



INFOMAR

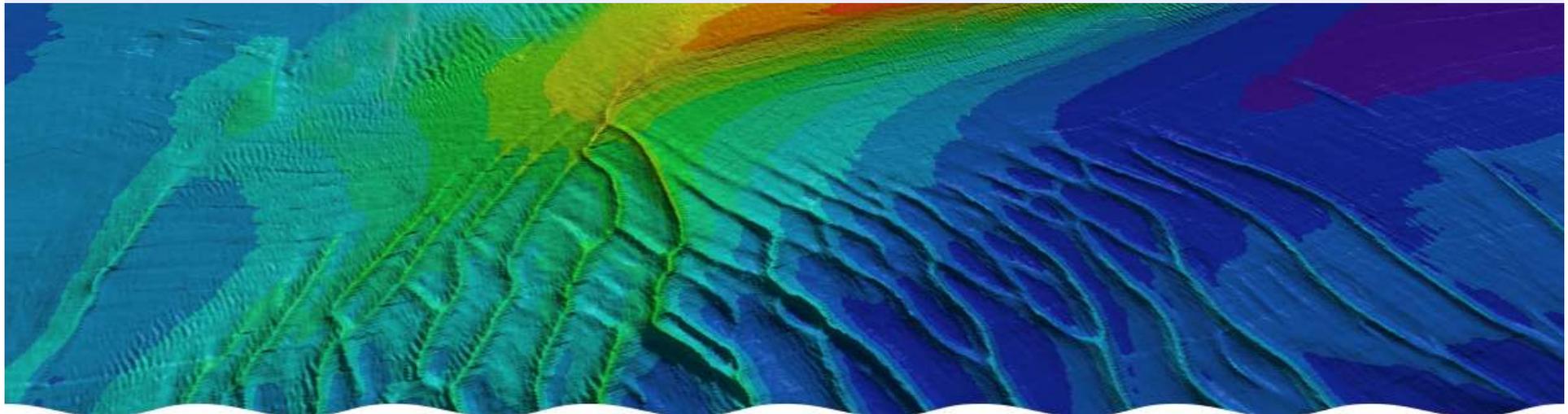
Integrated Mapping for the
Sustainable Development
of Ireland's Marine Resource

Atlantic Ireland

Ronan O'Toole (GSI)

30th October, 2019

Ireland's Seabed Mapping Programme



**Roinn Cumarsáide, Gníomhaithe
ar son na hAeráide & Comhshaoil**
Department of Communications,
Climate Action & Environment



Foras na Mara
Marine Institute



Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann



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of Ireland's Marine Resource

ABOUT INFOMAR

SEABED MAPPING 2019

WHAT WE MAKE

EDUCATIONAL IMPACT

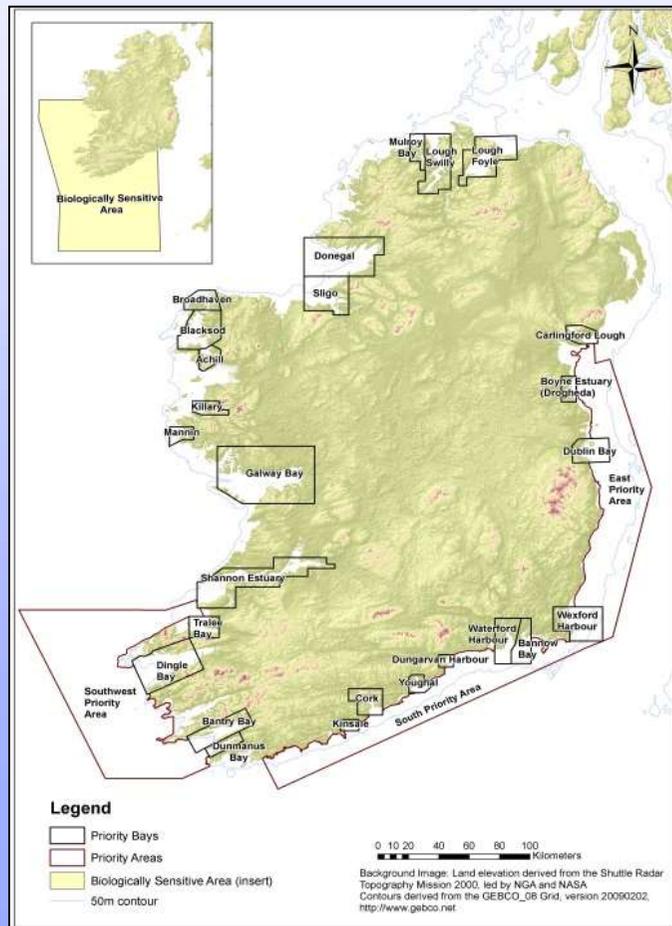


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INtegrated Mapping Survey FOr the Sustainable Development of Ireland's MARine Resource



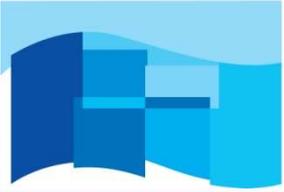
Partnership between MI & GSI.
€80m (DCCAE)
Cost Benefit 4-6 times return



PHASE 1: 2006-2016

PHASE 2: 2016 – 2026

(Remaining Areas – 125,000 KM2)



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PROGRAMME AREAS

1. Data Acquisition, Management & Interpretation

Data Acquisition Programme (UKHO / SOLAS)

Baseline Surveys for Habitats / Maritime Development

2. Data Exchange & Integration

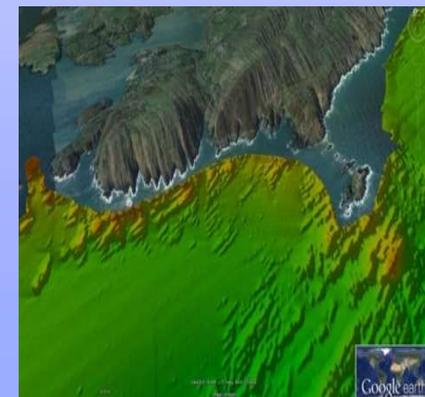
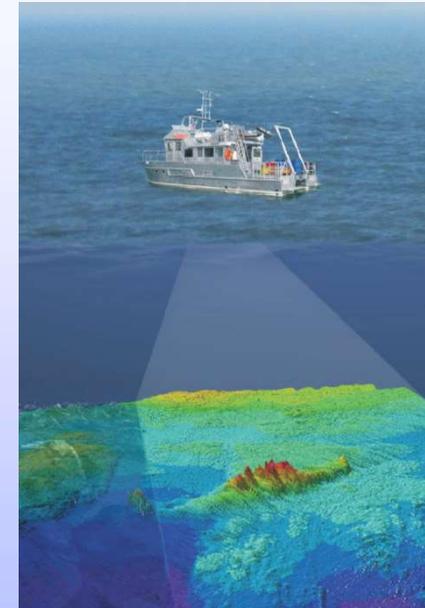
MSP /MSFD / WFD Reporting

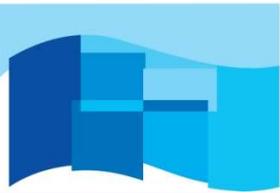
Cross Agency Support /Aquaculture / Fisheries

3. Value Added Exploitation

Product Development

National / International Partnerships /Research and Education





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OFFSHORE SURVEY



RV Celtic Explorer



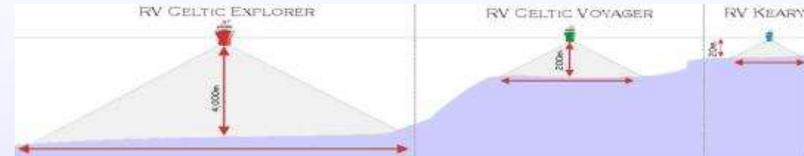
RV Celtic Voyager

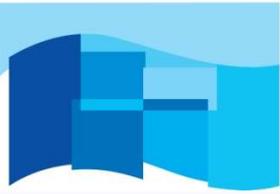


RV Mallet



RV Keary





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NEARSHORE SURVEY



RV Lir



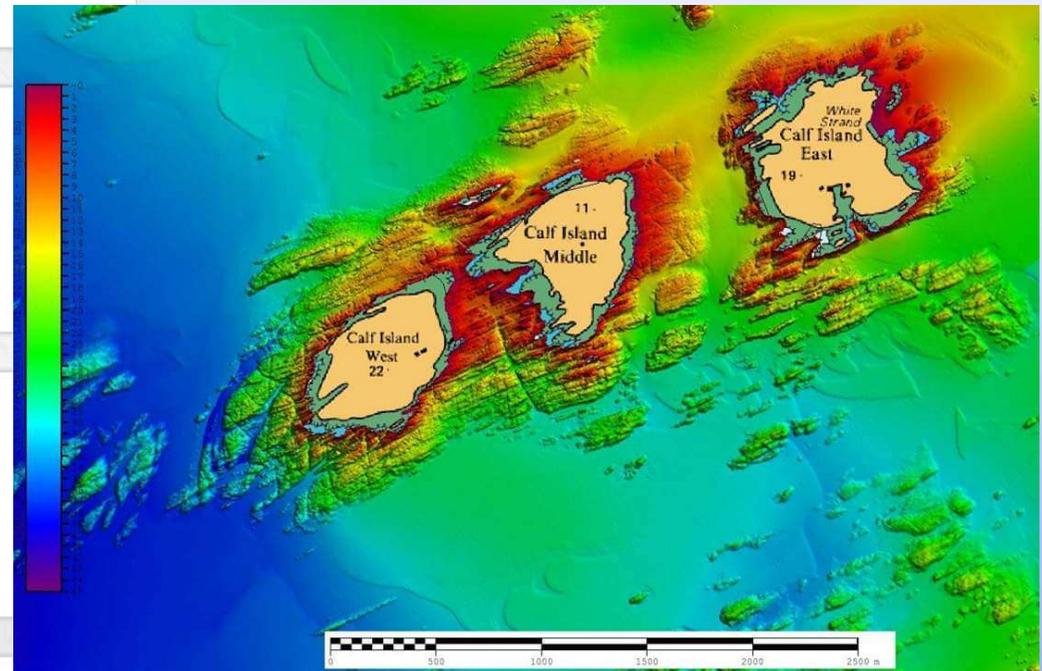
RV Geo



RV Tonn



M.V. Cosantóir Bradán





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Quality Standards



INFOMAR's Data Acquisition **underpinned** by Hydrographic Standards

International Hydrographic Organisation (IHO) Order 1a:

Vertical Accuracy (Depth Z)	+/- 0.5m (+ 5% depth)
Horizontal Accuracy (Position X & Y)	+/- 5m (+5% Depth)
Full Seafloor Search	Required
Data Density	9 Soundings/2mSQ

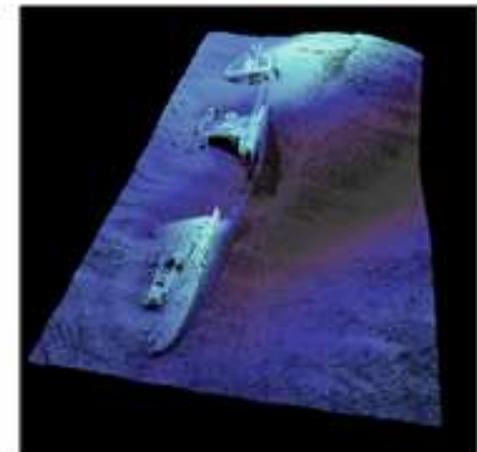
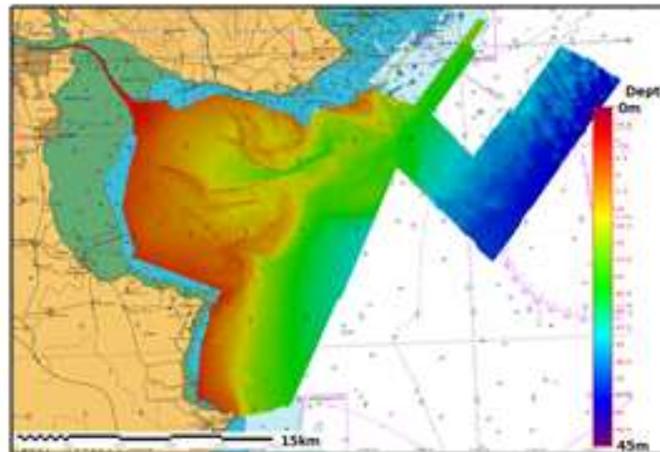
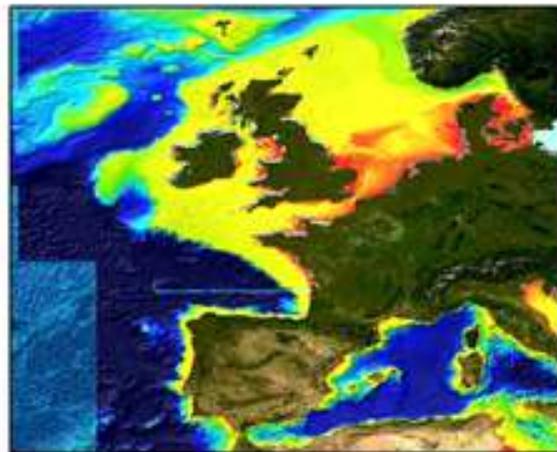
Multibeam Echosounders (MBES) become the tool of choice



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Multiple Applications



Regional Scale



Local Scale

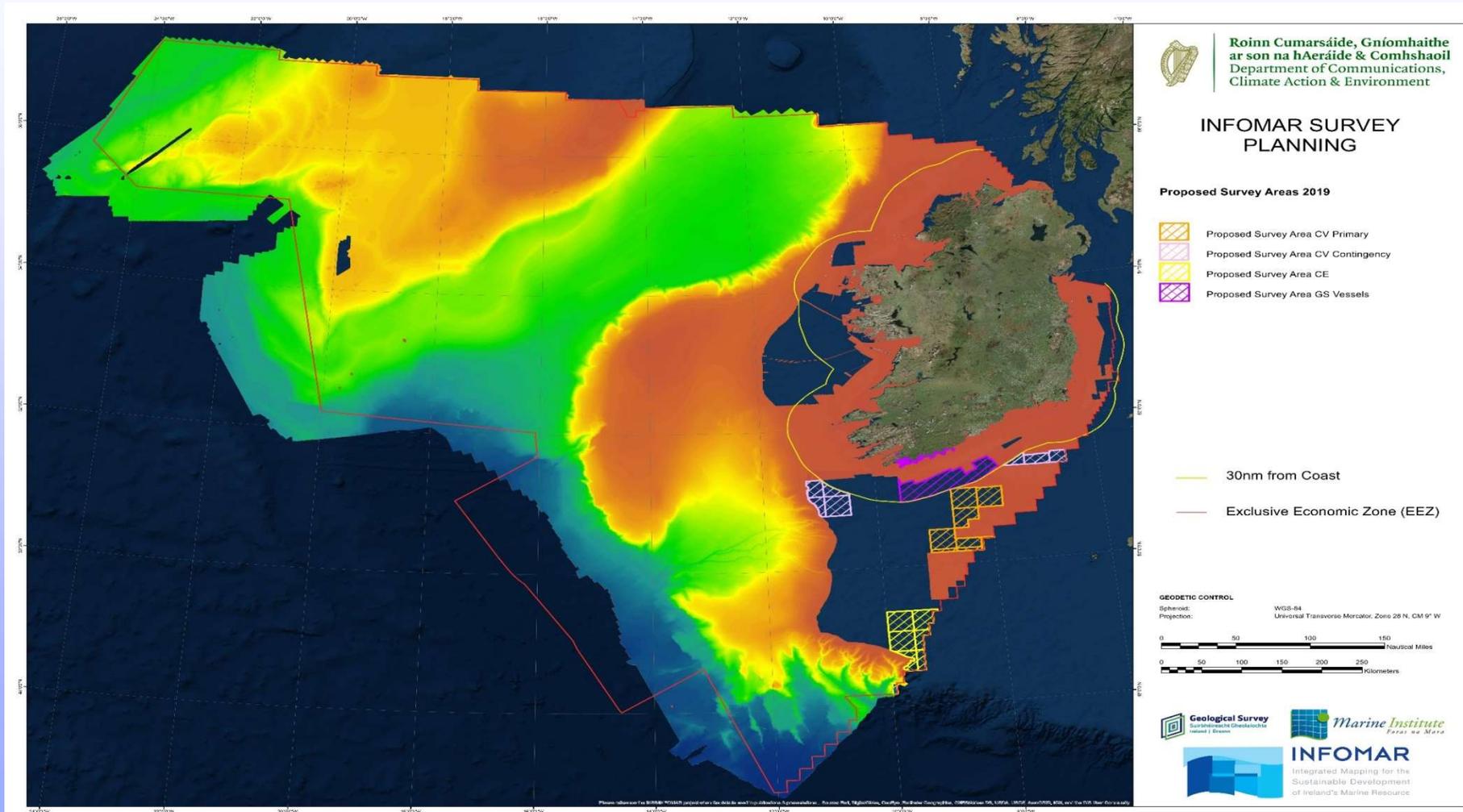
Full Seafloor Search Yields High Resolution DEMs



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AREA OF OPERATIONS





National Marine Plan (HOOW - Action 23)

OUR VISION

Our ocean wealth will be a key element of our economic recovery and sustainable growth, generating benefits for all our citizens, supported by coherent policy, planning and regulation, and managed in an integrated manner.

GOAL 1

THRIVING MARITIME ECONOMY

- Sustainable economic growth of our marine/ maritime sectors
- Increase the contribution to our national GDP
- Deliver a business-friendly yet robust governance, policy and planning framework

GOAL 2

HEALTHY ECOSYSTEMS

- Protect and conserve our rich marine biodiversity and ecosystems
- Manage our living and non-living resources in harmony with the ecosystem
- Implement and comply with environmental legislation

GOAL 3

ENGAGING WITH THE SEA

- Building on our maritime heritage, strengthen our maritime identity
- Increase our awareness of the value, opportunities and societal benefits
- Engagement and participation by all

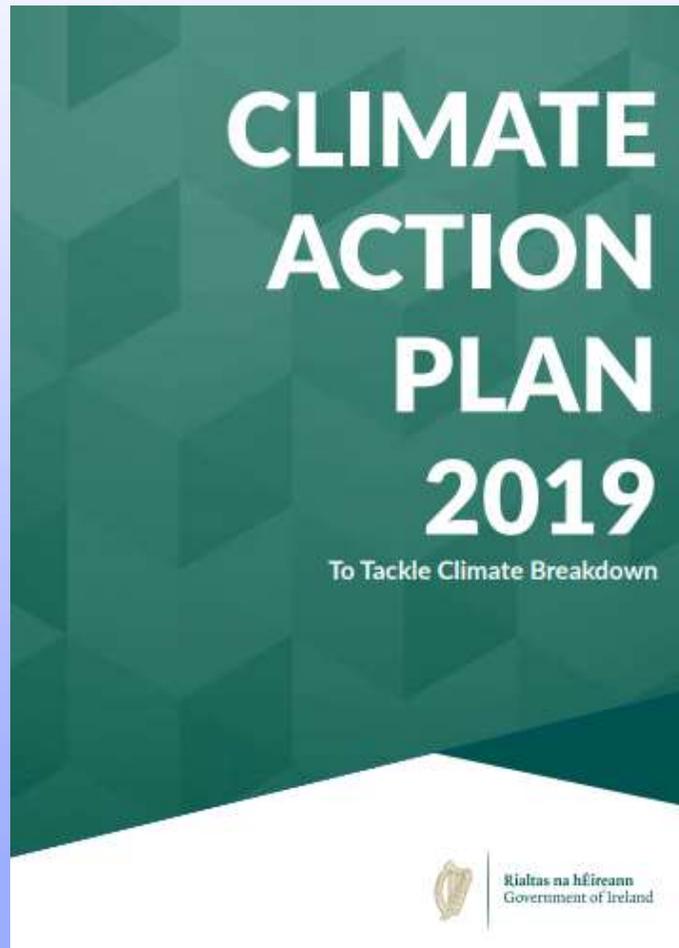


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HARNESSING OUR OCEAN WEALTH

Action 26: Complete the INFOMAR Seabed Mapping Programme





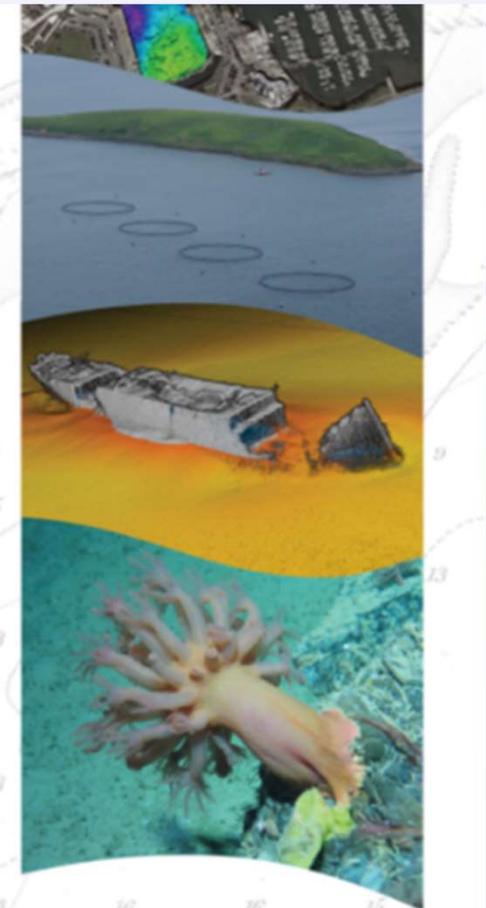
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SEABED MAPPING BENEFITS



- » Mapping our Resources
- » Guiding Shipping & Transport
- » Supporting Fisheries & Aquaculture
- » Discovering our Marine Heritage
- » Promoting Conservation & Protecting Biodiversity
- » Helping to Realise Ireland's Economic Potential





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WHAT DO MAKE

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INFOMAR Inshore Fleet

RV Geo



RV Keary

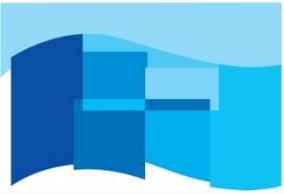


RV Mallet



RV Lir

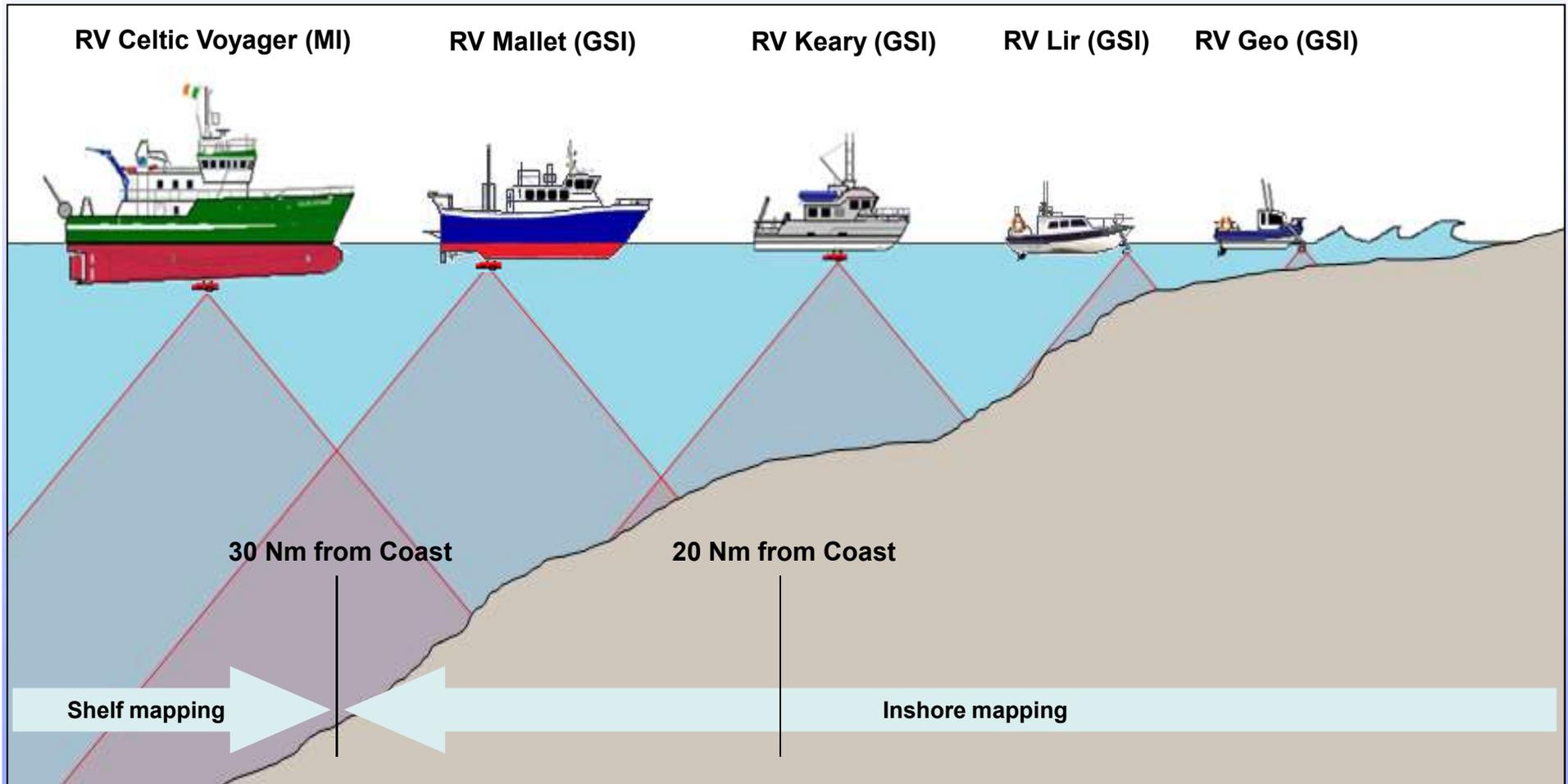


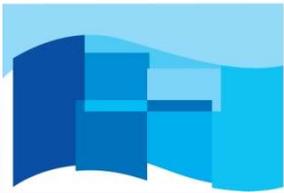


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Distribution of Vessels –GSI & MI





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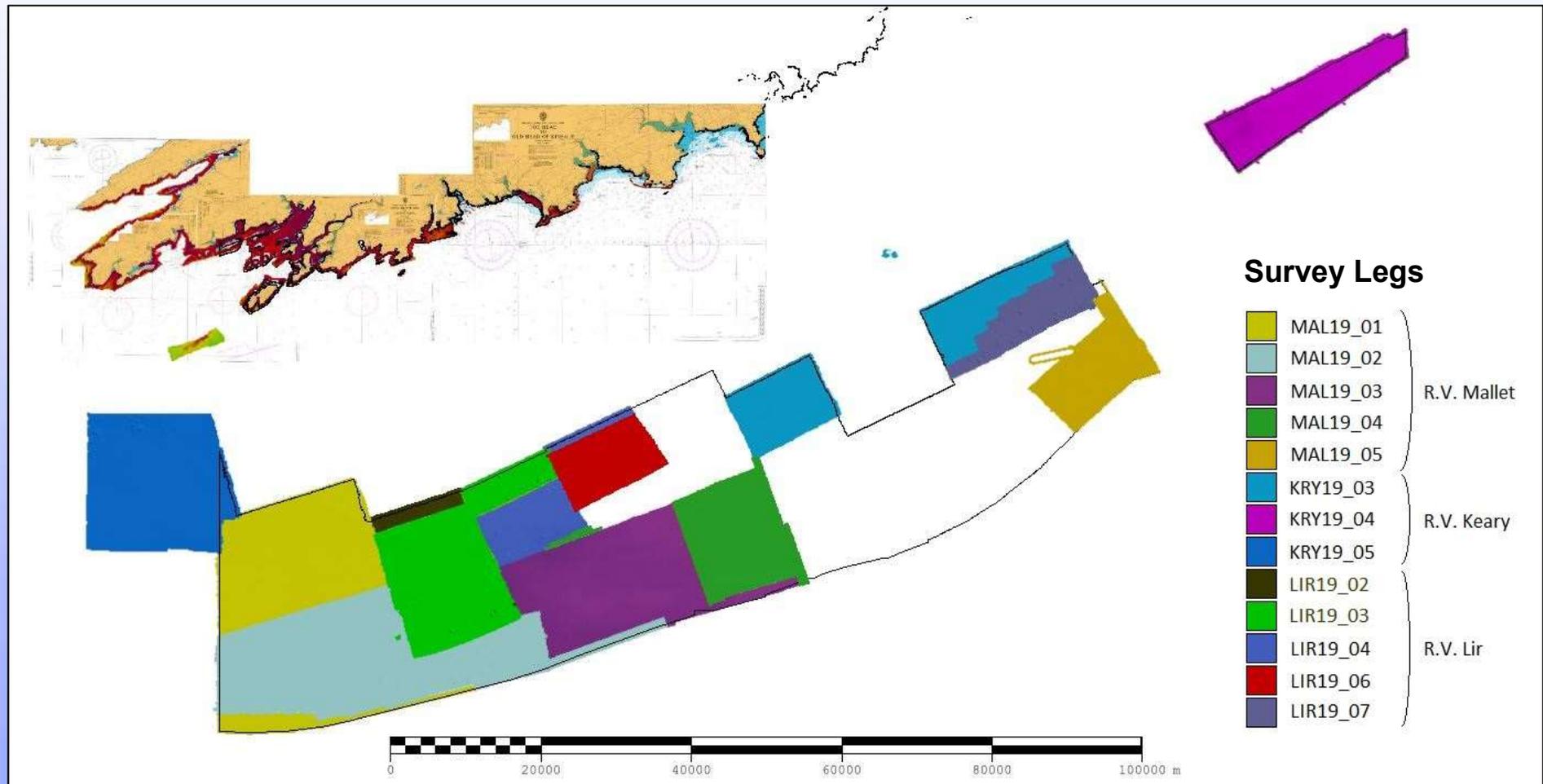
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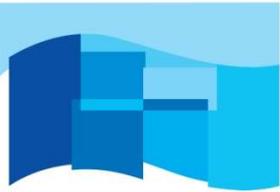
2019 Survey Coverage

Target: 3390 km²

Achieved: 3562 km²

21 Survey legs in total – coastal & offshore

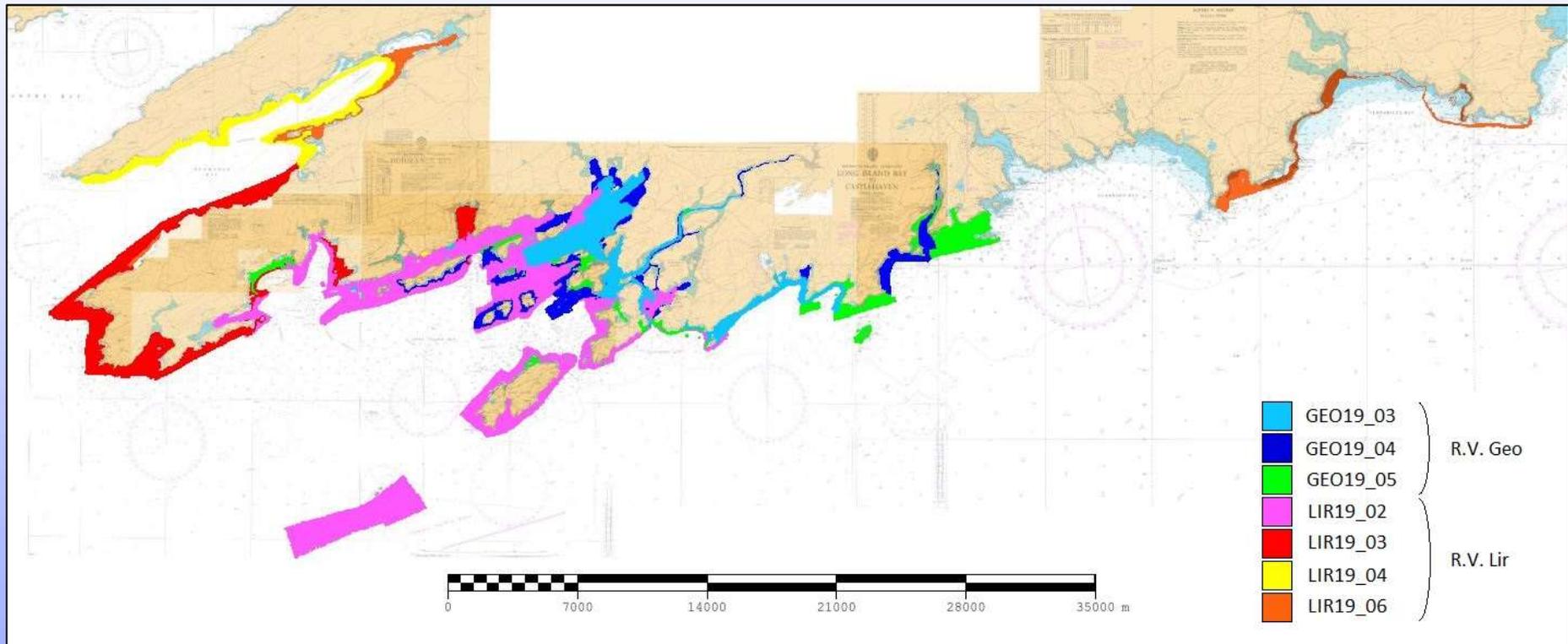




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Survey Legs Inshore

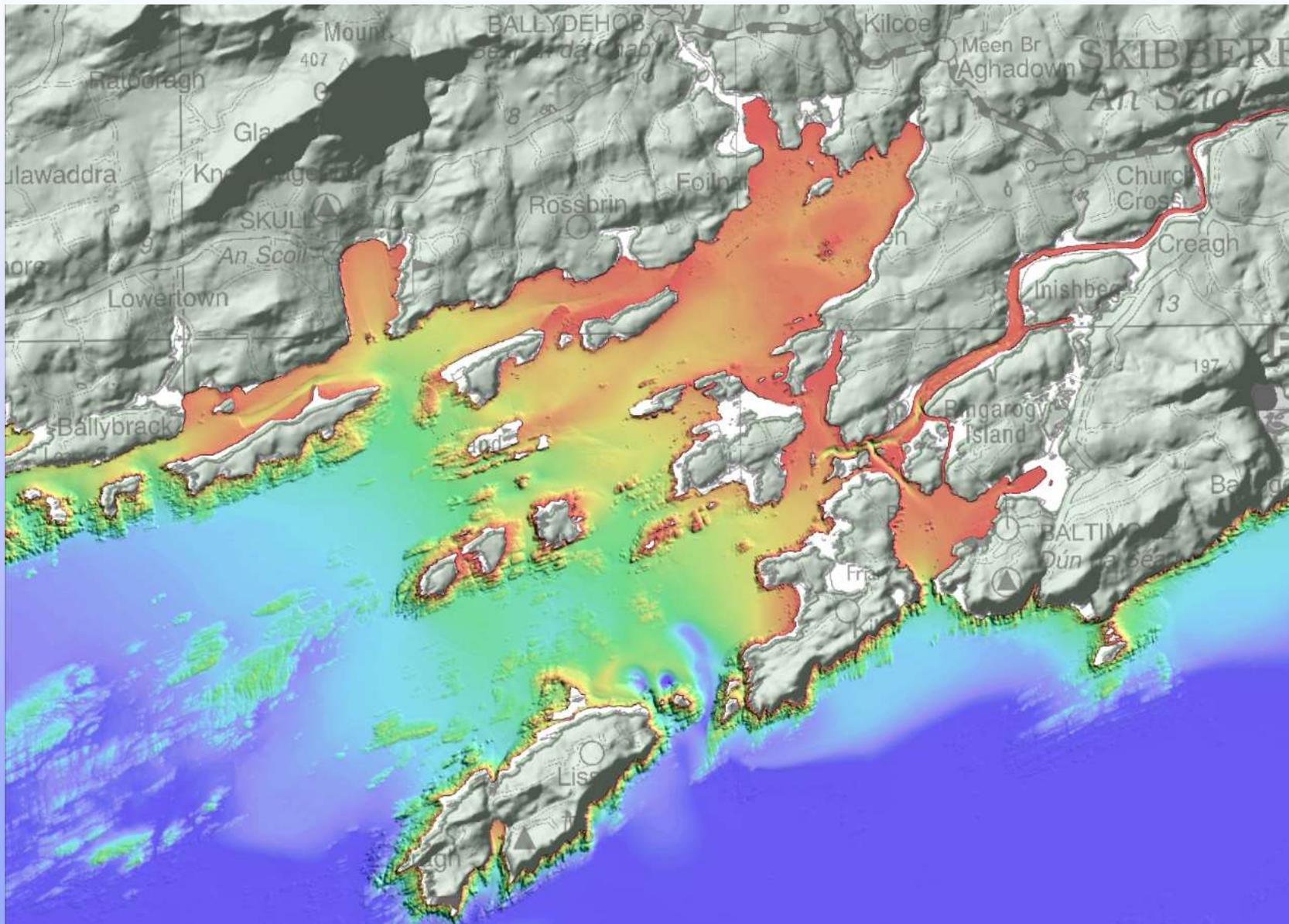




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Real Map of Baltimore

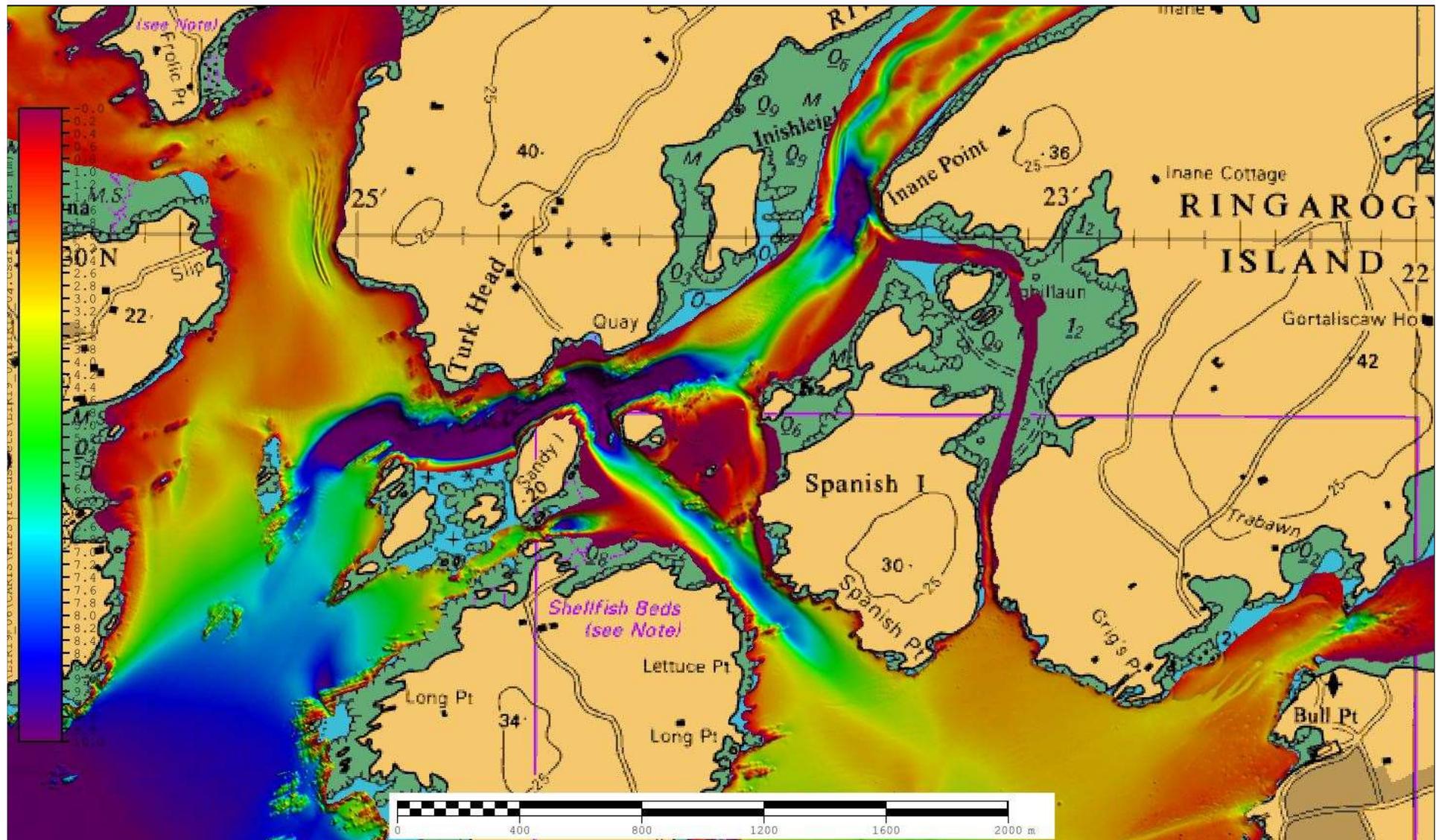


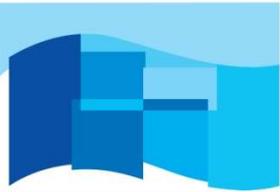


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Challenging inshore work

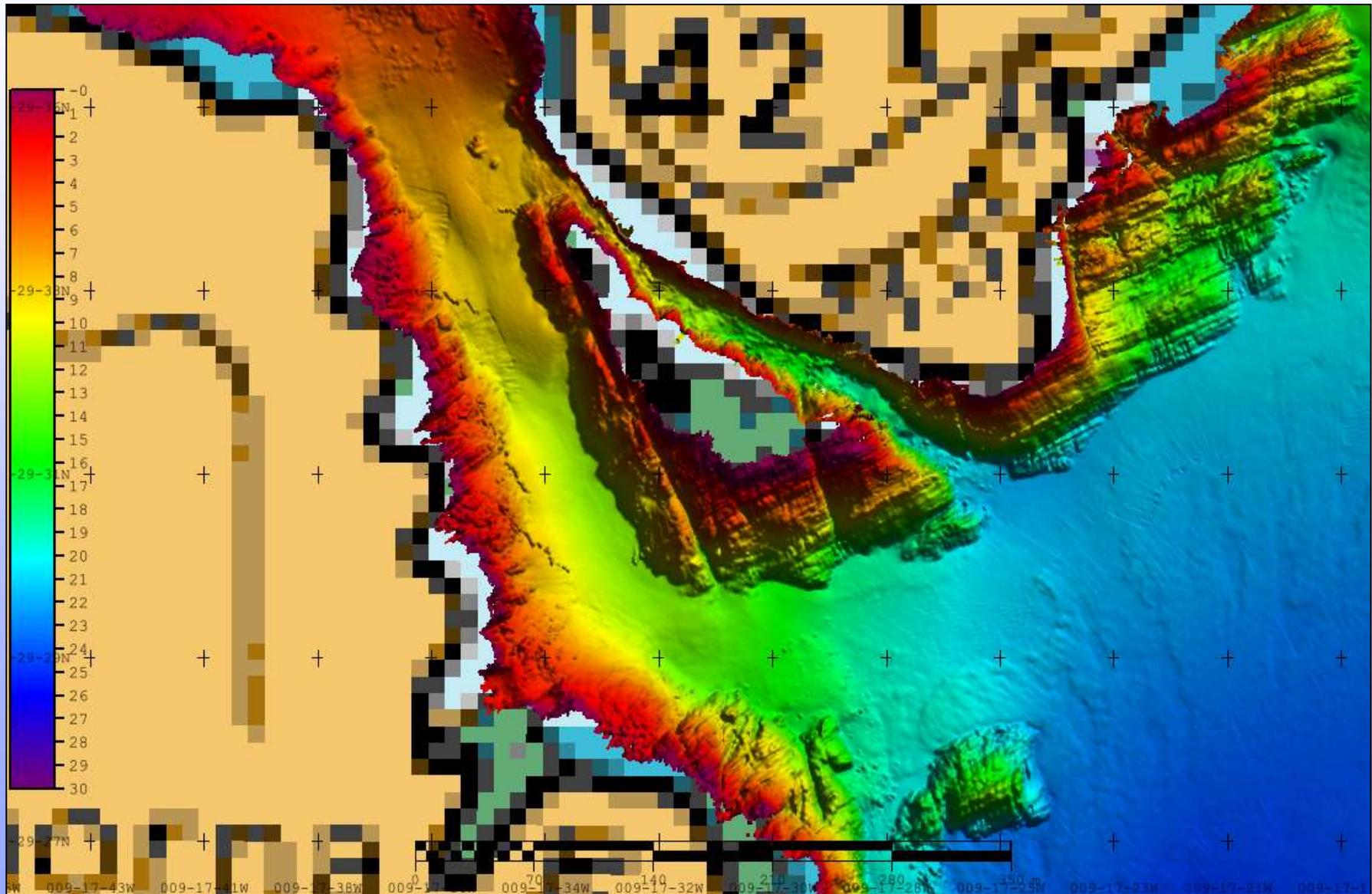


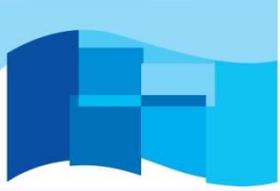


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Approach to Lough Hyne

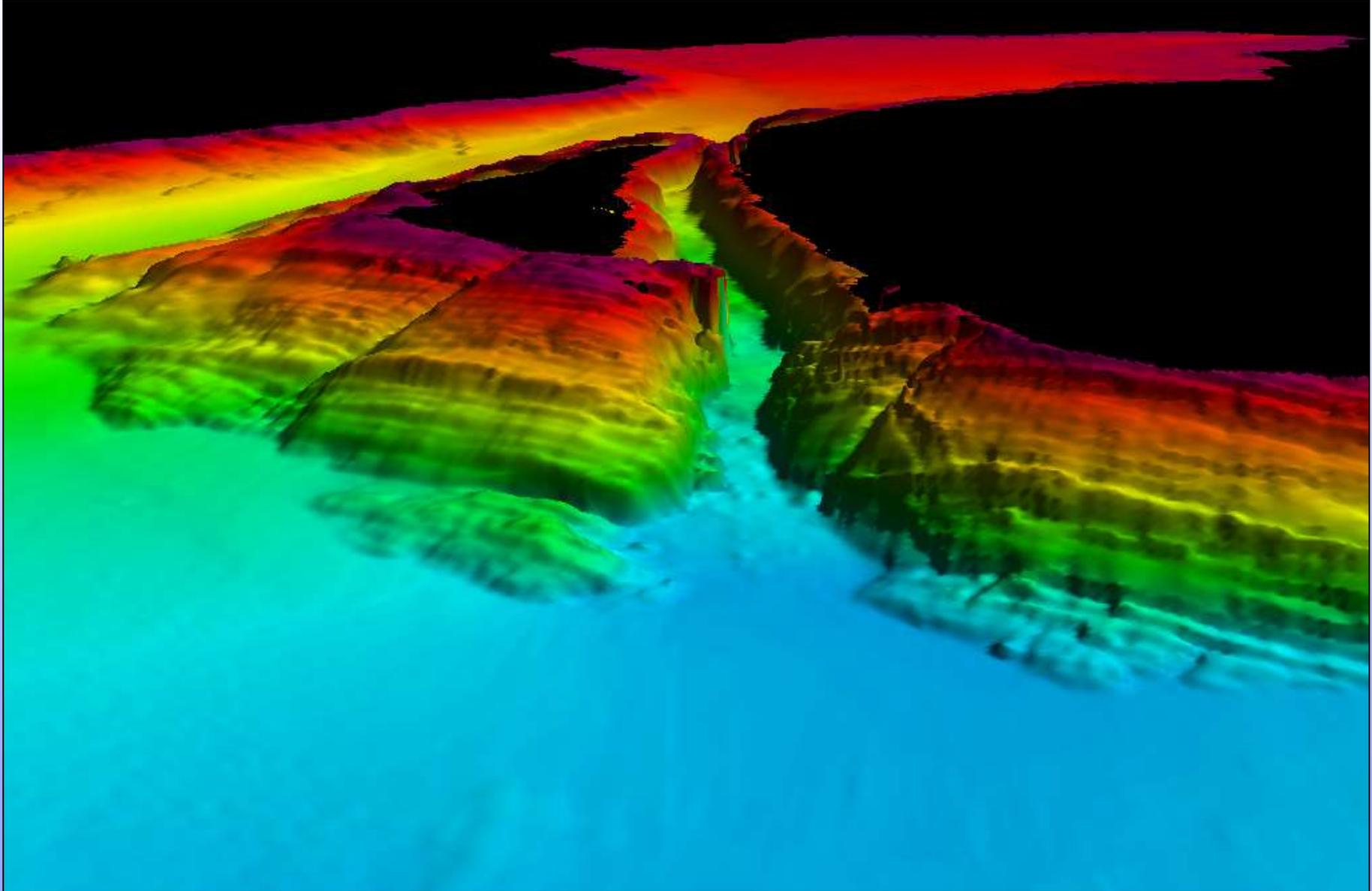




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Approach to Lough Hyne

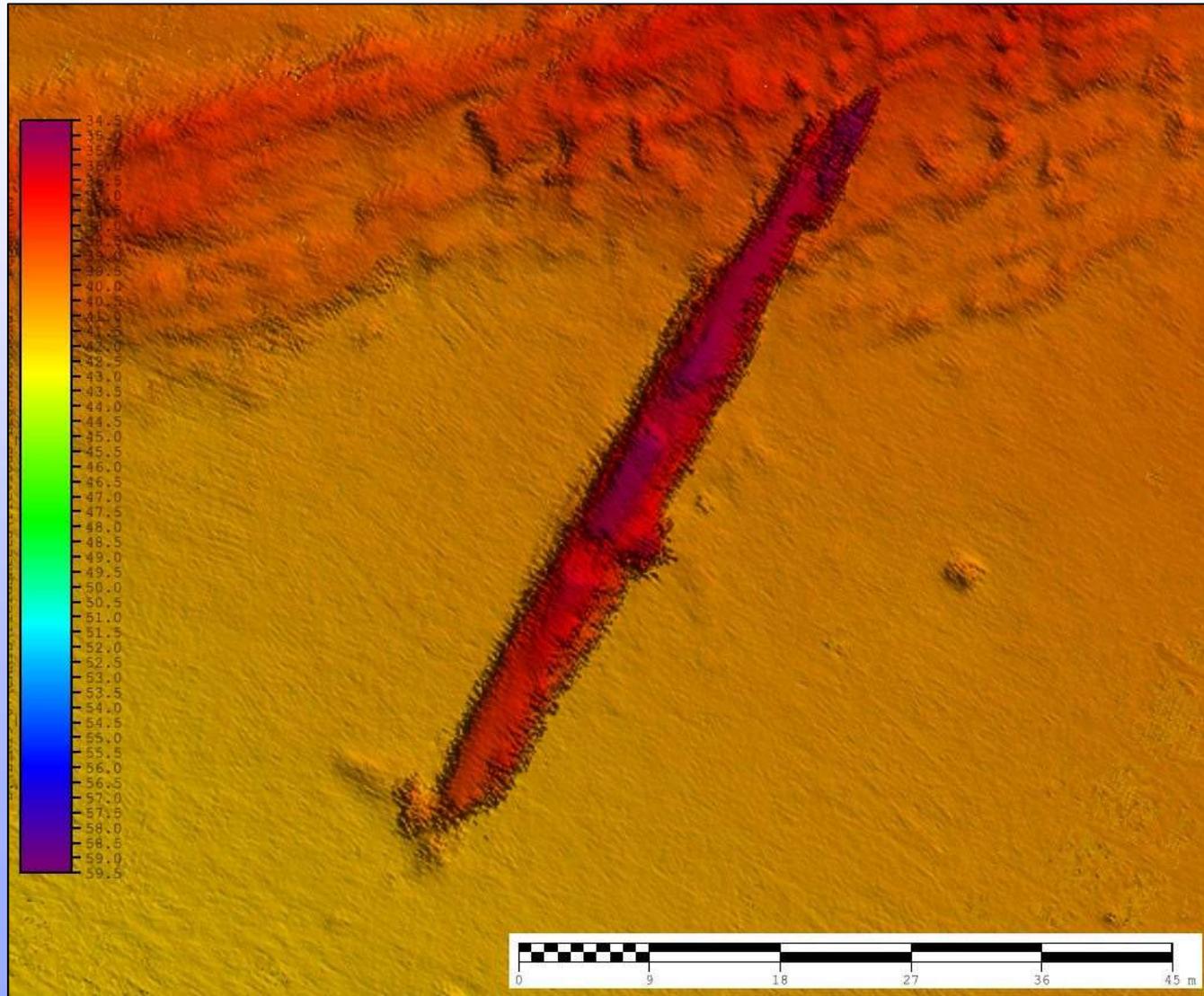




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Wrecks – U260

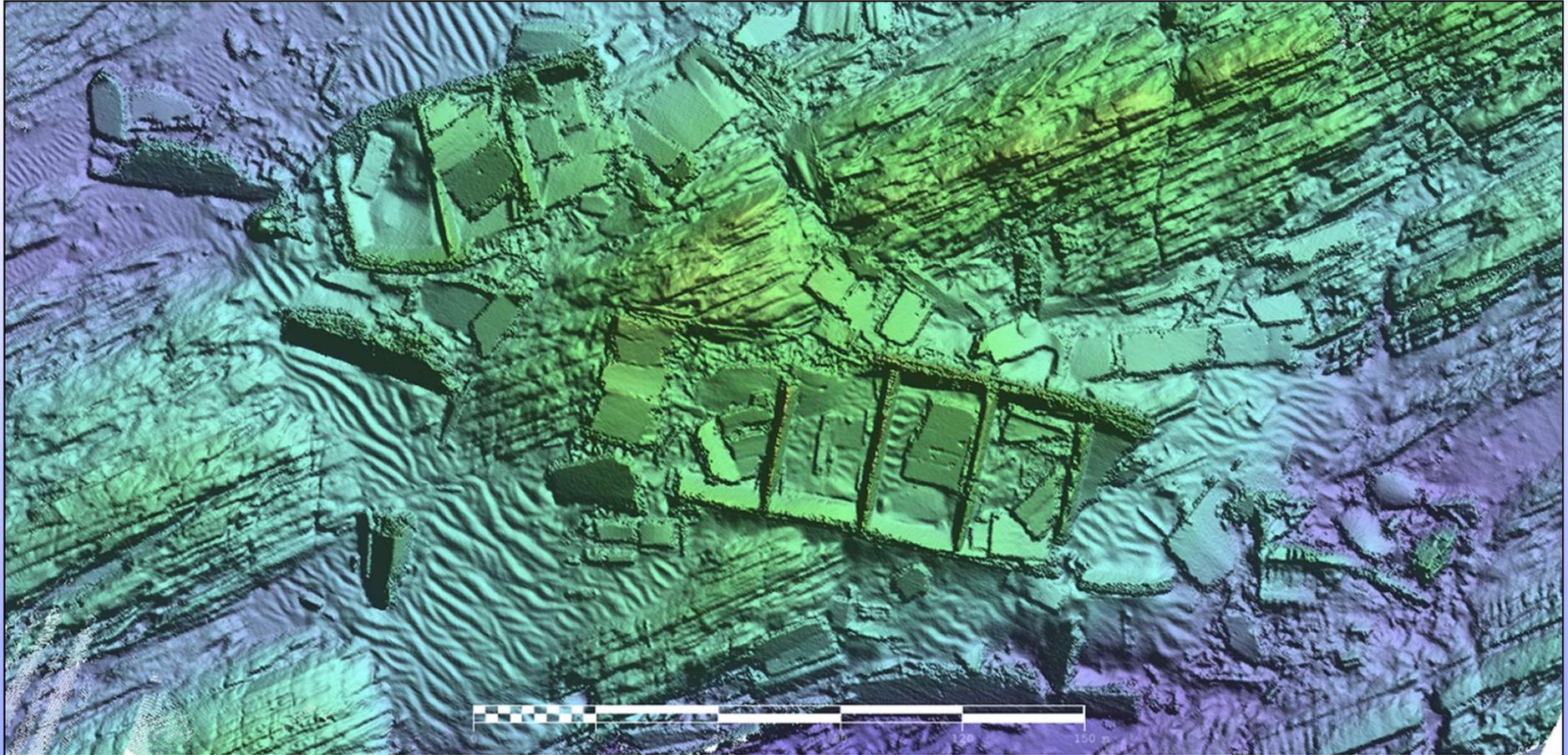


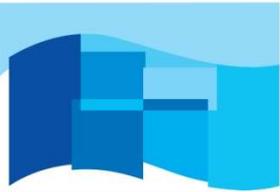


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Wrecks – MV *Kowloon Bridge* (RV Geo)





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Wrecks – *SS Manchester Merchant* (RV Keary)





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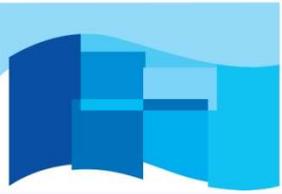
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Exercises



Boarding action from LE Bernard Shaw to RV Keary





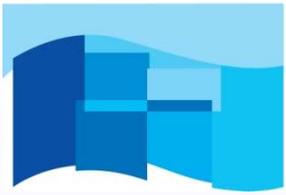
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Exercises



**Coastguard helicopter
& RV Keary**



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Exercises

Baltimore Inshore Lifeboat & RV Mallet





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Planning

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
27															
26															
25							2025			5.0					
24										6.7					
23										25.7	20.7	5.0			
22										17.2	25.1	25.9			
21										38.6					
20										48.7					
19										8.2	6.9				
18										1.9	3.9				
17										2.4	25.4				
16										7.0	4.4	6.8	13.4	5.9	
15										0.3	1.2	3.9	28.3	16.9	
14										0.2	7.8	17.5	3.0		
13										7.5	9.9				
12										14.5					
11										21.4					
10															
9															
8															

Cell Guide
Days for 1 big boat (e.g. 7-10 hour day)
Days for 1 small boat (e.g. 5 hour day)

Comments

Small vessel restricted to mapping between 2 and 5m LAT

Numbers in red pertain to areas unlikely to be mapped (These numbers are not included in the calculations)

		2 boats:
2018	6.1	3.052
	26.7	13.34
2019	73.2	36.6
	15.9	7.955
2020	105.8	52.91
	39.7	19.86
2021	85.5	42.76
	71.5	35.77
2022	140.5	70.26
	100.6	50.29
2023	123.9	61.93
	41.1	20.56
2024	58.3	29.17
	78.4	39.19
2025	95.1	47.53
	123.7	61.83
2026	87.0	43.52
	66.0	32.99

We are here



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ABOUT INFOMAR

SEABED MAPPING 2019

OUR PRODUCTS

EDUCATIONAL IMPACT



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PORTAL - WEBSITE



Maps ▾ Data Surveys ▾ R&D and Education ▾ Gallery News & Events ▾ About ▾



Mapping our sea beds

Exploring our underwater resources: from fish spawning habitats to foundations for ocean energy

[MORE ABOUT US](#)

Explore our amazing seabed

Ever wondered what lies beneath the sea?



Latest maps & publications

For all the latest publications, charts & much more



Already in marine industry

Discover a vast array of data, products and infrastructure





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DATA ACCESS

DYNAMIC WEB MAPPING

Seabed Bathymetry,
Backscatter and Sediment Data

DATA VIEWER

Download and Interrogate Data

SURVEY STATUS

Vessel Locations and Area Of Survey

Label	CV11_02_029
Date	23/07/2011
Latitude	52.53
Longitude	-8.91
Depth	52m

Dynamic Web Mapping
Analyse bathymetry data. 'How to use viewer' video guide.

Seabed and Sediment
Bathymetry, backscatter and sediment distribution data.

Data Viewer
Download and interrogate data.

Follow The Fleet
Follow the INFOMAR survey vessels.



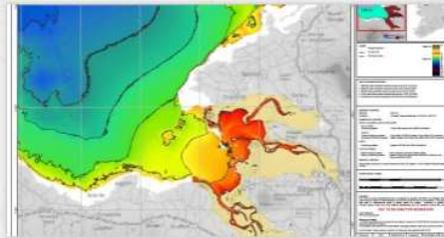
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PRODUCT ACCESS

INFOMAR CHARTS

Bay/Area Specific finished charts .PDFs are available



Charts

Bathymetry, backscatter and shaded relief charts.

MAP VIEWER

Download Google Earth Files and RMOI

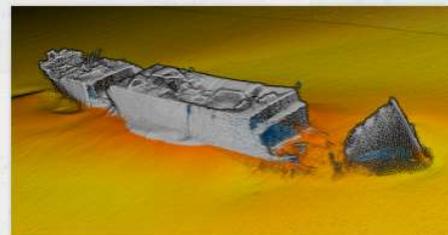


Maps

All our maps, Google Earth files and the Real Map of Ireland.

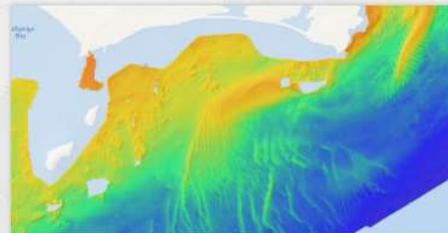
SHIPWRECKS

Download Wreck information sheets in .PDF



Shipwrecks

Over 350 shipwrecks mapped, 3D models, maritime history and much more



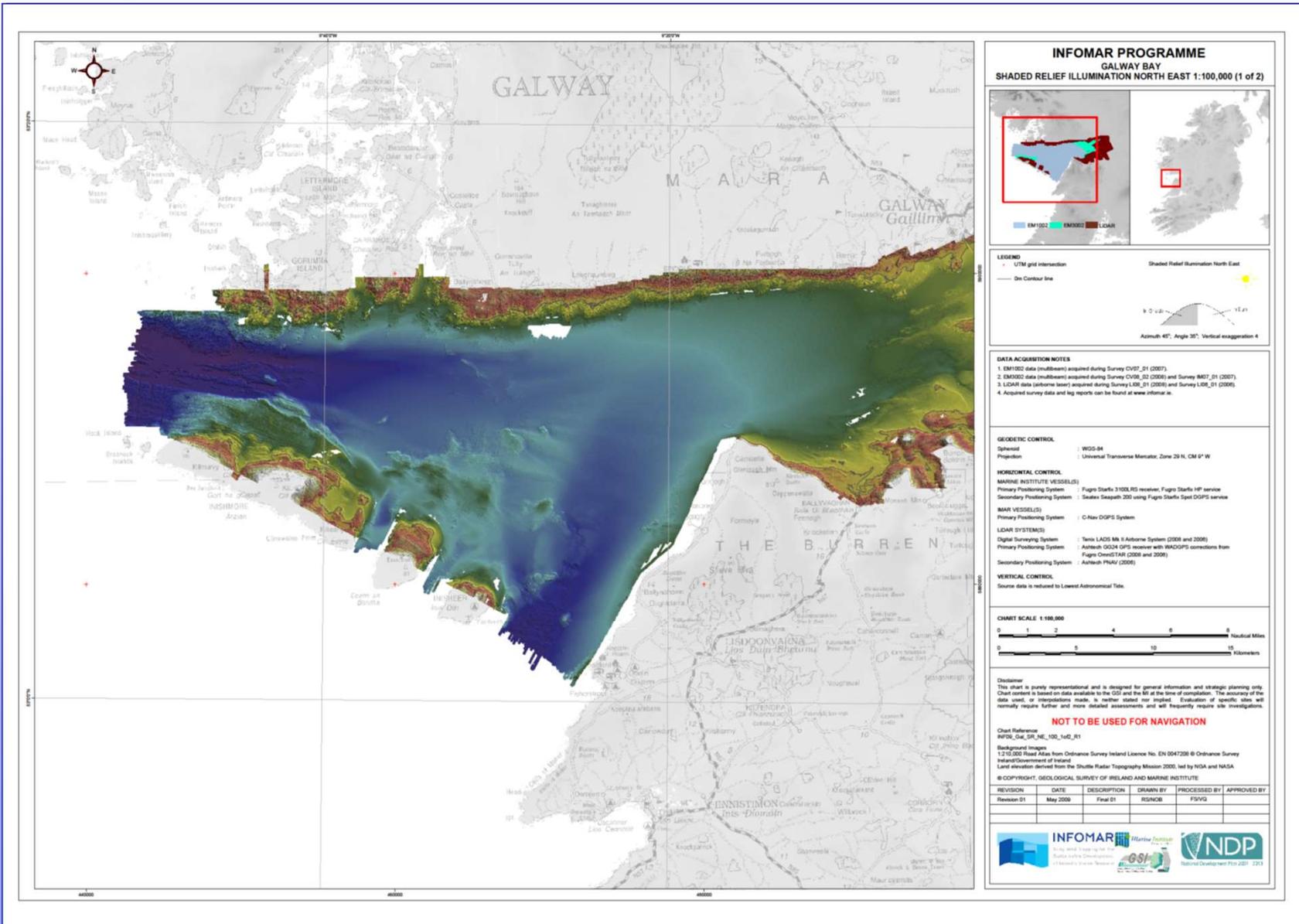
Surveys, Reports and Metadata



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CHARTS



INFOMAR PROGRAMME
GALWAY BAY
SHADED RELIEF ILLUMINATION NORTH EAST 1:100,000 (1 of 2)

LEGEND

- UTM grid intersection
- On Contour line
- Shaded Relief Illumination North East
- Azimuth 45°, Angle 30°, Vertical exaggeration 4

DATA ACQUISITION NOTES

- EM1002 data (multibeam) acquired during Survey CV07_01 (2007).
- EM3002 data (multibeam) acquired during Survey CV08_02 (2008) and Survey IM07_01 (2007).
- LIDAR data (airborne laser) acquired during Survey L08_01 (2008) and Survey L08_01 (2008).
- Acquired survey data and log reports can be found at www.infomar.ie.

GEOIDERIC CONTROL

- Spheroid : WGS-84
- Projection : Universal Transverse Mercator, Zone 29 N, CM 6° W

HORIZONTAL CONTROL

MARINE INSTITUTE VESSELS

- Primary Positioning System : Fugro Starfix 3100/RS receiver, Fugro Starfix HP service
- Secondary Positioning System : Seatech Seapath 300 using Fugro Starfix Spot DGPS service

MAR VESSELS

- Primary Positioning System : C-Nav DGPS System

LIDAR SYSTEMS

- Digital Sweeping System : Telex LAZS Mk 3 Airborne System (2008 and 2006)
- Primary Positioning System : Aishbach G024 GPS receiver with WADGPS corrections from Fugro DredSTAR (2008 and 2006)
- Secondary Positioning System : Aishbach PM04 (2006)

VERTICAL CONTROL

Source data is reduced to Lowest Astronomical Tide.

CHART SCALE 1:100,000

Disclaimer
 This chart is purely representational and is designed for general information and strategic planning only. Chart content is based on data available to the GSI and the MI at the time of compilation. The accuracy of the data used or interpretations made, is neither stated nor implied. Evaluation of specific sites will normally require further and more detailed assessments and will frequently require site investigations.

NOT TO BE USED FOR NAVIGATION

Chart Reference
 INFOMAR_100_1402_R1

Background Images
 1:250,000 Road Atlas from Ordnance Survey Ireland Licence No. EN 0047208 © Ordnance Survey Ireland/Government of Ireland
 Land elevation derived from the Shuttle Radar Topography Mission 2000, led by NASA and NASA

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REVISION	DATE	DESCRIPTION	DRAWN BY	PROCESSED BY	APPROVED BY
Revision 01	May 2008	Final 01	RSN008	FSV02	



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STORYMAPS

INFOMAR Maps Data Surveys R&D and Education Gallery News & Events About

Shipwrecks in Irish Waters

INFOMAR Shipwrecks

8 SS Manchester Merchant

On January 12th 1903, it is thought that the cotton cargo spontaneously ignited, with the vessel subsequently catching fire as it neared the SW Irish coast. The vessel sought refuge in Dingle Bay. With efforts to fight the fire having failed, the ship was scuttled in shallow water.

INFOMAR Maps Data Surveys R&D and Education Gallery News & Events About

Multibeam Imagery of the Seabed off the Irish Coast

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5 Tralee Bay

LIDAR image of Tralee Bay highlighting channels carved into the soft substrate.

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Kilkieran Bay Marine Life

Galway Sub Aqua Club

5 Cerianthus lloydii

A large solitary tube anemone found in soft sediments. This very common species of burrowing anemone can reach up to 40cm in height. However, the anemone's tentacles are usually all that is visible.

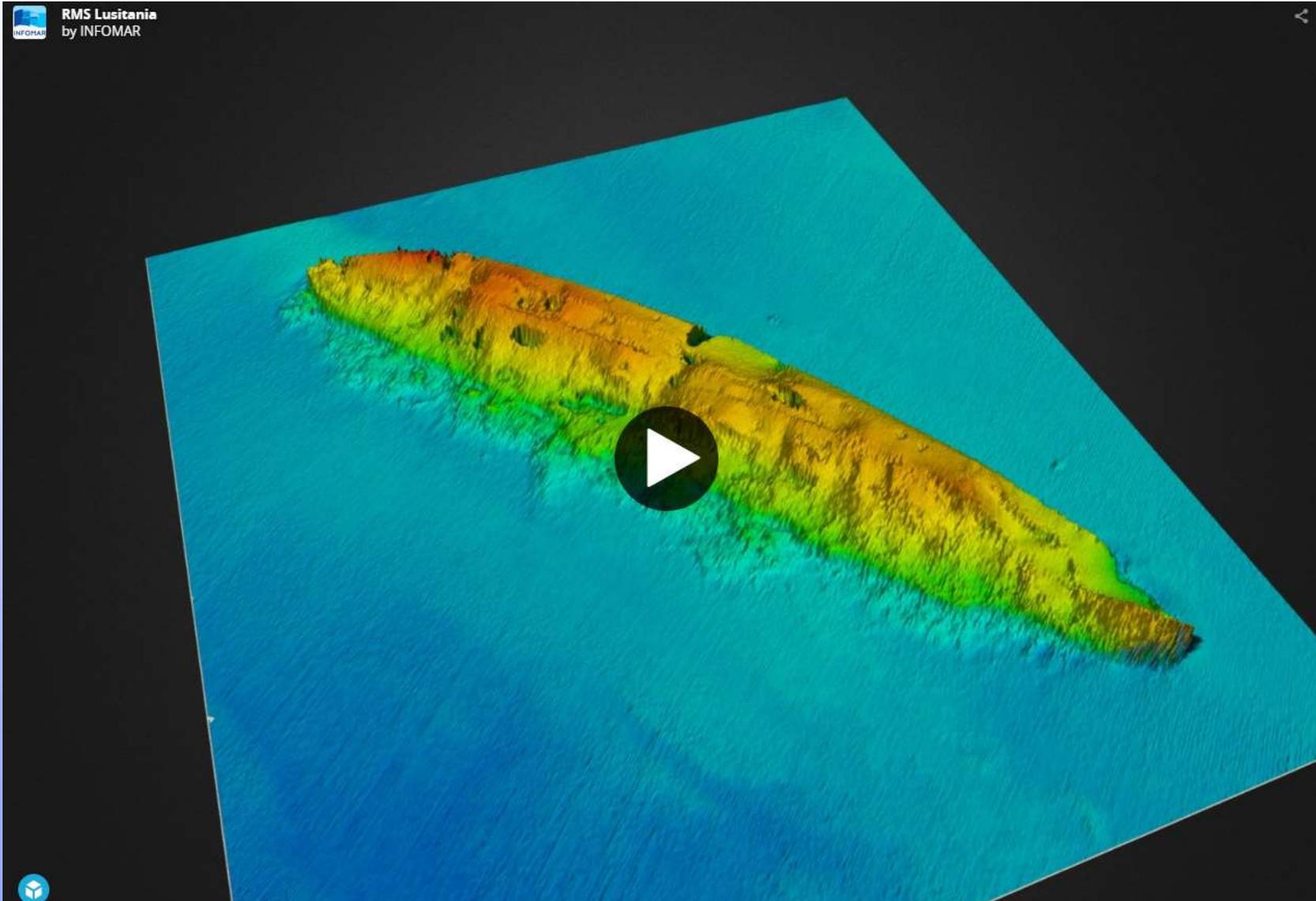
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SHIPWRECKS





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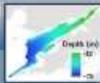
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OUTREACH EVENTS / PRODUCTS

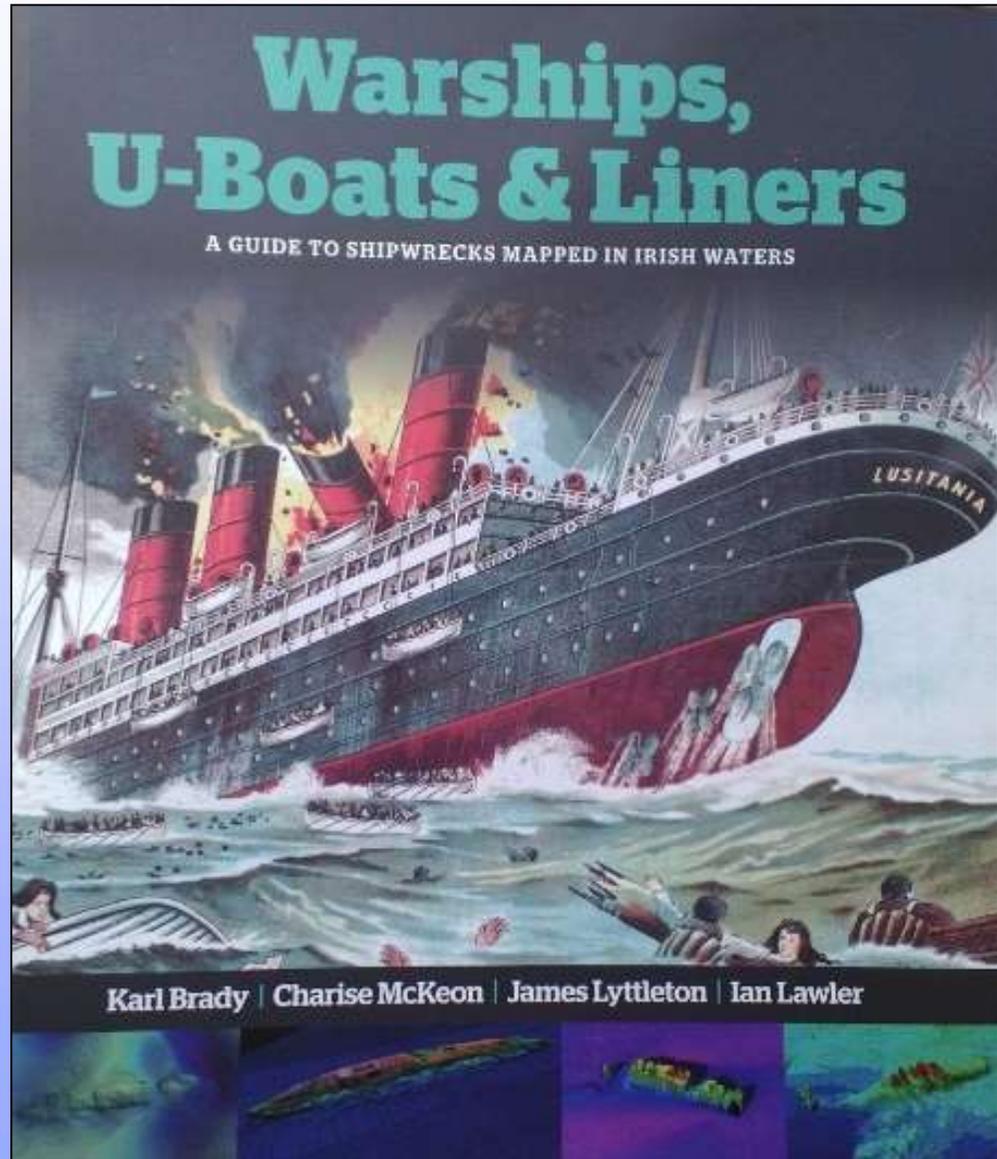
Profile of a Reef Kenmare River, Ireland

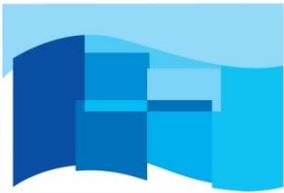


Overview of Physical Habitat of Kenmare River



Key to Reef Species

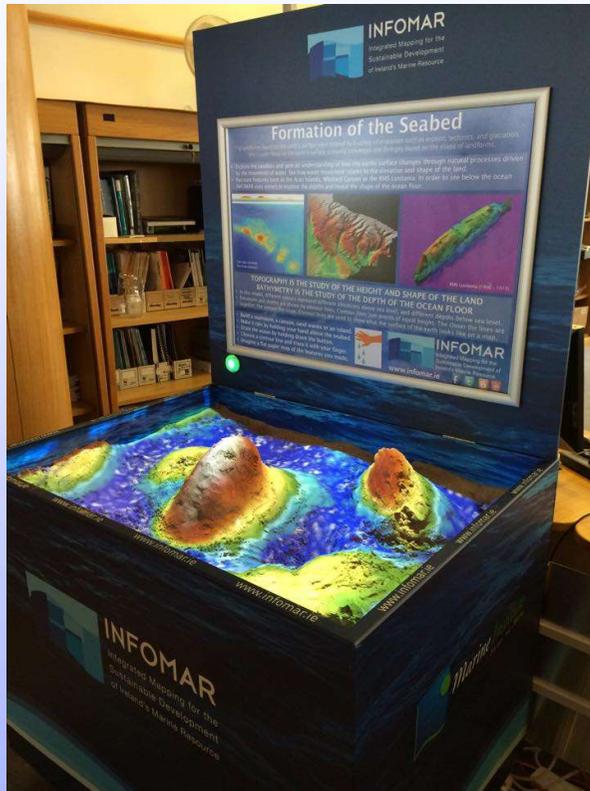




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HANDS ON EDUCATION



AR Sand Box Sessions

- Xbox + projector + PC + sand = 3D Interactive Map
- Learn how 3D shapes translate to 2D maps
- Look about contours and depth shading

General Interactive Sessions

- ROV in a tank.
- Live video feed to surveyor on a ship
- Shipwrecks presentation
- INFOMAR table quiz with prizes (feedback)





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Search Resources

Browse Resources

Add a Resource

Choose a level

No options

No options

No options



In The Spotlight



Student Maths Area

Find a wide range of Junior Cycle and Leaving Certificate Mathematics resources in this new student area by the PDST Maths Team.



RTÉ Archives

Scoilnet has collaborated with the RTÉ Archives to bring together a collection of resources that relate directly to the Irish Primary School History Curriculum.



JellyLab Online

JellyLab Online is a video based science education resource for primary school teachers in Ireland created by UCD research Scientists.



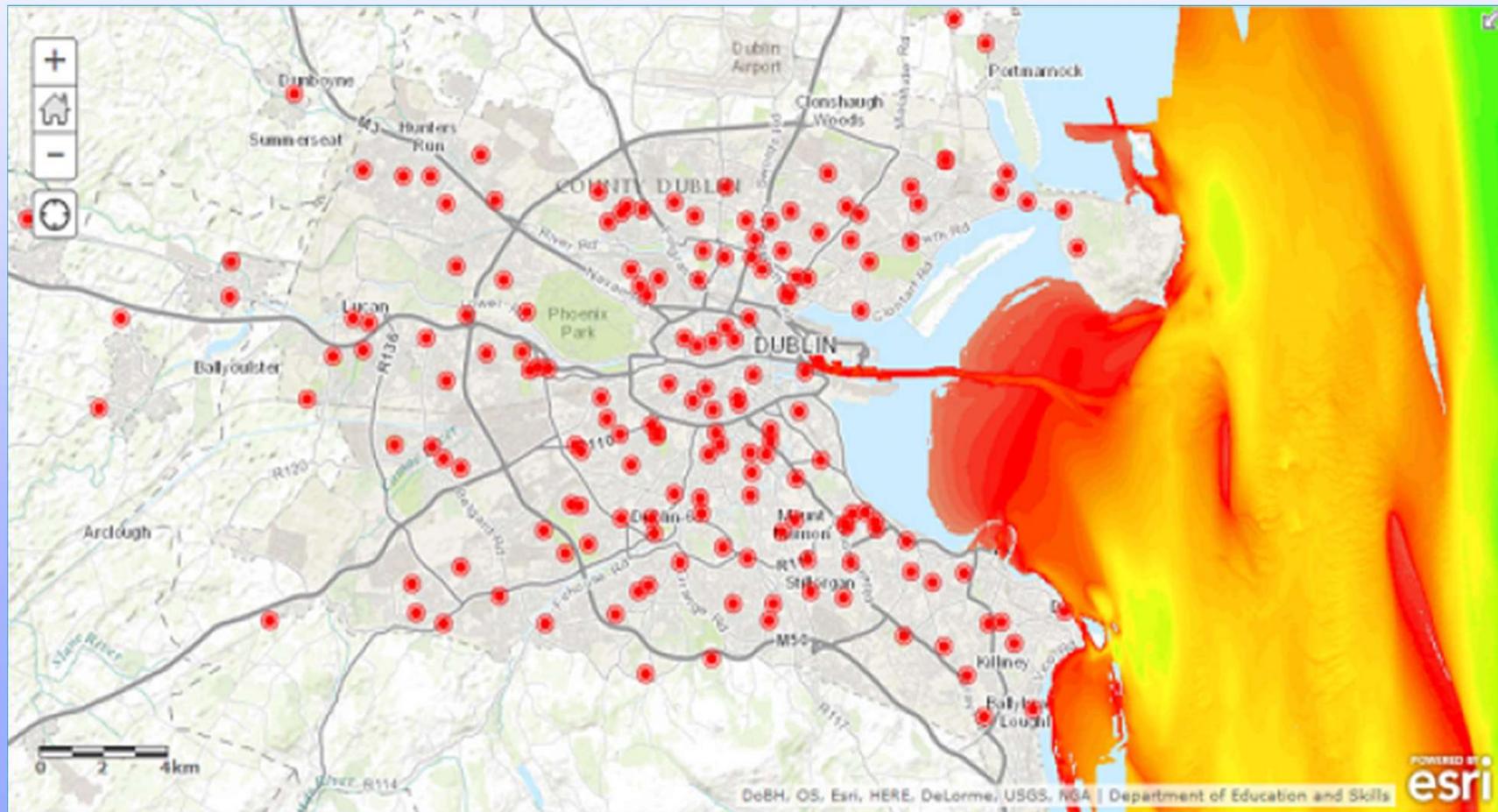


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TY STUDENTS

TY Student Education Outreach Development Programme





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TRAINING - NATIONAL

smart
The Strategic Marine Alliance for Research and Training

A Marine Science and Technology Partnership Programme for the island of Ireland

Home Partners Training Resources News Contact Blog

SMART Training Programmes
New Surveys Added: Training Through Research Surveys 2019

The 2019 call for applicants to take part in Training Through Research Surveys (TTRS) is now open. TTRS is a collaboration with the Marine Instit

[Read more »](#)

Call Open: Science@Sea 2019

Two Science@Sea courses in multidisciplinary marine science will take place from the **21st to the 24th of February** in Cork Harbour

[Read more »](#)

This Call is Now Closed: Science@Sea 2018

A Science@Sea course in multidisciplinary marine science will take place on the **7th and 8th of November on the RV Celtic Voyager in Cork**

[Read more »](#)

This Call is Now Closed: Training Through Research Surveys

Quality, accredited, internationally recognised research vessel-based training

Strategic Marine Alliance for Research & Training (SMART)

The Strategic Marine Alliance for Research and Training (SMART) is a marine science partnership programme designed to further develop capacity in carrying out offshore operations on board research vessels for third level students of marine-related science and technologies.

This strategic collaborative inter-institutional programme is led and funded by Irish Higher Education Institutions (HEIs) and the Marine Institute and is also supported by the Higher Education Authority (HEA).

Key Objectives

1. Develop integrated delivery of specifically tailored

Tweets by @smartseaschool

Smart Sea School @smartseaschool

Mega Congrats to Dr Olga Lyashevskaya from @MFRC & @GMITOfficial for winning silver at the 2019 World

S.M.A.R.T. (GMIT) – CV 2020

Eurofleets+
An alliance of European marine research infrastructure to meet the evolving needs of the research and industrial communities

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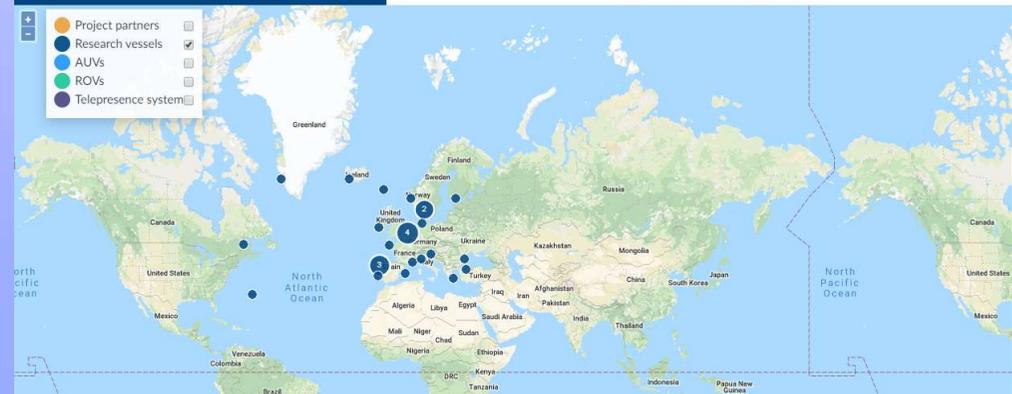
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SEA - Ship time and marine Equipment Application:

Access to research vessels and/or marine equipment through a classic call for proposals. A minimum of 2 calls, with "Ocean" (opening end of June 2019) and "Regional" (opening September 2019) vessels and marine equipment.

Call NS" 26th 2019

EUROFLEETS+ Floating University – CV 2020





INFOMAR

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

MSC MODULE

MSC. GIS & MARINE REMOTE SENSING –

DEPARTMENT: GEOGRAPHY

INFOMAR MODULE

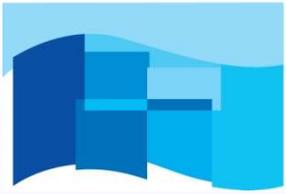
CREDITS: 10



**Maynooth
University**

National University
of Ireland Maynooth

1. Introduction to Ireland's seabed mapping programme
2. Fundamentals of oceanography
3. Marine survey planning
4. Seafloor mapping – how to image the seafloor
5. Marine geological mapping / Rock, mud and biology
6. Data analysis
7. Data products and data delivery
8. Impact of INFOMAR
9. The Future of ocean mapping



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FUTURE ACTIVITY

- **Knowledge transfer** – education/industry/modelling
- **Data applications development** – data for decision support
- **Baseline mapping** informing change monitoring/management
- **TAC Technical Advisory Committee** being re-established
- MSP/MAFA Support
- **Internationalisation** potential
- **Coastal/Climate** role –input to modelling, Earth Observation & Sea Level monitoring
- **Completing the map!**



INFOMAR

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THANK YOU

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CONTACT: Ronan.O'Toole@gsi.ie