



**EIAR Volume 4: Offshore Infrastructure
Technical Appendices
Appendix 4.3.10-3
Dublin Array Offshore Wind Farm
Marine Traffic Survey Report Summer
2021**

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RWE  **SLR** **GoBe**
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Dublin Array Offshore Wind Farm Marine Traffic Survey Report Summer 2021

Prepared by Anatec Limited
Presented to RWE
Date 11 February 2022
Revision Number 01
Document Reference A4561-RWE-SR-1

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Revision Number	Date	Summary of Change
00	09 December 2021	Initial Draft
01	11 February 2022	Final version

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Abbreviations Table

Abbreviation	Definition
AIS	Automatic Identification System
ARPA	Automatic Radar Plotting Aid
DBSC	Dublin Bay Sailing Club
ECC	Export Cable Corridor
IMO	International Maritime Organization
kt	Knot
kW	Kilowatt
LPG	Liquid Petroleum Gas
m	Metre
MCA	Maritime and Coastguard Agency
MGN	Marine Guidance Note
MMSI	Mobile Maritime Service Identity
N	North
nm	Nautical Mile
NRA	Navigational Risk Assessment
OWF	Offshore Wind Farm
Radar	Radio Detection and Ranging
Ro-Ro	Roll-on/Roll-off
ROPAX	Roll-on/Roll-off Passenger
SOLAS	International Convention for the Safety of Life at Sea
UK	United Kingdom
UTC	Universal Time Coordinated
VHF	Very High Frequency
W	West
WGS 84	World Geodetic System 1984

1 Introduction

As part of the Navigational Risk Assessment (NRA) process for the proposed Dublin Array Offshore Wind Farm (OWF) (hereafter 'Dublin Array'), marine traffic survey data has been gathered for the area surrounding the development. It is noted that 14 days of marine traffic survey data has already been collected in November 2019.

This report presents analysis of the 2021 shore-based survey which has been carried out from the Baily Lighthouse (at Howth), between the 20th of August and the 3rd of September. The marine traffic survey data has been recorded via Radio Detection and Ranging (Radar), Automatic Identification System (AIS), and visual observations by the on-site surveyors.

1.1 Background

Key regulator feedback to date on the Dublin Array is that the NRA should account for non AIS vessels, and have indicated consideration should be given to Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 (MCA, 2021) which sets out assessment requirements for United Kingdom (UK) OWFs including in terms of marine traffic survey data. MGN 654 requires NRAs to be informed by a minimum of 28 days of marine traffic survey data including capture of non AIS vessels. This second survey brings the total collected for Dublin Array up to 28 days, and as such the data is currently MGN 654 compliant. However, it should be considered that MGN 654 also requires the data to be collected within two years of application submission, and therefore the 2019 winter survey data will not be strictly MGN 654-compliant in 2022.

2 Survey Methodology

A marine traffic survey of the area of Dublin Array (hereafter the ‘array area’) as well as its surrounding area, was carried out in order to collect 14 days of seasonal marine traffic data relevant to the proposed site.

The marine traffic survey began at approximately 11:00 UTC on the 20th of August 2021 and concluded at 11:00 Universal Time Coordinated (UTC) on the 3rd of September 2021, for a combined total of 14 days.

The primary objective of the survey was to identify and validate the routeing of vessels and level of vessel activity within a 10 nautical mile (nm) study area around Dublin Array (hereafter the ‘study area’). This was achieved by recording in real time the positions of vessels within range of the AIS receiver and Automatic Radar Plotting Aid (ARPA), supplemented by observation of vessels within visual range to obtain information on type and size where information was not available from AIS.

2.1 Survey Location

The Radar and AIS were set up at co-ordinates 53° 21.687 North (N), 006° 03.140 West (W) (World Geodetic System 1984 (WGS 84)), approximately 4.9nm from the array area. The survey site was located directly on the coastline offering good line of sight of the survey area (i.e., the array area and surrounding waters).

Given the position of the survey site northwest of the array area, the southern and eastern extents of the study area may have observed reduced coverage based on proximity to the survey equipment. Therefore, to provide as comprehensive coverage of the study area as practicable, the AIS data recorded during the survey has been supplemented with additional data recorded from onshore receivers (data acquired by Anatec) located along the coastline, and over the same time period.

An overview of the survey location, array area, and study array are presented in Figure 2.1. A detailed overview of the array area is then presented in Figure 2.2.

It is noted that while the survey corridor has primarily been undertaken for the assessment of the array area, the offshore Export Cable Corridor (ECC) (within which the export cables will be laid) lies within the 10nm study area considered. This is shown in Figure 2.1 and Figure 2.2.

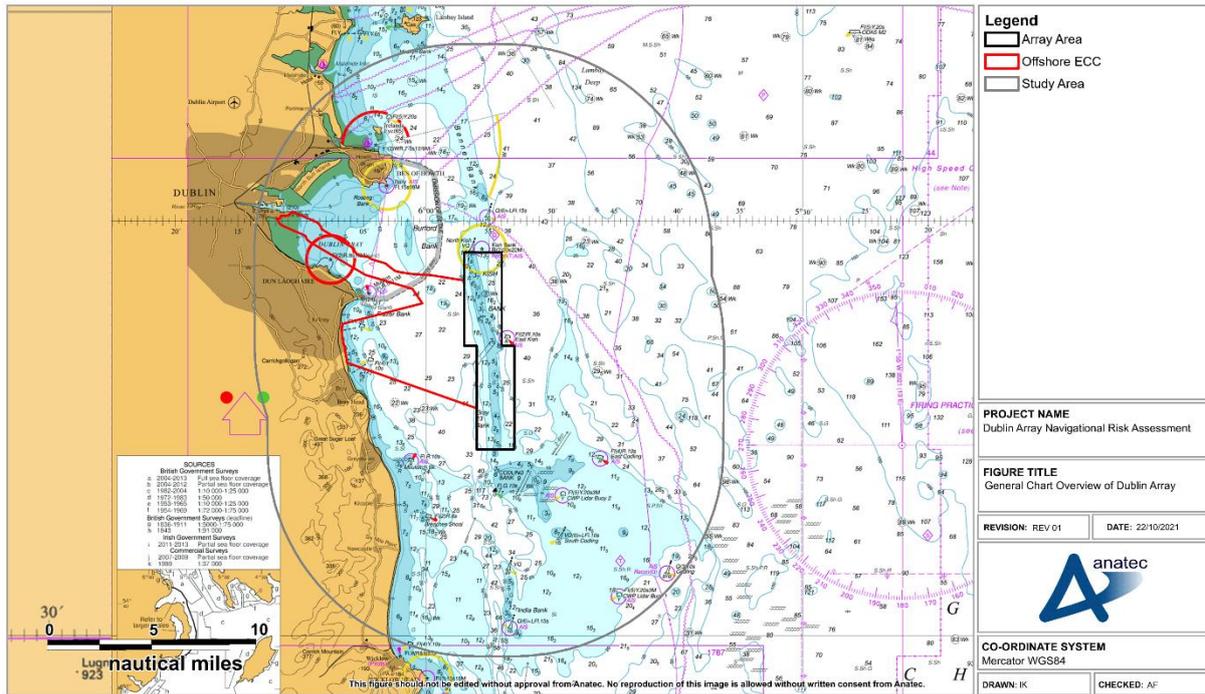


Figure 2.1: General Chart Overview of Dublin Array

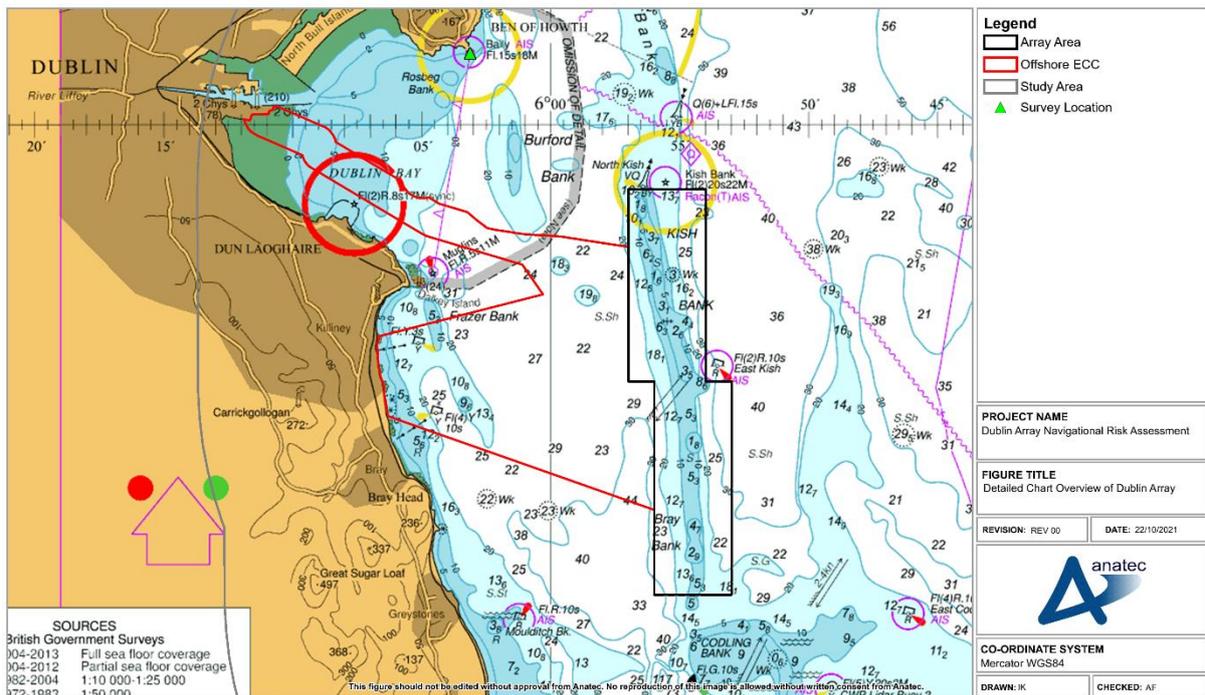


Figure 2.2: Detailed Chart Overview of Dublin Array

Reliable Radar coverage was observed to extend approximately 10-15nm south and east of the survey site, noting that vessels were able to be tracked further than this in certain cases. It is noted that this varies with atmospheric and sea conditions. The approximate reliable Radar coverage within the study area is presented in Figure 2.3, based on a 15nm buffer.

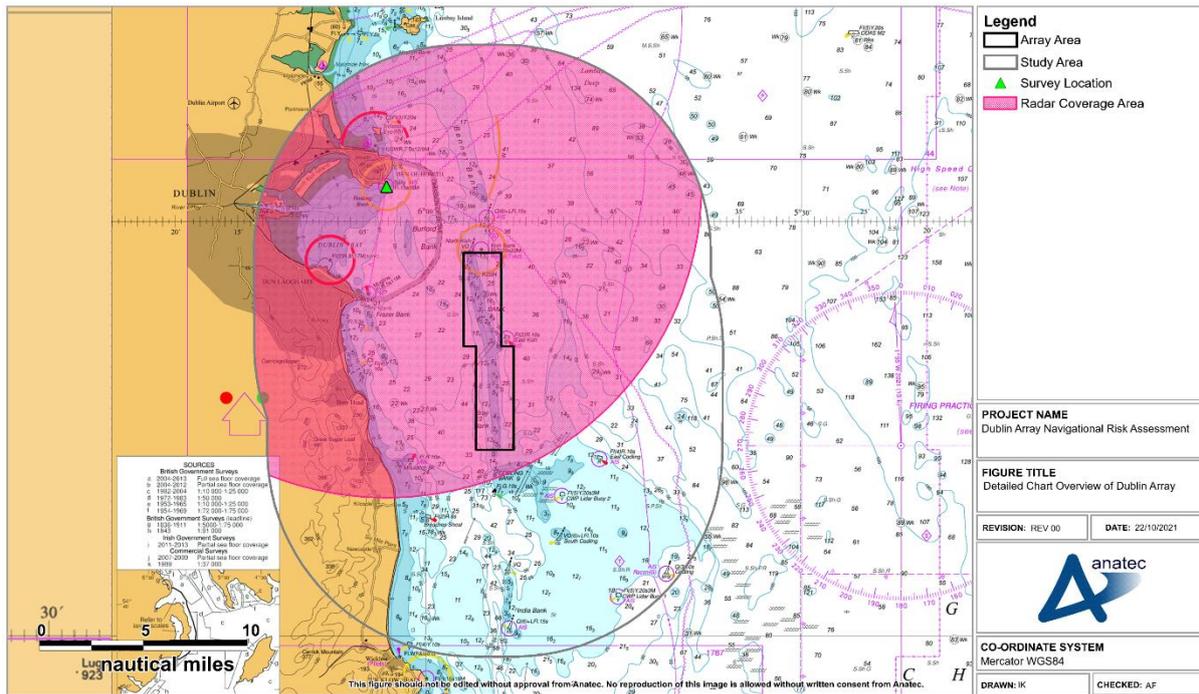


Figure 2.3: Approximate Area of Radar Coverage

2.2 Equipment and Manning

Table 2.1 lists the equipment used to carry out the traffic survey.

Table 2.1: Equipment Utilised in Traffic Survey

Equipment	Purpose
Furuno 2117 12 kilowatt (kW) Black Box Radar with 4ft Scanner and ARPA with integrated AIS	Tracking of targets (manually and automatically) typically up to 12nm from the survey location.
Furuno GP-32	Global Positioning System used to determine the position of the survey and to input the information to the Radar system.
Nautical Compass	Used to verify heading.
Monk Nautilus 7 x 50 Marine Binoculars & Nikon Spotting Scope (20-60x zoom)	Visual identification of vessels.
Digital Camera	Photographic evidence of targets (when possible).

Equipment	Purpose
AIS Receiver and Very High Frequency (VHF) Antenna	To receive and record data from vessels transmitting AIS data. Tracks vessels fitted with AIS (majority of vessels > 300 Gross Register Tonnage) within a range of typically 20nm.
Notebook Personal Computers	Connected to Radar and AIS receiver for real-time recording of tracked target data. Tracked targets displayed on hydrographic charts and can be replayed at high speed when required.
Logbook	Written log of all manual targets acquired during survey as well as other notes such as visual identification information, weather conditions, etc.

The AIS system tracked targets 24 hours per day during the survey period. The Radar was manned between 06:30 and 23:30 with targets not on AIS acquired manually. During this manned period a visual lookout was maintained, and all observations were recorded in the logbook. Between 23:30 and 06:30 Radar targets were acquired automatically by the Radar, over an area defined by the watch-keepers, which encompassed the study area. Where possible, radar data was matched to AIS in order to gather better data on each vessel.

2.3 AIS Description

Regulation 19 of the International Convention for the Safety of Life at Sea (SOLAS) Chapter V - Carriage requirements for vessel borne navigational systems and equipment - sets out navigational equipment to be carried on board vessels, according to vessel type. In 2000, the International Maritime Organization (IMO) adopted a new requirement (as part of a revised new chapter V) for vessels to carry AIS. AIS is a system by which vessels transmit data concerning their position, Mobile Maritime Service Identity (MMSI) etc., on two individual Very High Frequency (VHF) channels to the shore and other vessels, at very frequent intervals. The data is transmitted automatically via VHF to other vessels and coastal stations/authorities.

The regulation requires AIS to be fitted aboard all vessels of 300 gross tonnage and upwards, engaged on international voyages, cargo vessels of 500 gross tonnage and upwards, not engaged on international voyages and passenger vessels irrespective of size, built on or after 1st July 2002. It also applies to vessels engaged on international voyages, constructed before 1st July 2002, according to the following timetable:

- Passenger vessels, not later than 1st July 2003;

- Tankers, not later than the first survey for safety equipment on or after 1st July 2003; and
- Vessels, other than passenger vessels and tankers, of 50,000 gross tonnage and upwards, not later than 1st July 2004.

An amendment adopted by the Diplomatic Conference on Maritime Security in December 2002 states that vessels, other than passenger vessels and tankers, of 300 gross tonnage and upwards but less than 50,000 gross tonnage, will be required to fit AIS no later than the first safety equipment survey after 1st July 2004, or by 31st December 2004, whichever occurs earlier. Vessels fitted with AIS shall maintain AIS in operation at all times, except where international agreements, rules or standards provide for the protection of navigational information.

The regulation requires that AIS shall:

- Provide information – including the vessel’s identity, type, position, course, speed, navigational status and other safety-related information – automatically to appropriately equipped shore stations, other vessels and aircraft;
- Automatically receive such information from similarly fitted vessels; exchange data with shore-based facilities.

Fishing vessels of 15 metres (m) length and over are also required to carry Class A AIS.

Both dynamic and static information are transmitted via AIS. Examples of such information is presented in Table 2.2.

Table 2.2: Vessel Properties Transmitted via AIS

Static	Dynamic
<ul style="list-style-type: none"> ▪ MMSI ▪ IMO Number ▪ Call Sign ▪ Name ▪ Length and Beam ▪ Type of Ship ▪ Type of Nav Sensor 	<ul style="list-style-type: none"> ▪ Position (Latitude/Longitude) ▪ Time ▪ Course over ground ▪ Speed over ground ▪ Heading ▪ Navigational Status ▪ Rate of Turn ▪ Draught ▪ Hazardous Cargo (type) ▪ Destination ▪ Estimated Time of Arrival ▪ Route Plan

3 Survey Results

This section presents the vessel tracks recorded on AIS and Radar within 10nm of the array area during the 14-day survey period.

In any instance of a vessel being recorded via both AIS and Radar, the track providing the most complete coverage has been utilised. All vessel data recorded, colour-coded by recording source (i.e., AIS, Radar, or visual observation) is presented in Figure 3.1.

Vessels shown in Figure 3.1 detailed as being recorded via ‘visual observation’ were any non-AIS vessels unable to be manually acquired via Radar. Further details of these vessels are available in Section 3.9. It is noted that visual observation data is considered separately in Section 3.9.

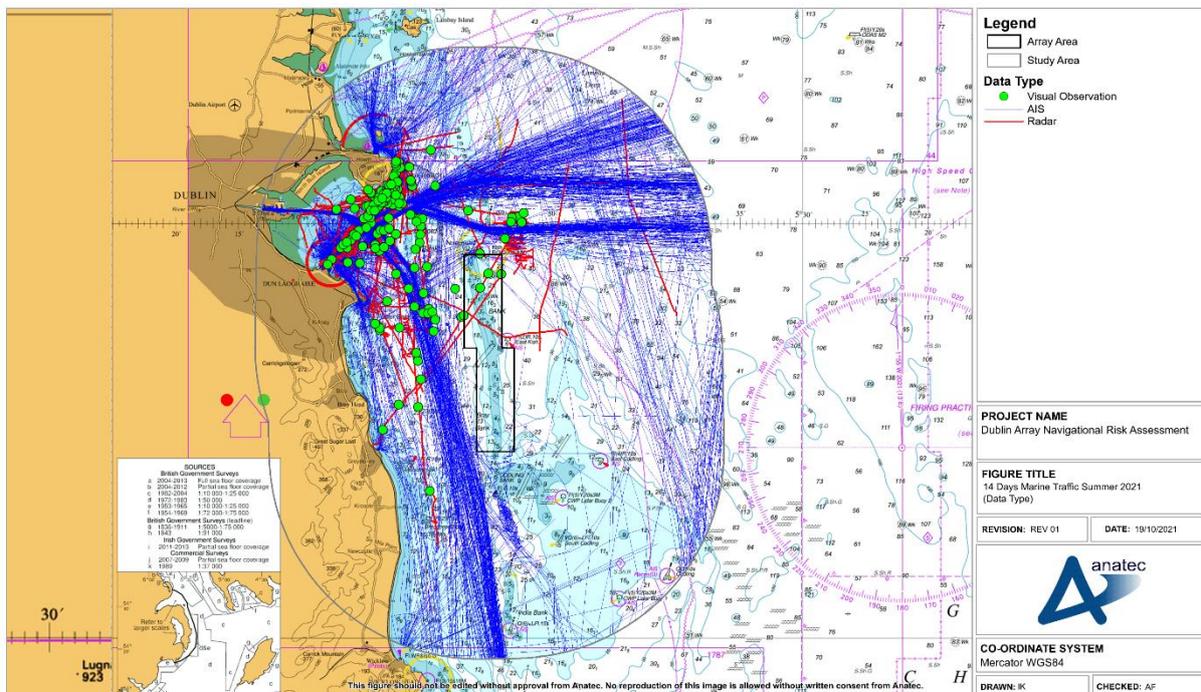


Figure 3.1: 14 Days Marine Traffic Summer 2021 by Data Type

3.1 Vessel Types

An overview of the data recorded in the study area during the survey period, colour-coded by vessel type, is presented in Figure 3.2. It is noted that where a vessel was recorded solely via Radar, type information could only be ascertained where the vessel was able to be visually identified at the time of recording. Such tracks which could not be assigned a type category comprised <1% of the total data, noting that of the vessels recorded via AIS, only one track was unable to be assigned into a type category based on the information transmitted.

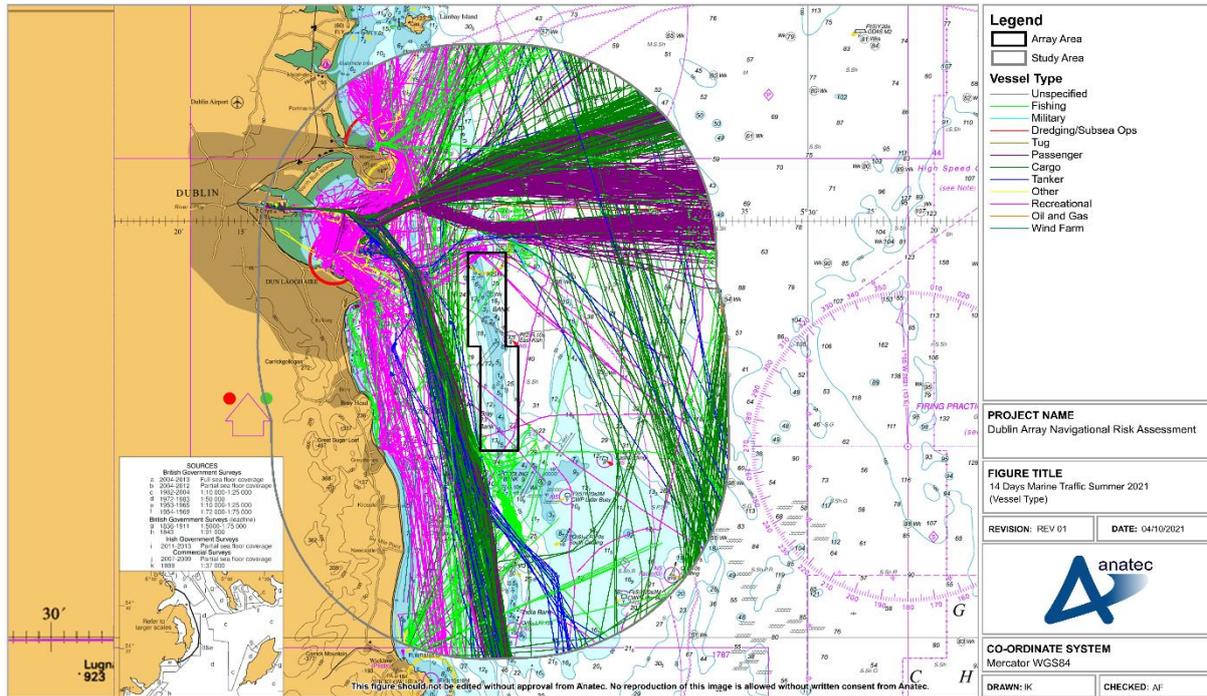


Figure 3.2: 14 Days Marine Traffic Summer 2021 by Vessel Type

The distribution of vessel types recorded within the study area during the survey period is presented in Figure 3.3. For the purposes of this figure, unspecified, military, dredging/subsea ops, oil and gas, and wind farm support vessels have been grouped under ‘other’ given that they comprise a limited proportion of traffic (<1%).

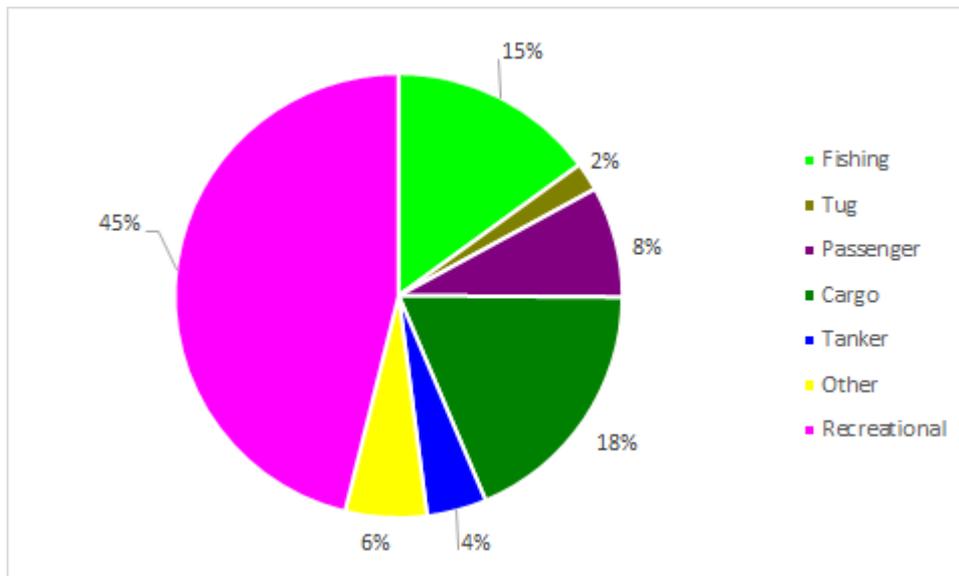


Figure 3.3: Distribution of Vessel Types

The most common vessel types recorded within the study area during the survey period were recreational vessels (45%), cargo vessels (18%), and fishing vessels (15%).

3.2 Anchored Vessels

The vessels identified as being at anchor within the study area during the survey period, based on speed assessment and information transmitted via AIS, are presented in Figure 3.4. Following this the same figure, zoomed in on the anchored vessels, is presented in Figure 3.5.

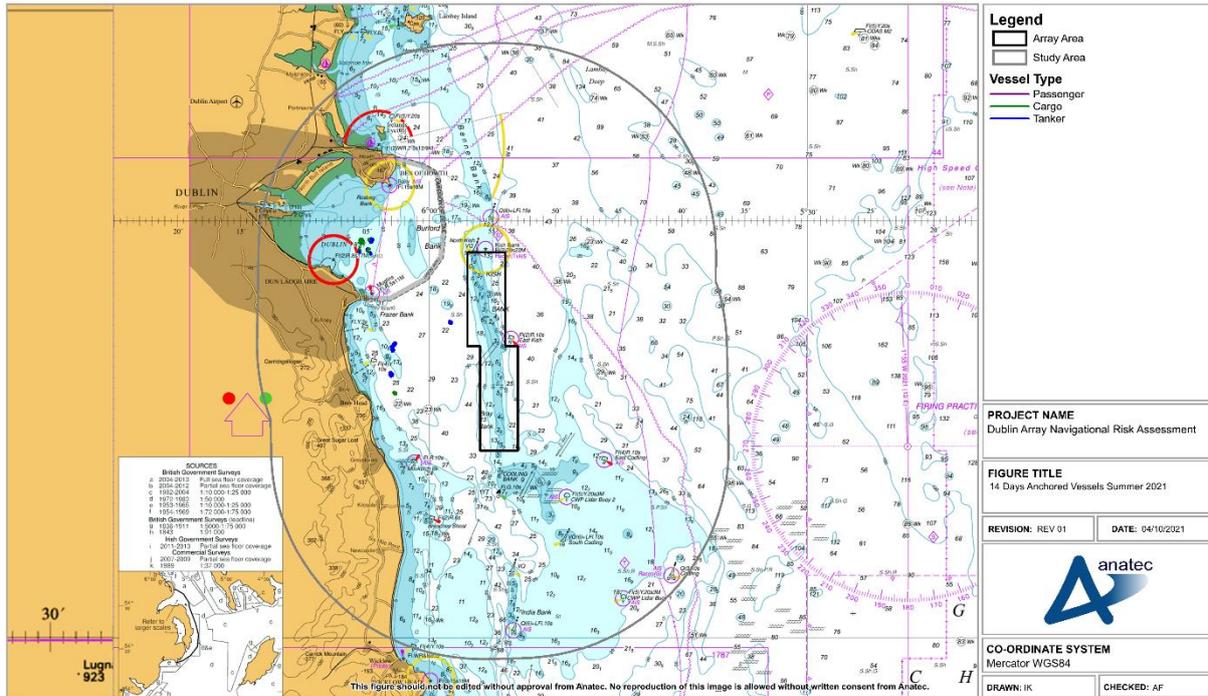


Figure 3.4: 14 Days Anchored Vessels Summer 2021

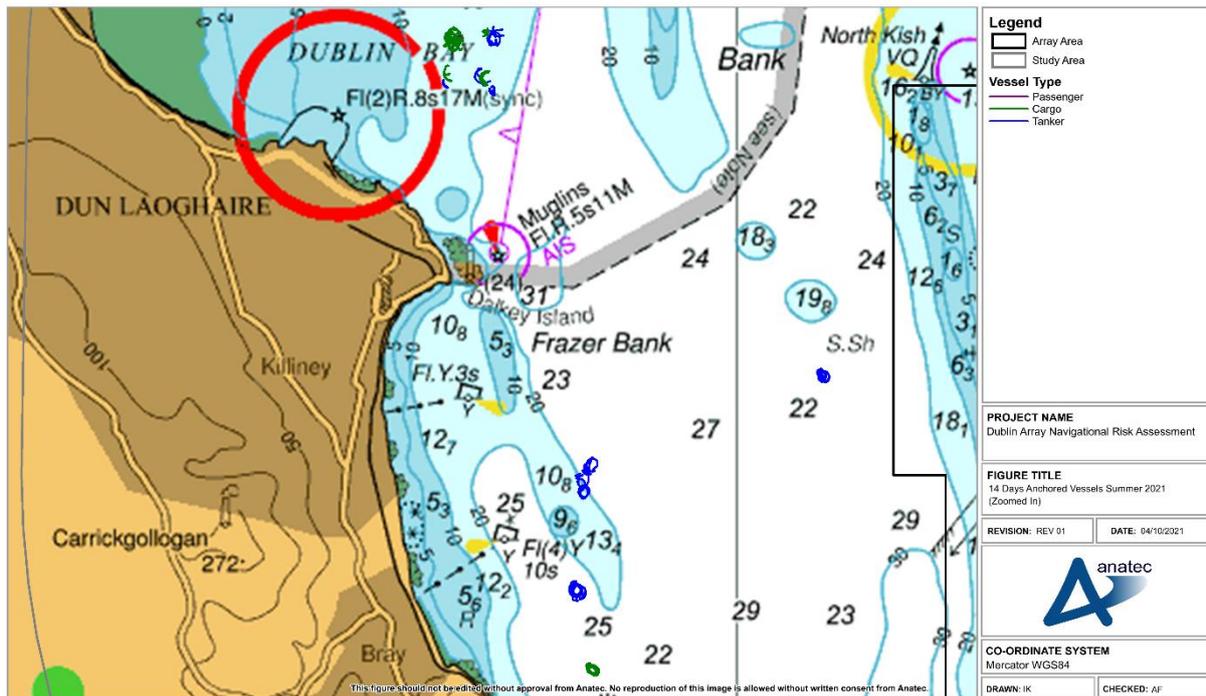


Figure 3.5: 14 Days Anchored Vessels Summer 2021 (Zoomed In)

Vessels primarily anchored at the designated anchorage in Dublin Bay, however anchoring further to the south was also recorded. This aligns with consultation undertaken with Dublin Port as part of the NRA process, where it was raised that due to the anchorage often being at capacity, vessels have also started to anchor coastally further to the south.

There were 48 unique instances of vessels anchoring within the study area during the survey period. These were solely comprised of commercial vessels, with tankers accounting for 54%, cargo vessels 44%, and passenger vessels 2%.

3.3 Vessel Count

The number of unique vessels per day recorded in the study area during the survey period is presented in Figure 3.6. It is noted that as the survey began at 11:00 on the 20th of August 2021 and completed at 11:00 on the 3rd of September 2021, data for these days is not representative of a complete day.

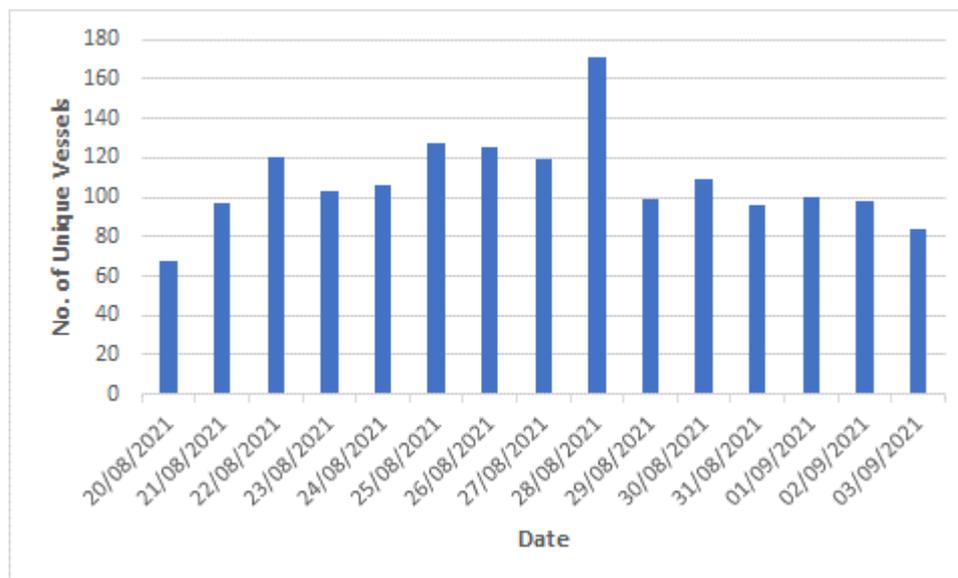


Figure 3.6: Counts of Unique Vessels per Day

On average, 116 unique vessels per day were recorded in the study area during the survey period. The busiest day was the 28th of August 2021, on which 171 unique vessels were recorded. It is noted that based on data available through the Dublin Bay Sailing Club (DBSC) website two races were held on this day which is considered a likely key factor as to why increased vessel numbers were observed. The quietest full day was the 31st of August 2021, on which 96 unique vessels were recorded.

3.4 Vessel Sizes

3.4.1 Vessel Length

The vessels recorded within the study area during the survey period, colour-coded by vessel length, are presented in Figure 3.7. It is noted that vessel length was unspecified for 12% of these vessels.

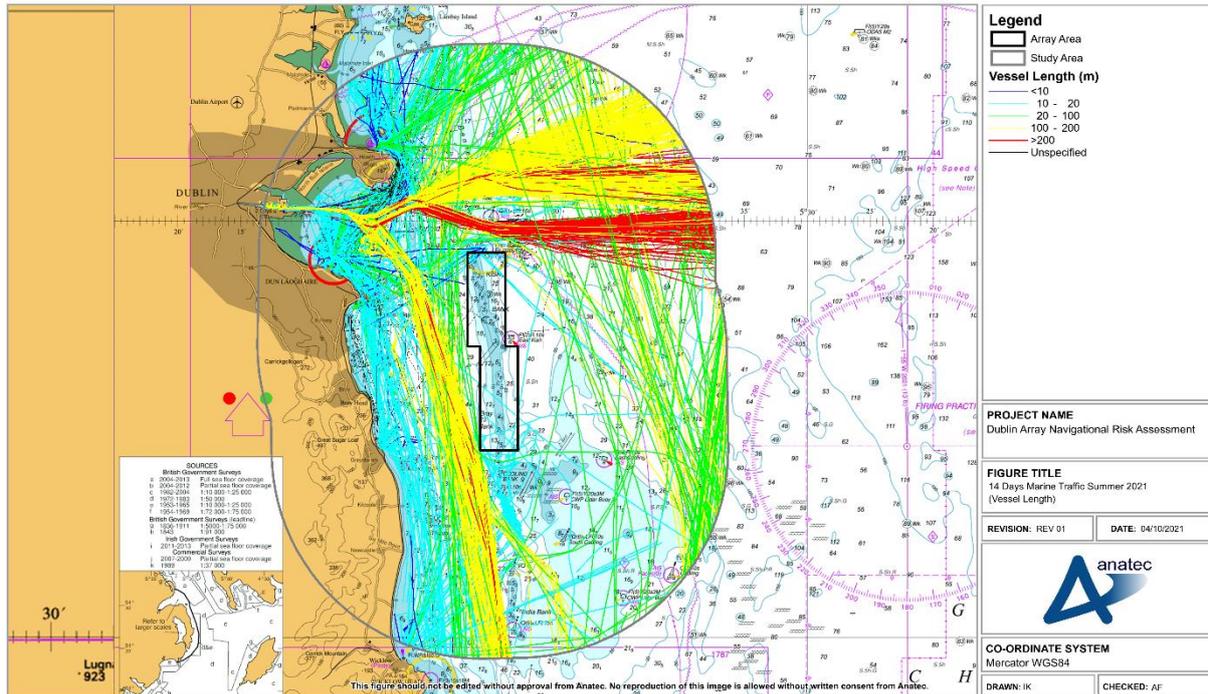


Figure 3.7: 14 Days Marine Traffic Summer 2021 by Vessel Length

Vessels operating inshore, in proximity to the array area were typically smaller vessels (<20m length), while larger vessels typically transited further from shore. The majority of vessels less than 20m in length were either fishing or recreational vessels.

The distribution of these vessel lengths, excluding those that were unspecified, is presented in Figure 3.8.

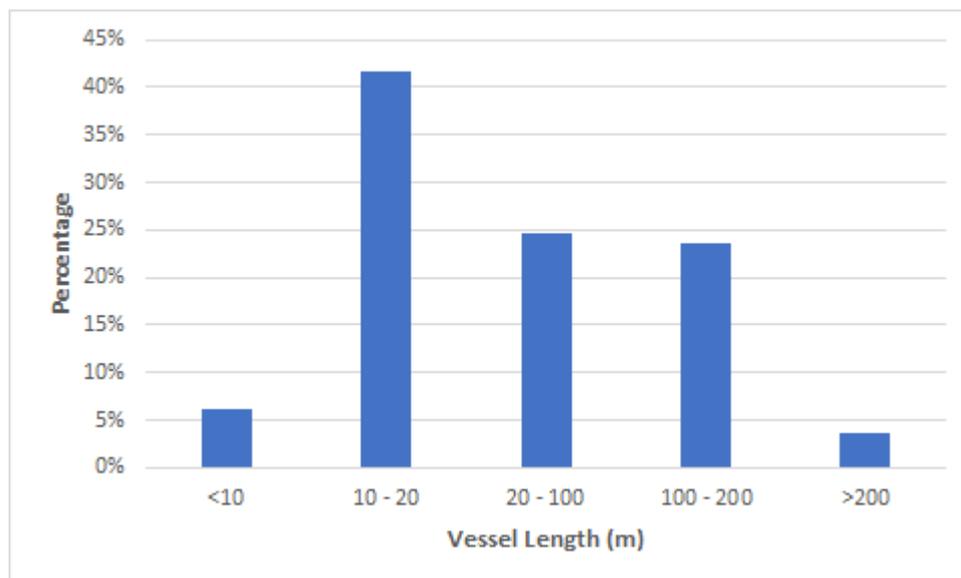


Figure 3.8: Distribution of Vessel Lengths

Excluding vessels of unspecified length, the average vessel length was 58m. The vessels of greatest length transiting the study area during the survey period were both cargo vessels of 234m length. One was present on the 22nd of August 2021 entering Dublin from the south, and the other left Dublin on the 29th of August 2021, destined for Zeebrugge.

3.4.2 Vessel Draught

Based on information available from AIS, an overview of vessel tracks in the study area during the survey period colour-coded by vessel draught is presented in Figure 3.9. It is noted that vessel draught was unspecified for 59% of these vessels.

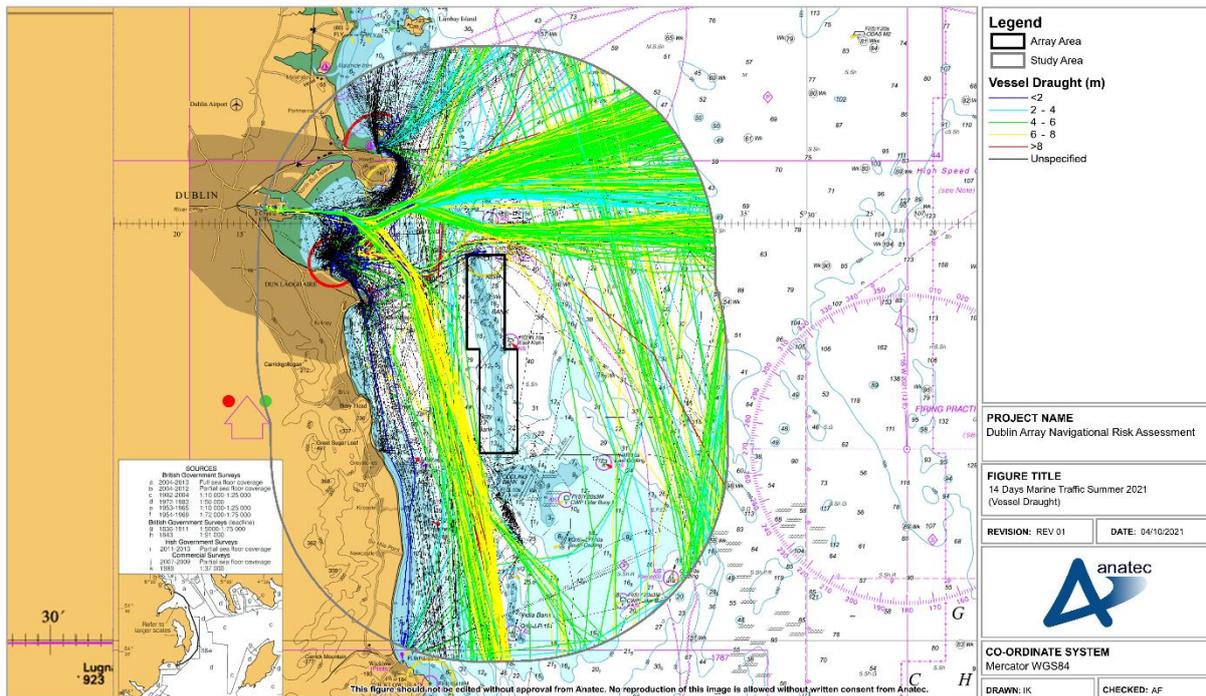


Figure 3.9: 14 Days Marine Traffic Summer 2021 by Vessel Draught

The vast majority of vessels of unspecified draught in the study area during the survey period were recreational vessels (74%) followed by fishing vessels (15%).

The distribution of vessel draughts, excluding those that were unspecified, is presented in Figure 3.10.

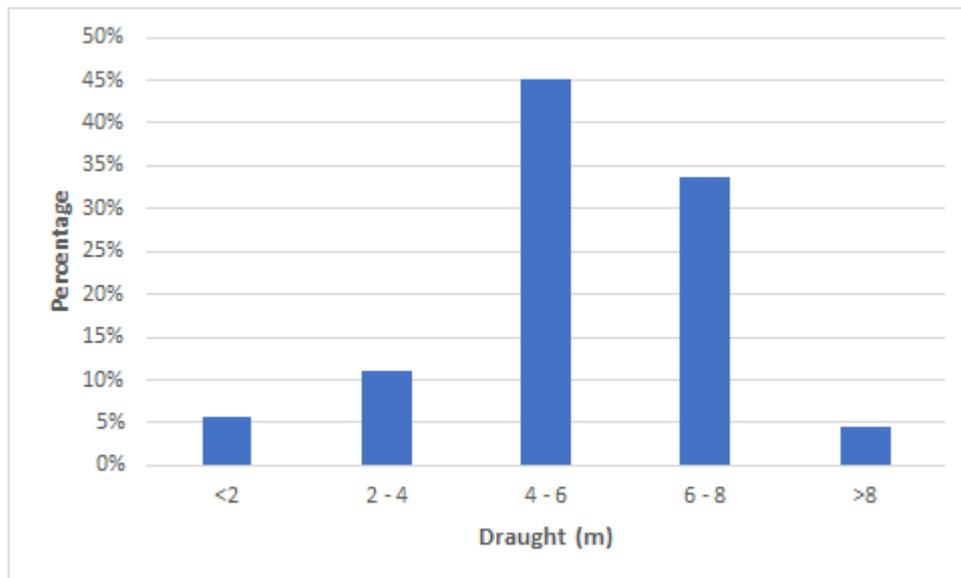


Figure 3.10: Distribution of Vessel Draughts

Excluding vessels of unspecified draught, the average vessel draught was 5.5m. The vessel of greatest draught transiting the study area during the survey period was a tanker with draught of 9.8m, present on routes to/from Dublin and the southeast from the 22nd to the 25th of August 2021. The tanker remained west of the array area during its transits, with its closest transit being 1nm to the array area.

3.5 Vessel Course

An overview of vessel tracks within the study area, colour-coded by average course, is presented in Figure 3.11.

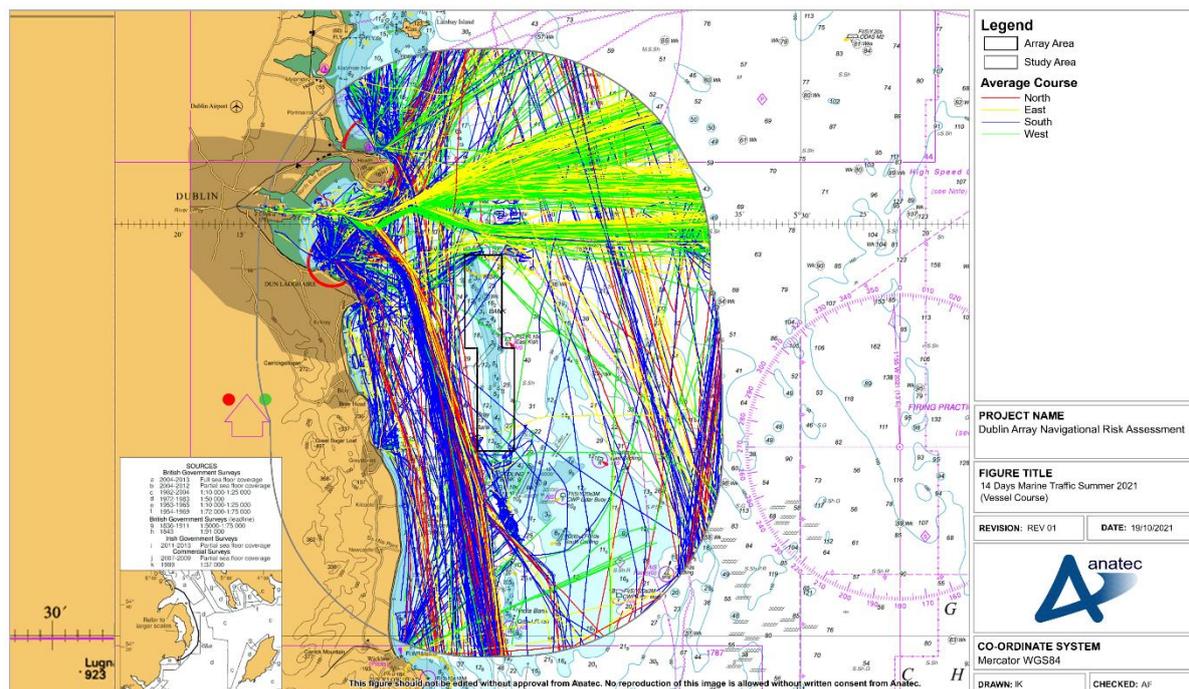


Figure 3.11: 14 Days Marine Traffic Summer 2021 by Vessel Course

Eastbound and westbound vessels were, in the majority, associated with Dublin, with westbound vessels accounting for a greater proportion of traffic (31% compared to 16%). There was also a disparity between northbound and southbound traffic, which comprised 18% and 34% of vessels respectively – however in this instance it should be considered that southbound traffic was observed to include the majority of fishing traffic in the area.

3.6 Vessel Speed

The vessels recorded within the study area during the survey period, colour-coded by vessel speed, are presented in Figure 3.12. It is noted that vessel speed was unspecified for <1% of these vessels.

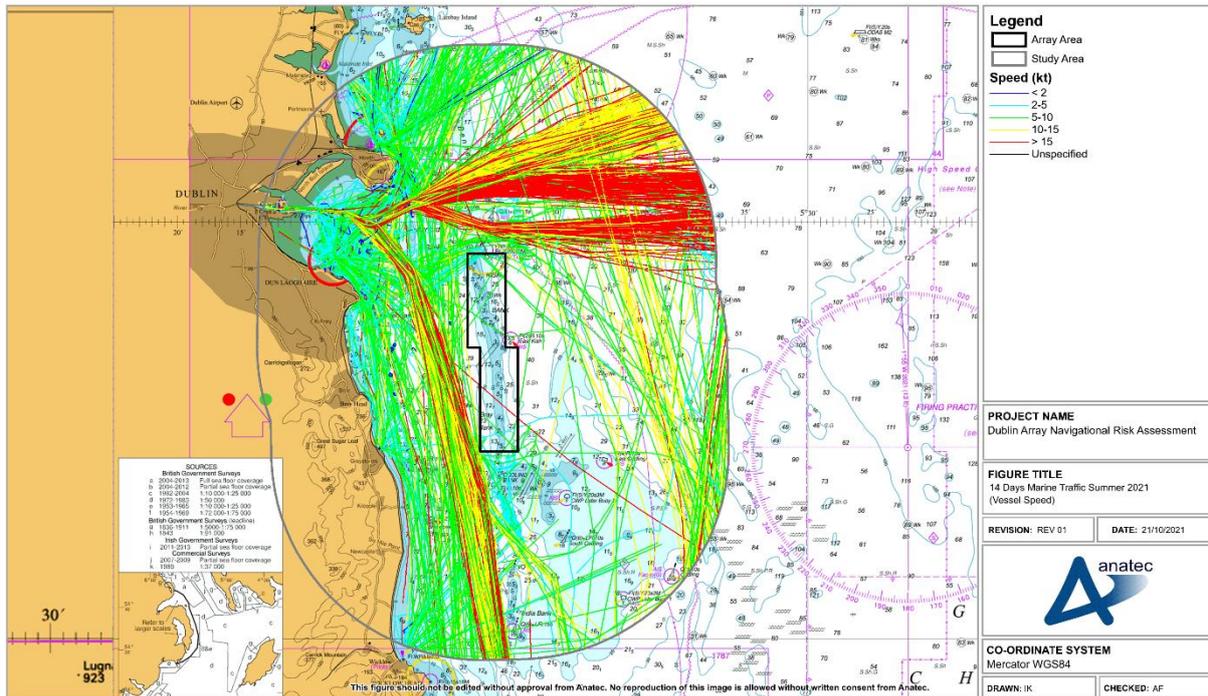


Figure 3.12: 14 Days Marine Traffic Summer 2021 by Vessel Speed

The distribution of vessel speeds is presented in Figure 3.13, noting that this excluded vessels of unspecified speeds.

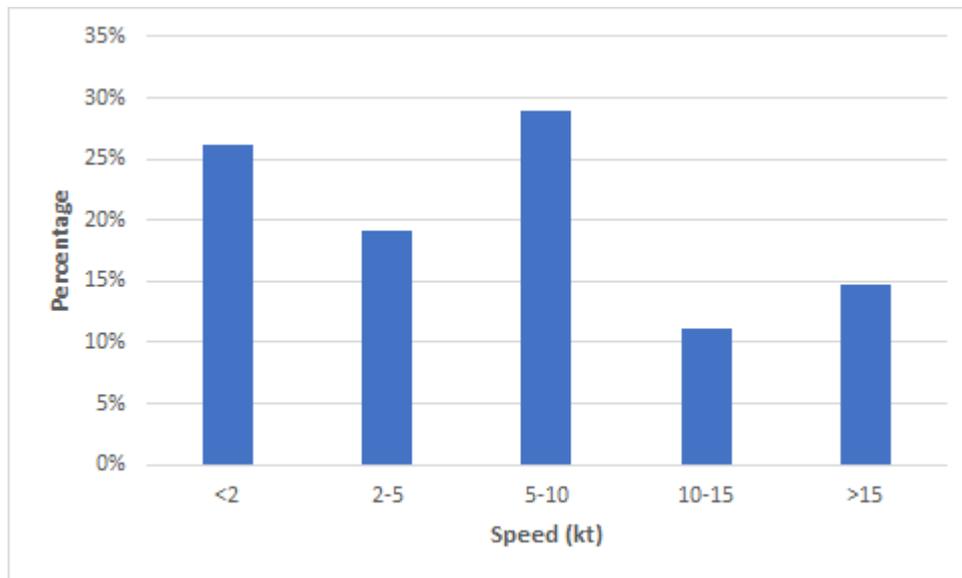


Figure 3.13: Distribution of Vessel Speeds

Excluding vessels of unspecified speeds, the average speed of vessels transiting in the study area during the survey period was 7.1 knots (kt). The fastest recorded vessel was a passenger vessel which transited at 34.6kt on the 15th of August 2021, on course from the Isle of Man for Dublin.

3.7 Vessel Destinations

Vessel destination data is broadcast over AIS, and using this the most frequently broadcast destinations are presented in Figure 3.14. Approximately 56% of AIS transits came from vessels that did not transmit a valid destination, and as such are not included.

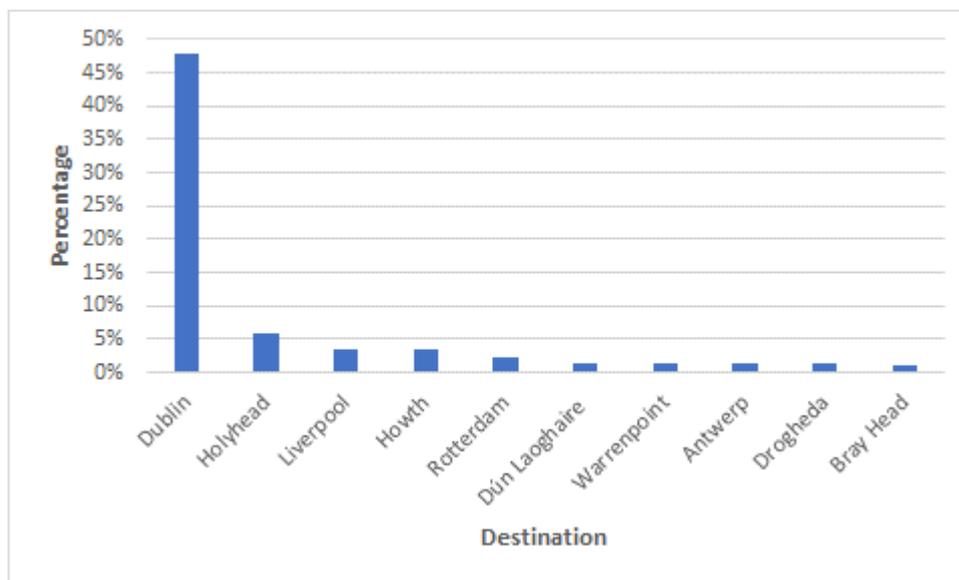


Figure 3.14: Distribution of Vessel Destinations

The most commonly-broadcast destination for vessels in the study area during the survey period was Dublin (48%). Other than the port of Holyhead (6%) no other destinations comprised 5% or over of the total broadcasts, with notable destinations in this bracket including Liverpool (4%), Howth (3%), and Rotterdam (2%).

3.8 Vessels within 1nm of the Array Area

For the purposes of site-specific assessment, the vessel tracks recorded passing within 1nm of the array area are presented in Figure 3.15.

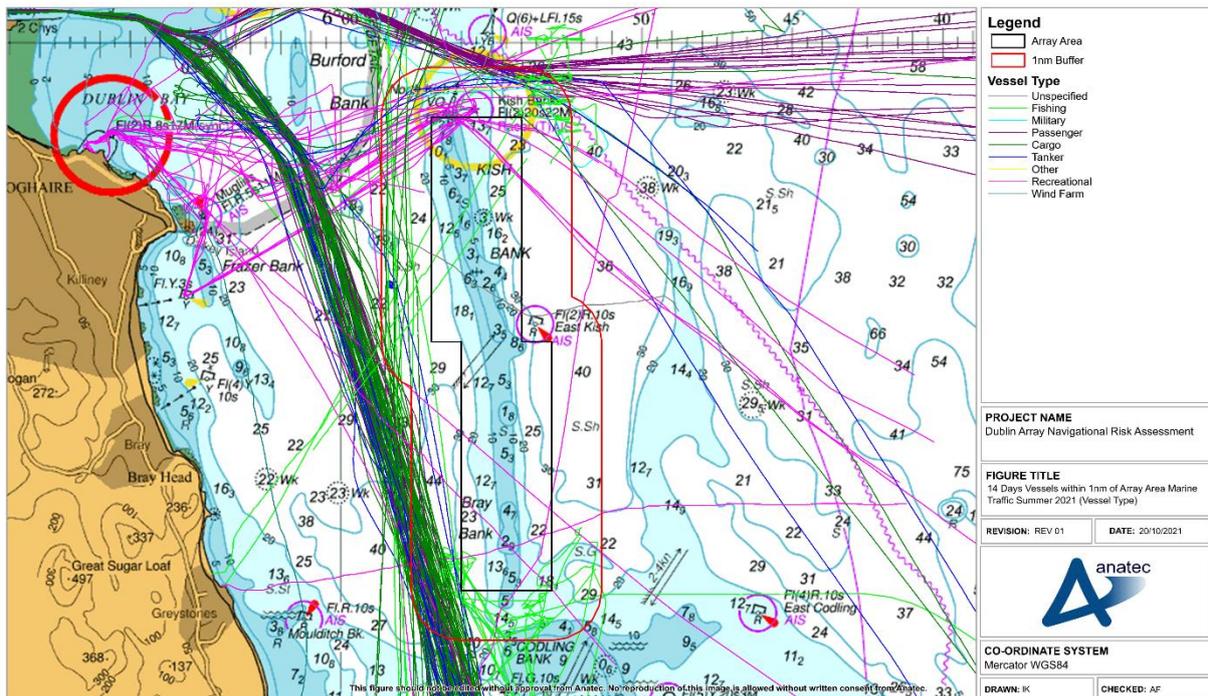


Figure 3.15: 14 Days Vessels within 1nm of the Array Area Marine Traffic Summer 2021 by Vessel Type

Of the vessels recorded within 1nm of the array area, 96% were recorded on AIS and 4% recorded on Radar.

During the survey period approximately 12 unique vessels per day passed within 1nm of the array area. Approximately two unique vessels per day passed through the boundary of the array area itself, with the majority being recreational vessels (61%). Of these, the majority (71%) were recorded on days when races were known to take place (see Section 3.3).

The distribution of vessel types passing within 1nm of the array area is presented in Figure 3.16.

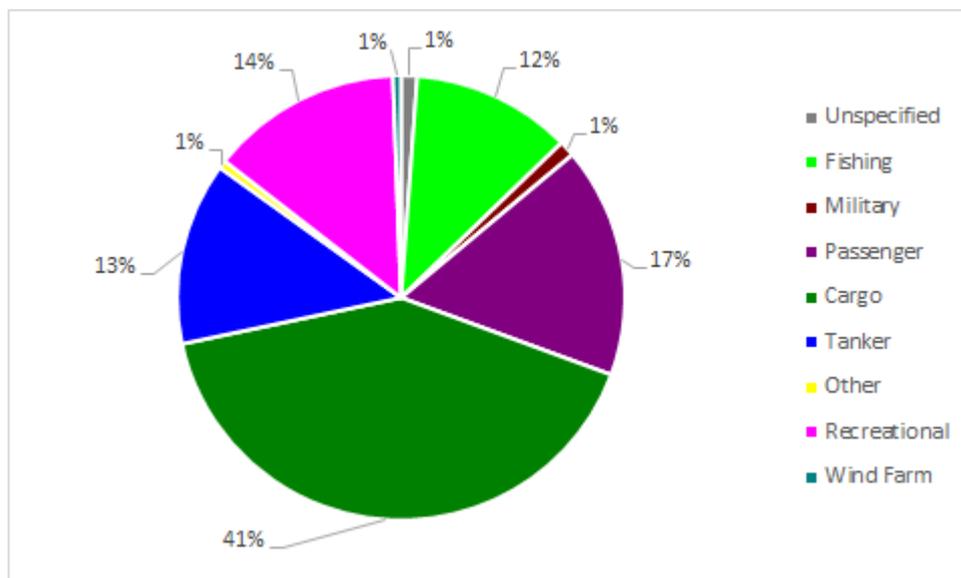


Figure 3.16: Distribution of Vessel Types within 1nm of the Array Area

The majority of vessels recorded within 1nm of the array area were cargo vessels (41%). Other significantly represented vessel types included passenger vessels (17%), recreational vessels (14%), tankers (13%), and fishing vessels (12%).

3.9 Visually Acquired Targets

A total of 68 vessels were recorded via visual observation (i.e., non-AIS vessels that could not be successfully acquired via Radar) within the study area during the survey period. These are colour-coded by vessel type and presented in Figure 3.17.

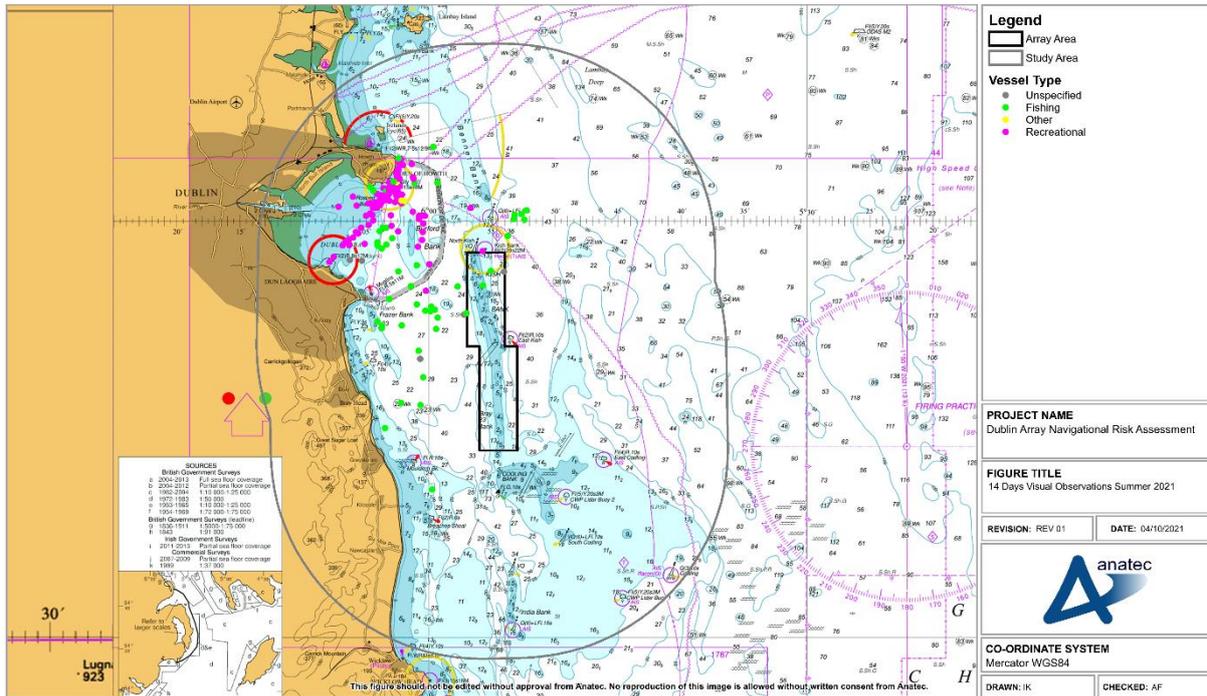


Figure 3.17: 14 Days Visual Observations Summer 2021

Excluding unidentified vessels, the vessel types recorded by visual observation within the study area during the survey period were composed of recreational vessels (81%), fishing vessels (14%), and other vessels (5%). The majority of sightings were recorded outwith the array area, although one fishing vessel (recorded on two separate occasions) and one vessel of unspecified type were recorded inside.

4 Detailed Review by Vessel Type

The following sub-sections present a more detailed analysis of the main vessel types recorded throughout the survey period.

4.1 Cargo Vessels

The tracks of cargo vessels recorded within the study area during the survey period are presented in Figure 4.1.

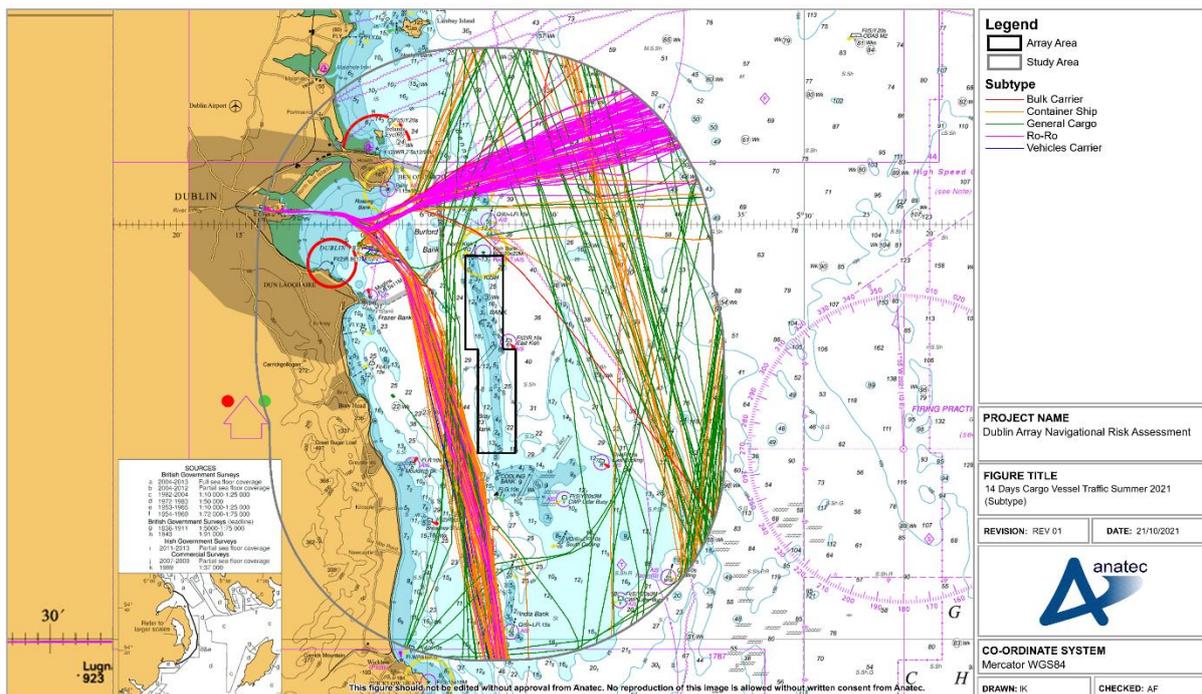


Figure 4.1: 14 Days Cargo Vessel Traffic Summer 2021

An average of 20 unique cargo vessels per day were recorded within the study area during the survey period. The most commonly recorded cargo subtypes were container ships (40%), general cargo vessels (29%), and Roll-on/Roll-off cargo (Ro-Ro) vessels (29%). Other cargo subtypes recorded were bulk carriers (1%) and vehicles carriers (1%).

The most common destinations for cargo vessels within the study area during the survey period were Dublin (56%), Rotterdam (4%), and Liverpool (3%).

It is noted that commercial Ro-Ro routes were present in the area, with the relevant operators being Cobelfret, Seatruck, and Stena Line.

4.2 Tankers

The tracks of tankers recorded within the study area during the survey period are presented in Figure 4.2.

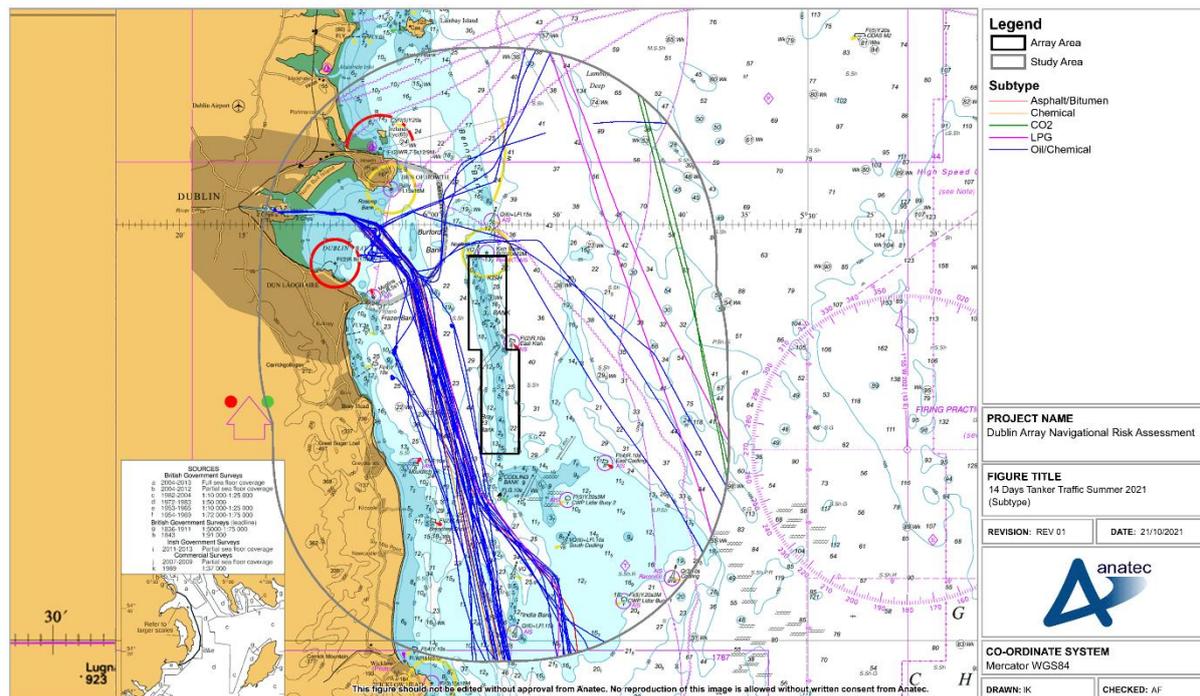


Figure 4.2: 14 Days Tanker Traffic Summer 2021

An average of five unique tankers per day were recorded within the study area during the survey period. The vast majority of tanker subtypes recorded were oil/chemical tankers (86%). Other subtypes recorded included Liquid Petroleum Gas (LPG) tankers (7%), chemical tankers (3%), CO₂ tankers (3%), and asphalt/bitumen tankers (1%).

The most common destinations for tankers within the study area during the survey period were Dublin (80%) and Bray Head (9%).

4.3 Passenger Vessels

The tracks of passenger vessels recorded within the study area during the survey period are presented in Figure 4.3.

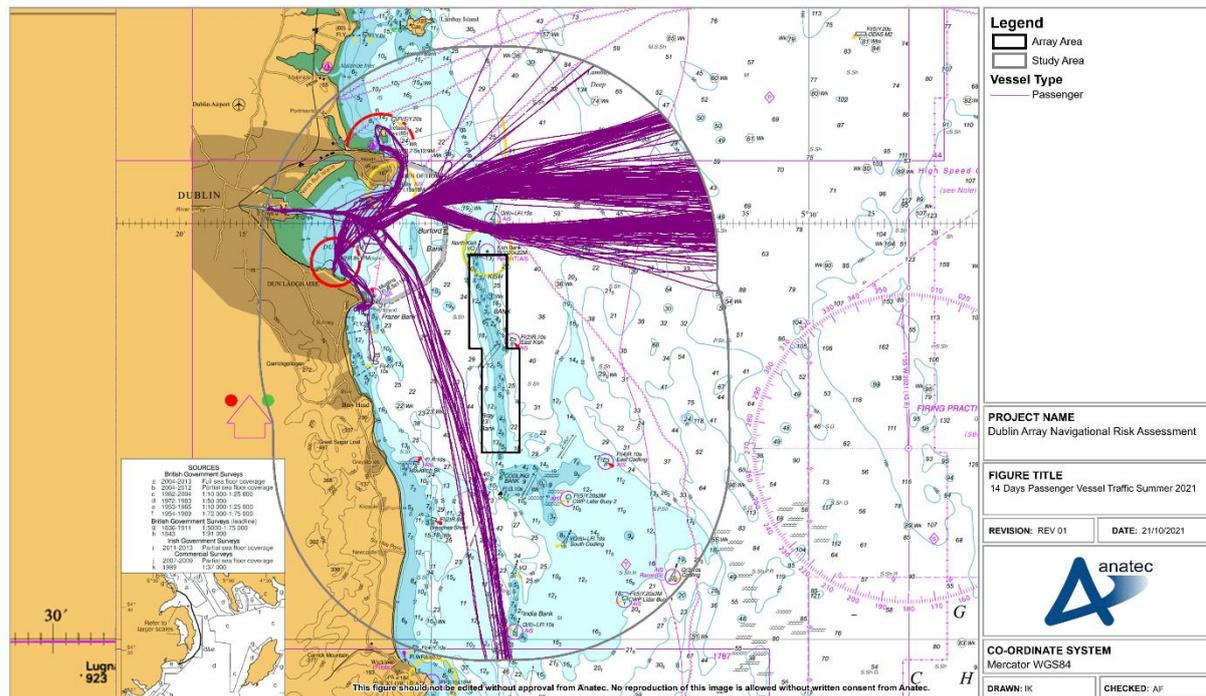


Figure 4.3: 14 Days Passenger Vessel Traffic Summer 2021

An average of nine unique passenger vessels per day were recorded within the study area during the survey period.

The majority of passenger vessels transited on an east-west course between Dublin and ports on the west coast of mainland UK such as Holyhead and Liverpool, although vessels transiting between Dublin and the Isle of Man, and between Dublin and Cherbourg (France) were also recorded.

Commercial cruise line and Roll-on/Roll-off passenger (ROPAX) routes were also present in the area, with the key operators being Irish Ferries, P&O Ferries, and Stena Line.

4.4 Fishing Vessels

The tracks of fishing vessels recorded within the study area during the survey period are colour-coded and presented in Figure 4.4. Where speed or behaviour indicates potential fishing activity, this has been indicated via colour coding.

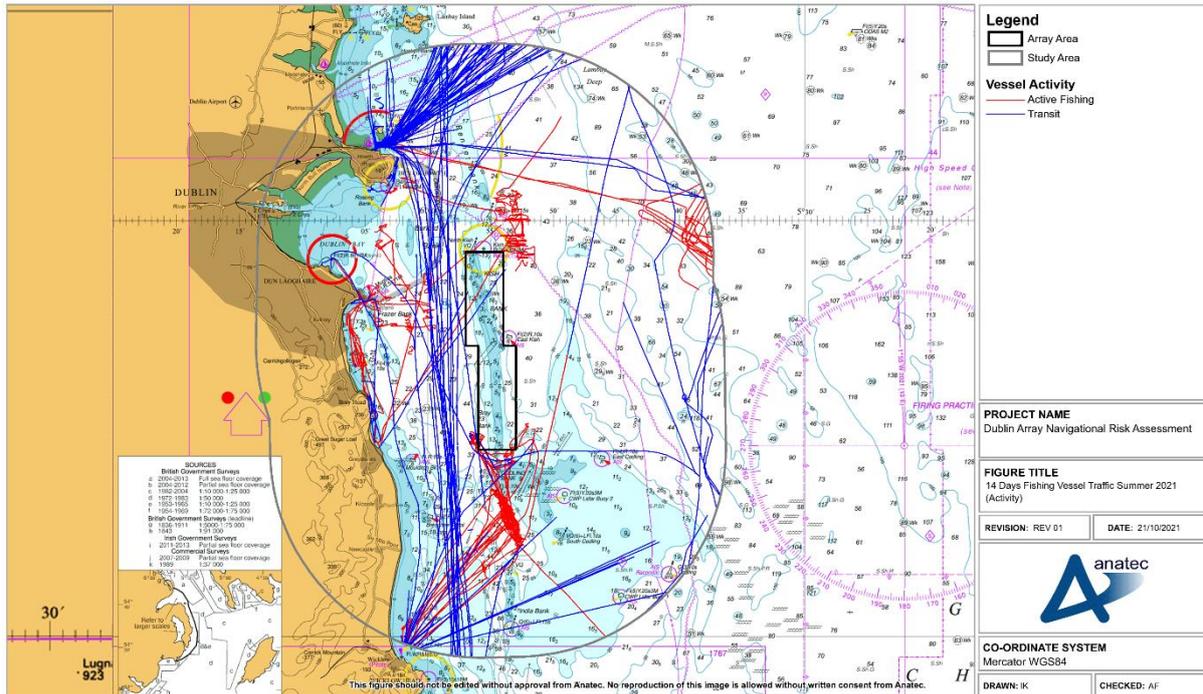


Figure 4.4: 14 Days Fishing Vessel Traffic Summer 2021 by Activity

An average of 16 unique fishing vessels per day were recorded within the study area during the survey period. Of these, 93% were recorded on AIS while 7% were recorded on Radar.

Vessels actively fishing were most commonly recorded close to shore, with the majority of fishing vessels in transit on either a northeast-southwest course to the north of the array area, or a north-south course to the west. These departed from the ports of Dún Laoghaire, Greystones, Howth, and Wicklow.

4.5 Recreational Vessels

The tracks of recreational vessels recorded within the study area during the survey period are presented in Figure 4.5.

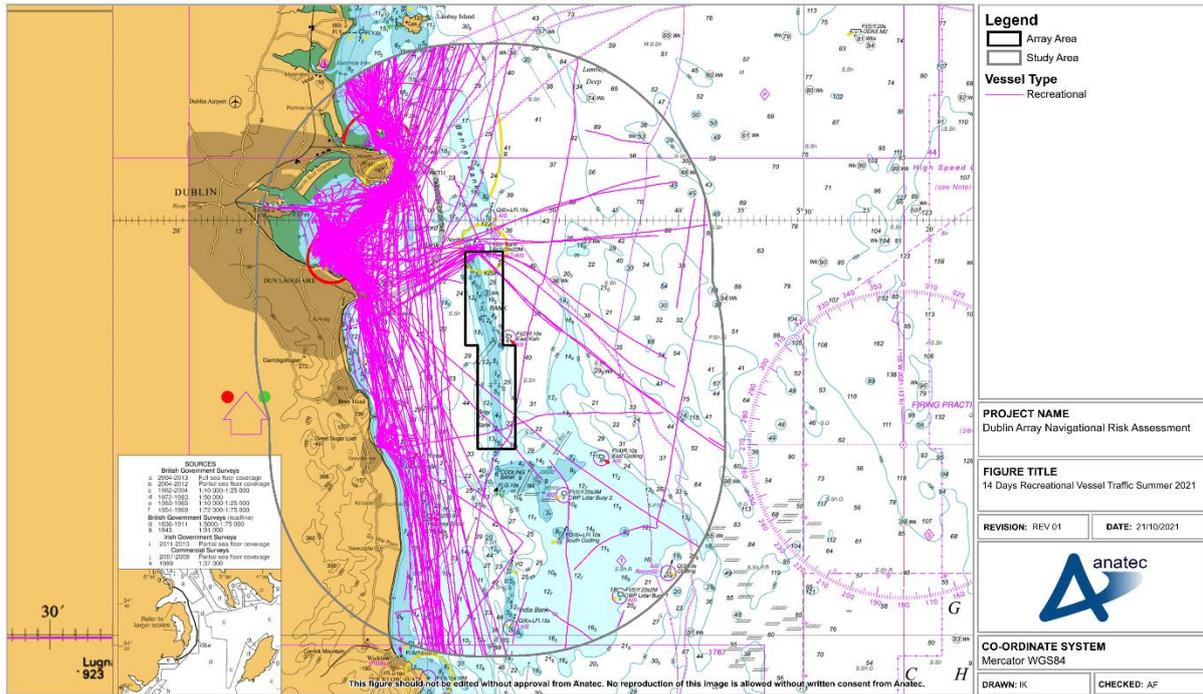


Figure 4.5: 14 Days Recreational Vessel Traffic Summer 2021

An average of 49 unique recreational vessels per day were recorded within the study area during the survey period. Of these, 82% were recorded on AIS, while 18% were recorded on Radar.

Recreational vessels were predominantly recorded close to the coast, with limited transits observed further offshore. Similarly to fishing vessels, recreational vessels departed from the ports of Dún Laoghaire, Greystones, Howth, and Wicklow, although they also utilised the port of Dublin.

5 Summary

This report presents analysis of 14 days of AIS, Radar, and visual observation survey data in summer 2021 within 10nm of the array area. The survey was carried out from Baily Lighthouse from 11:00 UTC on the 20th of August to 11:00 UTC on the 3rd of September 2021, in order to determine the volume, types, and behaviour of vessels transiting through the area.

The main vessel types recorded transiting through the study area during the survey period were recreational vessels (45%), cargo vessels (18%), and fishing vessels (15%).

An average of 116 unique vessels per day were recorded transiting through the study area during the survey period. The busiest day during the survey period was the 28th of August on which 171 unique vessels were recorded. The quietest full day during the survey period was the 31st of August 2021, on which 96 unique vessels were recorded.

The average length of vessels recorded within the study area during the survey period was 58m. The average draught of vessels recorded within the study area during the survey period was 5.5m. The average speed of vessels recorded within the study area during the survey period was 7.1kt.

The most common destinations for vessels recorded within the study area during the survey period were Dublin (48%), Holyhead (6%), and Liverpool (4%). Vessels predominantly transited in a westbound or southbound direction in the study area during the survey period.

There were, on average, 12 unique vessels per day passing within 1nm of the array area during the survey period, with the majority of vessels passing through the array area itself being recreational (61%).

Three Ro-Ro vessel operators were recorded within the study area during the survey period, with the main operator recorded being Seatruck. Seatruck vessels transited between Dublin and both Liverpool and Heysham. ROPAX vessels were recorded transiting through the study area were on passage between Dublin and Holyhead, Liverpool, the Isle of Man, and Cherbourg.

Recreational activity was high in the study area during the survey period, with an average of 49 unique vessels per day recorded. Fishing vessel activity was observed to be lower than recreational activity, with 16 unique vessels per day recorded in the study area during the survey period. Commercial fishing activity was split between vessels transiting, and those actively fishing, with the majority of fishing activity being close to the coast.

There were 48 unique instances of vessels anchoring within the study area during the survey period, comprised of tankers (54%), cargo vessels (44%), and passenger vessels (2%). Due to Dublin Bay anchorage often being at capacity, vessels have begun to also anchor further south.

6 References

DBSC (2021). Summer Series 2021 Calendar. Available at: https://www.raceview.ie/event_17/race_score/5571/ (Accessed on 02/12/2021)

MCA (2021). MGN 654 (Merchant and Fishing) Offshore Renewable Energy Installations (OREI) – Guidance on UK Navigational Practice, Safety and Emergency Response, Southampton: MCA.