installed on the survey vessel and was tested and maintained by NASH Maritime engineers throughout the survey period to integrate with the vessel's onboard systems. **Table 2** and **Table 3** provide an outline of general equipment on the vessel and the specific survey equipment used for vessel based AIS, radar and visual surveys.

Table 2: Survey Equipment

Item	No.	Purpose/Description
Survey Laptop Incl. logger software	2	1x laptop to record AIS and radar data outputs from vessel equipment – configured with chart and survey area layers for surveyor visual reference and context (to verify range/function etc.) and to record radar data outputs from vessel equipment 1x spare laptop for back-up Include battery for local power back-up to provide minimum of 1 hr emergency power
Power adaptor	2	Power for laptops (inc surge protection)
R232 Cable	2	For data connection from AIS and radar equipment to laptop (may vary)
USB Memory Stick	2	Hourly back up of survey data files and images (per laptop and in duplicate)

Table 3: Karelle Vessel Equipment

Item	No.	Purpose/Description
ARPA Radar	2	Furuno ARPA AIS Chart overlay Koden ARPA AIS Chart overlay
AIS Receiver	1	Furuno
Satellite Broadband	1	Vessel fit Used for daily data transfer
Mobile Phone Coverage 4G and 5G	1	As varies

2.4 SURVEY PERIODS

In accordance with MGN 654², the data was collected over 28 days in total. In order to ensure the overall survey incorporated seasonal variations in traffic patterns and consider peak and off-peak periods, the survey was split into two survey campaign periods each of 14 days over a summer and winter season.

The summer survey between 30-Jun-23 (08:00) and 14-Jul-23 (08:00) and the winter survey data was collected between 05-Jan-24 (12:30) and 19-Jan-24 (12:30).

Daily radar logs were collated from the vessel and provided in **Appendix A**.

² MCA MGN 654 Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response.
https://assets.publishing.service.gov.uk/media/64637cd60b72d3000c34454c/MGN_654.pdf

2.4.1 Vessel Downtime

No Downtime was recorded during the time on location for either the summer or winter survey.

2.5 SURVEY VESSEL LOCATION

The location of the survey vessel was monitored using onboard GPS, and a survey vessel track is presented in **Figure 3**.

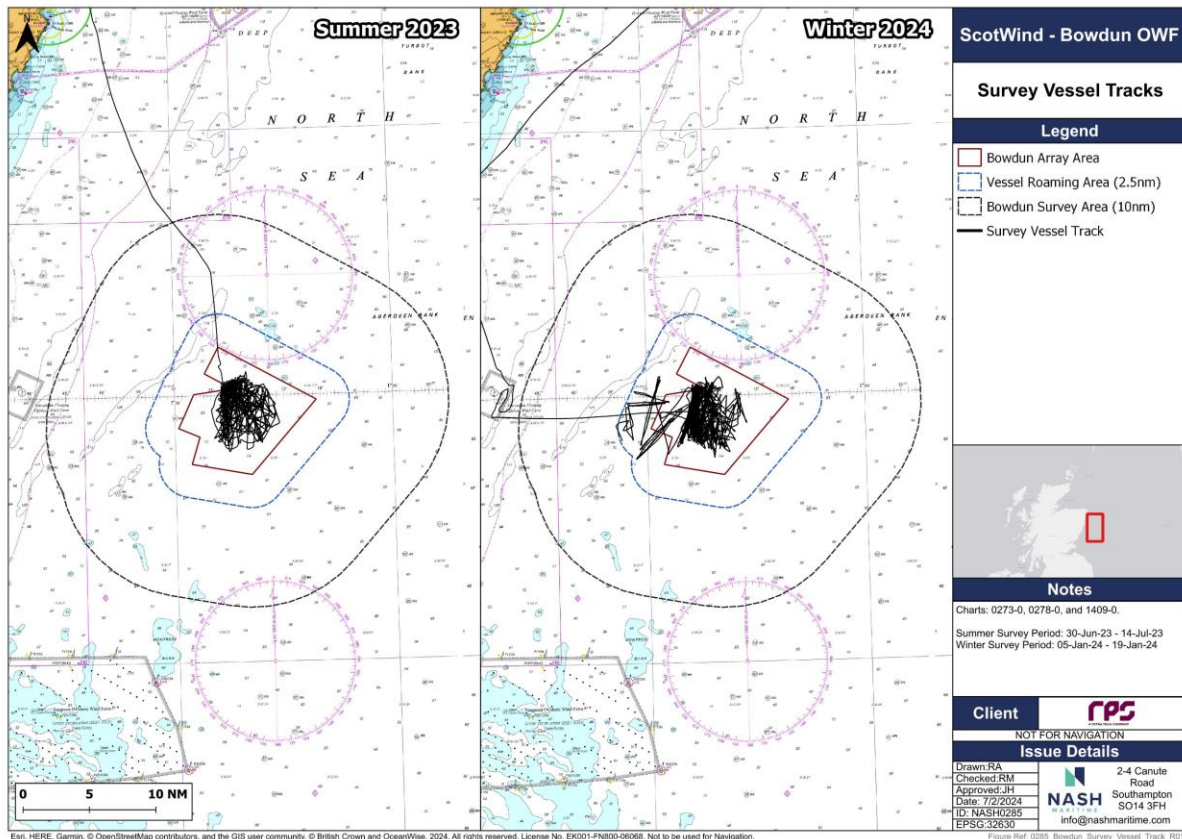


Figure 3: Summer and Winter Survey Vessel Tracks.

2.6 WEATHER LOG

Weather was recorded by the survey vessel at six hourly intervals during each survey campaign (see **Appendix B** for the survey weather log).

For the summer period, the maximum wind experienced was 25 kts on the 07-Jul-23, from the southwest. These winds contributed to a swell of 0.8 m and a moderate/rough sea state.

During the winter period, the maximum wind experienced was 45 kts on the 15-Jan-24 from the northwest which contributed to a swell of 5 m and rough/very rough sea state.

2.7 DATA COMPETENCY

Quality assurance checks on the survey vessel equipment and data collection was undertaken on a continuous basis throughout the surveys to ensure competency of equipment, area coverage and data collection fidelity. Initial data outputs following preliminary post processing of data are presented in **Section 3** and the data will be further post processed, interpreted and integrated with additional project datasets during the NRA.

It should be noted that some vessel tracks, as shown in this section, appear shortened or isolated. Reasons for this may include the below factors and, where notable for individual tracks, narrative is provided to accompany the plots.

- Coinciding with commencement or completion of survey (including survey vessel weather downtime events).
- Tracking vessels by radar initially and subsequently aligning with an AIS transmission (at which point radar tracking was ceased) or vice versa.
- Target vessel factors including:
 - Radar signature of the target vessel (shape and size of the vessel – for example a smaller vessel represents a smaller detectable radar signature).
 - Stability of the target vessel (shape and size of the vessel and motion in different sea states).
 - AIS transmission and detection range from target vessel can vary in strength and consistency due to factors including:
 - Whether equipment is on and transmitting (some small non mandatory vessels manually elect to transmit [and receive] infrequently for operational reasons)
 - Power and setting configuration of transmission equipment over Very High Frequency (VHF)
 - Location/height of aerial
 - Partial/intermittent shielding of AIS transmission aerial by vessel structures (common on smaller vessels)
 - Interference with other ship borne systems/communication equipment
 - State of repair of equipment and ancillary cables/fittings
 - Distance and range between target vessel and survey vessel
- Met-ocean effects including:

- Atmospheric pressure (ducting of AIS signals improves in higher pressure conditions); sea state and combination of swell waves and wind generated waves
- Precipitation and poor visibility (e.g. fog) will reduce radar and VHF range due to attenuation of signal and also influence ability of watch keeper making visual contact to identify vessel

3. SURVEY RESULTS

This section presents a series of vessel traffic plots, for the 10 nm survey area ('survey area') around the Bowdun OWF array area ('array area').

3.1 VESSEL TYPE

Figure 4, Figure 5, and Table 4 provides counts of identified vessels within the survey area for each of the main vessel types. The most frequently identified vessel type during both the summer and winter surveys was tug & service, with 197 vessels identified in the winter survey (60% of all vessels) and 132 in the winter survey (55% of all vessels).

The next most frequently identified vessel type was cargo, with vessels passing north-south to the east of the survey area and survey activity within the southern extent of the array area. Fishing is common in the region, however seasonality was not observed in the array area between the summer and winter surveys.

A single ferry was identified transiting the array area, traveling towards Newcastle from Holyhead, operated by NorthLink ferries. Cruise and recreational vessels were only observed during the summer period. Cruise vessels were recorded primarily travelling in a north-south orientation along the Scottish coastline.

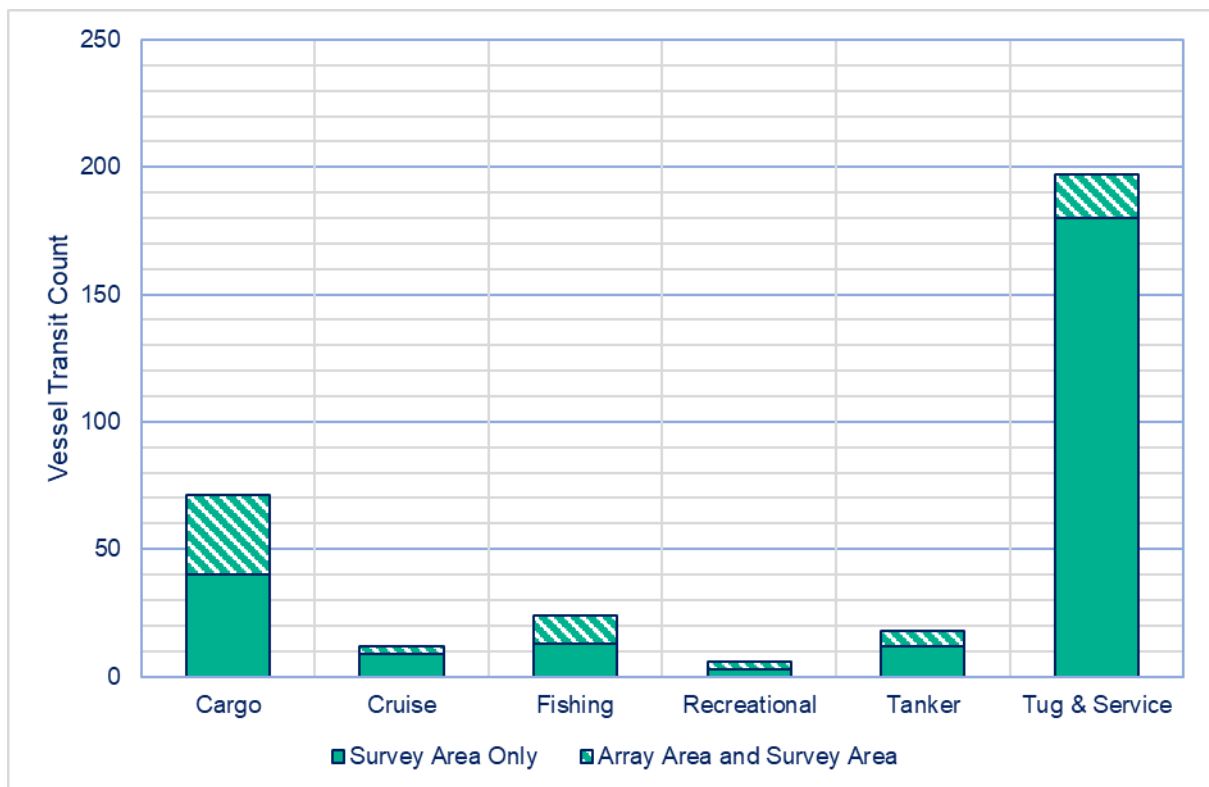


Figure 4: Vessel Transit Counts for Summer Survey

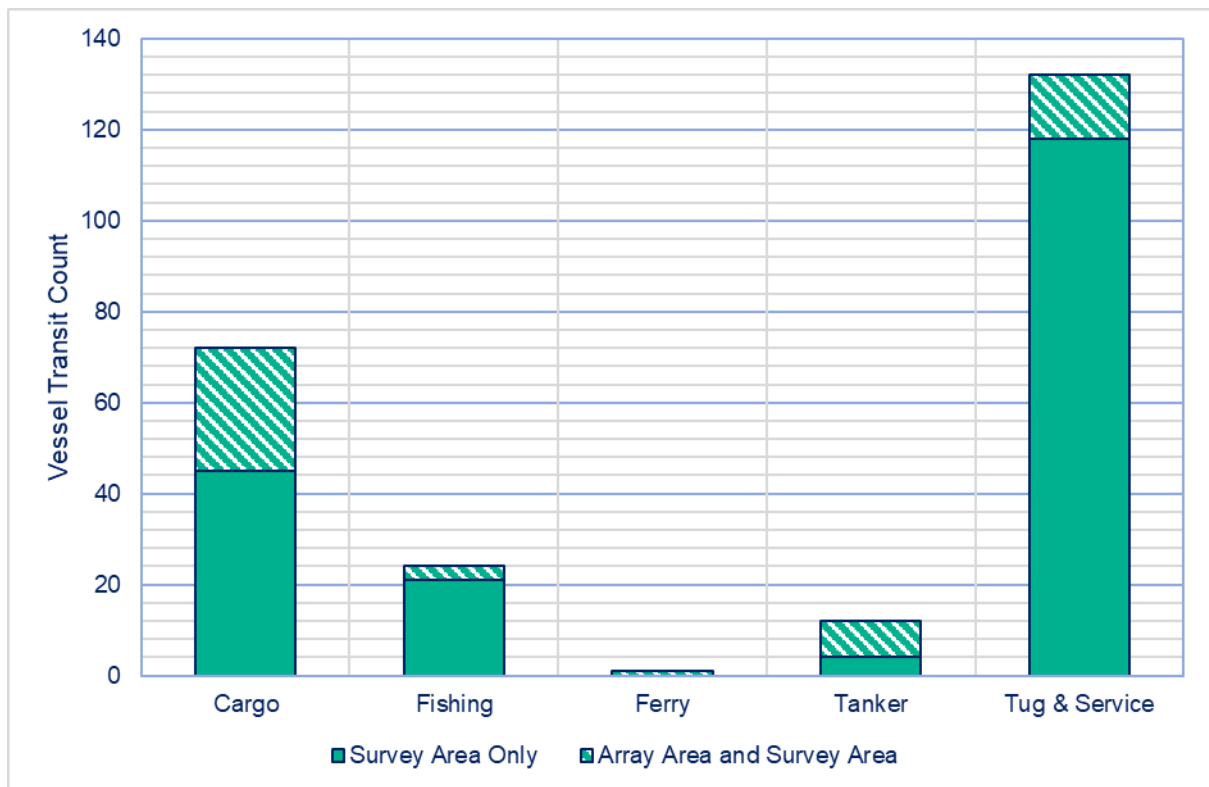


Figure 5: Vessel Transit Counts for Winter Survey

Table 4: Summary of Vessel Traffic Survey

Attributes	Summer 2023	Winter 2024
Vessel	Karelle (27.85 m Fishing Vessel)	
Dates	30-Jun-23 (08:00) to 14-Jul-23 (08:00)	05-Jan-24 (12:30) to 19-Jan-24 (12:30).
Downtime	N/A	
Survey Area	Bowdun Array Area + 10 nm	
Total Vessels Recorded (Survey Area)	328 (23.4/day)	241 (17.2/day)
Total Vessels Recorded (Array Area)	71 (5.1/day)	53 (3.8/day)
Cargo	Survey Area: 71 (5.1/day) Array Area: 31 (2.2/day)	Survey Area: 72 (5.1/day) Array Area: 27 (1.9/day)
Cruise	Survey Area: 12 (0.9/day) Array Area: 3 (0.2/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)
Ferry	Survey Area: 0 (0/day) Array Area: 0 (0/day)	Survey Area: 1 (0.1/day) Array Area: 1 (0.1/day)

Attributes	Summer 2023	Winter 2024
Fishing	Survey Area: 24 (1.7/day) Array Area: 11 (0.8/day)	Survey Area: 24 (1.7/day) Array Area: 3 (0.2/day)
Recreational	Survey Area: 6 (0.4/day) Array Area: 3 (0.2/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)
Tanker	Survey Area: 18 (1.3/day) Array Area: 6 (0.4/day)	Survey Area: 12 (0.9/day) Array Area: 8 (0.6/day)
Tug & Service	Survey Area: 197 (14.1/day) Array Area: 17 (1.2/day)	Survey Area: 132 (9.4/day) Array Area: 14 (1/day)

3.1.1 Cargo

Figure 6 shows the transits of cargo vessels within the survey area. A total of 71 cargo vessels entered the survey area during the summer survey with 31 entering the array area, for the winter survey recorded similar results with the number of cargo vessels entering the survey area being 72 and 27 vessels transiting the array area. Approximately, 22% of all vessels in the summer survey were cargo vessels, and 30% were cargo vessels in the winter survey.

All cargo vessels that entered the array area were travelling in a north-south orientation. Similarly, the majority of the winter survey cargo vessels travelled in an identical direction with four exceptions, three were operating east-west out of Aberdeen and one transit was recorded transiting northeast-southeast.

The largest vessel recorded during transiting the array area during the survey period was the 250m Length Overall (LOA) Bulk Carrier Marine Wisdom.

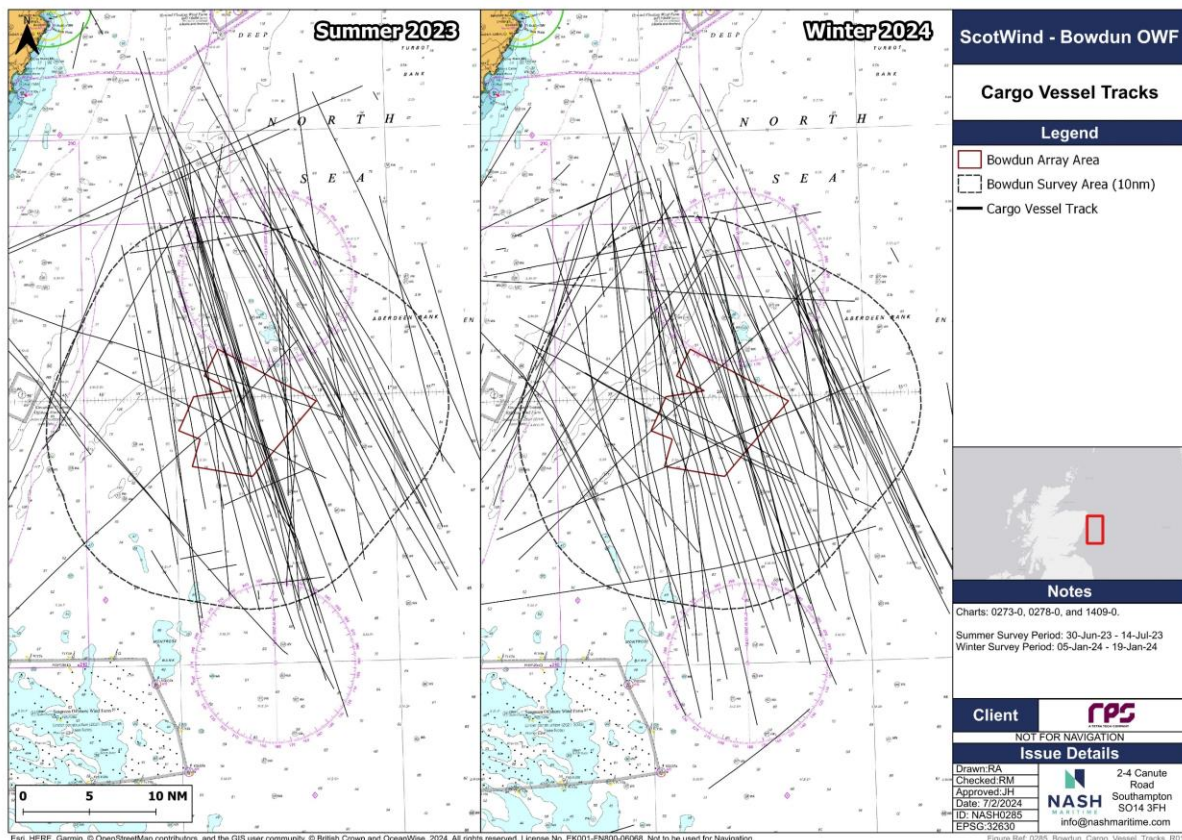


Figure 6: Cargo Vessel Tracks

3.1.2 Tanker

Figure 7 presents the transits of tanker vessels during the surveys. A total of 18 tanker vessels entered the survey area during the summer survey with six entering the array area, for the winter survey recorded similar results with the number of tanker vessels entering the survey area being 12 and eight vessels transiting the array area. Approximately, 5% of all vessels in the summer survey were tanker vessels, and 6% were tanker vessels in the winter survey

Similar to cargo vessel transits, the tanker vessels that primarily pass through the array area transited in a north/south orientation in both surveys. There are a small number of tanker vessels operating out of the Port of Aberdeen that enter the southwestern region of the survey area (four vessels in the summer survey and five in the winter survey).

The largest tanker vessel to transit the array area was the 180 m LOA LNG Tanker Ineos Intuition.

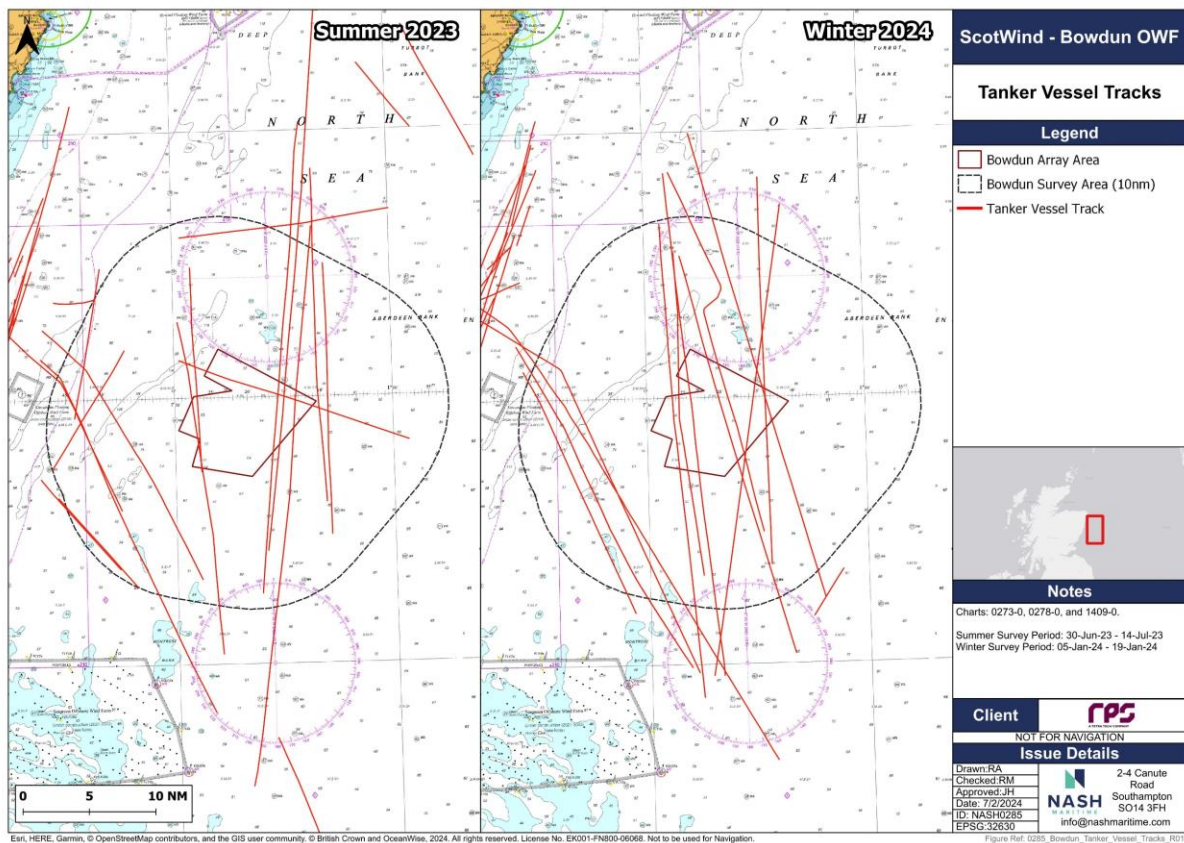


Figure 7: Tanker Vessel Tracks

3.1.3 Passenger

Figure 8 presents passenger vessel transits, including ferries and cruise vessels. A total of 12 cruise vessels entered the survey area during the summer survey with three entering the array area. During the winter survey no cruise vessels were recorded entering the survey area. One ferry vessel was identified across both survey periods, the Irish Ferries vessel Ulysses, voyaging from Holyhead to Newcastle. This ferry transited north-south through the array area.

The majority cruise vessels that entered the survey area transited east of the array area in a northeast-southwest orientation. Three cruise vessels passed through the array area in a north-south orientation. One vessel, the 203 m LOA AIDA Aura, was recorded visiting Aberdeen and transiting west to east on passage to Hamburg.

The cruise operators identified most often during the survey periods were vessels owned by AIDA Cruises, Viking, and Seabourn Cruise Line. The largest cruise vessel was the 253 m LOA AIDA SOL, which crossed once traveling north-south through the centre of the array area.

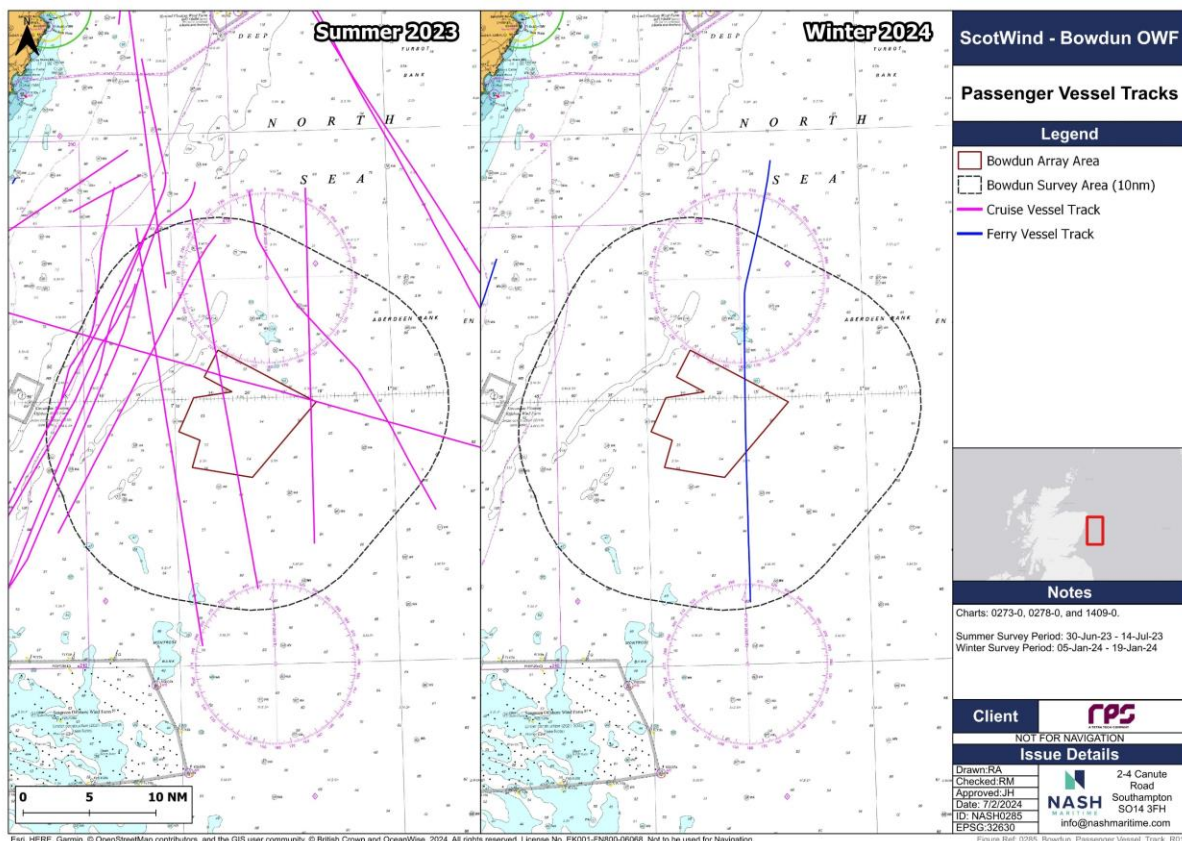


Figure 8: Passenger Vessel Tracks

3.1.4 Fishing

Figure 9 presents fishing tracks observed within 10 nm of the array area during the survey periods. A total of 24 fishing vessels entered the survey area during the summer survey with three entering the array area. The winter survey recorded similar results with 24 fishing vessel tracks observed through the survey area and three vessels transiting the array area. Fishing frequency appears to be consistent across the summer and winter seasons. Across both surveys, five unique vessels were identified entering the array area. Approximately 7% of all vessels in the summer survey were fishing vessels, and 10% were fishing vessels in the winter survey.

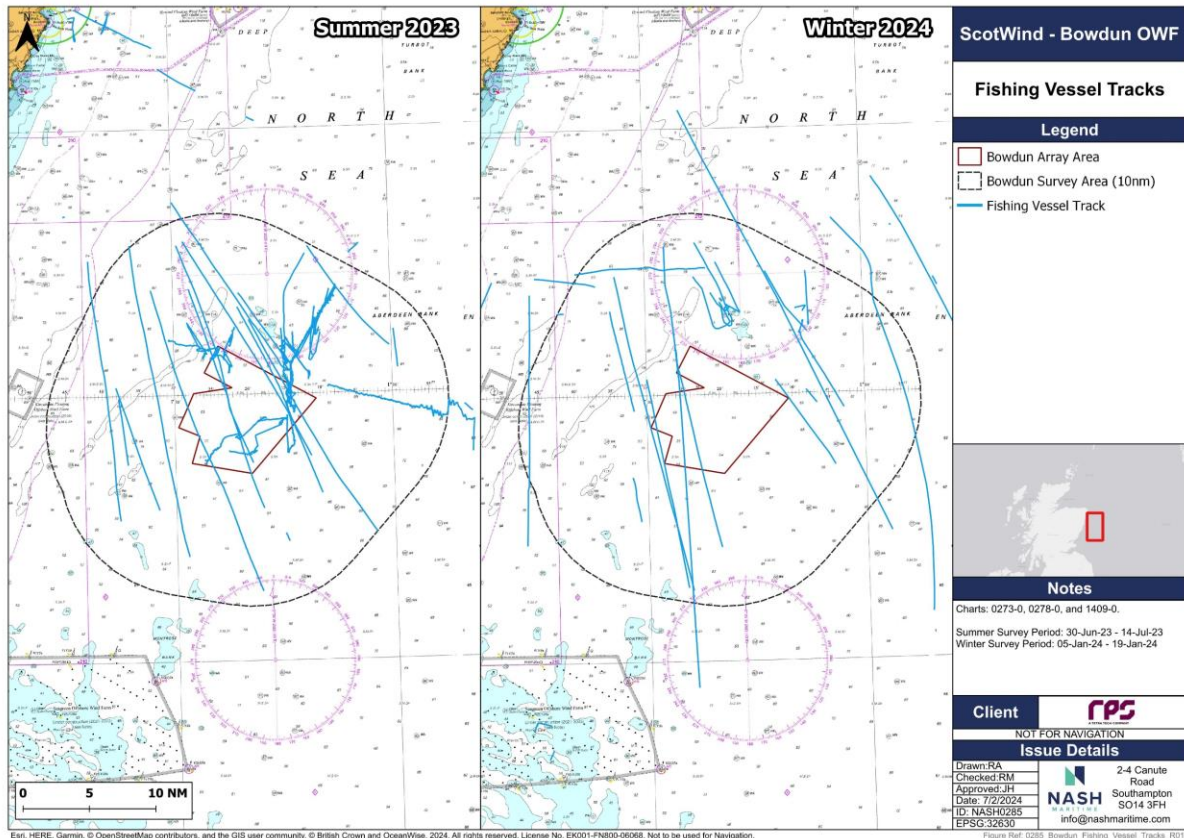


Figure 9: Fishing Vessel Tracks

3.1.5 Recreational

Figure 10 presents recreational vessel activity within the survey area. No recreational activity was observed during the winter survey. A total of six recreational transits were recorded during the summer survey. Vessels were observed transiting to the north-west/south-east through the survey area with four transits recorded within the array area. During the summer survey, recreational vessels accounted for 2% of total vessel traffic.

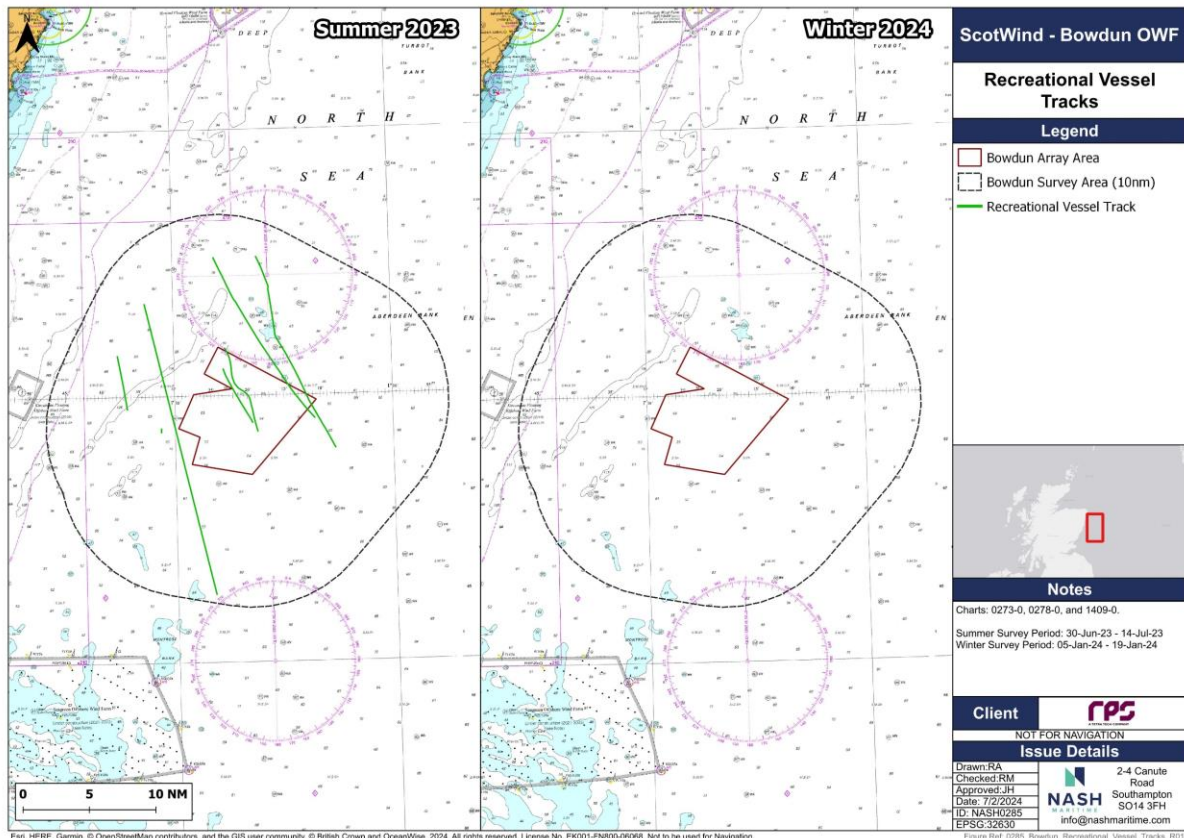


Figure 10: Recreational Vessel Tracks

3.1.6 Tug & Service

Tug & service vessel transits are presented in **Figure 11**. A total of 197 tug & service vessels entered the survey area during the summer survey with 17 entering the array area. The winter survey recorded similar results with the number of tug & service vessels entering the survey area observed to be 132 with 14 vessels transiting the array area. Approximately, 60% of all vessels in the summer survey were tug & service vessels and 55% were tug & service vessels in the winter survey.

During both surveys the majority of tug & service vessels identified were transiting east-west of the northern region of the survey area. These are composed almost entirely of oil and gas support vessels operating out of Aberdeen. A small number of these (ten vessels in the summer survey and seven in the winter survey) pass the northern extent of the array area boundary.

The 82 m LOA Edda Brint was the most frequently recorded vessel, with 50 transits through the survey area across both surveys (47 in winter and three in summer). This is a work/repair vessel supporting the Seagreen OWF.

The largest vessel observed was the 255 m LOA Xin Guang Hua, recorded once during the summer survey.

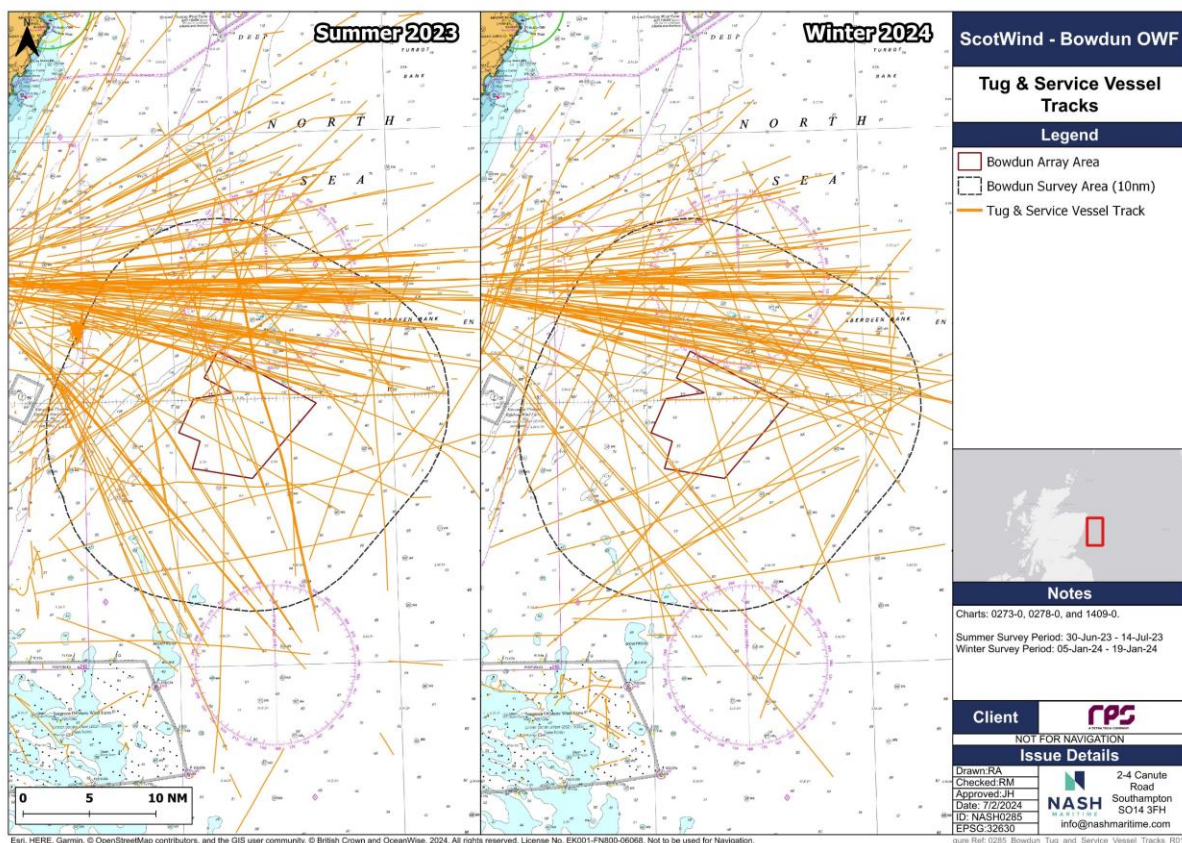


Figure 11: Tug & Service Vessel Tracks

3.2 VESSEL COUNTS

Figure 12 and Figure 13 show the daily counts of vessel tracks by vessel type through the survey area during the summer and winter survey periods.

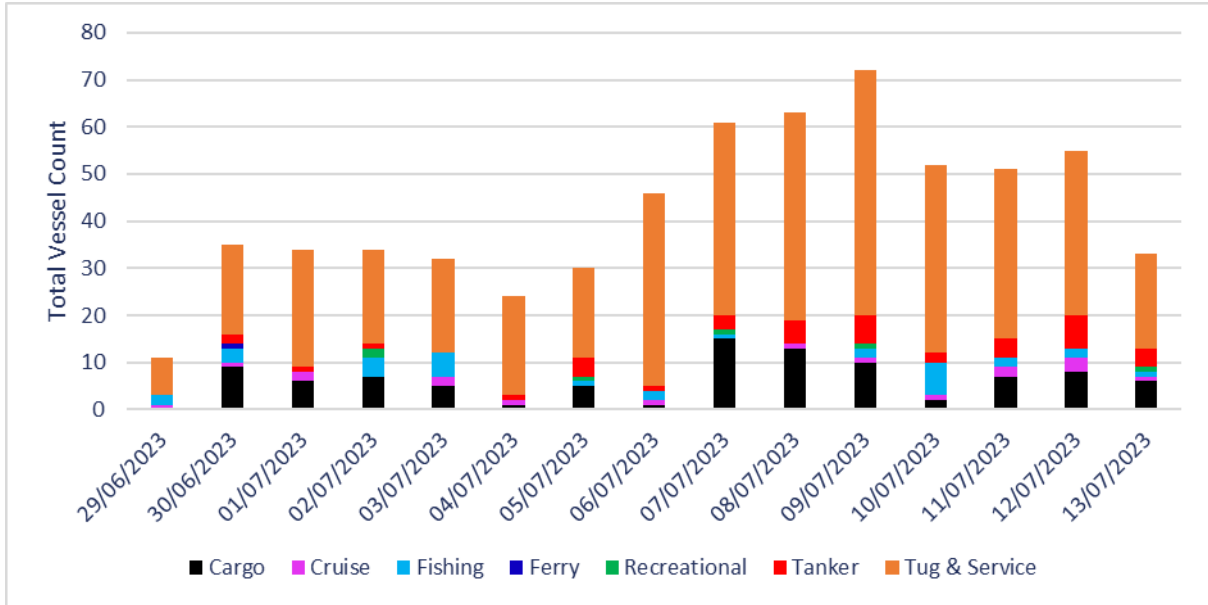


Figure 12: Daily Vessel Counts During the Summer Survey

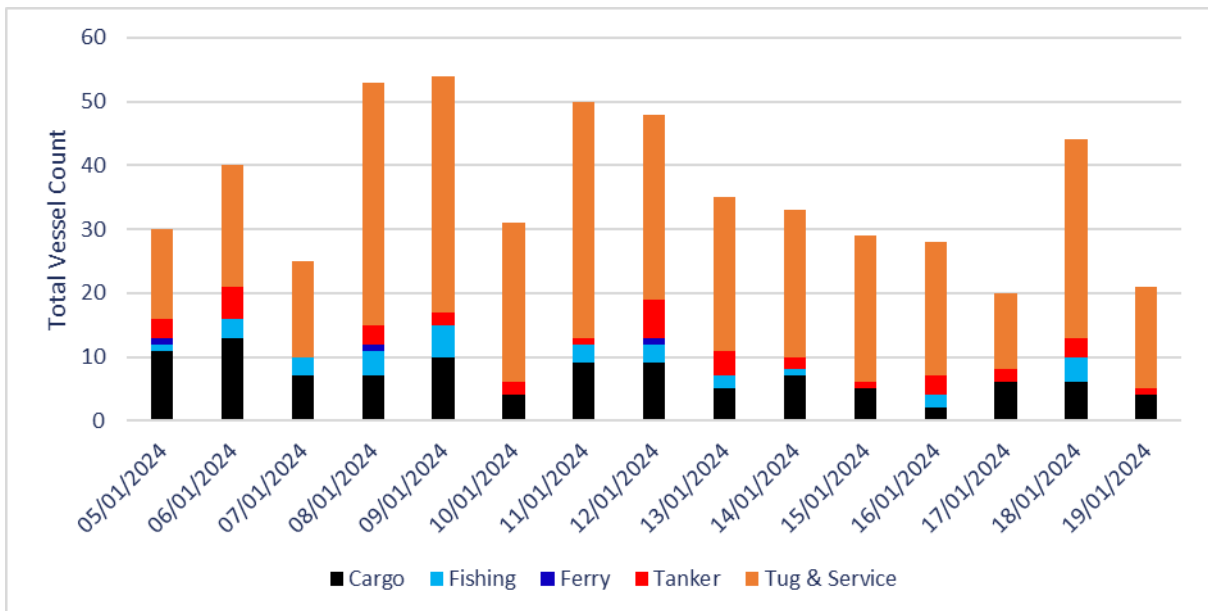


Figure 13: Daily Vessel Counts During the Winter Survey

There were 328 and 241 individual tracks identified through the survey area during the summer and winter survey periods averaging 23.4 and 17.3 per day, respectively. Within the array area were 71 and 53 tracks during the summer and winter survey, averaging 5.1 and 3.8 per day, respectively.

3.3 VESSEL SIZE

Figure 14 and **Figure 15** shows the counts of individual vessel tracks through the survey area, by vessel type and length, during the summer and winter survey periods. This figure only takes account of vessels observed in the AIS data as the radar data does not provide vessel lengths.

A total of 451 (71%) of vessel tracks observed during both the summer survey were between 50 m and 99 m LOA, mainly consisting of cargo and tug & service vessels. Similarly, a total of 383 (71%) of vessel tracks in the winter survey were between 50 m and 99 m LOA, also composing primarily of cargo and tug & service vessels.

A total of 64 tracks during the summer period were made by vessels >150 m LOA, compared with 38 tracks during the winter period. This is largely due to the presence of large cruise vessels, including vessels >300 m LOA.

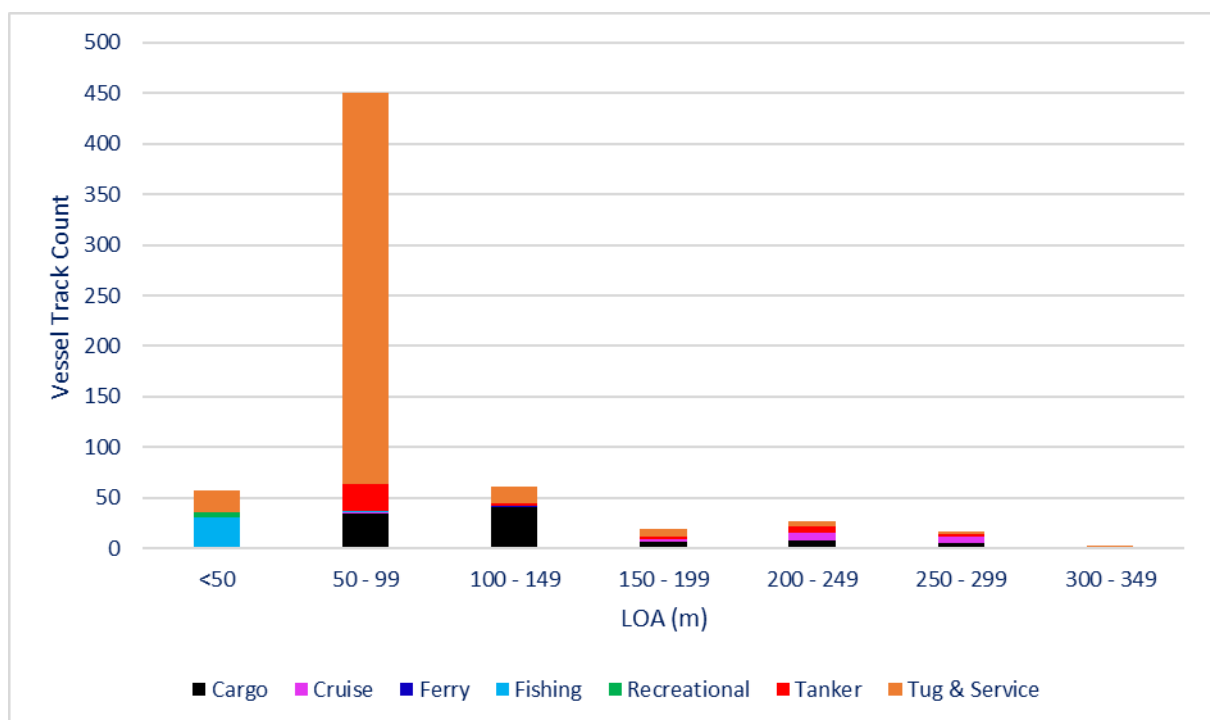


Figure 14: Vessel Track Counts by LOA During the Summer Survey

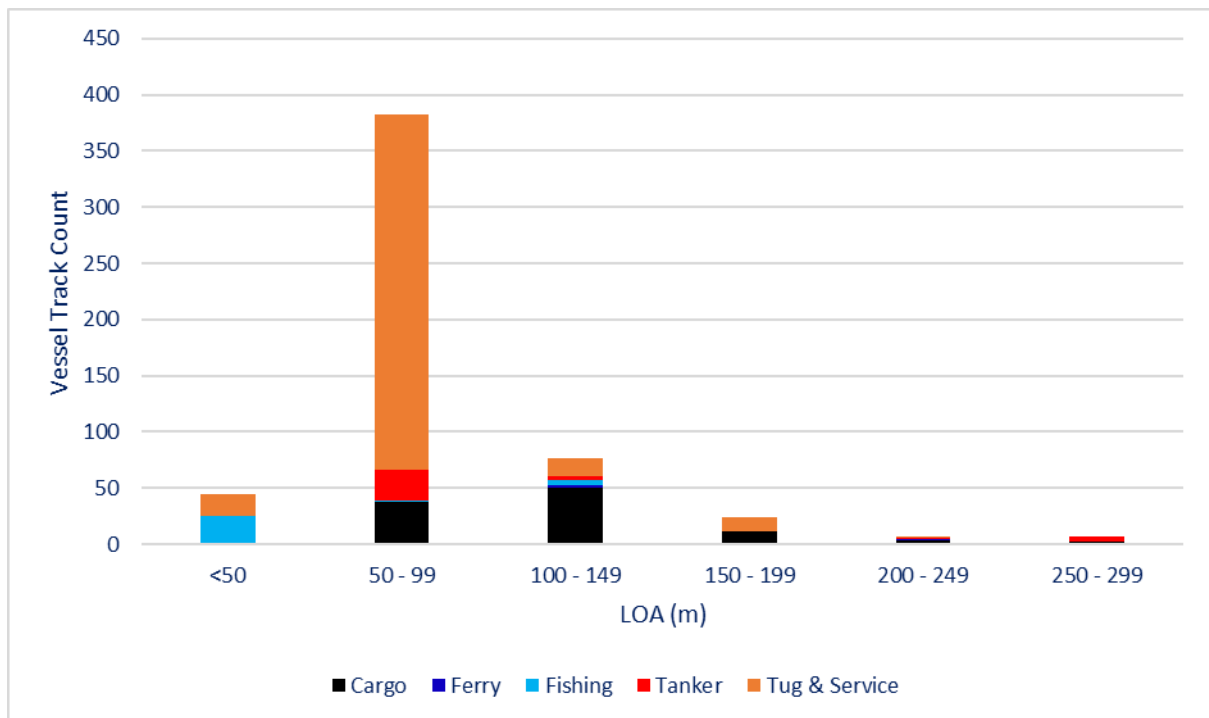


Figure 15: Vessel Track Counts by LOA During the Winter Survey

3.4 VESSEL DESTINATIONS

Table 5 shows a summary of the main destinations for the commercial vessels identified by AIS for both the winter and summer survey periods. Only the destinations that were provided within the AIS data have been included.

With 13 cargo vessels identified heading for Rotterdam, this port was the most popular destination recorded in the survey. Iceland was also a common destination with Reykjavik and Straumsvik having nine and seven identified cargo vessels heading to these ports, respectively.

For tanker vessels, Teesport was the most common destination with seven recorded transits.

One ferry was observed on route to Newcastle.

Table 5: Destination count for Commercial Vessels

Route/Destination	Cargo	Ferry	Tanker	Total
ABERDEEN	1		2	3
AMSTERDAM	2		1	3
ANTWERN	2			2
ANTWERP	1		1	2
ARDAL	1			1
ARLES	1			1
BALTIMORE	1			1
BELFAST	1			1
BLYTH	2			2
BREMEN	3			3
COPENHAGEN	1			1
DEN HELDER	2			2
DUBLIN			1	1
DUISBURG	1			1
DUNDEE	1		1	2
EIKEFET	1			1
ESBJERG	1			1
FOLLAFOSS	1			1
FUGLAFJORDUR			1	1
GLENSANDA	3			3
GRANGEMOUTH			2	2
GREAT YARMOUTH	1			1
GRIMSBY	3			3
GROVEPORT	3			3
GRUNDARTANGI	1			1
HAMBURG	1			1
HEIDRUN OIL FIELD			1	1
HOUSTON			1	1
HULL	1			1
HUMBER	1			1
IMMINGHAM	5		2	7
INVERGORDON	2			2
ISREY	4			4
KYLE OF LOCHALSH	2			2
LARVIK	2			2
LE HAVRE	1		2	3
LONDON	2			2
LONDONDERRY	1			1
MARGATE ROADS	1			1
MOERDIJK	1			1
MONSIN	2			2

Route/Destination	Cargo	Ferry	Tanker	Total
MONTROSE	5			5
NEW HOLLAND	4			4
NEWCASTLE		1		1
NORRKOPING	1			1
PUERTO DRUMMOND	1			1
REKEFJORD	1			1
REYDARFJORD	4			4
REYKJAVIK	9			9
RORVIK	1			1
ROSTOCK	2			2
ROTTERDAM	13			13
SAID	2			2
SARPSBORG			3	3
SELAA	1			1
SLOVAG	3			3
STRAUMSVIK	7			7
TEESPORT			7	7
TETNEY			1	1
THREE RIVERS	1			1
TORSHAVN	8			8
TYNE	2			2
VIGO	2			2
WICK	1			1
Total	127	1	26	155

4. SUMMARY

This report presents analysis of two 14 day dedicated marine traffic surveys carried out for the Bowdun OWF site. The following periods of survey were undertaken by the survey vessel Karelle:

- 30-Jun-23 (08:00 UTC) and 14-Jul-23 (08:00 UTC);
- 05-Jan-24 (12:30 UTC) and 19-Jan-24 (12:30 UTC)

The most frequently identified vessel types during both the summer and winter periods were cargo (71 transits in summer and 72 in winter) and tug & service (197 transits in summer and 132 in winter). Limited fishing activity was recorded, with a consistent number of transits between both surveys (24 in the summer survey and 24 in the winter). Transits by recreational craft were low (six in the survey area), with no activity recorded during winter.

Most vessels were 50 m to 99 m LOA (451 transits in summer, and 383 transits in winter), accounted for by the frequency of cargo and tug & service vessels within the survey area. The summer period includes vessels >300 m LOA, which is due to the presence of large cruise ships.

The most common destinations (excluding unspecified) for commercial vessels recorded during the survey periods were between Rotterdam, Reykjavik, and Straumsvik.

Overall, there were 71 tracks recorded intersecting the array area during the summer survey period and 53 tracks intersecting during the winter period, representing 22% and 22% of all transits within the survey area, respectively

Appendix A

Daily Radar Logs

Track IDs	1								
Date	30.06.2023	Start Time (UTC)	0535	End Time (UTC)	0730				
Speed (kts)	9 KTS	Photo Taken?	NO	Photo ID	NO				
Latitude	57 08 28	Longitude	1 12 361	Tracking Colour	YELLOW				
Vessel Details	FISHING BOAT								
Observations	STEAMING IN OUR SURVEY AREA								

Track IDs	15								
Date	02.07.2023	Start Time (UTC)	1705	End Time (UTC)	1830				
Speed (kts)	4KTS	Photo Taken?	YES	Photo ID	15				
Latitude	57 03 55	Longitude	01 23 686	Tracking Colour	CAYAN				
Vessel Details	SMALL YACHT .								
Observations	SEA STATE MODERATE , VESSEL UNDER POWER ,HEADING TOWARDS SE .								

Track IDs	15								
Date	04.07.2023	Start Time (UTC)	1525	End Time (UTC)	1610				
Speed (kts)	9.2kts	Photo Taken?	NO	Photo ID	NO				
Latitude	57 04 378N	Longitude	01 24 522W	Tracking Colour	DARKMAR OON				
Vessel Details	OCEAN FORTUNE								
Observations	ID-15 FIRST CAME UP WITH NO AIS,SO WE AQUIRED IT.WE COULD SEE THAT IT WAS AN OIL RIG BOAT .AFTER 10 MINS IT APPEARED ON AIS .SO WE TRACKED IT UNTIL IT LEFT RADAR AREA .								

Track IDs	16	17							
Date	06/07/23	Start Time (UTC)	0755	End Time (UTC)	1250				
Speed (kts)	7.3 KTS	Photo Taken?	YES	Photo ID	16/17				
Latitude	57 04 892	Longitude	01 21 89	Tracking Colour	RED				
Vessel Details	DALWINNIE								

Observations	WE ACQUIRED IDs 16/17 AT 0755, WE SOON DECIDED THAT IT WAS THE POTTER DALWHINNIE.IT WORKED TO THE NW CORNER NEVER COMING NEAR OURAREA. IT LEFT THE AREA AT 1250 IN THE NW , CORNER.									
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Track IDs	18									
Date	07.07.2023	Start Time (UTC)	0859	End Time (UTC)	0928					
Speed (kts)	13KTS	Photo Taken?	NO	Photo ID	NO					
Latitude	56 54 80N	Longitude	01 35 43W	Tracking Colour	MAGENTA					
Vessel Details	UN IDENTIFIED VESSEL .									
Observations	TRACK ID -18 WAS AN ERROR AT 11-12 MLS ,IT SHOWED UP ON RADAR BUT NOT AIS,AFTER 10 MIN WE DECIDED TO TRACK IT ,THEN AFTER 10 MIN IT SHOWED UP ON THE AIS . SO WE CANCELLED IT .									

Track IDs	19									
Date	12.07.2023	Start Time (UTC)	0259	End Time (UTC)	0524					
Speed (kts)	2.7KTS	Photo Taken?	NO	Photo ID	NO					
Latitude		Longitude		Tracking Colour	PURPLE					
Vessel Details	PAIR TRAWLERS									
Observations	FISHING IN SURVEY LOCATION									

Track IDs	20	22	24	25	27	28				
Date	13.07.2023	Start Time (UTC)	1206	End Time (UTC)	1605					
Speed (kts)	6.2 KTS	Photo Taken?	NO	Photo ID	NO					
Latitude	56,55.71N	Longitude	01,22,36W	Tracking Colour	RED					
Vessel Details	POTTER BOAT									
Observations	VESSAL NAME LILLIE 5,WK46.OWNER NAME RICHARD MENNIE.									

Track IDs	26									
Date	13.07.2023	Start Time (UTC)	1320	End Time (UTC)	1410					
Speed (kts)	4.1 KTS	Photo Taken?	NO	Photo ID	NO					
Latitude	57,02.08N	Longitude	01,24.08W	Tracking Colour	BLUE					

Vessel Details	YATCH (UNKNOWN)
Observations	YATCH PASSING SURVEY LOCATION

Appendix B

Weather Log

Summer Survey Weather Log

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/ rough)	Comments (e.g. swell height and direction, precipitation, trends)
Fri 30-Jun-2023 00:00	0	NN18KTS	GOOD	1050	SLIGHT	NN 0.5MTR
Fri 30-Jun-2023 06:00	0.25	NW17KTS	GOOD	1053	SLIGHT	NW 0.5MTR
Fri 30-Jun-2023 12:00	0.5	SE14KTS	GOOD	1030	SLIGHT	SE 0.2MTR
Fri 30-Jun-2023 18:00	0.75	SE10KTS	GOOD	1030	SLIGHT	SE 0.2MTR
Sat 01-Jul-2023 00:00	1	SE10KTS	GOOD	1029	CALM	SE 0.2MTR
Sat 01-Jul-2023 06:00	1.25	S10KTS	GOOD	1027	CALM	S0.2MTR
Sat 01-Jul-2023 12:00	1.5	SW15KTS	GOOD	1020	SLIGHT	SW0.5MTR
Sat 01-Jul-2023 18:00	1.75	W20KTS	GOOD	1020	MODERATE	W0.75MTR
Sun 02-Jul-2023 00:00	2	SW25KTS	GOOD	1028	MODERATE	SW0.8 MTR
Sun 02-Jul-2023 06:00	2.25	SW24KTS	GOOD	1030	MODERATE	SW0.1MTR
Sun 02-Jul-2023 12:00	2.5	SW20KTS	GOOD	1025	MODERATE	SW1.5MTR
Sun 02-Jul-2023 18:00	2.75	SW12KTS	GOOD	1025	MODERATE	SW.5MTR
Mon 03-Jul-2023 00:00	3	W20KTS	GOOD	1030	SLIGHT	W1.2MTR
Mon 03-Jul-2023 06:00	3.25	W22KTS	GOOD	1030	MODERATE	W1.5MTR
Mon 03-Jul-2023 12:00	3.5	W18KTS	GOOD	1030	MODERATE	W0.75MTR
Mon 03-Jul-2023 18:00	3.75	W18KTS	GOOD	1030	MODERATE	W0.75MTR
Tue 04-Jul-2023 00:00	4	W25KTS	GOOD	1034	MODERATE	W2MTR
Tue 04-Jul-2023 06:00	4.25	W15KTS	GOOD	1034	SLIGHT	W1MTR
Tue 04-Jul-2023 12:00	4.5	NW10KTS	GOOD	1030	SLIGHT	NW.5MTR
Tue 04-Jul-2023 18:00	4.75	S5KTS	GOOD	1035	CALM	SMOOTH
Wed 05-Jul-2023 00:00	5	NE15KTS	GOOD	1030	SLIGHT	NE0.7MTR
Wed 05-Jul-2023 06:00	5.25	NE15KTS	GOOD	1030	SLIGHT	NE0.5MTR
Wed 05-Jul-2023 12:00	5.5	NE12KTS	GOOD	1035	SLIGHT	NE0.5MTR
Wed 05-Jul-2023 18:00	5.75	NE12KTS	GOOD	1030	CALM	SMOOTH
Thu 06-Jul-2023 00:00	6	SW10KTS	GOOD	1038	SLIGHT	SW0.25MTR
Thu 06-Jul-2023 06:00	6.25	SW10KTS	GOOD	1038	SLIGHT	SW0.25MTR
Thu 06-Jul-2023 12:00	6.5	SW08KTS	GOOD	1039	SLIGHT	SW0.25MTR
Thu 06-Jul-2023 18:00	6.75	SW10KTS	GOOD	1040	SLIGHT	SW0.25MTR
Fri 07-Jul-2023 00:00	7	S15KTS	GOOD	1020	MODERATE-ROUGH	S1MTR
Fri 07-Jul-2023 06:00	7.25	SE25KTS	GOOD	1010	MODERATE-ROUGH	S2MTR
Fri 07-Jul-2023 12:00	7.5	S15KTS	GOOD	1025	MODERATE-ROUGH	S1.7MTR
Fri 07-Jul-2023 18:00	7.75	S10KTS	GOOD	1040	SLIGHT	S1MTR
Sat 08-Jul-2023 00:00	8	SE10KTS	GOOD	1040	SLIGHT	E1MTR
Sat 08-Jul-2023 06:00	8.25	SE10KTS	GOOD	1043	SLIGHT	SE0.25MTR
Sat 08-Jul-2023 12:00	8.5	E15KTS	GOOD	1045	MODERATE	SE0.5MTR

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/ rough)	Comments (e.g. swell height and direction, precipitation, trends)
Sat 08-Jul-2023 18:00	8.75	E15KTS	GOOD	1045	MODERATE	E0.5MTR
Sun 09-Jul-2023 00:00	9	E10KTS	GOOD	1045	SLIGHT	E0.25MTR
Sun 09-Jul-2023 06:00	9.25	E10KTS	GOOD	1045	SLIGHT	E0.25MTR
Sun 09-Jul-2023 12:00	9.5	SE5KTS	POOR	1040	SLIGHT	SE0.25MTR
Sun 09-Jul-2023 18:00	9.75	SE10KTS	GOOD	1045	SLIGHT	SE0.25MTR
Mon 10-Jul-2023 00:00	10	S10KTS	GOOD	1040	SLIGHT TO MODERATE	S0.5MTR
Mon 10-Jul-2023 06:00	10.25	SE10KTS	GOOD	1045	SLIGHT	SE0.25MTR
Mon 10-Jul-2023 12:00	10.5	S10KTS	GOOD	1040	SLIGHT	S 0.25MTR
Mon 10-Jul-2023 18:00	10.75	S15KTS	GOOD	1045	SLIGHT	S 0.25MTR
Tue 11-Jul-2023 00:00	11	S10KTS	GOOD	1040	MODERATE	S0.75MTR
Tue 11-Jul-2023 06:00	11.25	S15KTS	GOOD	1035	MODERATE	S0.75MTR
Tue 11-Jul-2023 12:00	11.5	S20KTS	GOOD	1030	MODERATE	S2.0MTR
Tue 11-Jul-2023 18:00	11.75	S10KTS	GOOD	1030	SLIGHT	S 0.75MTR
Wed 12-Jul-2023 00:00	12	S10KTS	GOOD	1030	SLIGHT	S O.25MTR
Wed 12-Jul-2023 06:00	12.25	S10KTS	GOOD	1030	SLIGHT	S O.25MTR
Wed 12-Jul-2023 12:00	12.5	W8KTS	GOOD	1025	SLIGHT	W O.25MTR
Wed 12-Jul-2023 18:00	12.75	SW8KTS	GOOD	1030	SLIGHT	SW O.25MTR
Thu 13-Jul-2023 00:00	13	W5KTS	GOOD	1025	SLIGHT	CALM
Thu 13-Jul-2023 06:00	13.25	W5KTS	GOOD	1025	SLIGHT	CALM
Thu 13-Jul-2023 12:00	13.5	S5KTS	GOOD	1040	SLIGHT	CALM
Thu 13-Jul-2023 18:00	13.75	S5KTS	GOOD	1040	SLIGHT	CALM
Fri 14-Jul-2023 00:00	14	S5KTS	GOOD	1040	SLIGHT	CALM

Winter Survey Weather Log

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Fri 05/01/2024 00:00:00	0	35KTS	GOOD	1035	MOD - ROUGH	SE 4.0 MTR
Fri 05/01/2024 06:00:00	0.25	25KTS	GOOD	1040	MODERATE	SE 2.5 MTR
Fri 05/01/2024 12:00:00	0.5	25KTS	GOOD	1040	MODERATE	SE 2.5 MTR
Fri 05/01/2024 18:00:00	0.75	15KTS	GOOD	1042	SLIGHT	SE 1.5 MTR
Sat 06/01/2024 00:00:00	1	15KTS	GOOD	1042	SLIGHT	SE 1.5 MTR

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Sat 06/01/2024 06:00:00	1.25	15KTS	GOOD	1044	SLIGHT	E 1.5 MTR
Sat 06/01/2024 12:00:00	1.5	10KTS	GOOD	1048	SLIGHT	E 1.0 MTR
Sat 06/01/2024 18:00:00	1.75	10KTS	GOOD	1052	SLIGHT	NW 0.6 MTR
Sun 07/01/2024 00:00:00	2	10KTS	GOOD	1055	SLIGHT	S 0.6 MTR
Sun 07/01/2024 06:00:00	2.25	10KTS	GOOD	1056	SLIGHT	N 0.6 MTR
Sun 07/01/2024 12:00:00	2.5	10KTS	GOOD	1058	SLIGHT	NW 0.6 MTR
Sun 07/01/2024 18:00:00	2.75	05KTS	GOOD	1060	CALM	NW 0.3 MTR
Mon 08/01/2024 00:00:00	3	05KTS	GOOD	1062	CALM	NW 0.3 MTR
Mon 08/01/2024 06:00:00	3.25	05KTS	GOOD	1064	CALM	SE 0.3 MTR
Mon 08/01/2024 12:00:00	3.5	10KTS	GOOD	1065	SLIGHT	SE 0.6 MTR
Mon 08/01/2024 18:00:00	3.75	10KTS	GOOD	1066	SLIGHT	E 0.6 MTR
Tue 09/01/2024 00:00:00	4	05KTS	GOOD	1064	CALM	VAR 0.3 MTR
Tue 09/01/2024 06:00:00	4.25	05KTS	GOOD	1065	CALM	VAR 0.3 MTR
Tue 09/01/2024 12:00:00	4.5	05KTS	GOOD	1065	CALM	VAR 0.3 MTR
Tue 09/01/2024 18:00:00	4.75	05KTS	GOOD	1066	CALM	VAR 0.3 MTR
Wed 10/01/2024 00:00:00	5	15KTS	GOOD	1065	SLIGHT	NE 1.5 MTR
Wed 10/01/2024 06:00:00	5.25	15KTS	GOOD	1065	SLIGHT	NE 1.5 MTR
Wed 10/01/2024 12:00:00	5.5	20KTS	GOOD	1064	SLIGHT-MOD	NE 2.0 MTR
Wed 10/01/2024 18:00:00	5.75	25KTS	GOOD	1063	MODERATE	NE 2.0 MTR
Thu 11/01/2024 00:00:00	6	15KTS	GOOD	1064	SLIGHT	NE 1.5 MTR
Thu 11/01/2024 06:00:00	6.25	15KTS	GOOD	1065	SLIGHT	NE 1.5 MTR
Thu 11/01/2024 12:00:00	6.5	10KTS	GOOD	1065	SLIGHT	NW 0.6 MTR
Thu 11/01/2024 18:00:00	6.75	10KTS	GOOD	1066	SLIGHT	NW 0.6 MTR
Fri 12/01/2024 00:00:00	7	08KTS	GOOD	1062	SLIGHT	NW 0.6 MTR
Fri 12/01/2024 06:00:00	7.25	08KTS	GOOD	1060	SLIGHT	NW 0.6 MTR
Fri 12/01/2024 12:00:00	7.5	06KTS	GOOD	1056	CALM	VAR 0.3 MTR
Fri 12/01/2024 18:00:00	7.75	05KTS	GOOD	1054	CALM	VAR 0.3 MTR
Sat 13/01/2024 00:00:00	8	20KTS	GOOD	1058	SLIGHT - MOD	NW 1.5 MTR
Sat 13/01/2024 06:00:00	8.25	24KTS	GOOD	1055	MODERATE	NW 2.0 MTR
Sat 13/01/2024 12:00:00	8.5	25KTS	GOOD	1053	MODERATE	NW 2.0 MTR
Sat 13/01/2024 18:00:00	8.75	27KTS	GOOD	1050	MODERATE	NW 2.5 MTR
Sun 14/01/2024 00:00:00	9	25KTS	GOOD	1045	MODERATE	NW 2.5 MTR
Sun 14/01/2024 06:00:00	9.25	30KTS	GOOD	1043	MODERATE	NW 3.0 MTR
Sun 14/01/2024 12:00:00	9.5	35KTS	GOOD	1040	MOD - ROUGH	NW 4.0 MTR
Sun 14/01/2024 18:00:00	9.75	40KTS	POOR	1040	ROUGH	NW 4.5 MTR
Mon 15/01/2024 00:00:00	10	40KTS	POOR	1040	ROUGH	NW 4.5 MTR
Mon 15/01/2024 06:00:00	10.25	45KTS	GOOD	1040	ROUGH	NW 5.0 MTR
Mon 15/01/2024 12:00:00	10.5	35KTS	GOOD	1040	MOD - ROUGH	NW 4.0 MTR
Mon 15/01/2024 18:00:00	10.75	30KTS	GOOD	1041	MODERATE	NW 3.0 MTR
Tue 16/01/2024 00:00:00	11	20KTS	POOR	1038	SLIGHT - MOD	NW 2.0 MTR

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Tue 16/01/2024 06:00:00	11.25	10KTS	GOOD	1032	SLIGHT	NW 0.6 MTR
Tue 16/01/2024 12:00:00	11.5	10KTS	GOOD	1030	SLIGHT	NW 0.6 MTR
Tue 16/01/2024 18:00:00	11.75	15KTS	POOR	1027	SLIGHT	NW 1.0 MTR
Wed 17/01/2024 00:00:00	12	15KTS	GOOD	1028	SLIGHT	NW 1.0 MTR
Wed 17/01/2024 06:00:00	12.25	20KTS	GOOD	1030	SLIGHT - MOD	NW 1.5 MTR
Wed 17/01/2024 12:00:00	12.5	20KTS	GOOD	1030	SLIGHT - MOD	NW 1.5 MTR
Wed 17/01/2024 18:00:00	12.75	24KTS	GOOD	1030	MODERATE	NW 2.0 MTR
Thu 18/01/2024 00:00:00	13	25KTS	GOOD	1032	MODERATE	NW 2.0 MTR
Thu 18/01/2024 06:00:00	13.25	26KTS	GOOD	1035	MODERATE	NW 2.0 MTR
Thu 18/01/2024 12:00:00	13.5	30KTS	GOOD	1041	MODERATE	NW 3.0 MTR
Thu 18/01/2024 18:00:00	13.75	30KTS	GOOD	1041	MODERATE	NW 3.0 MTR
Fri 19/01/2024 00:00:00	14	30KTS	GOOD	1041	MODERATE	NW 3.0 MTR


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