An Roinn Aeráide,
Fuinnimh agus Comhshaoil
Department of Climate,
Energy and the Environment

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

INFOMAR
Integrated Mapping for the
Sustainable Development
of Ireland's Marine Resource

Foras na Mara
Marine Institute

INFOMAR

2024 INFOMAR Activity Report

Thomas Furey & Sean Cullen

Marine Institute & Geological Survey Ireland Joint INFOMAR Programme Managers

Contents

Programme 1 - Data Acquisition, Management, & Interpretation

INFOMAR Programme 1 Objective: To contribute to the management of activities and resources in Irish inshore areas by completing a comprehensive mapping and data interpretation programme for priority areas, followed by completion of remaining unmapped areas.

Acquisition Plans: 2024 survey targets were defined based on stakeholder consultation at the INFOMAR seminar, the Geoscience Ireland seminar, an MI stakeholder workshop, a Programme Board and INFOMAR Team Phase 2 Planning Workshop, Technical Advisory Committee feedback, and with consideration of logistical and operational issues.

INFOMAR Phase 2 Operational Programme Status

Annual survey coverage targets (km^2) were provided in the "INFOMAR Memo to Government 2018" for INFOMAR continuation through to end 2026, for the areas <30nm and >30nm offshore, the GSI & MI survey target areas respectively. The following tables are incrementally updated to provide an oversight on cumulative survey coverage relative to these targets. More accurate coverage assessments will be undertaken and reported upon to DCEE intermittently for formal coverage tracking. This involves GIS analytics of the compilation of all programme coverage, and it is dependent upon availability of final processed survey data for detailed gap analysis and outstanding coverage calculations.

	MI & GSI 2018 Set Annual Targets	MI & GSI Gross EEZ Coverage Delivered	MI & GSI Cumulative Gross EEZ Coverage Delivered	MI & GSI Cumulative Net EEZ Coverage Delivered	EOY Gap w.r.t Coverage Delivered	% Targeted	% Complete
	km^2	km^2	km^2	km2	km^2	%	%
2016	n/a	5,135	41,757	38,048	85,143	n/a	30%
2017	n/a	5,296	47,054	43,242	79,950	n/a	35%
2018	8,871	11,456	58,510	54,374	68,817	44%	44%
2019	8,950	9,963	68,473	63,520	59,671	51%	51%
2020	8,461	9,623	78,097	72,551	50,640	58%	58%
2021	9,340	8,477	86,574	80,398	42,973	66%	65%
2022	8,857	5,675	92,249	85,797	37,394	73%	69%
2023	9,782	8,889	101,138	94,035	29,156	81%	76%
2024	8,230	7,163	108,301	100,578	22,613	87%	81%
2025	7,363	0				93%	
2026	8,433	0				100%	

Table 1 Total Coverage relative to 2018 Annual Mapping Targets set, and % surveyed (target relative to completed), derived from Q4 2023 GIS Assessment reported at INFOMAR Board Meeting # 58, 11th March 2024.

Table 1 Explanation Notes:

1. Annual Coverage Targets were first implemented in 2018
2. Net Coverage Delivered is the End of Year GIS calculated area of new territory mapped by year.
3. Net Coverage Delivered varies slightly from coverage reported by organisation or survey leg elsewhere in the INFOMAR Activity Reports, which are total areas for individual survey legs and/or sums thereof, without the removal of overlaps between surveys.
4. End Of Year Gap is the shelf area remaining to be surveyed.

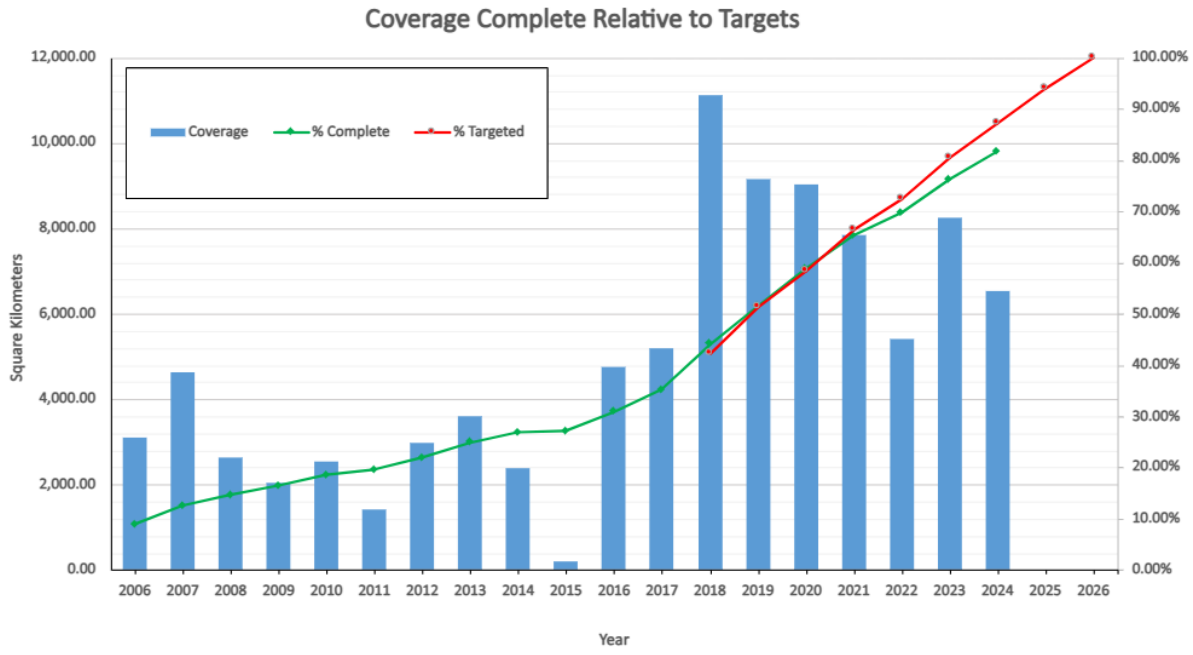


Figure 1 Visual assessment of annual survey coverage in km^2(in blue), including annual % completion targets set in 2018 (in red), relative to % completion achieved at the end of each year (green).

An overview of INOMAR Partner survey progress relative to annual coverage targets set in 2018 by organisation is presented in Table 2 and Table 3 for Marine Institute and Geological Survey Ireland respectively. The gross coverage figures are based on the summation of coverage of each individual survey during the relevant year, which may include areas of overlap between surveys.

	Targets		Gross Area Mapped		Status Relative to Target
	Target @ 2018 (km^2)	Cumulative 2018 Target (km^2)	Mapped to year end (km^2)	Cumulative Mapped to year end (km^2)	Cumulative Target Tracking Red = behind (km^2) Black = ahead (km^2)
2018	6305	6305	7991	7991	1686
2019	5560	11,865	5136	13,127	1262
2020	5504	17,369	6799	19,926	2557
2021	5867	23,236	6152	26,078	2842
2022	5823	29,059	4301	30,379	1320
2023	6687	35,746	4315	34,694	1052
2024	6988	42,734	5174	39,868	2866
2025	6712	49,446			
2026	6066	55,512			

Table 2 Marine Institute annual gross survey coverage achieved (sum of survey leg areas which includes overlap), and status relative to cumulative target.

	Targets		Gross Area Mapped		Status Relative to Target
	Target @ 2018 (km^2)	Cumulative 2018 Target (km^2)	Mapped to year end (km^2)	Cumulative Mapped to year end (km^2)	Cumulative Target Tracking Red = behind (km^2) Black = ahead (km^2)
2018	2566	2566	3635	3635	1059
2019	3390	5956	3368	7003	1047
2020	2957	8913	2908	9911	998
2021	3473	12,386	2332	12,243	143
2022	3034	15,420	1372	13,615	1805
2023	3095	18,515	2479	16,094	2421
2024	1242	19,757	1837	17,931	1826
2025	651	20,408			
2026	2367	22,775			

Table 3 Geological Survey Ireland annual gross survey coverage achieved (sum of survey leg areas which includes overlap), and status relative to cumulative target.

2024 Survey Plans

The collective Marine Institute and Geological Survey Ireland proposed work areas at the start of 2024 are shown in Figure 2. Outstanding gaps are presented within the annual plan, to deliver the flexibility necessary to maintain operations while dealing with logistical and weather constraints.

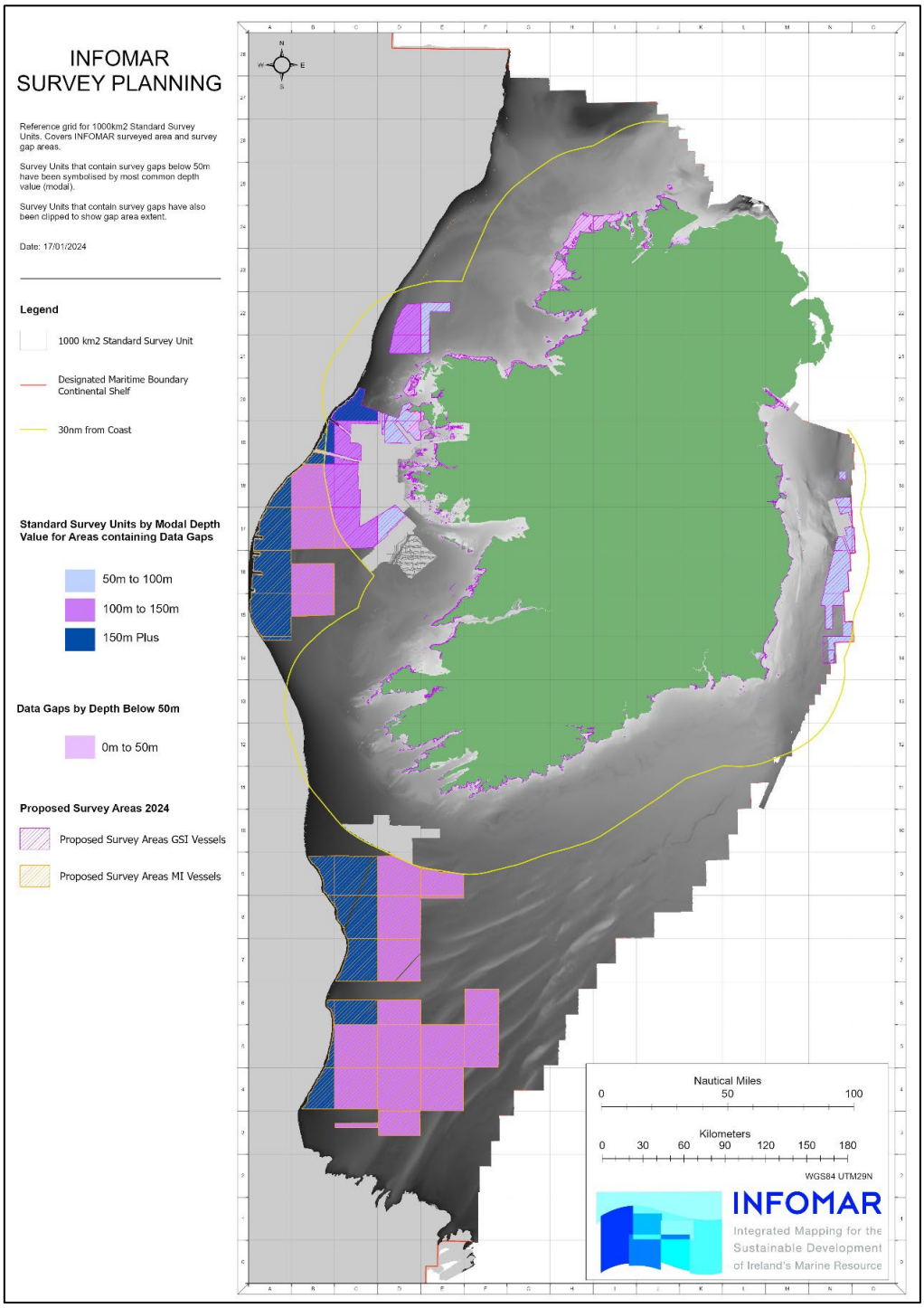


Figure 2 INFOMAR 2024 Proposed Working Areas.

MI Core INFOMAR Survey Summary

Four MI surveys were completed, in what was an earlier than usual start to the survey season in order to accommodate ORE surveys later in the year. One student was taken per survey in conjunction with the Strategic Marine Alliance for Research and Training (SMART) programme. A total of 2 ground-truthing stations were sampled, and 21 shipwrecks were surveyed. Survey coverage images are provided in Appendix 2.

TC24_01 from the 5th March to the 5th of April mapped off both the west and south coasts and included remapping of older, lower resolution multibeam data within Galway Bay. The vessel mobilised in Galway and mapped 450 km^2 west of Country Clare, 1465 km^2 off the south coast and covered 4220-line km of unsurveyed seabed. An additional 107 km^2 was remapped within Galway Bay. Seven shipwrecks were mapped.

TC24_02 took place from the 6th to the 25th of April. The vessel mobilised in Cork. Survey operations took place off the south coast. An area of 1441 km^2 was mapped and 3121-line km covered. The mapped area was contiguous with what was mapped off the south coast during the previous survey. Five shipwrecks were surveyed. A seabed depression which possibly owes its origin to shallow gas escape was mapped. The western extent of the mapped area corresponds with the 200 m contour and the shelf edge.

TC24_03 took place between 13th and 27th May. Mobilisation was in Lorient, France. A total of 1252 km^2 was mapped at the southern extent of the Celtic Sea gap. Two grab samples were acquired. The Tom Crean demobilised in Galway. Five wrecks were mapped, one of which was a submarine and another wreck appears to be that of the Carpathia, the vessel that rescued many of the survivors from the Titanic. Table 4 provides a summary of the predicted and achieved coverage to date this year.

TC24_04 mobilised in Cork City. The survey ran for 7 days from 14th to 20th September. Weather conditions were very favourable and so no downtime was incurred. Mapping took place approximately 150 km south of Cape Clear Island, County Cork. A total of 565 km^2 were mapped, including 4 wrecks.

2024 Offshore Shelf Mapping Targets								Shelf Mapping Achieved		
		Vessel Days By Leg	Coverage per Ops Day	24 Hr Ops Days	Coverage Target km^2	Coverage Target ISUs	VMEF	Line Km Achieved	Coverage Achieved km2	Coverage Achieved ISUs
R.V. Tom Crean	TC24_01	32	125	20.5	2560	2.6	0.64	4220	1916	1.9
	TC24_02	20	125	12.8	1600	1.6	0.64	3121	1441	1.4
	TC24_03	15	125	9.6	1200	1.2	0.64	2831	1252	1.3
	TC24_04	7	125	4.5	560	0.6	0.64	1310	565	0.6
	Total	74		47	5920	5.9		11482	5174	5.2

Table 4 - MI annual gross survey coverage (including survey overlaps) predicted and achieved

2024 MI INFOMAR Survey Overview

Survey Name	Survey Dates	Survey Days	Weather Downtime %	Coverage Gross (Km^2)	Line Km's
TC24_01	March 5th – April 5th	32	16.69	1916	4220
TC24_02	April 6th – April 25th	20	15.21	1441	3121
TC24_03	May 13th – May 27th	15	11.11	1252	2831
TC24_04	Sept 14th – Sept 20th	7	00.00	565	1310
			Total	**5,174**	**11,482**

Notes:

1. Vessels are operational at reduced speeds at times due to weather; however, this is not captured or reflected in survey statistics.
2. Vessels have varying sea-time endurance, impacting transit, port call and operational statistics.
3. Vessel susceptibility to poor weather decreases with increasing vessel size.

2024 MI Supported 3rd Party Surveys (Value Added Exploitation Sup Programme)

Survey	Contact	Affiliation	Project	Location	Topic
TC2024_1		UCD / UU	A multi-disciplinary environmental research survey of Galway Bay	Galway bay	Paleo climatic reconstruction
TC24016		DCEE	DMAP geophysical survey	DMAP south coast	ORE development
TC24021		DCEE	DMAP geophysical survey	DMAP south coast	ORE development
CE24009		University of Texas	West Greenland glaciers research investigation	Greenland	Climate Research.

Table 5 – List of MI supported surveys

GSI Core INFOMAR Survey Summary

GSI mobilised the R.V. Keary, R.V. Mallet, R.V. Lir and the R.V. Galtee for the 2024 survey season. The latter three vessels were deployed to Cleggan, Co. Galway, to pick up where they left off at the end of the previous year's survey operations – mapping westwards into the shelf from Co. Galway and Co. Mayo, and northwards along the coast towards Achill Island. The R.V. Keary was tasked with mapping a number of shipwrecks along the south and south-west coasts in cross collaboration with the Underwater Archaeology Unit of the National Monuments Service, along with a laser scan of Skellig Michael, Co. Kerry – which, when combined with LiDAR of the island and INFOMAR bathymetry, will support the development of a Research Framework for the World Heritage Property. The Keary was also tasked with completing INFOMAR mapping along the north coast of the Dingle peninsula while in the area, before relocating to Rossaveal, Co. Galway later in the season to resume operations on the shelf there.

Survey Name	Location	Survey Dates	Survey Days	Weather Downtime %	Coverage (Km^2)	Line Kms
GAL24_01	Co. Dublin	20/05/2024 - 03/06/2024	15	50	N/A	21
KRY24_01	Co. Waterford – Co. Cork – Co. Kerry	20/05/2024 - 27/07/2024	69	50	16.7	228
MAL24_01	Co. Dublin – CO. Cork	20/05/2024 - 03/06/2024	15	34	N/A	125
MAL24_02	Cleggan, Co. Galway	04/06/2024 - 12/07/2024	39	37	292.9	1025
LIR24_01_prelim	Clew Bay, Co. Mayo	04/06/2024 - 30/08/2024	88	50	102.8	1266
KRY24_02_prelim	Clifden, Co. Galway	10/08/2024- 28/10/2024	80	26	428.7	1340
LIR24_02_prelim	Clew Bay, Co. Mayo	31/08/2024- 27/10/2024	58	28	52.3	636
GAL24_02_prelim	Westport, Co. Mayo	04/06/2024 - 29/10/2024	148	42	283.3	2580
MAL24_03_prelim	Westport, Co. Mayo	13/07/2024- 29/10/2024	109	36	660.3	2652
				Total =	1837	9727

Table 6 – List of GSI supported surveys

2024 Ground-truthing Activity

A total of 61 sediment samples were collected by UCD/UU during survey TC2024_1 and shared with INFOMAR to expand the current database and fine tune Galway Bay substrate classification.

Two further sediment samples were collected during INFOMAR survey TC24_03.

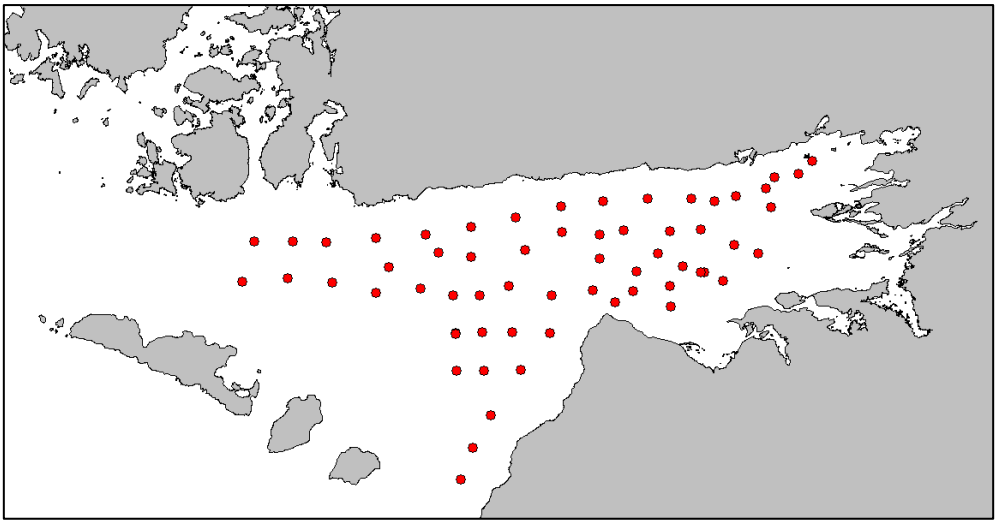
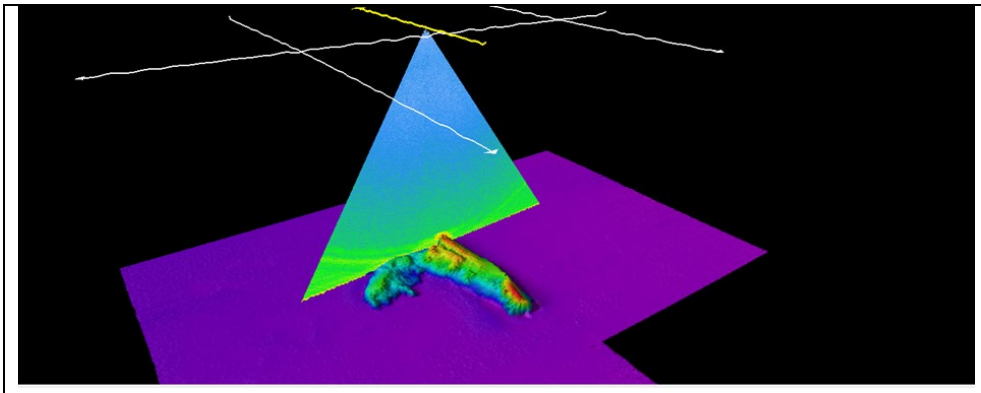


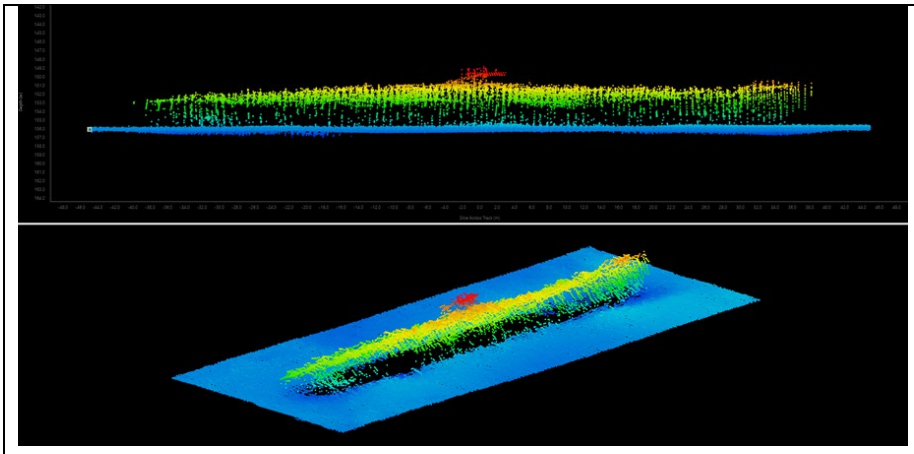
Figure 3. Sediment sampling achieved in 2024

2024 Shipwreck Surveys

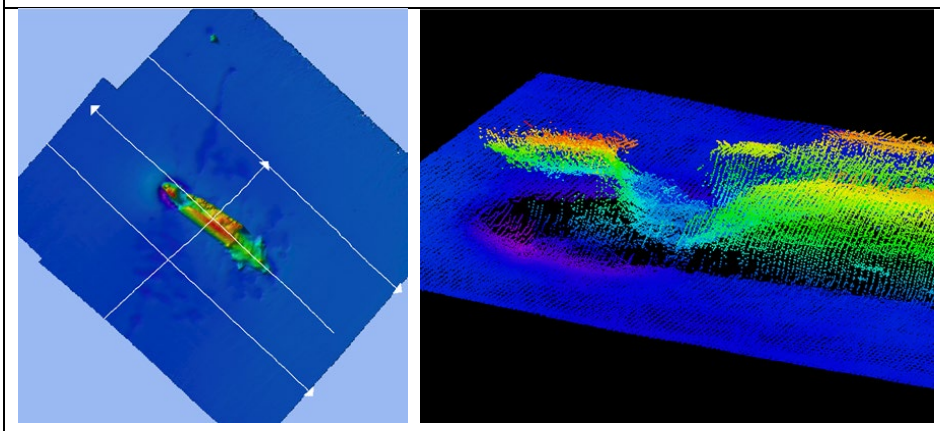
21 shipwrecks were mapped during the four MI INFOMAR surveys of 2024. One of these was discovered in the Atlantic during TC24_01, and the remainder were in the Celtic Sea. 12 of the shipwrecks were previously uncharted, and 5 had inaccurately listed positions.



TC24_03 Wreck 02 Probably SS Beaverburn which was sunk by torpedoes from U-41 on 5th February 1940



TC24_03 Wreck 03 Profile and 3D view of U-41 Submarine which was sunk by depth charges from British A Class destroyer HMS Antelope on 5th February 1940.



TC24_03 Wreck 04 RMS Carpathia which is famous for rescuing survivors of the RMS Titanic after it struck an iceberg. Sunk by torpedoes from German submarine U-55 on 17th of July 1918. Image on right shows hole in the stern where the first torpedo hit the engine room.

Figure 4. Selection of shipwrecks mapped during MI INFOMAR surveys in 2024

7 shipwrecks were mapped by the GSI INFOMAR inshore fleet in 2024. Of the 7 wrecks surveyed, 1 was uncharted and the remainder were previously charted wrecks predominately located on the west coast.

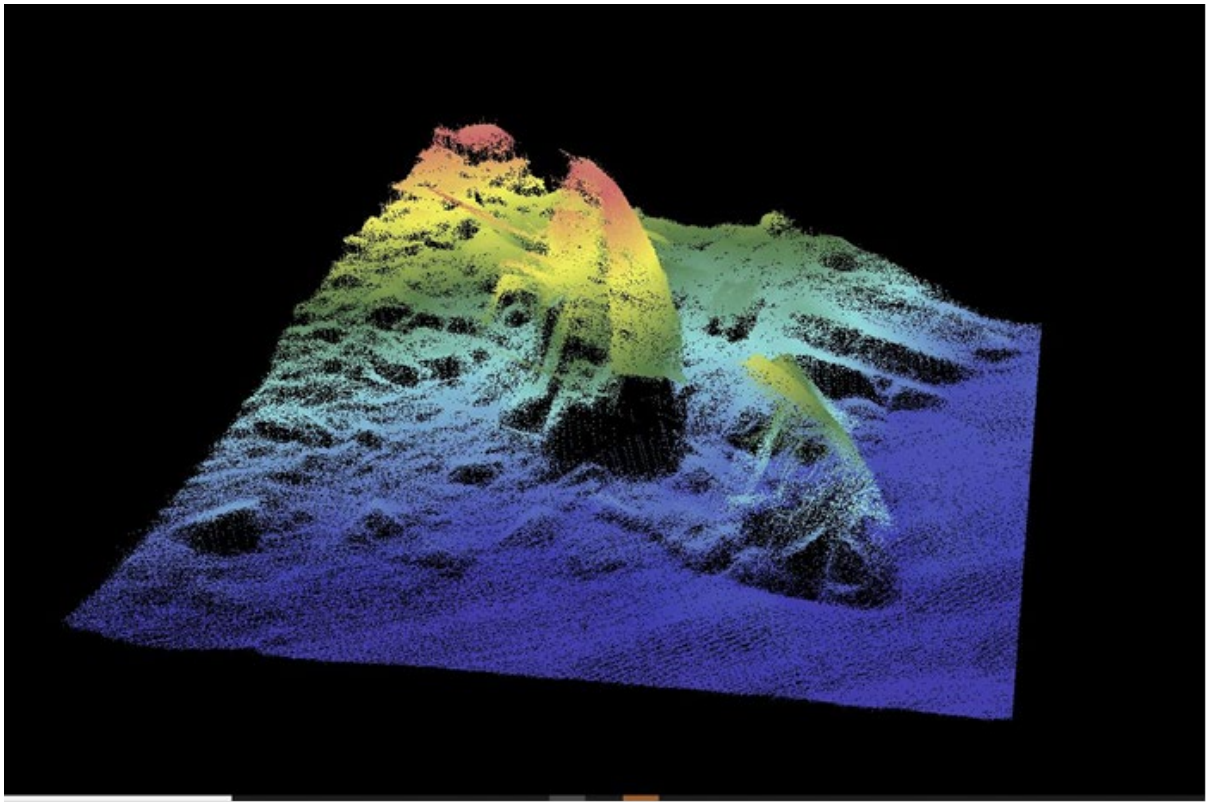


Figure 5. 3D view of previously charted wreck (MFV Three Brothers) surveyed by the RV Keary along the SW of the Great Blasket Island.

Programme 2 - Data Exchange & Integration

***INFOMAR Programme 2 Objective**:* Establishment of processes and procedures to establish an Inter-Agency National Marine Data Discovery and Exchange Service

Measure 1: Data Integration

A major objective of INFOMAR is to develop the capability to integrate both 'foundation data' (general seabed survey and environmental data) and 'stakeholder datasets' (i.e. designed for specialist use) in order to facilitate the development of specific information services by the public and private sector. The vision is to develop and continuously build a knowledge base over time, which will enable Ireland to develop and manage its marine resource in a sustainable manner.

Measure 2: Data Exchange

A programme to target data integration and data exchange is essential to maximising the value of existing and new data to the broad range of stakeholders. This requires the development of co-ordinated access to the data and selection of key aspects of the data for integration with other key marine data sets.

Introduction

INFOMAR provides free open-source data underpinning a wealth of applications. Data applications are continuously growing, and programme outputs enable quicker decision making, smarter long-term planning, and more sustainable development.

Storage and analytics technology are evolving rapidly, as are user requirements. Consequently, INFOMAR products and data delivery mechanisms are dynamic, with outputs now delivering to marine leisure applications, supporting infrastructure development projects, and underpinning regional tourism initiatives and marine resource management plans.

Processed bathymetry data acquired from all INFOMAR vessels are merged in both Geological Survey Ireland and the Marine Institute, and maps and digital products are subsequently created, including pdf charts, grids, web map services, and a variety of raw and processed data products. Once finalised, the outputs are archived and made available through the INFOMAR website, and a variety of data and digital mapping services. Products such as grids and vector data are processed in the GSI and uploaded to the INFOMAR Marine Data Download Portal.

Multibeam Data Processing

Multibeam data processing is a core activity within the data exchange and integration programme. Raw multibeam data, acquired on INFOMAR survey vessels are processed through a complex cycle which involves quality assurance measures applied in close to real time, before the data are subject to further office-based processing and quality control measures necessary to ensure that data products satisfy stakeholder requirements. Finalised survey legs for 2024 are shown in Table 7, while ongoing status of processing workload is shown in Figure 6 and Figure 7. All datasets require QC before external product creation and addition to web services.

	Q1	Q2	Q3	Q4
MI	TC24_01	TC24_02 TC24_03	Tosca-ROV	TC24_04
	MAL20_02 GAL21_03 GEO21_06	MAL22_01 LIR22_02 LIR23_02	MAL22_02 GAL22_02 LIR23_01	MAL23_01 MAL24_01 GAL24_01

Table 7 Surveys finalised by MI and GSI in 2024

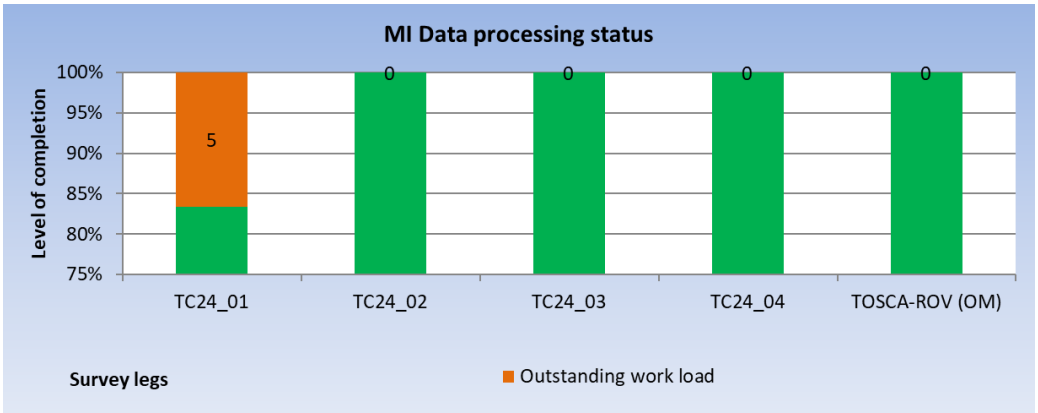


Figure 5 Current MI data processing status (green - complete, orange bar - estimated days to complete).

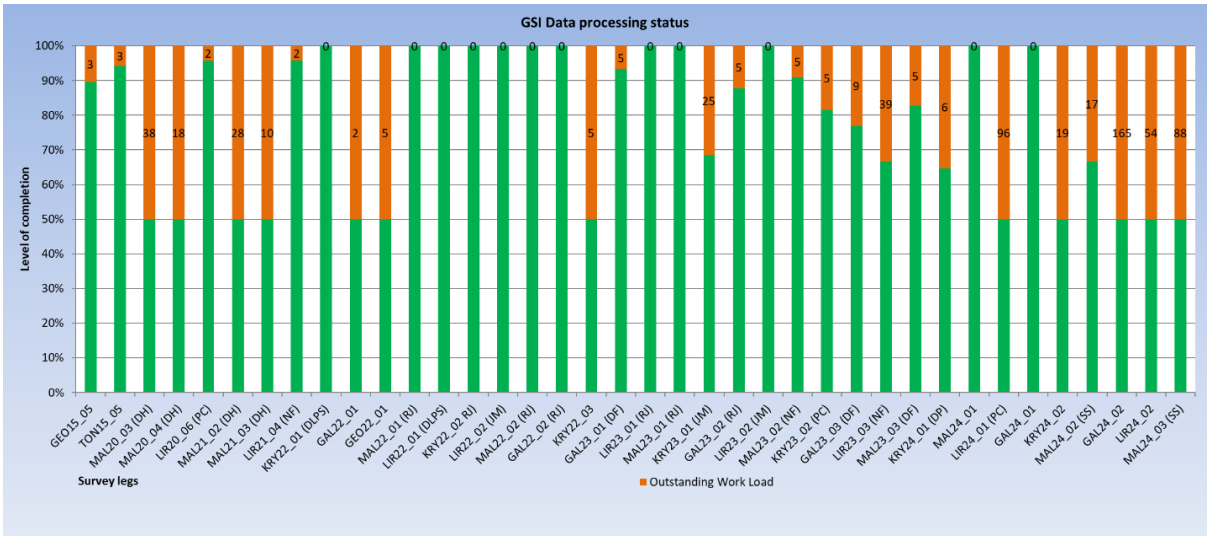


Figure 6 Current GSI data processing status (green - complete, orange bar - estimated days to complete).

Data integration and dissemination

Bathymetry and backscatter Database compilation 2024

The 2m resolution survey leg data, as well as 5m, 10m, and 25m resolution merged surfaces for bathymetry along with 40m resolution data for backscatter, covering the Irish offshore and shelf areas have been updated with latest available datasets and available in 3-star open standard format which improves user access across all GIS environments. This upgrade greatly enhances the use & availability of INFOMAR data to all users.

Seabed sediment classification - 2024 update

Seabed classification work continued with the interpretation of backscatter data in the Celtic Sea from *RV Celtic* Explorer and *RV Tom Crean* legs (CE20_01, CE21_01, TC23_01 and TC23_03) and from the inshore fleet (RVs Keary, Lir & Mallet) off the southwest coast. The Celtic Sea is a renowned fishery for *Nephrops norvegicus*. Gaps in the extent of seabed classification along the 30 nm boundary were completed along with deeper areas to the south. Sediment classification maps were also created for the Sceirde Rocks off the west coast which has been proposed as a site for ORE. Subtidal reef habitat maps off the Clare, Kerry and Cork coastlines were classified according to the dominant marine community types to aid reef monitoring work being undertaken by the NPWS. The focus in Q3 and Q4 will shift to the west coast along the 200 m contour which has been highlighted as an area intensively fished and the seabed classification data will aid future fisheries management plans/assessments for this area.

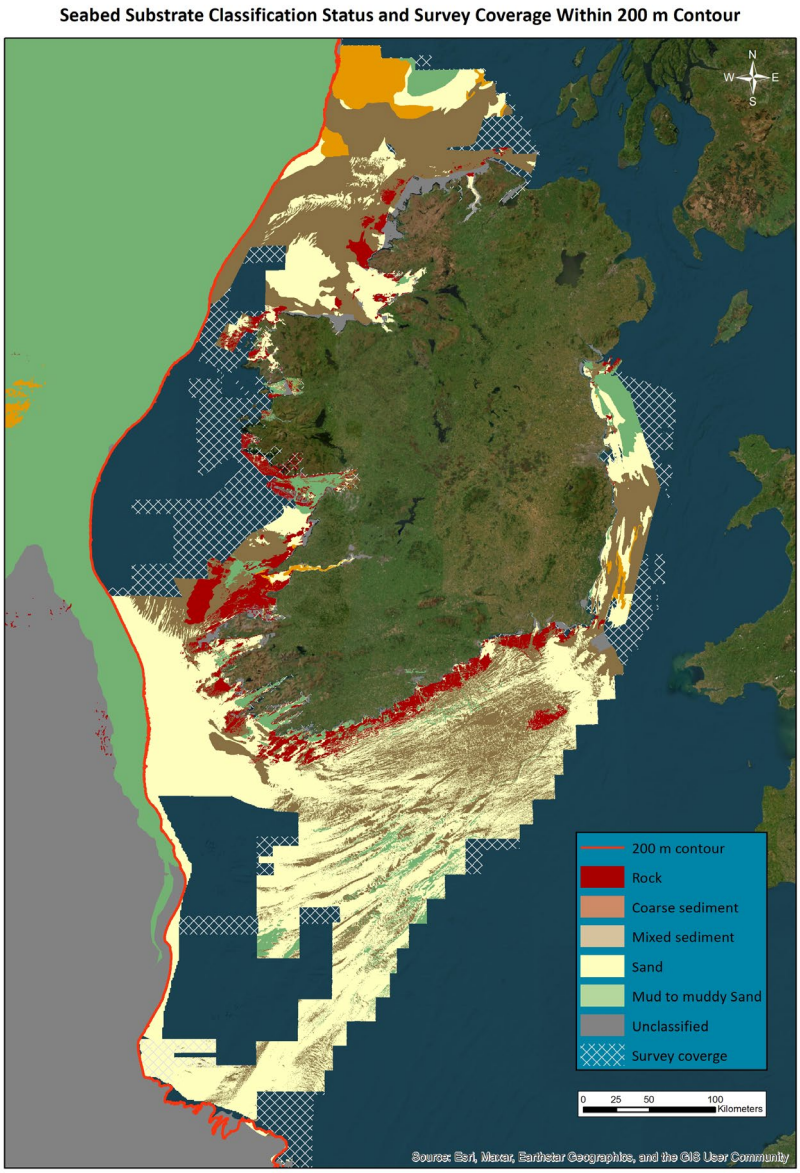


Figure 7. Extent of INFOMAR seabed classification status end 2024.

INFOMAR aims to produce charts for the following data type: bathymetry, backscatter, shaded relief at three separate scales (1:50k, 1:100k and overview scale) and seabed sediment classification maps. Other charts and map types are also created as required.

Bathymetric charts are designed to present accurate, measurable description and visual presentation of the submerged terrain. In some way, charting can be considered the last step in a long chain of events that can take up to several years. Charts of a specific area are only created when enough good quality and reliable data for such area have been collected. When new data become available, the charts are redone and a new revision tag is assigned (R1, R2 etc).

Charting

All charts are currently published to the web in pdf format. Grids and associated data are also available through web map services.

Charts available for download via the Chart Web Mapping Viewer include:

INFOMAR Bay charts: Bathymetry, Backscatter, Shaded Relief at three separate scales (1:50k, 1:100k and overview scale at 1:120k).

Coastal 100k scale series: Bathymetry, Backscatter, Shaded Relief at 1:100k scale

Sediment classification chart series: Charts created per bay based on sediment classification.

Various maps are available via the Map Web Mapping Viewer:

Google Earth series: various *.kmz shaded relief images for Google Earth

Grey Scale chart series: Shaded Relief maps of each bay

Real Map of Ireland – Seabed data from inside the Irish Continental Shelf boundary in usual Orange to Blue colour scale, and areas outside of the boundary as background blue. New format has been reused for several publications.

Blue scale maps are available via a dedicated Website Image Gallery.

Chart products - delivery status

INFOMAR's current online chart catalogue consists of:

- ✓ 50k charts: 132 charts online (100% of the 2016 target).
- ✓ 100k charts (Phase 1): 56 charts online (100% of the 2016 target).
- ✓ Sediment classification chart series (Phase 1): 20 of 26 bays were reproduced based on recent sediment classification and 1 new chart produced.
- ✓ 100k Coastal series (Phase 2): 28 charts online (30% of the 2026 target).
- ✓ 120k charts: 4 overview charts have been produced.
- ✓ Greyscale charts: 26 charts have been produced.

Remaining INFOMAR charts will be completed when outstanding inshore multibeam data and adequate ground-truthing information is made available.

Products	Currently Online	Outstanding charts	Target	% of completion
50k scale (Phase 1)	132	0	132	100%
100k scale (Phase 1)	56	0	56	100%
100k scale coastal (Phase 2)	28	64	92	30%
120k overview scale (Phase1)	4	0	4	100%
Grey scale charts	26	0	26	100%
Sediment classification charts	21	5	26	81%

Table 8 INFOMAR Chart Production status

Value Added maps and charts.

In Q2 2024 INFOMAR launched a new weekly campaign released via social media and hosted on the website over the course of several months. This features bespoke shipwreck infographic products, each showcasing a different shipwreck from around the coast of Ireland. These infographics provide details about each vessel's sinking, their locations, and include high-resolution multibeam echosounder data imagery of the wrecks.

The new infographic series aims to bring Ireland's maritime history to life, making it both accessible and engaging for the public. Each infographic displays key information and the unique stories of these wrecks and present a visual representation of where they lie on the seabed. The high-resolution sonar imagery highlights the advanced mapping techniques used to study these underwater sites. This initiative not only showcases Ireland's rich maritime heritage but also underscores the importance of preserving these underwater cultural sites.

The Gallery can be found at https://www.infomar.ie/galleries/images/node/141 and examples of Shipwreck infographics released so far can be seen in figure 8.

The remaining wrecks in the series are as follows:

12. City of London / 13. SS Aud / 14. Justica / 15. HMS Guide Me II / 16. SS Folia / 17. SS Polwell / 18. SS Candidate / 19. SV Invercauld / 20. Bardini Reefer

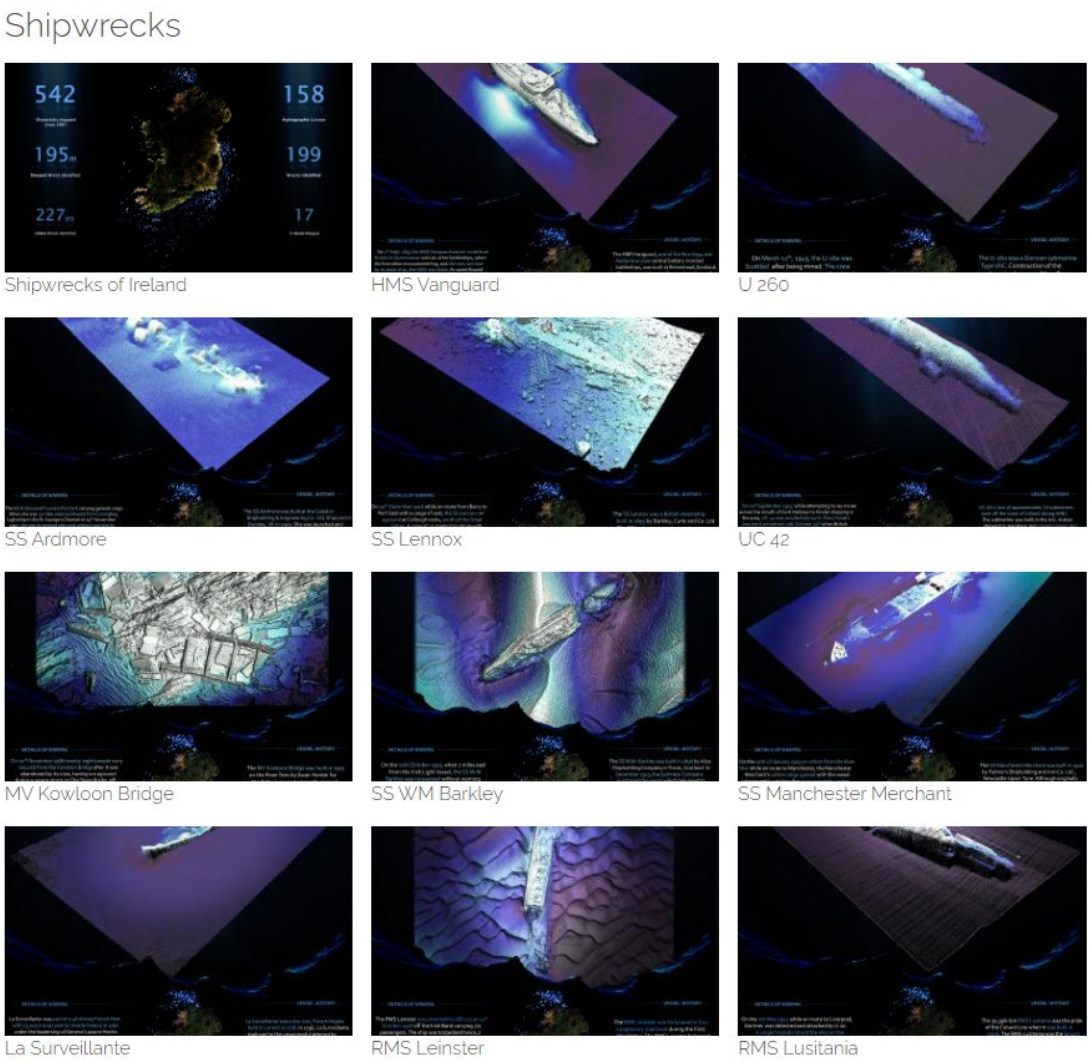


Figure 8.. Example of Shipwreck infographic

2024 Routine Data Exchange & Integration Services

In 2024 INFOMAR data requests were serviced across many sectors including fisheries, aquaculture, engineering, oceanographic, marine planning, education, research, geoscience, and offshore renewable sectors. The following tables summaries key metadata of all the data requests that have been services.

MI Data Requests

Date Requested	Organisation Type	User Type	Data Type Requested	Discipline / Sector
15/01/2024	Professional, Scientific and Technical Activities	Researcher	Bathymetry: Depth contours along coast of Ireland	Research
15/01/2024	Renewable Energy	Senior GIS Analyst	Bathymetry & backscatter (2m, 5m & 10m resolution) TC023-02	Renewable Energy
17/01/2024	Education Universities/Colleges	MSc Researcher	Multibeam Echosounder Raw data & Magnetometer - CV13_01	ORE
13/02/2024	Renewable Energy	MSc Researcher	Bathymetry - RV Lough Beltra data	ORE
20/02/2024	Education Universities/Colleges	MSc Researcher	Magnetometer data - CV8_02	ORE
13/02/2024	Education Universities/Colleges	MSc Researcher	Survey area data for 2024	ORE
23/01/2024	Education Universities/Colleges	Researcher	Bathymetry within CROCO model extent - West coast	Research
09/02/2024	Personal Use	Fisherman	Keary22_01 & Keary22_02	Fishing
09/02/2024	Professional, Scientific and Technical Activities	Researcher	SeaRover point data	Conservation
15/02/2024	Education Universities/Colleges	Researcher	Bathymetry data KRY 2023 – transit data	Research Heritage
23/02/2024	Personal Use	Researcher	Bathymetry GEO20_01	Research Heritage
23/02/2024	Media	Jounalist	Map of Bathymetric coverage and gaps	Media
04/03/2024	Education Universities/Colleges	MSc Researcher	Raw Multibeam Data - (CV21_01) (CV16_02)	ORE
05/03/2024	Education Universities/Colleges	MSc Researcher	PSA – Sediment Samples	ORE

06/03/2024	Professional, Scientific and Technical Activities	Researcher	Backscatter amplitude values for scallop grounds in the southeast	Research
07/03/2024	Education Universities/Colleges	MSc Researcher	PSA (Celtic Sea and Arklow Bank)	ORE
15/03/2024	Education Universities/Colleges	MSc Researcher	MBES data (INSS Zone 3)	ORE
21/03/2024	Education Universities/Colleges	MSc Researcher	Sound velocity profiles of the water column	Scientific Research
20/03/2024	Education Universities/Colleges	MSc Researcher	MBES data (CV16_01)	ORE
25/03/2024	Education Universities/Colleges	MSc Researcher	Sub-bottom Segy-y data (CV10_02; CV16_05; CV13_01; CV06_01)	ORE
20/03/2024	Education Universities/College	MSc Researcher	Multibeam Bathymetry and Backcatter	Scientific Research
09/04/2023	Education Universities/College	MSc Researcher	MBES data	Scientific Research
10/04/2024	Education Universities/College	MSc Researcher	Deep-Water Seabed by Boris Dorschel.	Scientific Research
03/05/2024	Education Universities/College	MSc Researcher	MBES data	Scientific Research
15/05/2024	Education Universities/College	MSc Researcher	Seabed Classification	EU Reporting
12/06/2024	Renewable Energy	Geophysical analyst	ORE geophysics	ORE
19/06/2024	Education Universities/College	MSc Researcher	Bathymetry and Backscatter	ORE
25/06/2024	Education Universities/College	MSc Researcher	Magnetometry	ORE
12/07/2024	Education Universities/College	MSc Researcher	Bathymetry - Celtic Sea	Scientific Research
19/07/2024	Education Universities/College	MSc Researcher	Seg-y data	Scientific Research
06/08/2024	Education Universities/College	MSc Researcher	Water Column	Scientific Research
06/08/2024	Education Universities/College	MSc Researcher	Seabed Classification	Scientific Research

02/12/2024	Education Universities/College	MSc Researcher	Raw MBES	ORE
02/12/2024	Education Universities/College	MSc Researcher	PSA sediment samples between 2022-24	ORE
02/12/2024	Education Universities/College	MSc Researcher	Raw Magnetometry	ORE

Table 9 Summary of data requests received and completed by the MI

GSI Data Requests

Date Requested	Organisation Type	User Type	Data Type Requested	Discipline / Sector
20/03/2024	Education Universities/Colleges	MSc Researcher	Multibeam bathymetry and backscatter datasets - CE23013 (AMETS test site)	ORE
09/04/2024	Education Universities/Colleges	MSc Researcher	Raw Multibeam Data	ORE
10/04/2024	Education Universities/Colleges	MSc Researcher	Raw Multibeam Data (CV18_02, CV16_01, CV17_01) & INSS Zone 3 Survey Report)	ORE
13/05/204	Education Universities/Colleges	Marine Archaeologist	SS Gracia Shipwreck	ORE
23/05/2024	Education Universities/Colleges	MSc Researcher	Raw Multibeam (CE04_03)	ORE
10/04/2024	Education Universities/Colleges	MSc Researcher	Spatial vector for geomorphology features	EU Reporting
04/06/2024	Professional, Scientific and Technical Activities	Researcher	Bathymetry Data for Galway Bay	Scientific Research
14/06/2024	Education Universities/Colleges	Researcher	Backscatter and Magnetometer - INSS Zone3 survey 2000	Research
25/06/2024	Other	Personal Use	Magnetometer	Scientific Research
19/06/2024	Education Universities/College	MSc Researcher	Magnetometer and Bathymetry	ORE
20/06/2024	Education Universities/Colleges	MSc Researcher	Magnetometer	ORE
25/06/2024	Other	Personal Use	Magnetometer	Scientific Research
12/07/2024	Education Universities/Colleges	Researcher	Raw Bathymetry Data	Scientific Research

Table 10 Summary of data requests received and completed by the GSI

Website and social media impact

ArcGIS Online - AGOL

Monthly views of this new site are monitored and shown in figure 8.

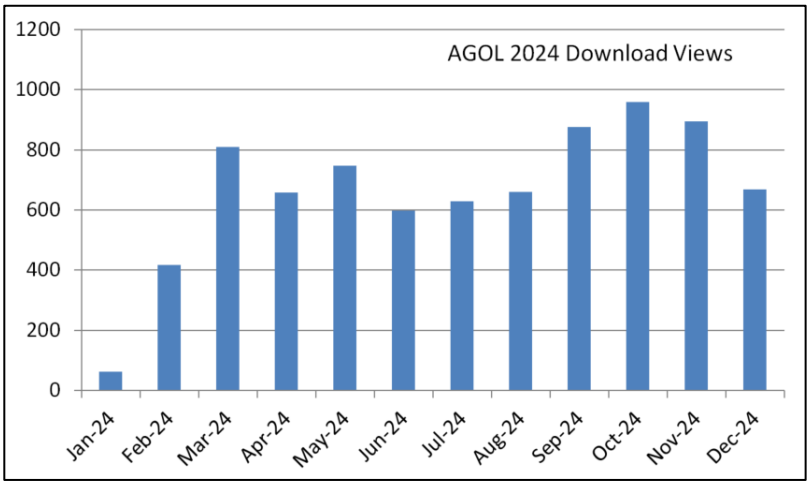
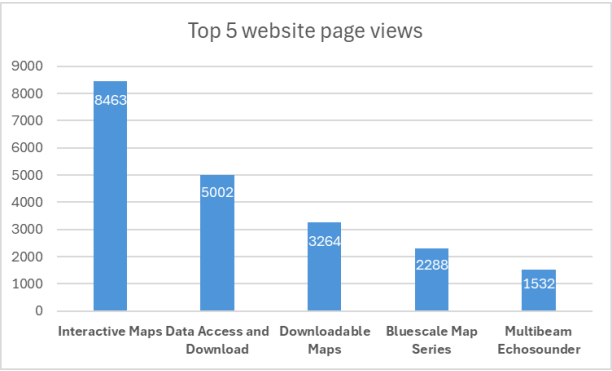


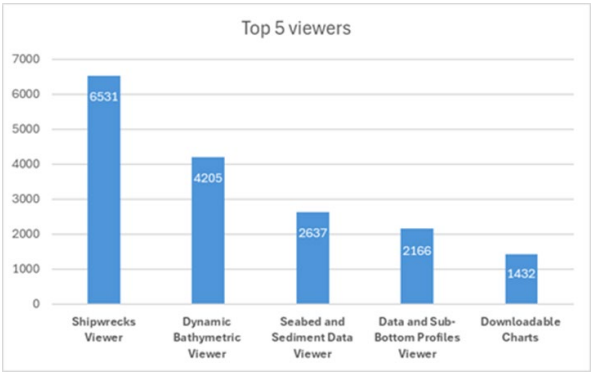
Figure 9 Monthly views of the AGOL download site in 2024

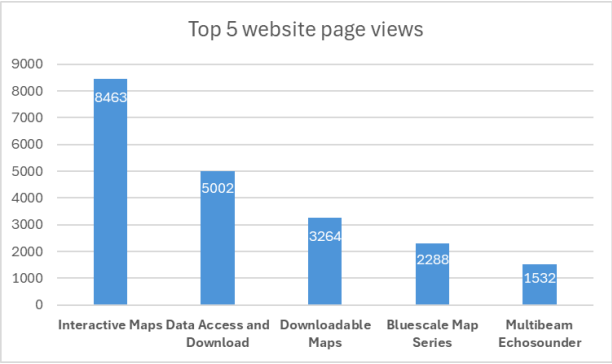
Website Statistics (January – December 2024)

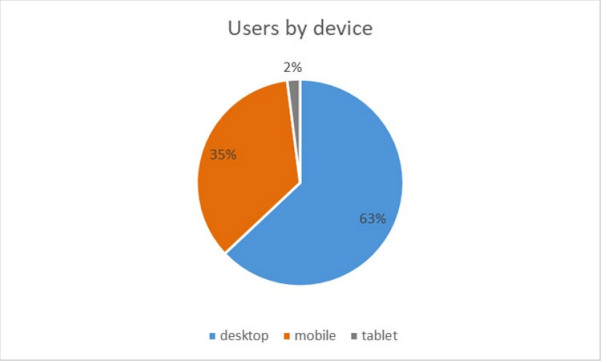
There were 86,015 visits to the INFOMAR website from January-December 2024 which included 21,462 new users, and peak monthly use in August with 15,836 visits.

After the Homepage with 31,209 views. Figures 9, 10, 11 & 12 shows the top 5 most popular pages, top 5 most popular viewers, device usage & top users by country (outside of Ireland with 11,369 users).









Social Media Statistics

The INFOMAR Social Media strategy was implemented using a similar approach to that taken in previous years, with a particular focus on Twitter and Facebook activity. This year an Instagram account was also created with the aim of promoting best quality imagery. The current approach has been effective in increasing the Reach and Following of the programme on social media, and the programme team plan to build on this progress in the future, with a particular emphasis on ensuring that INFOMAR branding is associated with such activity. Numbers of followers across our social platforms and combined totals for key metrics are shown in Table 10. It should be noted that while INFOMAR maintains a YouTube channel it was not actively managed as part of INFOMAR's joint communications committee but has been highlighted as an area for development.

Platform	New Followers	Posts	Impressions	Page Views	Total Followers
X	-122	142	Pay wall	Pay wall	5,038
Facebook	270	101	47,000	31,000	3,451
Instagram	200	125	27,000	1,000	623
YouTube	5	0	14,200	2,400	220
TOTAL	**353**	**226**	**88,200**	**34,400**	**9,332**

Table 11 General Statistics for INFOMAR Social Media Platforms in 2024

Programme 3 - Value Added Exploitation

INFOMAR Programme 3 Objective: To deliver a range of value added opportunities linked to user demands, commercial markets and external funding sources.

Introduction

INFOMAR continues to deliver a range of value-added opportunities linked to user demands, commercial markets and external funding sources (e.g. EU Framework Programme 7) while our strategic plan is evolving to meet the requirements and fulfil the objectives of national and international policy including:

Harnessing Our Ocean Wealth (HOOW)

- HOOW is Ireland's integrated marine plan. It sets out a comprehensive range of actions across multiple sectoral areas to enable our marine potential to be realised. Key objectives are to double the value of our ocean wealth to 2.4% of GDP by 2030 and increase the turnover from our ocean economy to exceed €6.4bn by 2021.

Marine Spatial Planning (MSP)

- An integrated planning and management approach is required to address competition for marine space e.g. for infrastructural development, natural and biological resource exploitation, ecosystem, biodiversity and heritage conservation, and human activities such as shipping, fishing, and tourism & leisure. As such Ireland will implement a Marine Spatial Plan through DCEE, which will be underpinned by INFOMAR data and activities.

Marine Strategy Framework Directive (MSFD)

- The MSFD aims to achieve Good Environmental Status of the EU's marine waters by 2021 and to protect the resource base upon which marine-related economic and social activities depend. Specifically, the structure, functions and processes (including physiographic, geographic, geological and climactic) of marine ecosystems are not to be impaired or lessened by human-induced environmental change, and biodiversity is to be maintained.

Ireland's Marine Atlas

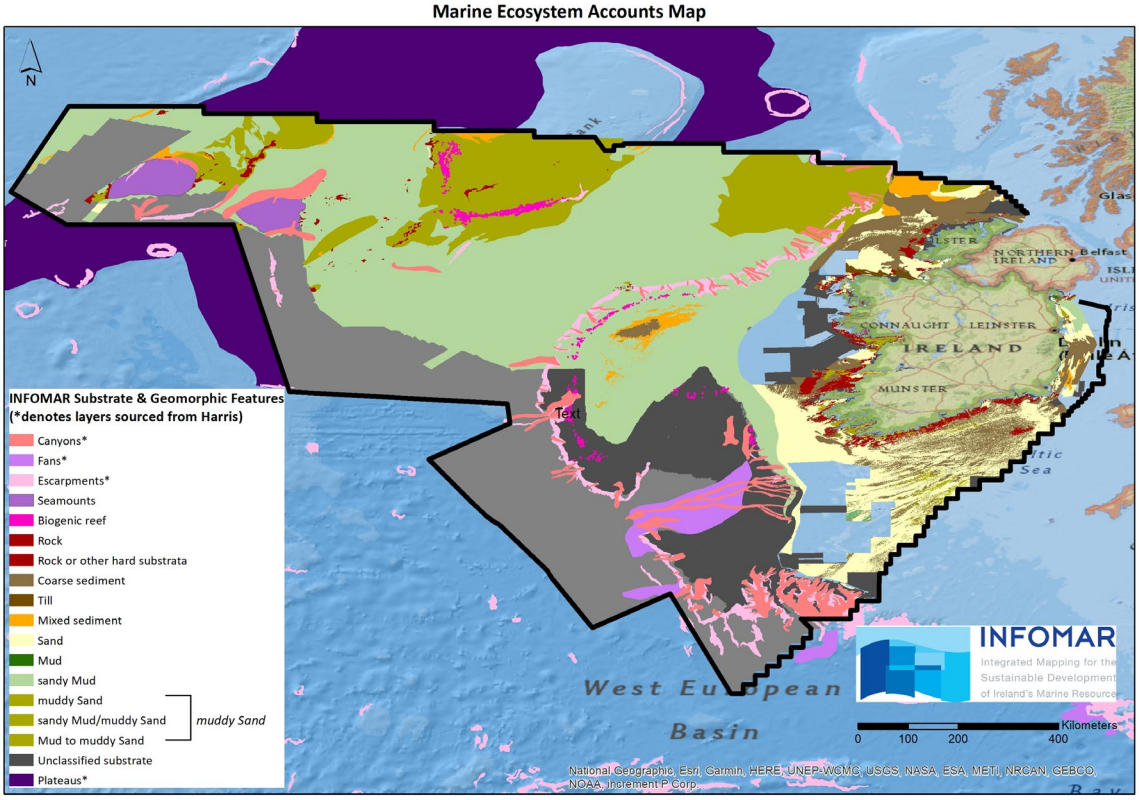
- INFOMAR continues to create and contribute critical bathymetric, habitat and geophysical data to Ireland's Marine Atlas, Digital Ocean, and through an array of INFOMAR Web mapping Viewers, GIS Services, and data portals.

Climate Action Plan

- Completing INFOMAR falls under Action MA/23/4 of the Climate Action Plan providing support and baseline information for the development of offshore renewable energy.

Ecosystem Accounts

- Accounting for ecosystems and their services in the European Union is required under EU Regulation 691/2011. INFOMAR contributes seabed classification data to facilitate annual reporting on marine habitat extent to EUROSTAT.



2024 Value Added Exploitation Progress Overview

Significant activity has been ongoing under the Value-Added Exploitation Programme.

The focus of INFOMAR effort on this sub-programme in 2024 included:

- DCEE ORE Pre-Auction Surveys (Design, Permitting, Acquisition, Delivery, Dissemination)
- EMODnet Seabed Habitats WP Delivery
- EMODnet Bathymetry data deliveries
- Mission Atlantic (H2020) Benthic Habitats WP Lead
- EMODnet Geology data harmonisation and deliveries ongoing
- Ongoing data merging and collation for EMODnet Geology WP7 Marine Minerals (GSI is WP Leader)
- Collaboration with BGS (WP leader) on GEUS Work Package 5.2 Offshore Wind Farm siting
- ICES SCICOM Participation
- ICES Working Group on Marine Habitat Mapping
- ICES Working Group on Oceanic Hydrography GIS
- Map production for ICES Report on Ocean Climate
- Hydrographic Society UK & Ireland: Ireland Branch Co-ordination

- Aquarius Project Support GIS
- Aquaculture reporting GIS
- RVOP'S GIS / Vessel
- East Greenland Expedition GIS
- West Greenland Expedition GIS /Charts

Research & Development Activity

Advanced Mapping Services participated in a wide range of research and capacity development activities resourced through non INFOMAR leveraged funding through competitive initiatives including Cullen & MI Post Doc Fellowships, H2020, EMODnet, EMFAF, and DCEE ORE projects. These research and development activities encompassed diverse fields, including the application of ML in species detection and recording, 3D visualisation of ROV data, benthic habitat mapping, and delivery of geophysical 2-D Seismic surveys on behalf of DCEEs ORE Pre-Auction Survey programme. Participation in the Offshore Wind Expert Advisory Group has allowed Advanced Mapping Services to bolster the research impact in advancing Offshore Renewable Energy (ORE) development.

Marine & Coastal Unit staff collaborated and provided steering across several GSI-funded, MI-funded and EPA-funded research projects, as well as participating in the Offshore Renewable Energy (ORE) Expert Data Group to provide advice on seabed mapping data and technologies. Research topics included mapping of Ireland's offshore bedrock lithologies using machine learning techniques to leverage INFOMAR data, enhanced coastal zone monitoring through multispectral 3D photogrammetry, machine learning and numerical modelling, using fibre optic cables for ocean noise monitoring, development of a geospatial toolbox to help understand sediment mobility and seabed disturbance.

International R&D and Collaboration

In support of developing INFOMAR's current and future role in European and international research activity, the INFOMAR team progressed the following during 2024;

- Development and delivery of an updated seabed classification map, used to directly inform the MSFD Assessment process.
- EMODnet Seabed Habitats Essential Ocean Variable (EOV) Layers (Live Hard Coral, Seagrass cover, Macroalgae canopy coral cover) updated (Phase 5: Sept 2023- Sept 2025).
- EMODnet Seabed Habitats Communications WP successfully in delivery (Phase 5: Sept 2023- Sept 2025).
- EMODnet Seabed Habitats ongoing engagement with Regional Seas Conventions / ICES to assess reporting needs and composite product development (Sept 2023- Sept 2025).
- EMODnet Seabed Habitats Use Cases / Storymaps successfully in delivery (Phase 5: Sept 2023- Sept 2025).
- Ongoing contribution of bathymetric data to EMODnet Bathymetry.
- EMODnet Geology WP3 Seabed Substrate successfully in delivery (Phase 5: September 2023 – September 2025).
- EMODnet Geology WP4 Seabed Geology successfully in delivery with updates to the Geomorphological layer (Phase 5: September 2023 – September 2025).
- EMODnet Geology WP6 Geological Events & Probabilities in delivery with updates (Phase 5: September 2023 – September 2025).
- EMODnet Bathymetry Meeting Bologna 2024 – contribution

- EMODnet Bathymetry DTM (NetCDF format) of INFOMAR grids by survey leg to EMODnet Bathymetry Common Data Index (CDI) Data Products Catalogue contribution
- EMODnet Bathymetry Regional Products contribution – Celtic Sea
- Data deliveries and consultancy provided to GEUS Work Package 5.2 Offshore Wind Farm Siting.
- Participating in IHO development of an updated Manual for Hydrography (with particular responsibility for updating the chapter on seabed classification).
- Working with the IHO to update nternational S-44 hydrographic standards.
- Mission Atlantic WP sucessfully in delivery.
- Participation on ICES SCICOM (Ireland delegate).
- Ongoing participation in EMSAGG committee (European Marine Sand & Gravel Group).
- Participation and contribution to ICES Working Group For Marine Habitat Mapping.
- Contribution to the review and final delivery of ICES SCICOM Science Plan.
- Participation at UN Ocean Decade Conference (As EMODnet Seabed Habitats Representative).
- Participation in AZTI Workshop on delivery of science to policy.
- GEOHAB 2024 – Poster presentation of EMODnet Seabed Habitats Outputs.
- GEOHAB 2024 – Oral presentations: The NOMANS_TIF map: Ireland's first complete shallow seabed geomorphology map.
- Co-ordination and delivery of the highly successful Remote Hydrography 2024 Hydrographic Conference in the Print Works (Dublin Castle).
- Seismic and hydrographic survey Industry engagement at Oceanology International Expo.
- Engagement with Barbados Coastal Marine Unit / Government Delegation re: EEZ Mapping For Barbados.
- 2nd International Conference on Seafloor Landforms, Processes and Evolution. – Oral and poster presentations of INFOMAR and Ireland's first complete shallow seabed geomorphology map in an ORE context.
- Engagement with Finland MSP Policy Advisors Delegation re: INFOMAR and Data Provision for MSP in Ireland.
- A number of UKHO staff joined the INFOMAR inshore fleet on weekly rotation in Galway for knowledge sharing and fieldwork experience over the course of six weeks in July and August of 2024. This proved to be a valuable collaboration providing insights and advice on some survey operation protocols while giving UKHO staff a more comprehensive view of data acquisition on site.
- Support from and acknowledgement to INFOMAR and the Underwater Archaeology Unit in the publication of "Wood, Iron and Steel: Shipwreck Mapped off the Western Cape" Henderson (B.) & Graham (K.). This book documents 60 shipwrecks dating from 1698 to 2009, surveyed in 2021 as part of a project to map the seafloor off the Western Cape. The concept of the book was adapted from the INFOMAR/UAU 2021 publication "Warships, U-Boats and Liners".
- INFOMAR representative chairs GEBCO's Sub-committee for Regional Undersea Mapping and works closely with Nippon Foundation-GEBCO Seabed 2030 and the IHO's Crowdsourced Bathymetry Working Group
- INFOMAR representative attended GEBCO Guiding Committee meetings on the 4th, 7th & 8th of November in Fiji as member of the Guiding Committee
- INFOMAR representative attended workshop "Executing a GEBCO Community Vision Working Meeting" from the 11th to 13th of March
- Virtually attended GEBCO Guiding Committee intersessional meeting on the 3rd of April
- Attended Crowdsourced Bathymetry Working Group Meeting 23rd- 25th of April, at the IHO in Monaco

- Presented on INFOMAR at the Seabed2030 6th Pacific Ocean Mapping Meeting on the 5th November in Fiji.
- Contributed to "The International Bathymetric Chart of the Arctic Ocean Version 5.0", published in Nature research journal

Irish R&D and Collaboration

- Continue MI-AMS supervision of MI funded Cullen PhD in collaboration with UCC, focused on Celtic Sea acoustic data analytics to improve seabed classification and water column study workflows, groundtruth integration techniques, and product outputs and applications.
- Continue MI-AMS supervision of two MI funded Cullen PhD in collaboration with UL and SETU, focused on use of UAV and multi/hyperspectral cameras for coastal and sea monitoring.
- Start of one MI funded Cullen PhD supervised by MI-AMS in collaboration with UL, focused on developing new underwater AI algorithms for real time data analysis, mission planning and investigations.
- GSI mobilisation of the RV Tonn for loan to AFBI for mapping of Lough Neagh.
- Continued MI-AMS supervision of MI funded Post-Doc fellowship on geomorphology entitled ”Novel mapping of the shallow water INFOMAR data toward Ireland first shallow water Atlas”. Led by UCC and focussed on Geomorphological interpretation and mapping of the Irish continental shelf data.
- GSI steering of GSI-funded MSc, led by UCC entitled “An Enhanced Angular Range Analysis workflow with backscatter and magnetometry for wider industrial impact and uptake of INFOMAR data”.
- GSI steering, and collaboration with, GSI funded targeted research project, led by UCC entitled “Carraig Báite - Bedrock mapping of the offshore Irish coastal and shelf regions through standard and semi-automated techniques”
- GSI steering of EPA-funded project, led by UCC entitled “DETECT - Digital Environmental Technology for Enhanced Coastal Zone Management”.
- GSI steering of GSI-funded MSc project, led by DIAS entitled “Using DAS (Distributed Acoustic Sensing) with an Optical Fibre Cable in Galway Bay for Ocean Noise Monitoring”.
- GSI steering of GSI-funded short call project, led by UCD entitled “Sediment mobility and seabed disturbance geo-spatial toolbox development (Sed-mob-bed Tool)”.
- Awarded new Post Doc supervised by MI-AMS focused on Risk Assessment for Potentially Polluting Shipwrecks in Irish water. GSI and UAU also in technical advisory committee/supervisory role.
- ORE Industry / Policy engagement at Wind Energy Ireland Conference.
- EMFAF SeaShelf acquisition delivered in co-operation with UCC Geomorphology Survey and XYZ Ltd..
- Participation in MPA Planning Workshop at UCC with DHLGH Policy Advisors / CEFAS.
- GSI and MI collaborating with Offshore Energy divisions of the Department of Climate, Energy and the Environment on the development of the south coast offshore wind development map (DMAP). Provision of marine spatial planning shapefiles and map production. Consulting on procurement of marine data. Gap analysis.

- MI staff and GSI MCU staff and contractors attended the Submarine Landform Atlas Workshop in Dublin (June 2024) to discuss the proposed book and provide input for the general outline of the Atlas sections [*note the Atlas is currently on hold*]. Other potential contributors joined the workshop from both Ireland and abroad.
- A survey of the Skelligs in collaboration with the National Underwater Archaeology Unit was carried out this year on the RV Keary. The survey allowed use of a scanner to obtain data to join INFOMAR multibeam data and pending LIDAR data which the Discovery Programme will acquire. This dataset will then form part of UAU's developing Research Framework for the World Heritage Property (https://www.worldheritageireland.ie/heritage-property/sceilg-mhichil/). The intention then is to use the dataset as a monitoring device for climate change over time, perhaps with repeat surveys.
- MCU worked with DCEE Offshore Energy and RPS to collate and assess all commercial data holdings provided through tendering process, in support of the ORE DMAP.
- Virtual presentation "Mapping the Seabed with INFOMAR" to TY students of CBS Enniscorthy on 13th March
- Filming for BBC StoryWorks for "The Secret Sounds of the Sea" with DIAS on 17th Jan
- Presentation on "Utilising an Uncrewed Survey Vessel to Investigate Tonga's Hunga-Tonga Hunga-Ha'apai Submarine Volcanic Eruption" at Remote Hydrography Conference
- Remote CARIS support to AFBI (DH/AB) - virtual meeting on 7th March
- Attended SDG Goal 14 Garden Party at Áras an Uachtaráin on 27th June
- Delivered presentation on "Mapping the Seabed with INFOMAR" to Trinity College Physics, Geography and Geology Societies on the 10th Oct
- R.V. Mallet crew appeared on and hosted Nationwide crew.

Irish SME Support

- Following on from the INFOMAR collaboration with Doolin Ferries in 2023. Q1 2024, Doolin ferries began to design a new brochure for their 2024 summer season based on INFOMAR's blue scale maps. 45,000 of these flyers were distributed at key visitor-frequented locations such as hotels, guesthouses and attractions along the West Coast of Ireland.
- Multiple Irish SME's were involved in provision of contractual support for DCEE ORE Survey operations in the South Coast DMAP, including geophysicists, hydrographic surveyors, land surveyors, marine mammal observers, marine environmental consultants, and fisheries liaison officers.
- In addition Irish SME's were contracted to provide habitat mapping support to augment team support for EMODnet Seabed Habitats and EMFAF project activities and deliverables.

Irish Education, Training, Capacity Build

In a continued effort to develop Irish education, training and research and professional networks in INFOMAR related disciplines the following initiatives were supported during 2024:

- INFOMAR co-ordination of the Ireland branch of The Hydrographic Society UK and Ireland.
- Professional development for early and mid-career scientists via THS:UKI HPAS process.
- INFOMAR Development and delivery of Remote Sensing focused MSc modules.
- NUIM: Delivery of level 9 post-graduate module, Marine Remote Sensing – INFOMAR, as part of Maynooth University's Dept. Of Geography, Masters in Geographic Information System (GIS) and Remote Sensing. Lectures were delivered both in-person and remotely by the INFOMAR team. Subsequent Field work and demonstrations were delivered during a 2-day trip onboard the RV Tom Crean in and outside Cork harbour, in partnership with the Strategic Marine Alliance for Research & Training.
- Five bursar opportunities offered to participate to INFOMAR 2024 surveys onboard RV Tom Crean via SMART School selection programme. This enables graduate and postgraduate students to get on the job training in hydrographic surveying for seafloor mapping.
- UCD: Delivery of two modules as part of MSc Risk, Resilience and Sustainability, and MSc Geospatial Data Analysis. The modules are GEOG40990 INFOMAR Marine Geodata Science and GEOG41000 INFOMAR Marine and Survey Data. Lectures were delivered both in-person and remotely by the INFOMAR team. Subsequent Field work and demonstrations were delivered during a 2-day trip onboard the RV Tom Crean in and outside Cork harbour, in partnership with the Strategic Marine Alliance for Research & Training.
- MI provision of INFOMAR training and overview module to MI Transition Year Students.
- Public Awareness & Engagement.
- The Planning and Marine Ecosystems workshop was a 2-day interactive workshop in June 2024 which brought together planners, scientists, decision makers and other professionals involved in maritime development.

Outreach 2024

List of outreach activities attended and/or organised by the INFOMAR team

10/01/2024 - 13/01/2024	BT Young Scientist Exhibition	RDS, Dublin	Second Level Education	National
17/01/2024	Filming for BBC StoryWorks on R.V. Keary for "The Secret Sounds of the Sea" with DIAS	R.V. Keary	International Press	International
15/02/2024	NUIM TC Training	R.V. Tom Crean, Cork	Third Level Education	Online Social Media
23/02/2024 - 24/02/2024	The Skipper Expo	UL, Limerick	Fisheries	National
26/02/2024 - 28/02/2024	Remote Hydrography	Dublin Castle, Dublin	Hydrography	International
28/02/2024	TY Day Marine Institute	Marine Institute, Galway	Second Level Education	Local
11/03/2024 - 13/03/2024	Executing a GEBCO Community Vision Working Meeting	Virtual	International Collaboration	International
12/03/2024 - 14/03/2024	OI24 - Oceanology	Excel, London	Oceanographic Conference	International
13/03/2024	Virtual presentation to TY students of CBS Enniscorthy	Virtual	Second Level Education	National
13/03/2024	Virtual presentation to TY students of CBS Enniscorthy	Virtual	Second Level Education	Local
11/03/2024 - 13/03/2024	GEBCO Community Vision Working Meeting	Virtual	International Collaboration	International
18/04/2024	EMODnet Biology RSC Meeting	Constanta, Romania (hybrid)	International Collaboration	International
22/04/2024	EMODnet Bathymetry Annual Meeting	Bologna, Italy	International Collaboration	International
24/04/2024	Finland MSP Delegation	Helsinki, Finland	International Collaboration	International
02/04/2024 - 03/04/2024	Offshore Wind Conference 2024, Dublin	Clayton Hotel, Dublin	Irish Public Sector	National
02/04/2024 - 04/04/2024	EMODnet Seabed Habitats SG	Helsinki, Finland	International Collaboration	International
03/04/2024	GEBCO Guiding Committee intersessional meeting	Virtual	International Collaboration	International
09/04/2024 - 12/05/2024	UN Ocean Decade Conference	Barcelona, Spain	International Collaboration	International
23/04/2024 - 25/04/2024	IHO Crowdsourced Bathymetry Working Group Meeting	Monaco, Monaco	International Collaboration	International

25/04/2024	The Geopark Academy 2024 INFOMAR Presentation	Burren College of Art, Clare	Research	National
03/04/2024	GEBCO Guiding Committee intersessional meeting	Virtual	International Collaboration	International
23/04/2024 - 25/04/2024	Crowdsourced Bathymetry Working Group Meeting	Monaco	International Collaboration	International
29/04/2024 - 30/04/2024	Barabados Government Delegation Visit	Marine Institute, Galway	International Collaboration	International
15/05/2024	HELCOM Workshop, Online	Virtual	Intewrnational Collaboration	National
16/05/2024	HS:UK&I Ireland AGM, Online	Virtual	International Collaboration	International
06/05/2024 - 10/05/2024	GEOHAB	Arendal, Norway	International Collaboration	International
25/05/2024 - 26/05/2024	Talk at The Geopark Academy 2024	Burren College of Art. Co. Clare	International Collaboration	International
11/06/2024 - 13/06/2024	AZTI Workshop – Integration of Science and Policy	San Sebastian, Spain	International Collaboration	International
17/06/2024	European Marine Board Launch of Habitat Mapping for policy doc	Virtual	Irish Public Sector	National
17/06/2024	Marine Atlas Workshop	Virtual	Research	National
20/06/2024	Irish Planning and Marine Ecosystems Workshop	Irish Planning Institute	Irish Public Sector	National
17/06/2024	Marine Atlas Workshop	Virtual	Irish Public Sector	National
13/07/2024	UKHO Inshore fleet Staff Training	Cleggan, Galway	International Collaboration	International
09/09/2024 - 12/09/2024	ICES annual science conference.	Gateshead, UK.	International Collaboration	International
10/09/2024	Marine Institute Explorers Education Programme	Rinville	Education	National
10/09/2024 - 13/03/2024	BT Young Scientist & Technology Exhibition	RDS, Dublin	Second Level Education	National Exhibition
12/11/2024	Geoscience Ireland, Dublin	Dublin	Irish Public Sector	National
20/11/2024 - 21/11/2024	Ocean Knowledge 2030.	RDS, Dublin	International Collaboration	International
28/11/2024	INFOMAR Annual seminar	Beggars Bush, Dublin	Irish Public Sector	International
18/11/2024	Hidden in Plain Sight' documentary premier	Kerry International Film festival	Local Press	Local

	featuring INFOMAR data/ interview			
20/11/2024	Shipwreck talk at UCD subaqua Club	UCD Campus	Third Level Education	Local
03/12/2024 - 06/12/2024	EMODnet Seabed Habitats Project Management	Copenhagen, Denmark	International Collaboration	International

Table 12 INFOMAR Outreach Events 2024

Reports and Scientific Publications

INFOMAR led and related publications 2024
Arosio R., Gafeira J. De Clippele L., Wheeler A., Huvenne V., Sacchetti F, Conti L., Lim A (2024). CoMMa Toolbox: a GIS geomorphometry instrument to map and measure confined landforms. Geomorphology. https://doi.org/10.1016/j.geomorph.2024.109227.
Arosio R.,Wheeler A., Huvenne V., Sacchetti F, Lim A (2024). Hidden landscapes: the mapping of Ireland's shelf geomorphology. Mapping the seabed using high-res bathymetry data and semi-automated methods. Hydro International. Issue 1. Volume 28.
Sacchetti F., Callaway A. (2024). Irish Sea shipwrecks on the spotlight. From Maritime history to Kongsberg contest awards. Hydro International Issue 2. Volume 28.
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APPENDIX 1 Survey Coverage end 2024.

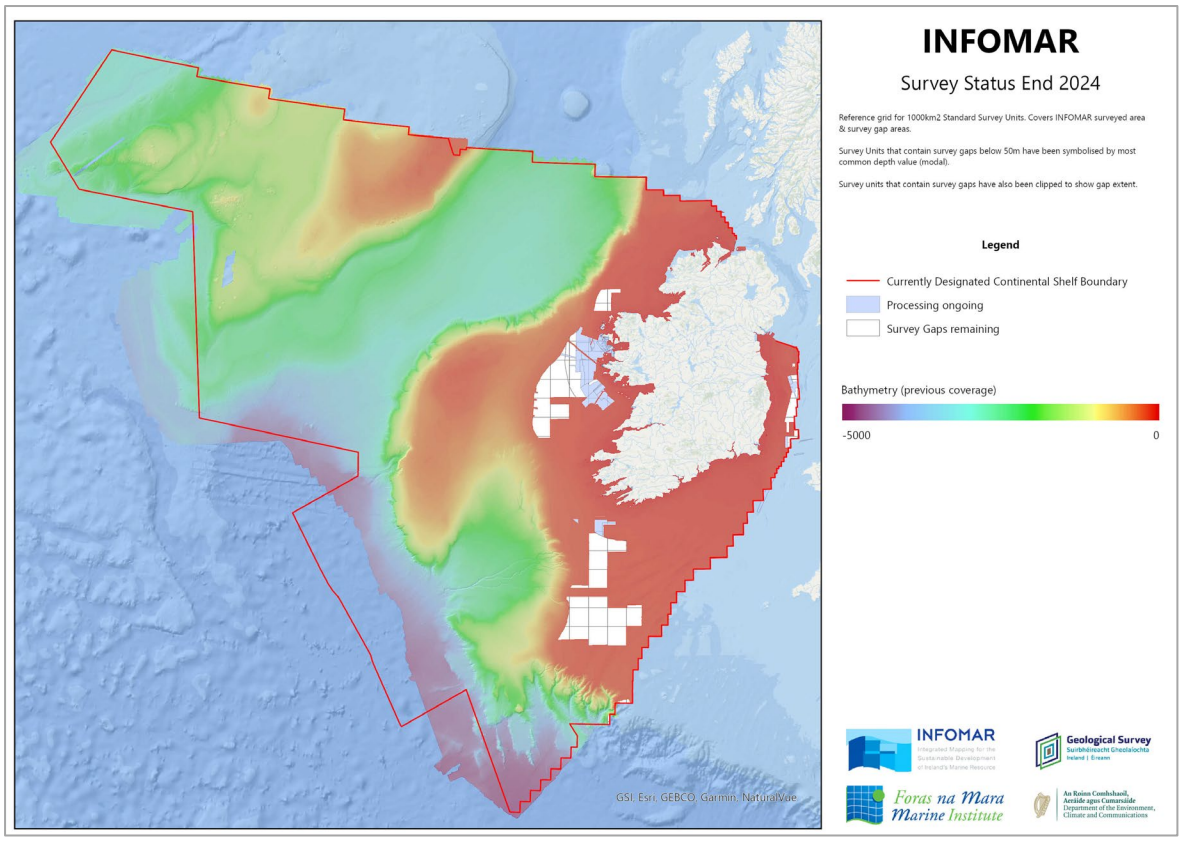
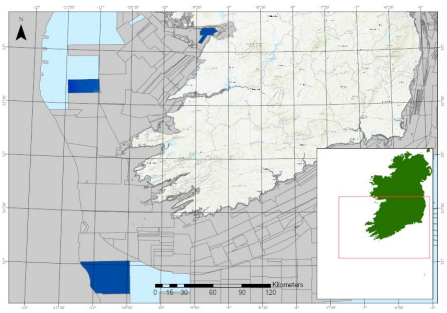
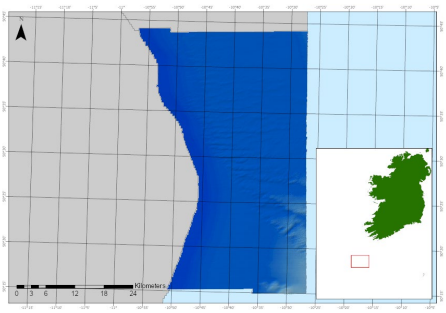


Figure 10 Survey Coverage End 2024.

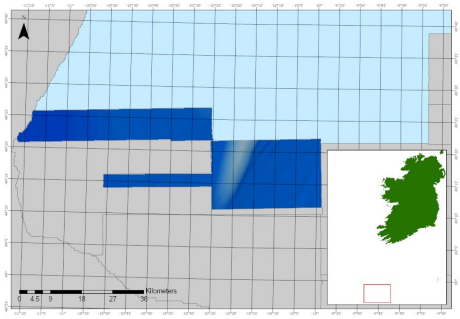
APPENDIX 2 Marine Institute Survey Leg Coverage



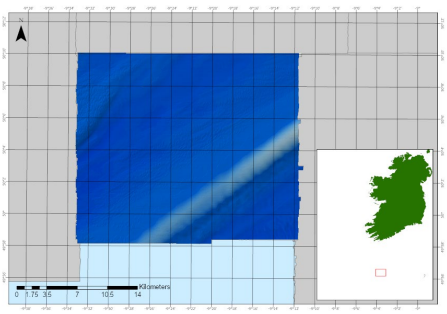
TC24_01 Celtic Sea, West Coast and Galway Bay



TC24_02 Celtic Sea



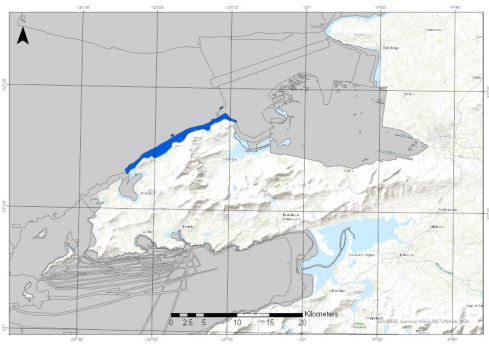
TC24_03 Celtic Sea



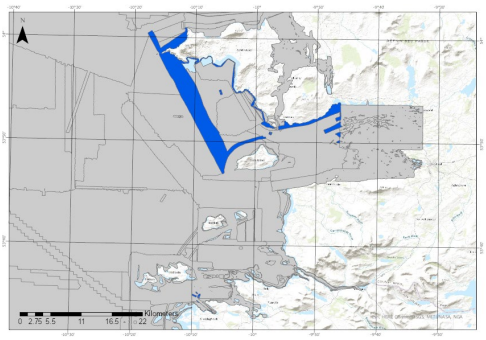
TC24_04 Celtic Sea

Figure 11 Compilation of all MI survey coverage areas.

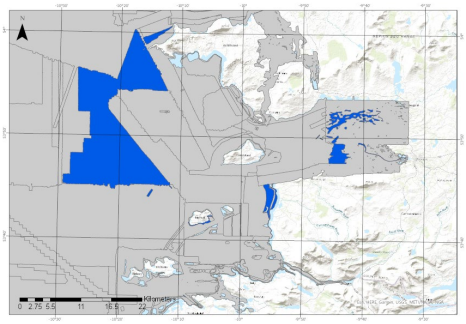
APPENDIX 3 Geological Survey Ireland Survey Leg Coverage



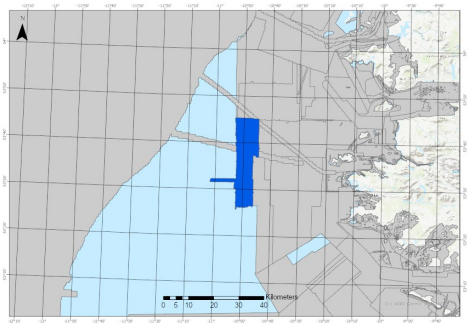
KRY24_01



LIR24_01



GAL24_02



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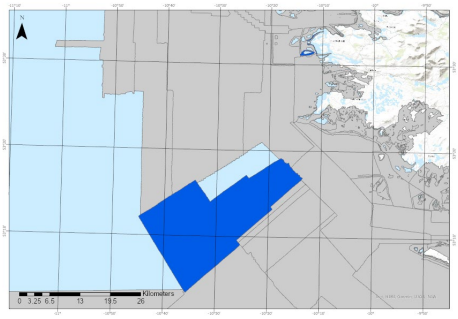

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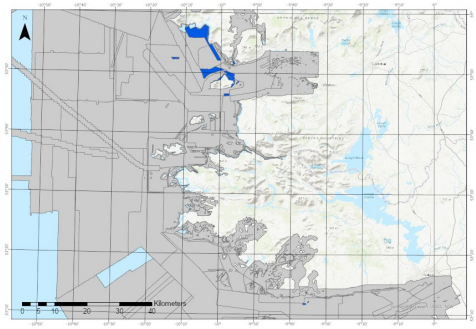

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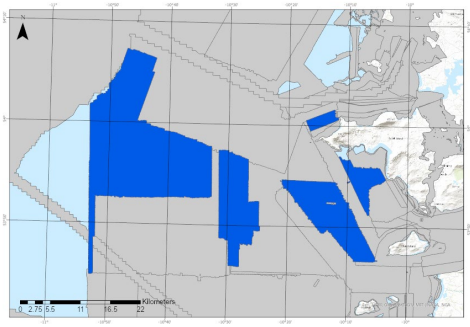

MAL24_03

Figure 12 Compilation of all GSI survey coverage areas.

APPENDIX 4 INFOMAR Wreck Notes Submitted to UKHO

MI H525 forms issued to UKHO in 2024

Survey leg	Date mapped	Date report issued	Wreck report file name	Latitude	Longitude	Comment
TC24_01	02/04/2024	02/04/2024	H525_TC24_01 Wreck_1	52°41.6401'N	11°03.1729'W	Previously Uncharted
TC24_01	02/04/2024	02/04/2024	H525_TC24_01_ Wreck_2	50°59.0064'N	11°09.9701'W	Previously Uncharted
TC24_01	02/04/2024	02/04/2024	H525_TC24_01_ Wreck_3	50°55.4550'N	10°46.6946'W	Previously Uncharted
TC24_01	02/04/2024	02/04/2024	H525_TC24_01_ Wreck_4	50°53.6874'N	10°36.2492'W	Previously Uncharted
TC24_01	02/04/2024	02/04/2024	H525_TC24_01_ Wreck_5	50°55.0601'N	10°29.2330'W	Previously Uncharted
TC24_01	03/04/2024	03/04/2024	H525_TC24_01_ Wreck_6	50°47.4564'N	10°50.3806'W	Previously Uncharted
TC24_01	04/04/2024	04/04/2024	H525_TC24_01_ Wreck_7	50°45.6079'N	10°51.2398'W	Previously Uncharted
TC24_02	10/04/2024	10/04/2024	H525_TC24_02_ Wreck_1	50°43.9822'N	10°47.3141'W	Previously Uncharted
TC24_02	10/04/2024	10/04/2024	H525_TC24_02_ Wreck_2	50°43.8329'N	10°38.9420'W	Previously Uncharted
TC24_02	21/04/2024	21/04/2024	H525_TC24_02_ Wreck_3	50°24.1334'N	10°38.0949'W	Previously Uncharted
TC24_02	24/04/2024	24/04/2024	H525_TC24_02_ Wreck_4	50°22.7700'N	10°31.0339'W	Previously Uncharted
TC24_02	22/04/2024	22/04/2024	H525_TC24_02_ Wreck_5	50°20.1186'N	10°36.1339'W	Previously Uncharted
TC24_03	18/05/2024	18/05/2024	H525_TC24_03_ Wreck_01	49°13.7656'N	10°19.6247'W	Possibly UKHO wreck number 21394
TC24_03	20/05/2024	20/05/2024	H525_TC24_03_ Wreck_02	49° 17.9364'N	010° 8.525'W	Probably SS Beaverburn IMO 160187
TC24_03	20/05/2024	20/05/2024	H525_TC24_03_ Wreck_03	49° 18.9504'N	010°03.994'W	Probably U-41 Submarine
TC24_03	23/05/2024	23/05/2024	H525_TC24_03_ Wreck_04	49° 22.0850'N	010° 41.714 'W	Probably RMS Carpathia IMO 118014
TC24_03	24/05/2024	24/05/2024	H525_TC24_03_ Wreck_05	49° 24.9066' N	010° 46.7815' W	Probably MV Isis
TC24_04	19/09/2024	19/09/2024	H525_TC24_04_ Wreck_01	50° 00.403'N	009°30.096 W	unknown wreck
TC24_04	19/09/2024	19/09/2024	H525_TC24_04_ Wreck_02	49° 58.811'N	009°29.275'W	unknown wreck
TC24_04	19/09/2024	19/09/2024	H525_TC24_04_ Wreck_03	49° 58.662'N	009°19.986'W	unknown wreck

TC24_04	19/09/2024	19/09/2024	H525_TC24_04_ Wreck_04	50° 00.574'N	009°20.528'W	unknown wreck

GSI H525 forms issued to UKHO in 2024

Year	Survey leg	Date mapped	Date report issued	Wreck report file name	Lat	Long
2024	MAL20_02	16/08/2020	16/08/2020	MAL20_02_WK1_H525	51.23365833	-10.66732
2024	LIR23_02	17/06/2023	20/03/2024	LIR23_02_WK1_H525	53.57484	-10.04004
2024	LIR23_02	21/06/2023	21/06/2023	LIR23_02_WK2_H525	53.57257	-10.00797
2024	KRY23_02	08/10/2023	08/10/2023	KRY23_02_Wk1_H525	53.67465	-9.969
2024	CV14_03		10/04/2024	CV14_03_Wreck12_H525	51.35397	-10.0318
2024	KRY21_03	18/05/2021	10/04/2024	KRY21_03_WK7_H525	51.0869	-9.94635

APPENDIX 5 INFOMAR Hydrographic Notes Submitted to UKHO in 2024

List of 301 observations within GSI H102 forms issued to UKHO in 2024

Year	Vessel	Observation	Date sent to UKHO
2024	RV Galtee	GAL22_02_001_Obs1	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs2	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs3	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs4(ShoalA)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs4(ShoalB)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs4(ShoalC)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalA)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalB)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalC)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalD)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalE)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalF)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalG)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs5(ShoalH)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalA)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalB)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalC)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalD)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalE)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalF)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalG)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalH)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs6(ShoalI)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs7(ShoalA)	2024-01-08
2024	RV Galtee	GAL22_02_001_Obs8(ShoalA)	2024-01-08
2024	RV Lir	LIR23_02_H102_001	2024-01-31
2024	RV Lir	LIR23_02_H102_002_Obs1	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs2	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs3	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs4	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs5	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs6	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs7	2024-03-20
2024	RV Lir	LIR23_02_H102_002_Obs8	2024-03-20
2024	RV Lir	LIR23_02_H102_002	2024-03-20
2024	RV Mallet	MAL20_02_WK2_H525	2024-03-20
2024	RV Keary	KRY23_02_001_H102	2024-03-25
2024	RV Lir	LIR23_02_H102_004	2024-03-26
2024	RV Keary	KRY23_01_001_Obs1	2024-03-29

2024	RV Keary	KRY23_01_001_Obs2	2024-03-29
2024	RV Keary	KRY23_01_001_Obs3	2024-03-29
2024	RV Celtic Voyager	H102_Wk12_CV14_03 / CV14_03_012	2024-04-10
2024	RV Keary	KRY21_03_WK7_H102	2024-04-10
2024	RV Keary	KRY21_03_WK7_H102	2024-04-10
2021	RV Lir	LIR21_04_003_Area_1_Obs_1	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_2	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_3	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_4	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_5	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_6	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_7	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_8	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_9	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_10	2024-04-15
2021	RV Lir	LIR21_04_003_Area_1_Obs_11	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_1	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_2	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_3	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_4	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_5	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_6	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_7	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_8	2024-04-15
2021	RV Lir	LIR21_04_002Area_1_Obs_9	2024-04-15
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2021	RV Lir	LIR21_04_002Area_2_Obs_2	2024-04-15
2021	RV Lir	LIR21_04_002Area_2_Obs_3	2024-04-15
2021	RV Lir	LIR21_04_002Area_2_Obs_4	2024-04-15
2021	RV Lir	LIR21_04_002Area_2_Obs_5	2024-04-15
2021	RV Lir	LIR21_04_002Area_2_Obs_6	2024-04-15
2021	RV Lir	LIR21_04_002Area_2_Obs_7	2024-04-15
2021	RV Lir	LIR21_04_002Area_2_Obs_8	2024-04-15
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2021	RV Lir	LIR21_04_002 Area_3_Obs_2_Black	2024-04-15
2021	RV Lir	LIR21_04_002Area_3_Obs_3	2024-04-15
2021	RV Lir	LIR21_04_002Area_3_Obs_4	2024-04-15
2021	RV Lir	LIR21_04_002Area_3_Obs_5	2024-04-15
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2021	RV Lir	LIR21_04_002Area_3_Obs_7	2024-04-15
2021	RV Lir	LIR21_04_002Area_3_Obs_8	2024-04-15
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2021	RV Lir	LIR21_04_002Area_4_Obs_2	2024-04-15
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2021	RV Lir	LIR21_04_002Area_4_Obs_4	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_5	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_6	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_7	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_8	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_9	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_10	2024-04-15
2021	RV Lir	LIR21_04_002Area_4_Obs_11	2024-04-15
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2021	RV Lir	LIR21_04_005_Area_1_Obs_2	2024-04-24
2021	RV Lir	LIR21_04_005_Area_1_Obs_3	2024-04-24
2021	RV Lir	LIR21_04_005_Area_1_Obs_4	2024-04-24
2021	RV Lir	LIR21_04_005_Area_1_Obs_5	2024-04-24
2021	RV Lir	LIR21_04_005_Area_1_Obs_6	2024-04-24
2021	RV Lir	LIR21_04_004_Area_1_Obs_1	2024-04-24
2021	RV Lir	LIR21_04_004_Area_1_Obs_2	2024-04-24
2021	RV Lir	LIR21_04_004_Area_1_Obs_3	2024-04-24
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2021	RV Lir	LIR21_04_008_Area_1_Obs_4	2024-04-26
2021	RV Lir	LIR21_04_008_Area_1_Obs_5	2024-04-26
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2021	RV Lir	LIR21_04_007_Area_1_Obs_2	2024-04-26
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2021	RV Lir	LIR21_04_007_Area_1_Obs_4	2024-04-26
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2021	RV Lir	LIR21_04_007_Area_1_Obs_6	2024-04-26
2021	RV Lir	LIR21_04_007_Area_1_Obs_7	2024-04-26
2021	RV Lir	LIR21_04_007_Area_1_Obs_8	2024-04-26
2021	RV Lir	LIR21_04_007_Area_1_Obs_9	2024-04-26
2021	RV Lir	LIR21_04_007_Area_1_Obs_10	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_1	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_2	2024-04-26

2021	RV Lir	LIR21_04_006_Area_1_Obs_3	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_4	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_5	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_6	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_7	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_8	2024-04-26
2021	RV Lir	LIR21_04_006_Area_1_Obs_9	2024-04-26
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2021	RV Lir	LIR21_04_009_Area_1_Obs_3	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_4	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_5	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_6	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_7	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_8	2024-04-29
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2021	RV Lir	LIR21_04_009_Area_1_Obs_13	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_14	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_15	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_16	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_17	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_18	2024-04-29
2021	RV Lir	LIR21_04_009_Area_1_Obs_19	2024-04-29
2021	RV Lir	LIR21_04_010_Area_1_Obs_1	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_2	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_3	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_4	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_5	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_6	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_7	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_8	2024-04-30
2021	RV Lir	LIR21_04_010_Area_1_Obs_9	2024-04-30
2021	RV Lir	LIR21_04_012_Area_1_Obs_1	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_2	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_3	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_4	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_5	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_6	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_7	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_8	2024-05-01

2021	RV Lir	LIR21_04_012_Area_1_Obs_9	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_10	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_11	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_12	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_13	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_14	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_15	2024-05-01
2021	RV Lir	LIR21_04_012_Area_1_Obs_16	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_1	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_2	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_3	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_4	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_5	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_6	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_7	2024-05-01
2021	RV Lir	LIR21_04_011_Area_1_Obs_8	2024-05-01
2022	RV Lir	LIR21_04_011_Area_1_Obs_9	2024-05-01
2021	RV Lir	LIR21_04_014_Area_1_Obs_1	2024-05-02
2021	RV Lir	LIR21_04_014_Area_1_Obs_2	2024-05-02
2021	RV Lir	LIR21_04_014_Area_1_Obs_3	2024-05-02
2021	RV Lir	LIR21_04_014_Area_1_Obs_4	2024-05-02
2021	RV Lir	LIR21_04_014_Area_1_Obs_5	2024-05-02
2021	RV Lir	LIR21_04_014_Area_1_Obs_6	2024-05-02
2021	RV Lir	LIR21_04_014_Area_1_Obs_7	2024-05-02
2021	RV Lir	LIR21_04_013_Area_1_Obs_1	2024-05-02
2021	RV Lir	LIR21_04_013_Area_1_Obs_2	2024-05-02
2021	RV Lir	LIR21_04_013_Area_1_Obs_3	2024-05-02
2021	RV Lir	LIR21_04_015_Area_1_Obs_1	2024-05-03
2021	RV Lir	LIR21_04_015_Area_1_Obs_2	2024-05-03
2024	R.V. LIR	LIR21_04_016_Obs_1_Shoal_1	2024-05-06
2024	R.V. LIR	LIR21_04_016_Obs_1_Shoal_2	2024-05-06
2024	R.V. LIR	LIR21_04_016_Obs_1_Shoal_3	2024-05-06
2024	R.V. LIR	LIR21_04_016_Obs_1_Shoal_4	2024-05-06
2024	R.V. LIR	LIR21_04_016_Obs_1_Shoal_5	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_1	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_2	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_3	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_4	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_5	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_6	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_7	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_8	2024-05-06
2024	R.V. LIR	LIR21_04_017_Obs_1_Shoal_9	2024-05-06

2024	R.V. LIR	LIR21_04_018_Obs_1_Shoal_1	2024-05-07
2024	R.V. LIR	LIR21_04_018_Obs_1_Shoal_2	2024-05-07
2024	R.V. LIR	LIR21_04_018_Obs_1_Shoal_3	2024-05-07
2024	R.V. LIR	LIR21_04_018_Obs_1_Shoal_4	2024-05-07
2024	R.V. LIR	LIR21_04_018_Obs_1_Shoal_5	2024-05-07
2024	R.V. LIR	LIR21_04_018_Obs_1_Shoal_6	2024-05-07
2024	R.V. LIR	LIR21_04_019_Obs_1_Shoal_1	2024-05-07
2024	R.V. LIR	LIR21_04_019_Obs_1_Shoal_2	2024-05-07
2024	R.V. LIR	LIR21_04_019_Obs_1_Shoal_3	2024-05-07
2024	R.V. LIR	LIR21_04_019_Obs_1_Shoal_4	2024-05-07
2024	R.V. LIR	LIR21_04_019_Obs_1_Shoal_5	2024-05-07
2024	R.V. LIR	LIR21_04_020_Obs_1_Shoal_1	2024-05-07
2024	R.V. LIR	LIR21_04_020_Obs_1_Shoal_2	2024-05-07
2024	R.V. LIR	LIR21_04_020_Obs_1_Shoal_3	2024-05-07
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_1	2024-05-08
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_2	2024-05-08
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_3	2024-05-08
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_4	2024-05-08
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_5	2024-05-08
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_6	2024-05-08
2024	R.V. LIR	LIR21_04_021_Obs_1_Shoal_7	2024-05-08
2024	R.V. LIR	LIR21_04_022_Obs_1_Shoal_1	2024-05-08
2024	R.V. LIR	LIR21_04_022_Obs_1_Shoal_2	2024-05-08
2024	R.V. LIR	LIR21_04_023_Obs_1_Shoal_1	2024-05-08
2024	R.V. LIR	LIR21_04_023_Obs_1_Shoal_2	2024-05-08
2024	R.V. LIR	LIR21_04_023_Obs_1_Shoal_3	2024-05-08
2024	R.V. LIR	LIR21_04_023_Obs_1_Shoal_4	2024-05-08
2024	R.V. LIR	LIR21_04_023_Obs_1_Shoal_5	2024-05-08
2024	R.V. LIR	LIR21_04_024_Obs_1_Shoal_1	2024-05-08
2024	R.V. LIR	LIR21_04_025_Obs_1_Shoal_1	2024-05-14
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_1	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_2	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_3	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_4	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_5	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_6	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_7	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_8	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_9	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_10	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_11	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_12	2024-08-15
2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_13	2024-08-15

2024	R.V. MALLET	MAL23_02_001_Obs_1_Shoal_14	2024-08-15
2024	R.V. MALLET	MAL24_03_001_Obs_1_Wreck_1	2024-08-30
2024	R.V. MALLET	MAL23_02_002_Obs_1_Shoal_1	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_2_Shoal_1	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_3_Shoal_1	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_3_Shoal_2	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_3_Shoal_3	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_3_Shoal_4	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_3_Shoal_5	2024-09-04
2024	R.V. MALLET	MAL23_02_002_Obs_3_Shoal_6	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_1	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_2	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_3	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_4	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_5	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_6	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_7	2024-09-04
2024	R.V. MALLET	MAL23_02_003_Obs_1_Shoal_8	2024-09-04
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_1	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_2	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_3	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_4	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_5	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_6	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_7	2024-09-05
2024	R.V. MALLET	MAL23_02_004_Obs_1_Shoal_8	2024-09-05
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_1	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_2	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_3	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_4	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_5	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_6	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_7	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_8	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_9	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_10	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_1_Shoal_11	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_2_Shoal_1	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_3_Shoal_1	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_3_Shoal_2	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_3_Shoal_3	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_4_Shoal_1	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_4_Shoal_2	2024-09-25

2024	R.V. Galtee	GAL23_01_001_Obs_4_Shoal_3	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_4_Shoal_4	2024-09-25
2024	R.V. Galtee	GAL23_01_001_Obs_5_Shoal_1	2024-09-25
2024	R.V. KEARY	KRY24_02_001_Obs_1_Shoal_1	2024-10-10