

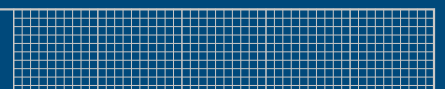


**EIAR Volume 4: Offshore Infrastructure
Technical Appendices
Appendix 4.3.10-6
Dublin Array Offshore Wind Farm
Long-Term Data Annex**

Kish Offshore Wind Ltd

RWE  **SLR** **GoBe**
APEM Group

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Dublin Array Offshore Wind Farm Long-Term Data Annex

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Table of Contents

1	Introduction	5
1.1	Aims and Objectives	5
2	Data Sources	6
2.1	Study Area	6
2.2	Data Collection Summary	6
2.3	Data Limitations.....	6
3	Long-Term Data Analysis	8
3.1	Overview	8
3.2	Vessel Count	9
3.3	Vessel Type	10
3.3.1	Commercial Vessels	11
3.3.2	Recreational Vessels	15
3.3.3	Fishing Vessels	17
3.3.4	Anchored Vessels.....	18
3.3.5	Summary.....	20
3.4	Intersecting Vessels	20
4	Survey Data Comparison	23
5	Summary and Conclusion	24

Table of Figures

Figure 2-1: Study Area Overview	6
Figure 3-1: Vessels by Type (Six Months, February to July 2024).....	8
Figure 3-2: Vessel Density (Six Months, February to July 2024).....	9
Figure 3-3: Vessel Counts per Month per Type (Six Months, February to July 2024)	10
Figure 3-4: Distribution of Main Vessel Types (Six Months, February to July 2024).....	11
Figure 3-5: Commercial Vessels by Type (Six Months, February to July 2024)	12
Figure 3-6: Cargo Vessels by Subtype (Six Months, February to July 2024).....	12
Figure 3-7: Passenger Vessels by Subtype (Six Months, February to July 2024)	13
Figure 3-8: Tankers by Subtype (Six Months, February to July 2024)	13
Figure 3-9: Average Number of Commercial Vessels per Day (Six Months, February to July 2024)	15
Figure 3-10: Recreational Vessels (Six Months, February to July 2024).....	16
Figure 3-11: Recreational Race (11 th May 2024)	17
Figure 3-12: Fishing Vessels by Likely Activity (Six Months, February to July 2024)	18
Figure 3-13: Anchored Vessels by Type (Six Months, February to July 2024)	19
Figure 3-14: Intersecting Vessels by Type (Six Months, February to July 2024)	21

Figure 3-15: Distribution of Main Vessel Types Recorded Intersecting Array Area (Six Months, February to July 2024)22

Table of Tables

Table 3-1: Summary of Vessel Numbers Recorded during the Six-Month Period20

Table 4-1: Comparison of Daily Averages During the Six-Month Period and Each Survey Period23

Abbreviations Table

Abbreviation	Definition
AIS	Automatic Identification System
GT	Gross Tonnes
LOA	Length Overall
m	Metre
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MSO	Marine Survey Office
nm	Nautical mile
NRA	Navigational Risk Assessment
Radar	Radio Detection and Ranging
RoPax	Roll-on/Roll-off Passenger
RoRo	Roll-on/Roll-off
UK	United Kingdom

1 Introduction

As part of the Navigational Risk Assessment (NRA) process for the proposed Dublin Array Offshore Wind Farm (hereafter ‘Dublin Array’), assessment of long-term Automatic Identification System (AIS) data has been undertaken. The assessment is designed to supplement the primary analysis within the NRA, which is based on shorter-term AIS, Radio Detection and Ranging (Radar) and visual observation data collected over four vessel traffic surveys.

The approach to vessel traffic data collection for the Dublin Array has been based on requirements of Marine Guidance Note (MGN) 654 (Maritime and Coastguard Agency (MCA), 2021). While this is United Kingdom (UK) guidance, the equivalent dedicated Irish guidance is likely to closely resemble MGN 654 (based upon the draft wording), and the Irish Coastguard, Marine Survey Office (MSO), and Irish Lights all agreed on its use as the primary NRA guidance for the Dublin Array.

MGN 654 requires a minimum of 28 days of up-to-date vessel traffic data that accounts for non-AIS traffic and seasonal variation. However, short-term periods in isolation can omit certain seasonal or infrequent marine activity. Therefore, in line with good practice assessment procedures, six months of AIS data from February 2024 to July 2024 has also been considered to ensure a comprehensive overview of the vessel traffic baseline can be established, including the inclusion of any seasonal variation.

1.1 Aims and Objectives

The key aims and objectives of this NRA annex are as follows:

- Identify seasonal variations in vessel traffic via assessment of the long-term data;
- Determine which variations are not reflected within the short-term survey data (and therefore should be fed into the NRA baseline); and
- Assess which dataset (long-term/survey, or combination of both) should be utilised for each key NRA element that requires vessel traffic data input.

2 Data Sources

2.1 Study Area

A buffer of 10 nautical miles (nm) has been applied around the array area as the study area for shipping and navigation (hereafter the 'study area') and is presented in Figure 2-1.

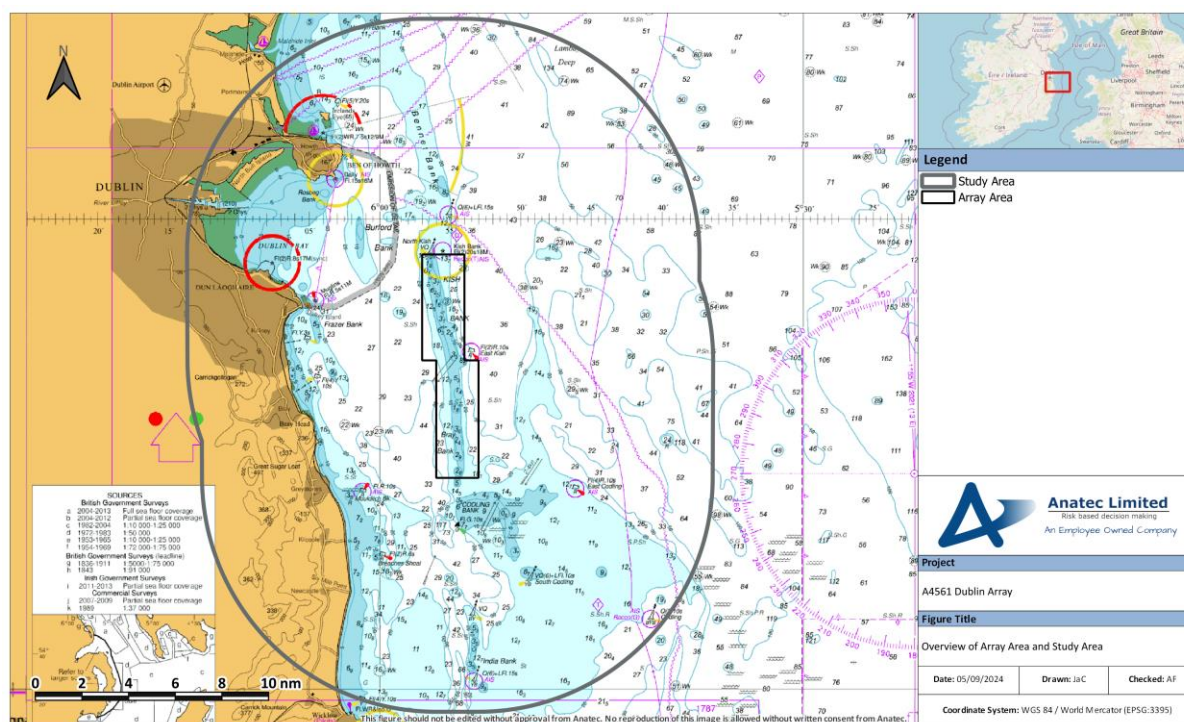


Figure 2-1: Study Area Overview

2.2 Data Collection Summary

The AIS data was collected from satellite and terrestrial receivers for the period 1st February 2024 – 31st July 2024. This period was chosen to capture peak traffic levels while encompassing a consecutive six month duration. Given a combination of satellite and terrestrial receivers were used, downtime was observed to be limited.

A proportion of traffic has been excluded using the same approach taken for the vessel traffic survey data analysis. Any traffic deemed as temporary in nature (e.g., vessels associated with surveys or guard activities) has been excluded from the analysis in Section 3 to ensure the assessment focuses on routine traffic and activity. Vessels which remained at berth within nearby key ports and harbours have also been excluded from the data to avoid skewing the analysis and to ensure the focus is on moving traffic.

2.3 Data Limitations

The assessment undertaken in this report is based on an AIS-only dataset. It should therefore be considered in tandem with the dedicated vessel traffic surveys, due to the fact that not all

vessels are required to carry an AIS transceiver. AIS carriage is mandatory for all vessels of 300 Gross Tonnes (GT) and upwards on international voyages, cargo vessels of 500GT and upwards not engaged on international voyages and all passenger vessels irrespective of size. In addition, fishing vessels with length overall (LOA) 15 metres (m) and greater must carry AIS. Smaller fishing vessels, recreational vessels and military vessels are not required to broadcast on AIS (although may do so voluntarily). Therefore, there is likely to be a proportion of the vessel traffic in the area which is not covered by the AIS data.

All information broadcast via AIS is assumed accurate unless there is clear evidence to the contrary.

3 Long-Term Data Analysis

3.1 Overview

Figure 3-1 presents the vessels recorded within the study area during the six-month period, colour-coded by vessel type. All vessels were associated with a known type except for two (which accounted for less than 0.1% of the data). Following this, Figure 3-2 presents a density map of the data within a 500m × 500m grid.

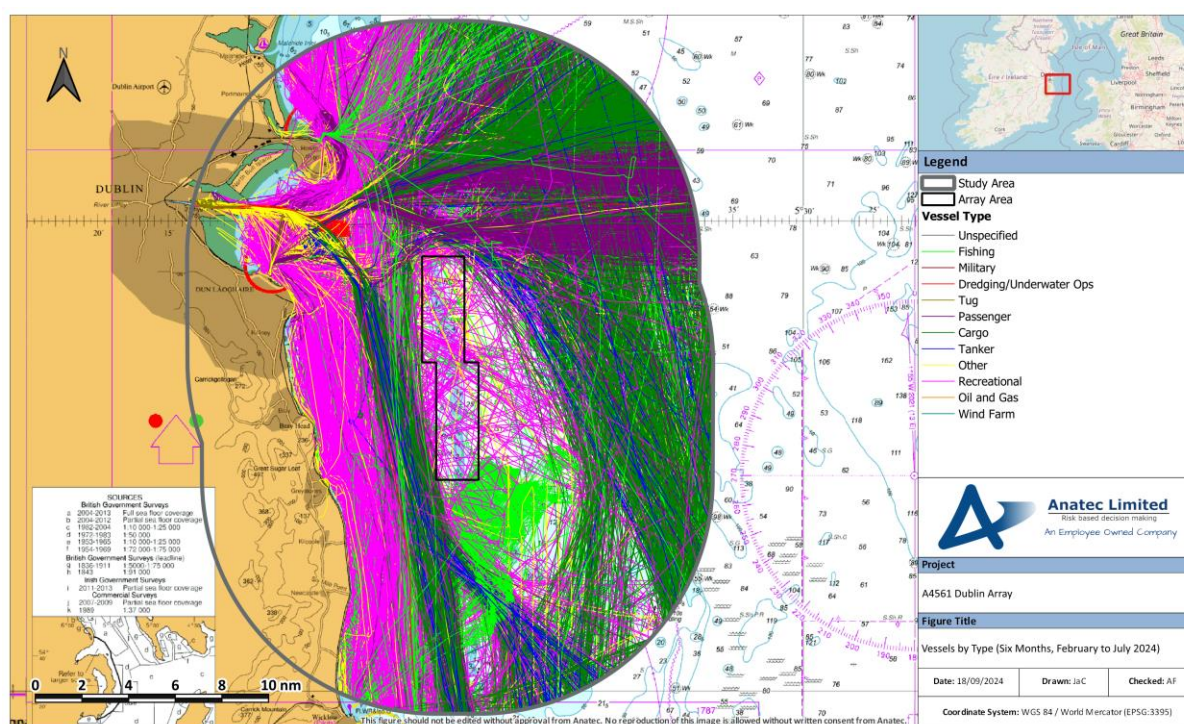


Figure 3-1: Vessels by Type (Six Months, February to July 2024)

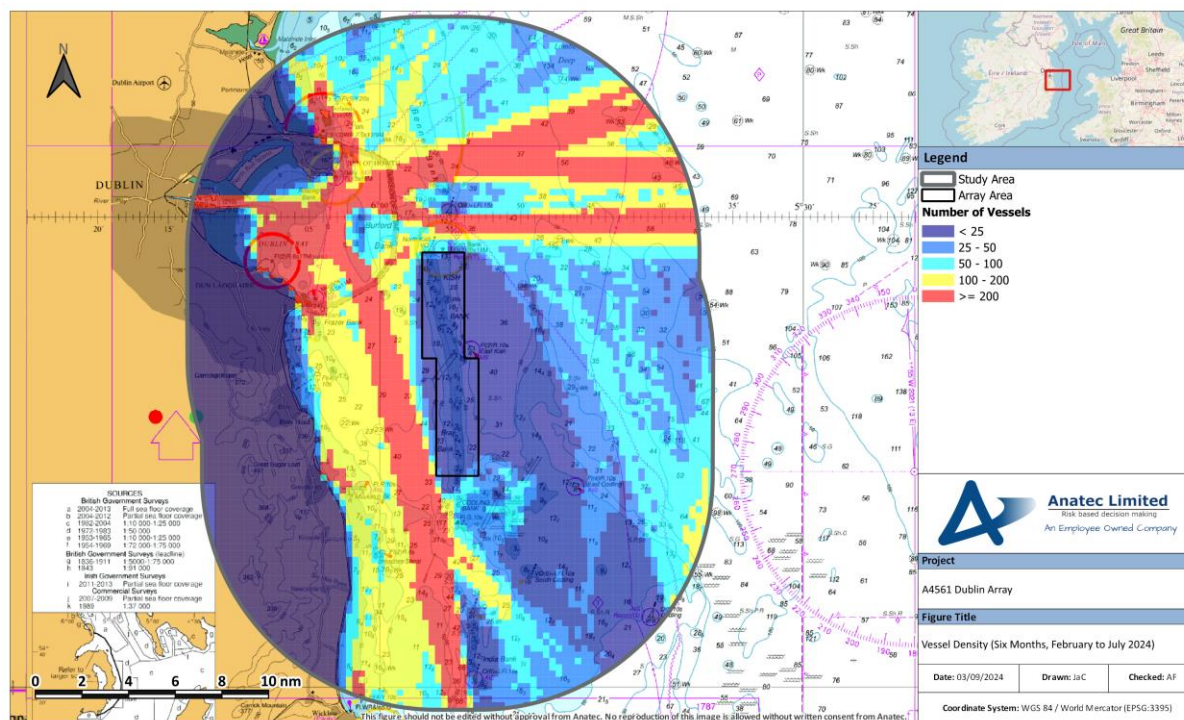


Figure 3-2: Vessel Density (Six Months, February to July 2024)

It can be seen that the areas of highest density within the study area were associated with the following commercial routes (see Section 3.3.1):

- A southeast/northwest route, inshore of the Array Area, between Dublin (Ireland) and destinations including Rotterdam (the Netherlands), Waterford (Ireland) and Cork (Ireland). This route was mainly undertaken by cargo vessels.
- Two east/west routes, north of the Array Area, mainly between Dublin (Ireland) and Holyhead (UK). This route was mainly undertaken by passenger vessels.
- A northeast/southwest route, north of the Array Area, between Dublin (Ireland) and Liverpool (UK) or Heysham (UK). This route was mainly undertaken by cargo vessels.

Moderate density can also be seen close to the coast, associated with recreational vessel traffic (see Section 3.3.2).

Density within, and directly east of, the Array Area was minimal due to vessels avoiding the shallow banks. However, fishing activity was noted at Codling Bank to the southeast of the Array Area (see Section 3.3.3).

3.2 Vessel Count

Figure 3-3 presents the average number of vessels recorded per day within the study area, per month, for each vessel type.

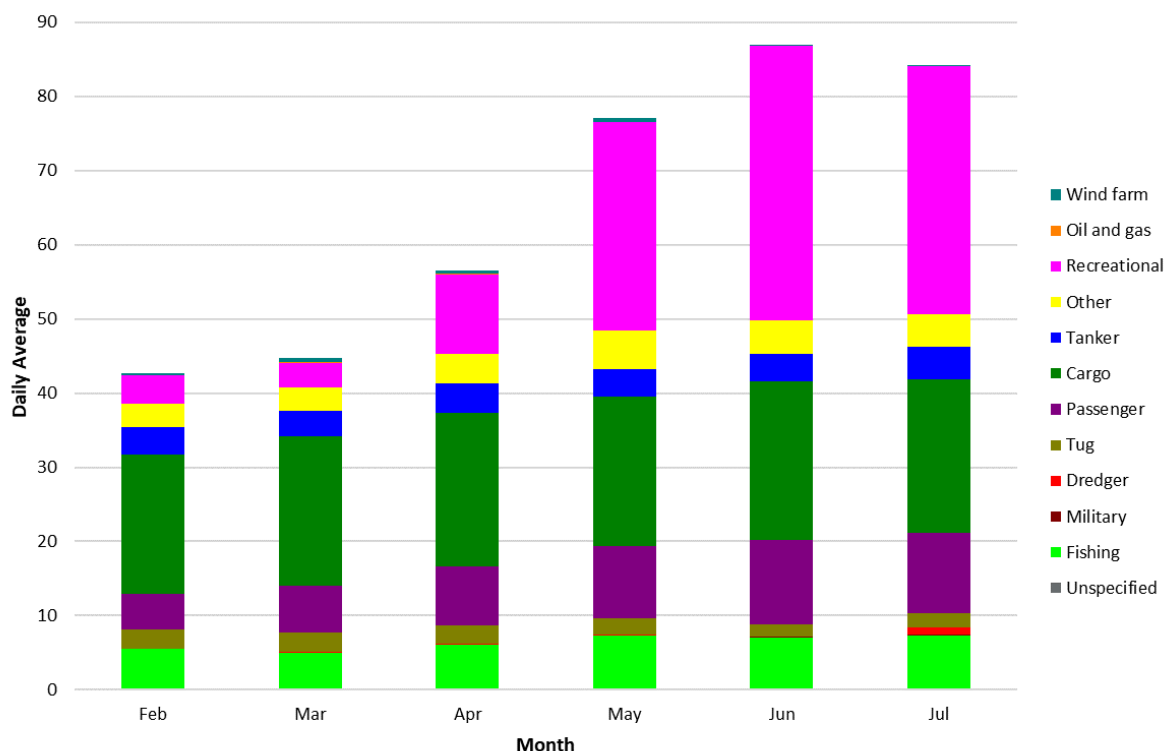


Figure 3-3: Vessel Counts per Month per Type (Six Months, February to July 2024)

Overall, there was an average of 66 vessels per day within the study area during the six-month period. The quietest month was February, with an average of 43 vessels per day. The busiest month was June, with an average of 87 vessels per day. Recreational traffic displayed the highest level of seasonal variation, with higher numbers of vessels during the summer months coinciding with the more favourable weather. Seasonal variation in passenger vessel numbers was also noted, with higher levels during the summer months.

3.3 Vessel Type

Figure 3-4 presents the distribution of the main vessel types recorded within the study area during the six-month period, excluding unspecified types (which accounted for less than 0.1%).

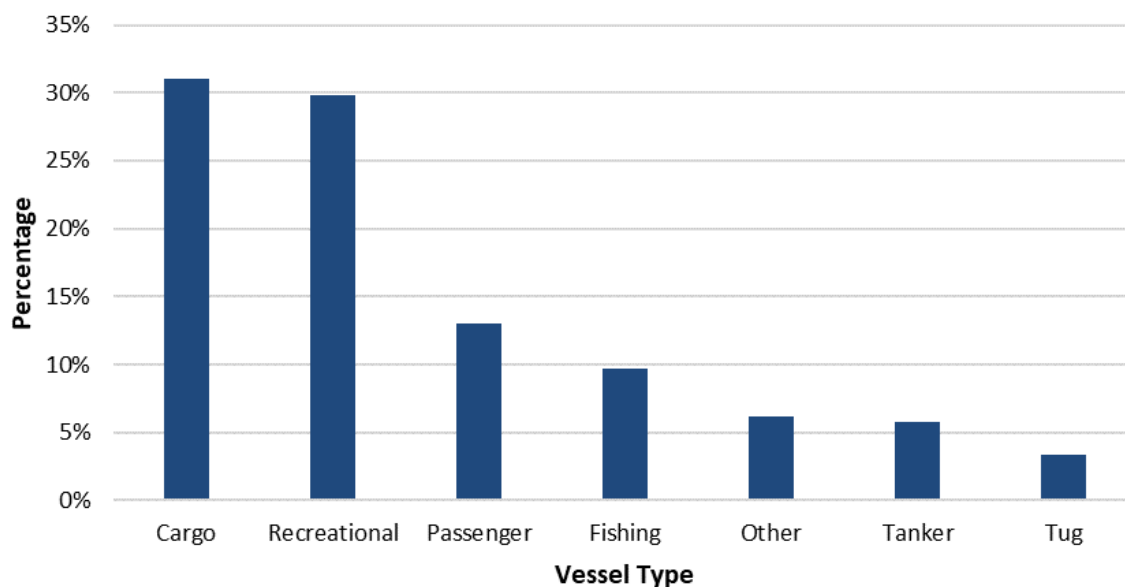


Figure 3-4: Distribution of Main Vessel Types (Six Months, February to July 2024)

Cargo vessels and recreational vessels were the most common vessel types, accounting for 31% and 30% respectively. This was followed by passenger vessels (13%), fishing vessels (10%), “other” vessels (which largely consisted of pilot vessels, port tender boats and lifeboats) (6%), tankers (6%) and tugs (3%). Also recorded in low numbers (accounting for less than 1%) were wind farm support vessels, dredgers, military vessels and oil and gas vessels.

The following subsections present each of the main vessel types in further detail.

3.3.1 Commercial Vessels

Figure 3-5 presents the commercial vessels (i.e. passenger vessels, cargo vessels and tankers) recorded within the study area during the six-month period colour-coded by type. Following this, Figure 3-6, Figure 3-7 and Figure 3-8 presents the cargo vessels, passenger vessels and tankers individually, each colour-coded by subtype.

Note that any sailing vessels or yachts above 24m in length are classed in this report as passenger. Sailing vessels and yachts that are not above 24m in length are classed as recreational (see Section 3.3.2).

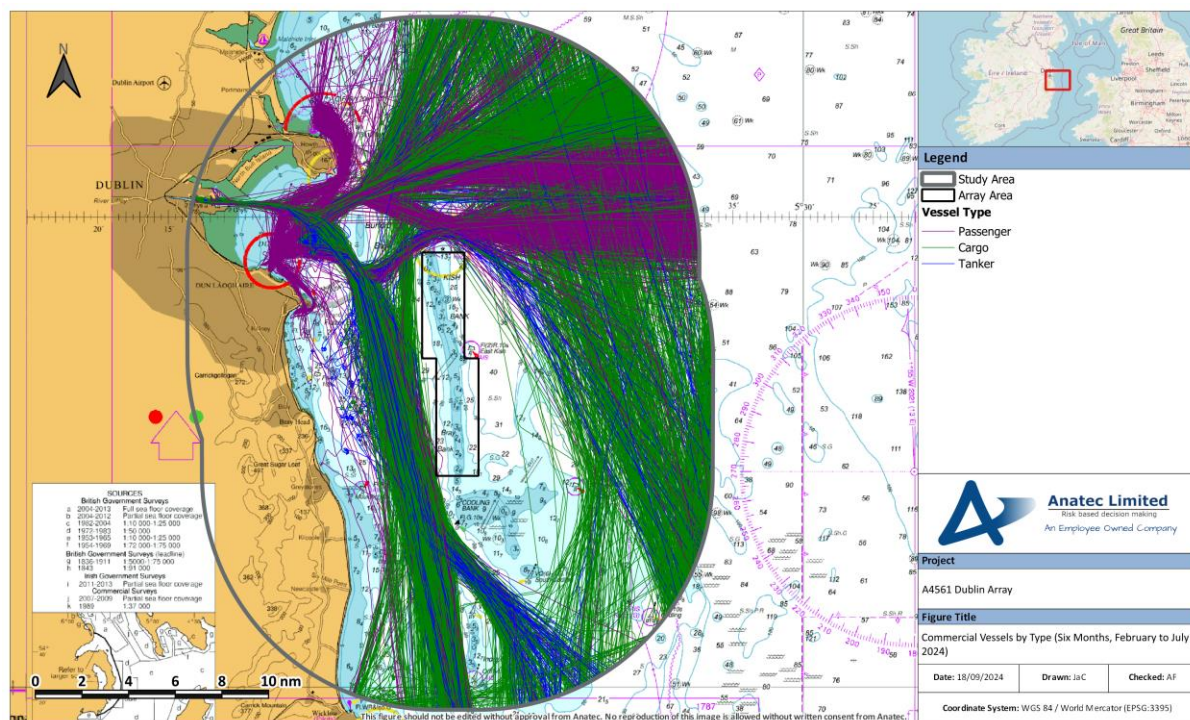


Figure 3-5: Commercial Vessels by Type (Six Months, February to July 2024)

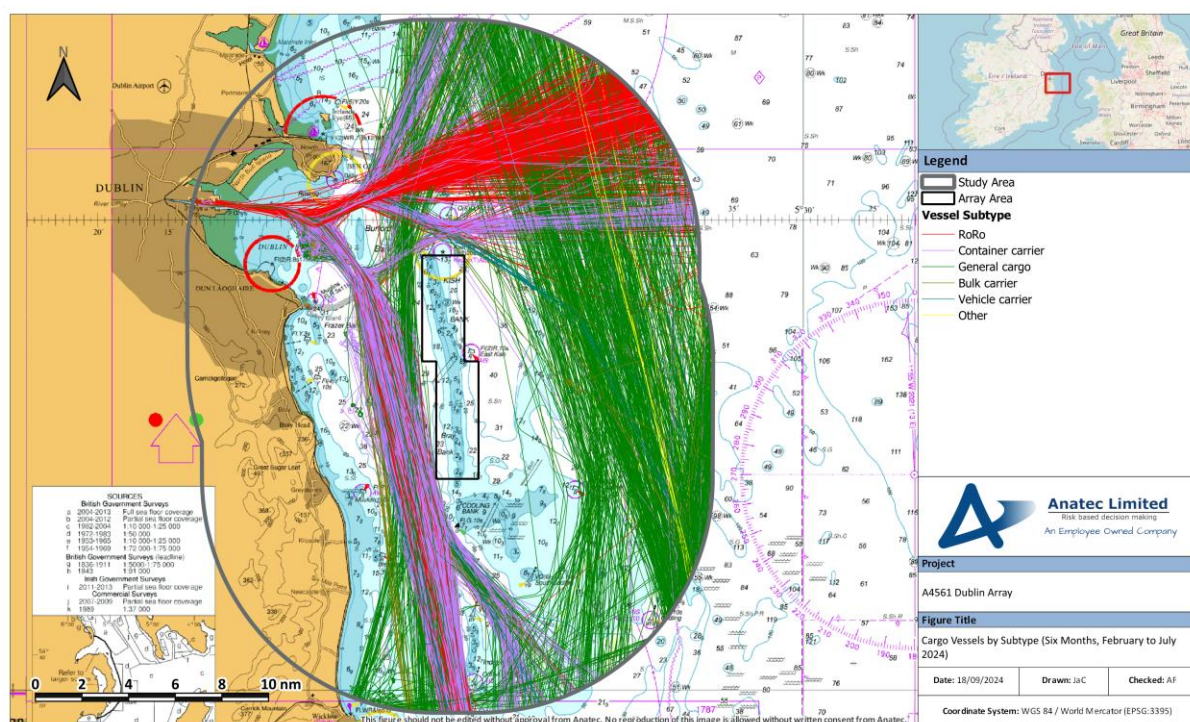


Figure 3-6: Cargo Vessels by Subtype (Six Months, February to July 2024)



Page 13

Array Area were minimal. Over the six-month period, a total of 17 intersections from commercial vessels were seen, corresponding to approximately three per month.

The majority of commercial vessels inshore of the Array Area were on a southeast/northwest route to/from Dublin (see Figure 3-2). This route was mainly comprised of cargo vessels, and included Roll-on/Roll-off Passenger (RoPax) traffic (operated by Irish Ferries and transiting to/from Cherbourg (France)) and RoRo (Roll-on/Roll-off) traffic (operated by CLdN and transiting to/from Rotterdam (the Netherlands)). Vessels on this route passed inshore of Kish Bank and Bray Bank (within the Array Area) and Codling Bank (south of the Array Area). Vessels also largely passed inshore of the India Bank at the southern extent of the study area, with a minor proportion preferring to pass offshore of the India Bank. It is also noted that commercial vessels were seen to anchor inshore of this route; see Section 3.3.4 for further details.

Cargo vessels were also noted routeing north/south, directly west of the Array Area. This traffic was associated with a variety of broadcast destinations, however it is noted that a proportion travelled to/from Wicklow (Ireland).

Commercial traffic offshore of the Array Area passed at a greater distance from the Array Area, avoiding Codling Bank. This traffic was mainly comprised of cargo vessels transiting southeast/northwest between a variety of ports in the UK and Ireland.

North of the Array Area, two east/west routes mainly comprised of passenger vessels can be seen. Traffic on these routes included RoPax vessels operated by StenaLines and Irish Ferries, with Holyhead (UK) being the main destination. This traffic branches into two parts, avoiding Bennet Bank directly north of the Array Area (which is marked by a south cardinal buoy equipped with AIS). These vessels also mainly passed north of Burford Bank (at the northwest of the Array Area) although a minor proportion preferred to pass south.

Further north of these routes is another high-density route, mainly comprised of RoRo vessels operated by CLdN transiting northeast/southwest between Dublin (Ireland) and Liverpool (UK) or Heysham (UK).

Figure 3-9 presents the average number of commercial vessels recorded within the study area during the six-month period, broken down by type.

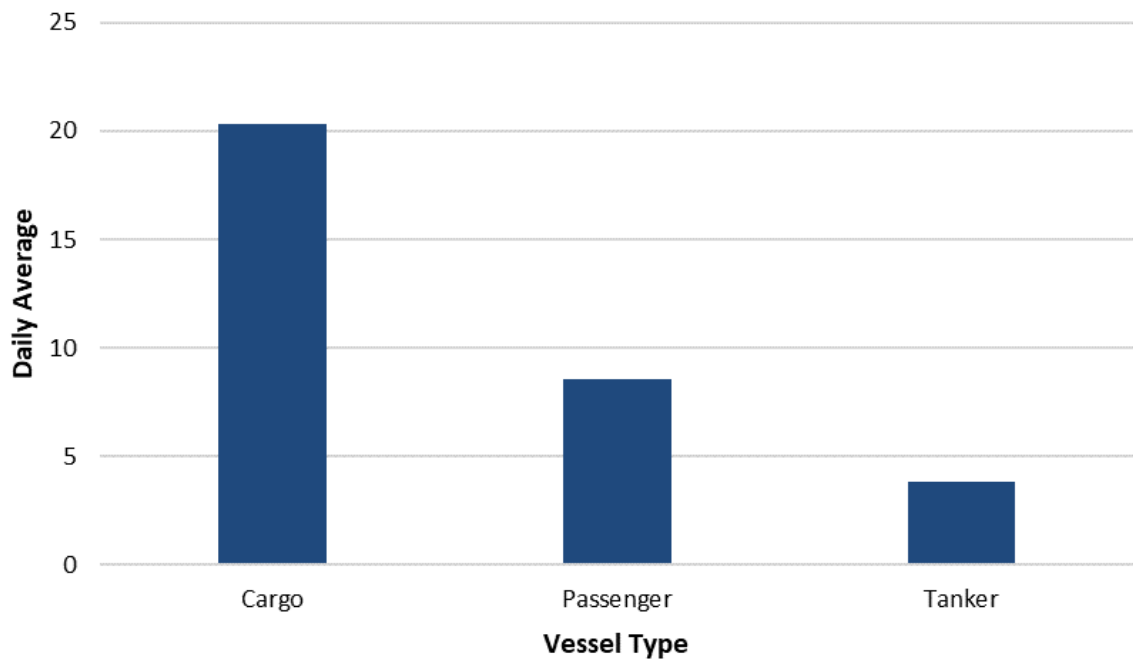


Figure 3-9: Average Number of Commercial Vessels per Day (Six Months, February to July 2024)

Cargo vessels were the most common of the three, with an average of 20 per day. This was followed by passenger vessels, with an average of eight to nine, and tankers, with an average of four. Note that, as seen in Figure 3-3, the passenger vessels displayed a level of seasonality, with higher levels of traffic seen during the summer months, while cargo vessels and tankers remained relatively consistent in terms of volume.

3.3.2 Recreational Vessels

Figure 3-10 presents the recreational vessels recorded within the study area during the six-month period. As noted in Section 2.3, this data is AIS-only and therefore may under-represent recreational vessel activity. Also note that any sailing vessels or yachts above 24m in length are instead defined as passenger and are shown in Figure 3-7.

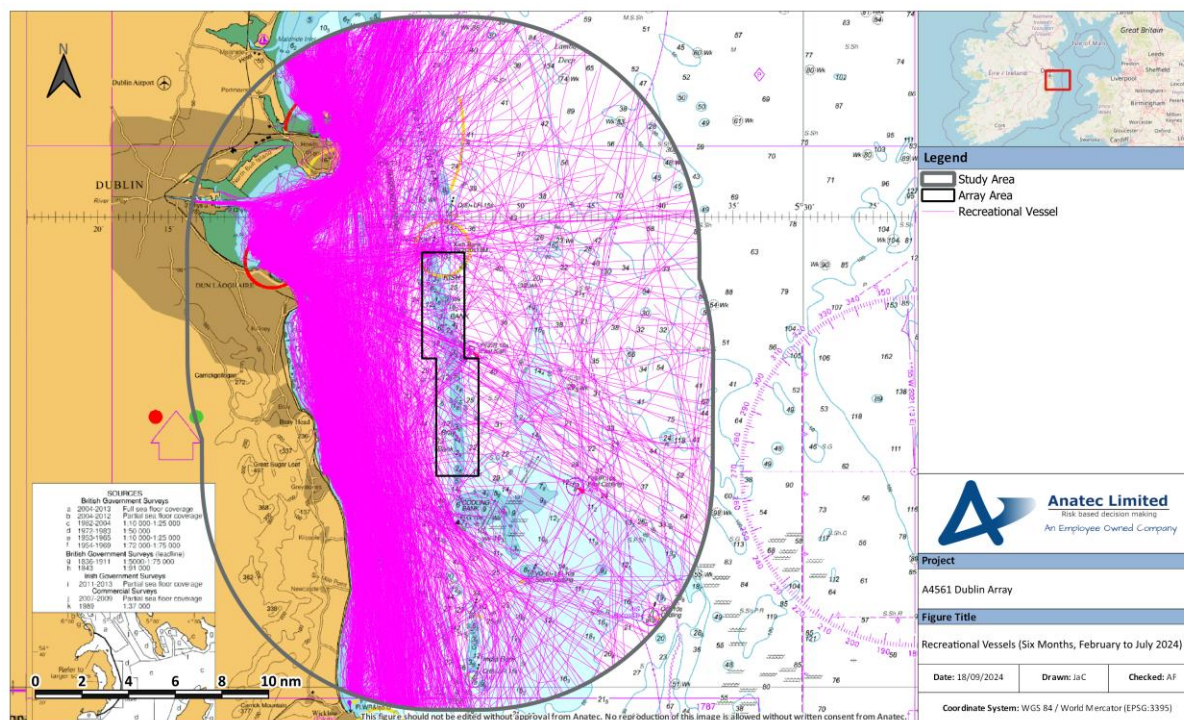


Figure 3-10: Recreational Vessels (Six Months, February to July 2024)

Recreational traffic was heavily concentrated inshore of the Array Area and the majority of vessels were seen transiting in/out of the key ports/harbours in the area i.e. Greystones Harbour, Howth Harbour, Dún Laoghaire Harbour and Dublin Port. The average length of recreational vessel was 11m.

An average of 20 recreational vessels per day was seen within the study area, with one per day within the Array Area. However, it should be noted that the majority (60%) of recreational vessels were recorded during either June or July and the average over these two months was 35 per day.

The busiest day for recreational traffic was the 11th May 2024, during which a race from Dún Laoghaire (Ireland) to Pwllheli (UK) was held and a total of 85 unique vessels was recorded. Figure 3-11 presents the recreational traffic on this day. It should be noted that multiple other recreational races took place during the six-month period that affected recreational levels within the study area¹.

¹ See <https://www.isora.org/index.php/notice-board/race-schedule-2024>.



Figure 3-12 presents the fishing vessels recorded within the study area during the six-month period. Tracks have been colour-coded by likely activity based on track behaviour, as well as average speeds, navigational status and destination information broadcast via AIS. As noted in Section 2.3, this data is AIS-only and therefore may under-represent fishing vessel activity.

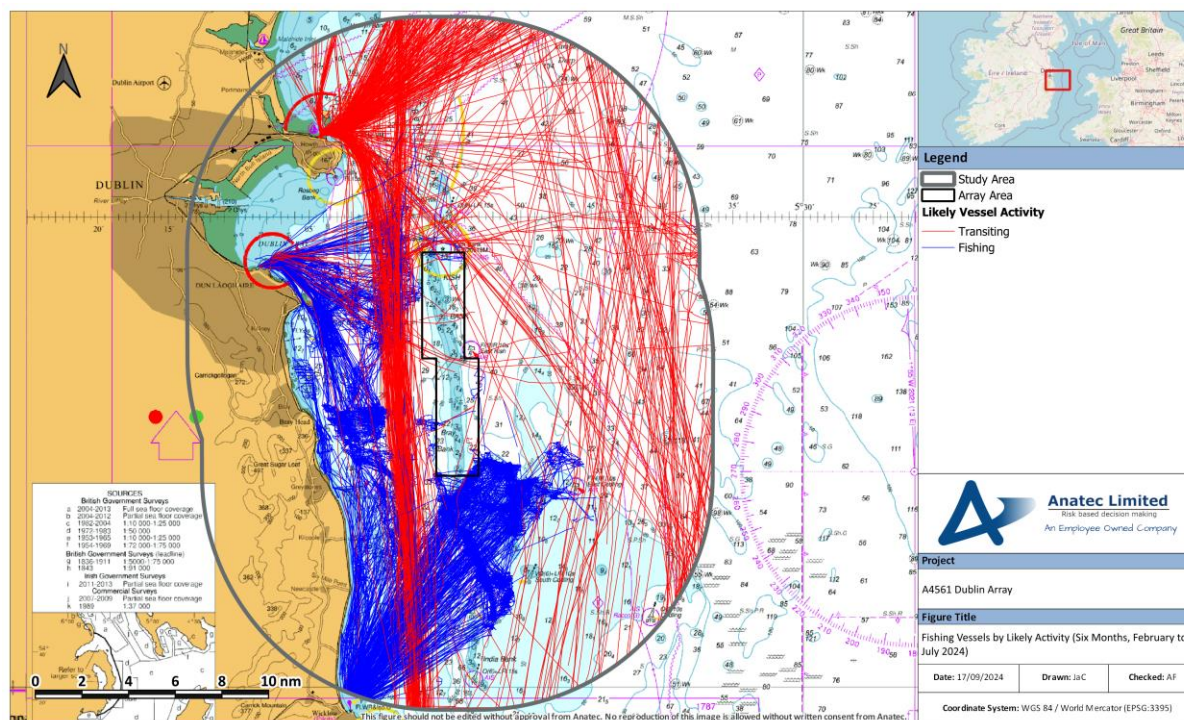


Figure 3-12: Fishing Vessels by Likely Activity (Six Months, February to July 2024)

Transiting fishing vessels can be seen to follow a north/south route inshore of the Array Area as they transited to/from either Howth Head (Ireland) or Clogherhead (Ireland). Transits to/from Howth Head (Ireland) in a northeast/southwest direction were also noted. Transits offshore of the Array Area were less frequent and less clearly defined in comparison.

Behaviour indicative of active fishing was noted inshore of the Array Area as well as within and around Codling Bank, south/southeast of the Array Area.

An average of six to seven fishing vessels per day was seen within the study area during the six-month period, with one every three days intersecting the Array Area. These intersections most commonly corresponded to a single vessel (which uses pots and traps as its gear) seen displaying active fishing behaviour while intersecting the southeastern/southwestern corners of the Array Area; this vessel mainly remained at/near Codling Bank, however was not seen displaying this behaviour at Bray Bank.

3.3.4 Anchored Vessels

Vessels broadcast their navigation status, including whether at anchor, via AIS. Any vessels broadcasting their navigation status as 'At Anchor' within the study area during the six-month period were identified and their tracks manually reviewed to confirm anchoring activity.

However, vessels do not always keep their navigation status up to date. Therefore, as an additional step, Anatec's *Speed Analysis* model was used to identify any vessels that were travelling at a speed of less than 1 knot for at least 30 minutes. The output was then reviewed,

and tracks were added to the results of the first step only if showing clear signs of anchoring activity.

Figure 3-13 presents the results of this process, with the vessel tracks colour-coded by vessel type.

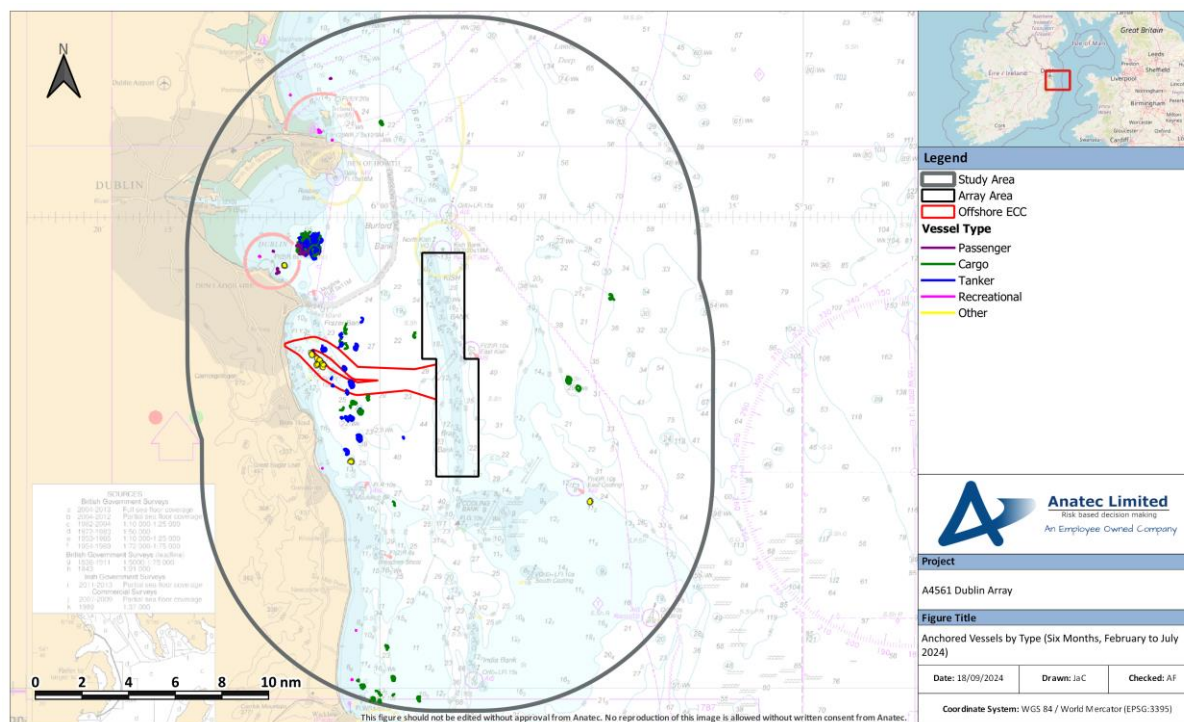


Figure 3-13: Anchored Vessels by Type (Six Months, February to July 2024)

The majority of anchored vessels were seen anchored within the designated anchorage area at the approaches to Dublin Port near the pilot boarding station. An average of two to three unique anchored vessels per day were seen anchored within the designated anchorage area.

It was noted during consultation that, due to the designated anchorage area often being at capacity, vessels have also started to anchor further to the south of the designated anchorage area, west of the Array Area. This aligns with the six-months data, which indicated cargo vessels and tankers anchored in vicinity to, and within, the offshore ECC. An average of one vessel every two to three days was seen anchored in this area.

Anchored vessels were also seen offshore of the Array Area, at the southern extent of the study area, within Scotsman's Bay next to Dún Laoghaire and at the approaches to Howth Head.

The majority of the anchored vessels identified were commercial vessels. A minor proportion were recreational, mainly seen near Howth Head and Dún Laoghaire. Note that sailing vessels and yachts of length greater than 24m are classed as passenger as opposed to recreational; these vessels were seen in similar locations to the recreational vessels, while cruise liners were seen using the designated anchorage area. A buoy-laying vessel also accounted for a

minor proportion, seen anchored within the offshore ECC as well as offshore of the Array Area and near Scotsman's Bay.

3.3.5 Summary

Table 3-1 provides a summary of the number of unique vessels, per vessel type, recorded within the study area during the six-month period.

Table 3-1: Summary of Vessel Numbers Recorded during the Six-Month Period

Vessel Type	Daily Averages		
	Quietest Month	Busiest Month	Six Months Average
Cargo	19	21	20
Recreational	3 - 4	37	20
Passenger	5	11	8 - 9
Fishing	5	7 - 8	6 - 7
Tanker	3 - 4	4 - 5	4

3.4 Intersecting Vessels

Figure 3-14 presents the vessels recorded intersecting the Array Area during the six-month period, colour-coded by vessel type. All vessels intersecting the Array Area were assigned a known type.

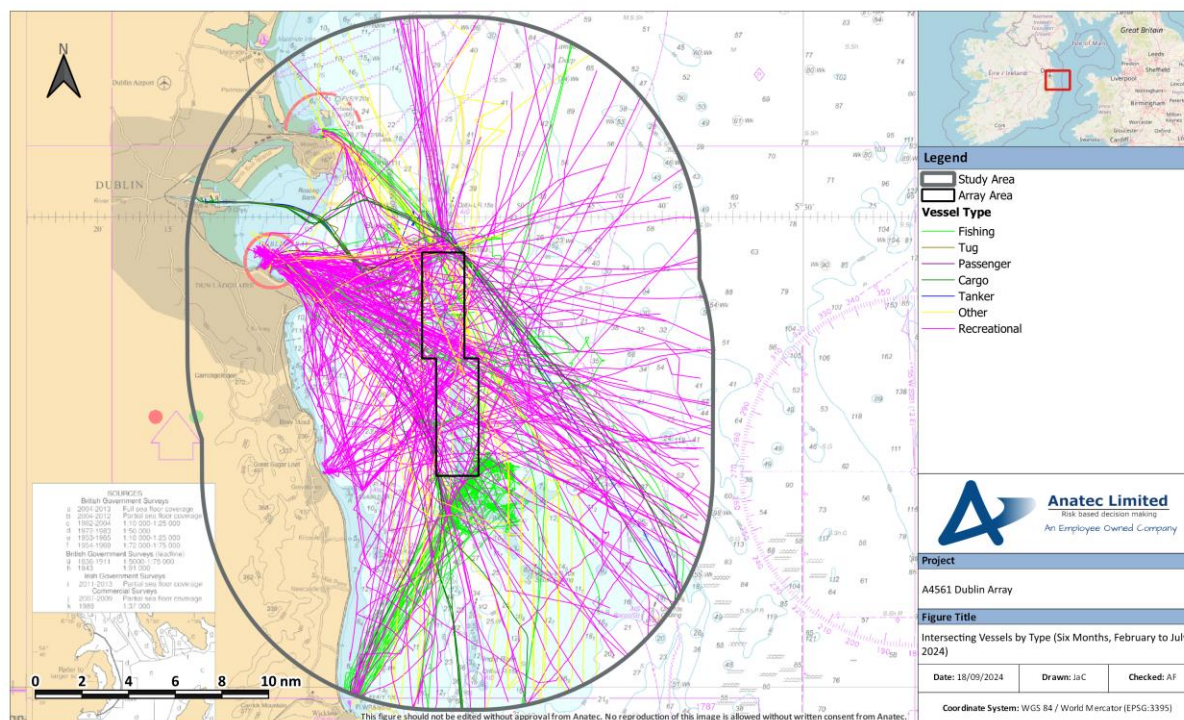


Figure 3-14: Intersecting Vessels by Type (Six Months, February to July 2024)

Intersections through the centre of the Array Area were generally limited to recreational vessels and, to a lesser extent, transiting fishing vessels. Intersections from large commercial vessels took place at the outer edges of the Array Area (avoiding Bray Bank and Kish Bank).

Figure 3-15 presents the distribution of the main vessel types that intersected the Array Area.

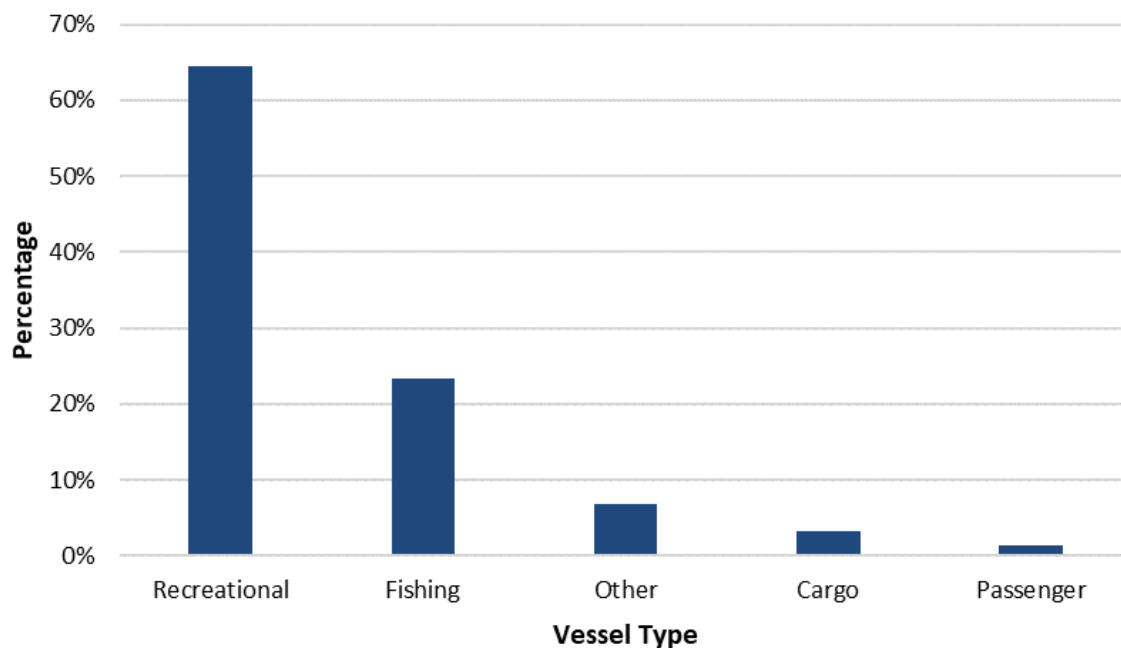


Figure 3-15: Distribution of Main Vessel Types Recorded Intersecting Array Area (Six Months, February to July 2024)

There was an average of one to two intersections through the Array Area per day during the six-month period.

The majority of intersections through the Array Area were from recreational vessels, accounting for 65%. This was followed by fishing vessels (23%), “other” vessels (which included lifeboats, a charter boat and a buoy-laying vessel) (7%), cargo vessels (3%) and passenger vessels (1%). Also recorded intersecting was a single tug and a single tanker, each accounting for less than 1%.

4 Survey Data Comparison

There was broad agreement between the six-month AIS dataset and the vessel traffic surveys undertaken in terms of vessel routing. In particular, there was agreement on the main routes as discussed and highlighted by the density plot in Section 3.1.

There were also similarities in terms of fishing vessel traffic; specifically, there is agreement on fishing vessels transiting north/south inshore of the Array Area (as well as northeast/southwest to/from Howth Head), and agreement on active fishing behaviour inshore of the Array Area and at Codling Bank.

A comparison between the six-month period and each of the vessel traffic surveys in terms of the daily averages for each of the main vessel types is presented in Table 4-1.

Table 4-1: Comparison of Daily Averages During the Six-Month Period and Each Survey Period

Vessel type	Long-term AIS data			Winter 2022	Summer 2023
	Busiest month	Quietest month	Average vessels per day	Average vessels per day	Average vessels per day
Cargo	June	February	20	19 - 20	19
Recreational	June	March	20	4 - 5	29
Passenger	June	February	8 - 9	6	12
Fishing	May/July	March	6 - 7	4 - 5	8
Tanker	July	March	4	3	4

Daily averages for cargo vessels and tankers were consistent across the three periods.

For recreational vessels, the daily average was higher during summer 2023 compared to the other two periods; the six-months analysis has shown this traffic to be highly seasonal (see Figure 3-10) with the majority (60%) of the recreational vessels being recorded in June or July and the daily average over these two months being higher at 35 per day. Therefore the differences between the counts can likely be attributed to the seasonality of the traffic and the differences between the periods.

Similarly, passenger vessels and fishing vessels have also shown a level of seasonality in the six-months data with higher levels recorded during the summer months; specifically, daily averages during June and July were seven per day for fishing vessels and 11 per day for passenger vessels.

For those seasonal vessel types, the daily averages during the six-month period are higher than the winter averages and lower than the summer averages, which is in agreement with the seasonality observed.

5 Summary and Conclusion

This annex has analysed a long-term six-month AIS vessel traffic dataset and compared the traffic behaviour, vessel numbers, and vessel types to those recorded in the vessel traffic survey data. A combination of these findings shall be used to inform the risk assessment undertaken within the NRA.

Commercial routeing was heavily determined by the shallow banks and therefore clearly defined. The majority of fishing and recreational activity was recorded inshore, and active fishing behaviour was also recorded at Codling Bank.

There was an average of 66 unique vessels recorded per day within the study area during the six-month period, with June being the busiest and February being the quietest. The seasonal variation can be mainly attributed to recreational traffic levels, with passenger vessels and fishing vessels also displaying a level of seasonality.

Cargo vessels and recreational vessels were the most common vessel types, accounting for 31% and 30% respectively. This was followed by passenger vessels (13%), fishing vessels (10%), “other” vessels (which largely consisted of pilot vessels, port tender boats and lifeboats) (6%), tankers (6%) and tugs (3%).

An average of 20 cargo vessels per day was recorded. The next most common commercial vessel type was passenger, with an average of eight to nine per day, followed by tankers with an average of four per day. Passenger vessels displayed a level of seasonality, with higher levels of traffic seen during the summer months, while cargo vessels and tankers remained relatively consistent in terms of volume.

There was an average of six to seven unique fishing vessels recorded per day within the study area, with one every three days intersecting the Array Area. Limited active fishing was observed within the Array Area itself, with the majority taking place inshore of the Array Area and at Codling Bank. Fishing vessels in transit were commonly seen transiting north/south inshore of the Array Area.

Recreational activity was heavily concentrated inshore. An average of 20 recreational vessels per day was seen within the study area, with one per day within the Array Area. The majority (60%) of recreational vessels were recorded during either June or July.

Anchored vessels were most commonly seen within the designated anchorage area at the approach to Dublin Port, with a notable number also seen anchored inshore of the Array Area. The identified anchored vessels were most commonly commercial, although recreational vessels and a buoy-laying vessel also accounted for a minor proportion.

There was an average of one to two intersections through the Array Area per day. Intersections through the Array Area mainly occurred from recreational vessels, due to larger vessels avoiding the Bray and Kish Banks.