Ollscoil na Gaillimhe
University of Galway

Foras na Mara
Marine Institute

Ireland's Ocean Economy

Key Facts & Figures

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Authors

Dr. Daniel Norton, Marine Institute
Prof. Stephen Hynes, University of Galway
Marie-Christin Lanser, Marine Institute
Jenny O'Leary, Marine Institute
Prof. Cathal O'Donoghue, University of Galway
Dr. Andreas Tsakiridis, University of Galway

Contributors & Acknowledgements

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FOR FURTHER INFORMATION PLEASE CONTACT:

Jenny O' Leary
Policy, Innovation and Research Support
Marine Institute
Oranmore, Galway
Email: Jenny.O'Leary@Marine.ie
Web: www.marine.ie

Prof Stephen Hynes
Socio-Economic Marine Research Unit (SEMRU)
Whitaker Institute
University of Galway
Email: stephen.hynes@universityofgalway.ie
Web: www.universityofgalway.ie/semru

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Socio-Economic Marine Research Unit (SEMRU), University of Galway

SEMRU was established through the Beaufort Award in 2008. Since then, it has developed into the foremost marine economic analysis centre in Ireland. The research of the unit is interdisciplinary in nature and focuses on the economic importance of coastal and off-shore marine environments. This involves examining the economic utility of the marine environment and the ecological value derived from the productivity of associated ecosystems.

Marine Institute

The Marine Institute is Ireland's state agency set up under the Marine Institute Act 1991, to undertake, to co-ordinate, to promote and to assist in marine research and development, and to provide government services that inform policymaking, regulation and the sustainable management of Ireland's maritime area and marine resources. The Institute provides support through a range of scientific, advisory and economic development services.

Contents

Summary

This report provides an update on Ireland's ocean economy across three main economic indicators: turnover, gross value added (GVA) and employment, and provides an analysis of trends over the last five years. The report also reviews demographic change in Ireland's coastal economy, as well as highlighting developments in marine natural capital accounting. The economic trends are presented in the context of key drivers (e.g. policy, legislative, geo-political) that are directly or indirectly impacting on the performance of the ocean economy industries currently and possibly impacting into the future.

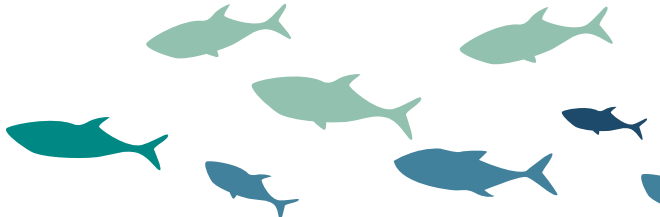
The analysis shows Ireland's ocean economy in 2021:

- generated approximately €4.98 billion in turnover;
- had a direct economic contribution, as measured by GVA, of €2.1 billion;
- employed 32,100 Full-Time Equivalents (FTEs); and
- generated direct and indirect GVA from marine economic activity of approximately 1.6% of national output[1].

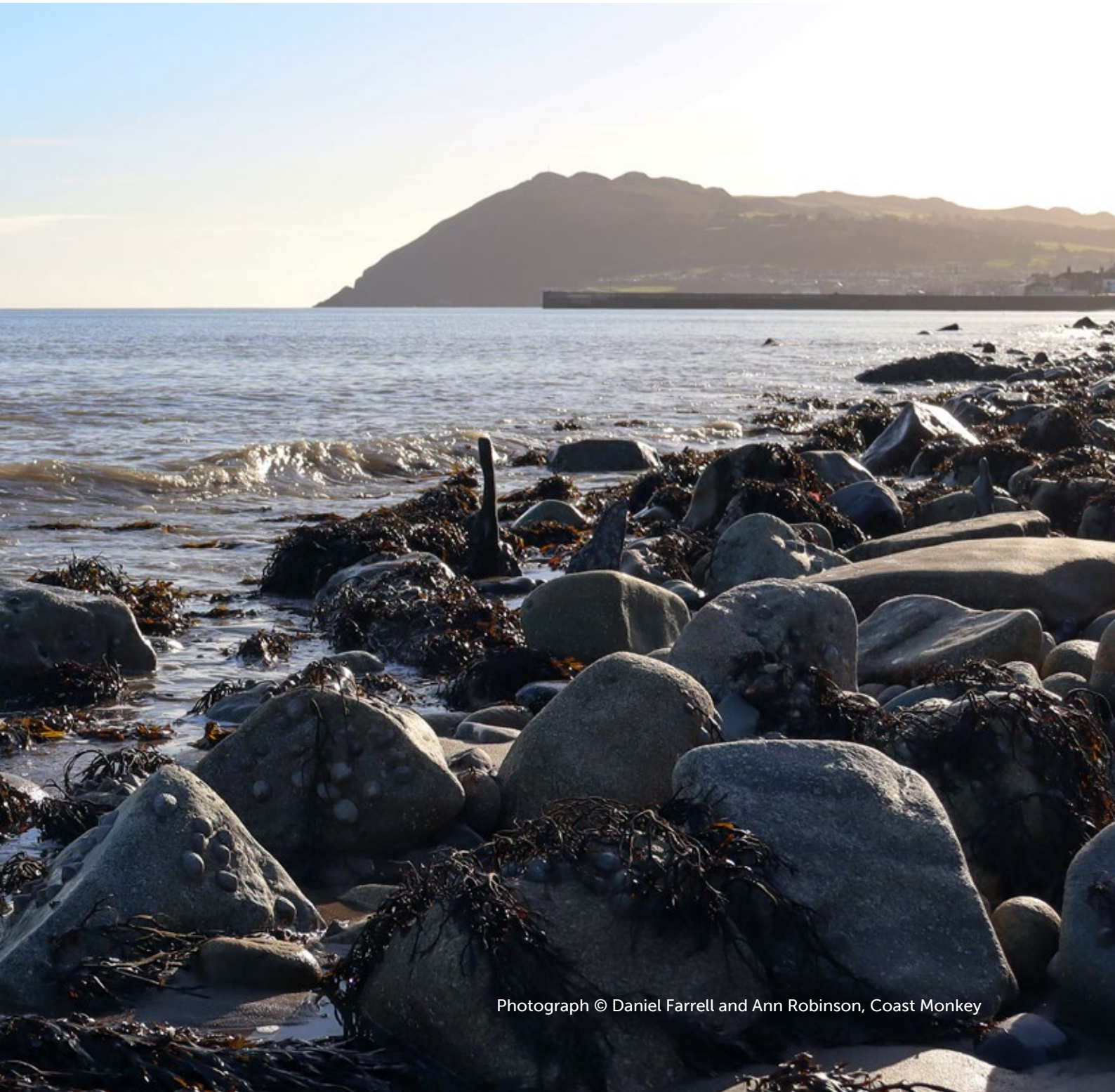
TOP FIVE INDUSTRIES		
Turnover	**GVA**	**Employment**
1. Shipping & Maritime Transport	1. Oil and Gas Exploration and Production	1. Tourism in Marine & Coastal Areas
2. Bioresources / Seafood	2. Shipping & Maritime Transport	2. Bioresources / Seafood
3. Oil and Gas Exploration and Production	3. Tourism in Marine & Coastal Areas	3. Shipping & Maritime Transport
4. Tourism in Marine & Coastal Areas	4. Bioresources / Seafood	4. Marine Manufacturing, Construction & Engineering
5. Marine Commerce	5. Marine Commerce	5. Marine Retail Services

Turnover for Ireland's ocean economy is estimated to be 8% below turnover in the pre Covid-19 year of 2019. Even before the pandemic, the value of output in the ocean economy had fallen, driven by a sharp drop in the price of natural gas, and a slowdown in shipping and maritime transport and seafood related industries. Comparing 2021 to 2019, GVA has managed to increase by 3% to €2.1 billion, mostly driven by gas production and energy price increases. Employment over the same period is still recovering, down 8% on 2019 levels, due to slower than expected employment growth in tourism.

[1] National output as measured by Modified Gross National Income.



Although recovery from the pandemic crisis continues in 2022, the sector is in a period of significant transition. This is being driven by policies such as the European Green Deal that calls for "a transformation of our economy to become a modern, resource-efficient and competitive economy where net emissions of greenhouse gases are phased out and the EU's natural capital is protected". While there will be challenges for all ocean economy industries on the path to net zero emissions, this transition also offers the same industries opportunities with the potential of blue growth and job creation in offshore renewable energy production, the development of 'smart' energy efficient ports and shipping, marine construction, and a marine ecosystem restoration industry. Benefiting from these opportunities will require fully functioning and well-resourced marine planning infrastructure and the upskilling of existing and new employees to be able to cope with the technological innovations and the ongoing digitalisation of marine activities and logistic chains.



Photograph © Daniel Farrell and Ann Robinson, Coast Monkey

IRELAND'S OCEAN ECONOMY 2021

DIRECT IMPACT

32,100
EMPLOYEES

€4.98 BN
TURNOVER

1%
GNI*

€2.12 BN
GVA

DIRECT & INDIRECT IMPACT

71,013
EMPLOYEES

€10.2 BN
OUTPUT

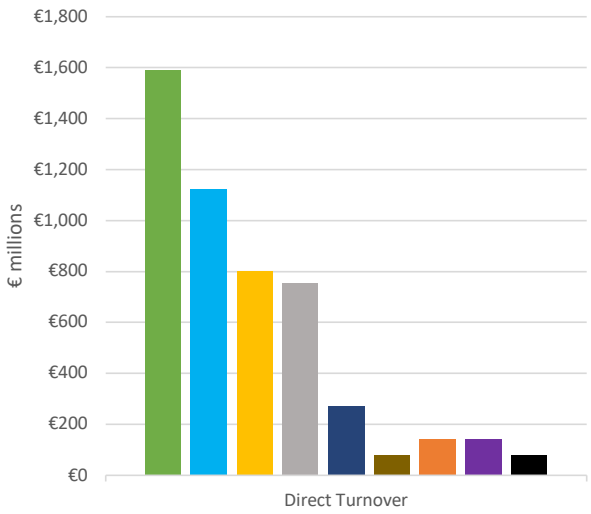
1.6%
%GNI*

€3.79 BN
GVA

THE OCEAN ECONOMY - DEFINITION

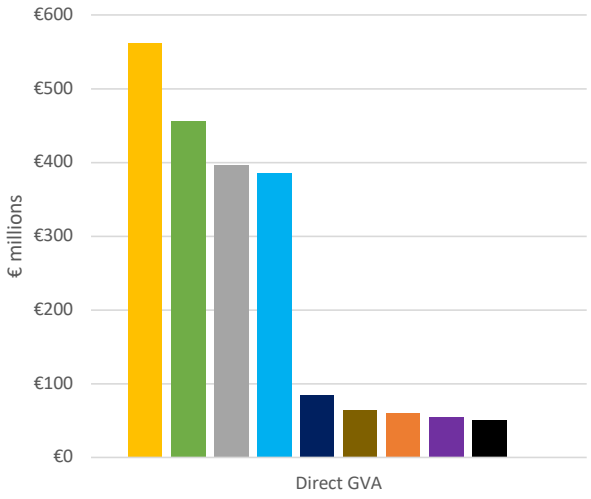
The ocean economy is defined as any economic activity that directly or indirectly uses the sea as an input or produces an output for use in a sea-specific activity.

TURNOVER



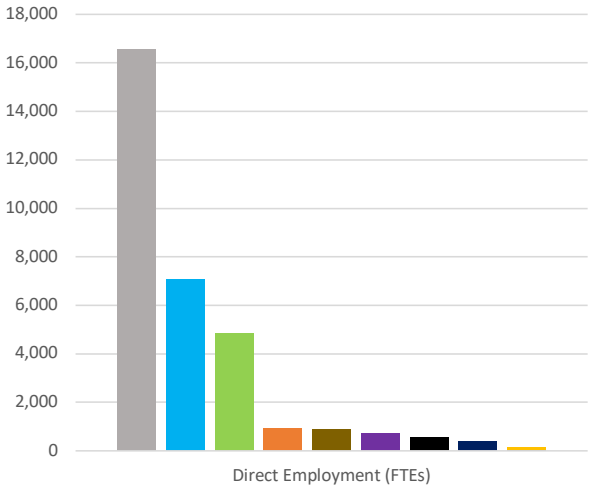
- Shipping & Maritime Transport
- Bioresources / Seafood (fisheries, aquaculture, processing, seaweed, blue bioeconomy)
- Oil and Gas Exploration and Production
- Tourism in Marine and Costal Areas
- Maritime Commerce
- Marine Retail Services
- Marine Manufacturing, Construction and Engineering
- Marine Advanced Technology Products and Services
- Marine Renewable Energy

GVA



- Oil and Gas Exploration and Production
- Shipping & Maritime Transport
- Tourism in Marine and Costal Areas
- Bioresources / Seafood (fisheries, aquaculture, processing, seaweed, blue bioeconomy)
- Maritime Commerce
- Marine Retail Services
- Marine Manufacturing, Construction and Engineering
- Marine Advanced Technology Products and Services
- Marine Renewable Energy

EMPLOYMENT



- Tourism in Marine and Costal Areas
- Bioresources / Seafood (fisheries, aquaculture, processing, seaweed, blue bioeconomy)
- Shipping & Maritime Transport
- Marine Manufacturing, Construction and Engineering
- Marine Retail Services
- Marine Advanced Technology Products and Services
- Marine Renewable Energy
- Maritime Commerce
- Oil and Gas Exploration and Production

Introduction

This report is the sixth in the ocean economy series[2]. The methodology used in compiling this report builds on previous reports allowing for a complete and comparable representation of Ireland's ocean economy across all industries. The reference year for the data is primarily 2020 (based on best available data), with estimates based on economic projections of Ireland's ocean economy up to 2021 also provided. These estimates are based on a forecasting exercise that combines the latest published economic data from the CSO, BIM, government economic forecasts, information and data obtained from surveys with marine-related businesses, and insights from government departments and agencies.

Ireland's Ocean Economy Report also provides details on Ireland's coastal economy by providing insights into the latest changes in population in Ireland's coastal urban and rural areas. The report also examines the spatial distribution of marine businesses, primarily in coastal areas.

Policies such as the EU Green Deal and those related to the UN's Decade of Ocean Science for Sustainable Development (2021-2030)[3] require that growth in the ocean economy is 'blue', i.e., "development of marine economic activities is in such a manner that the long-term ability of the marine environment to continue to provide ecosystem service benefits is not compromised"[4]. This also aligns with the UN Sustainable Development Goal 14 to 'Conserve and sustainably use the oceans, seas and marine resources for sustainable development'. While this report focuses on the economic trend of Ireland's ocean economy, the application of the recently adopted UN System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA-EA) to Irish marine waters will provide a clearer indication of how sustainable the changes have been.

Ireland's ocean economy reporting is moving into a new phase. Current work has been carried out under a five-year partnership between the Socio-Economic Marine Research Unit (SEMRU), University of Galway and the Marine Institute. This builds on the role of the Marine Institute, tasked by the Irish government to provide a range of scientific, technical and economic data and evidence to support integrated marine policy and planning. SEMRU's ongoing collaboration with the Marine Institute and international researchers in the area is essential as ocean accounting methodologies evolve. Working within the OECD, Ireland is looking at how best to build an ocean satellite accounting system. Liaising with the European Commission and other Member States on cross country comparison via the EU blue economy report[5] is also helping align Irish ocean reporting with international counterparts, while also maintaining its relevance to Irish marine policy and planning.

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[2] An update on Ireland's Ocean Economy was published in 2020 as part of a report outlining key challenges and opportunities for Ireland's major ocean economy industries [Ahearne, A. and Hynes, S. (2020). Challenges and Opportunities for Ireland's Major Ocean Economy Industries https://www.universityofgalway.ie/media/researchsites/semru/files/Challenges-facing-major-ocean-economy-industries-report.pdf

[3] United Nations (2021). Decade of Ocean Science for Sustainable Development (2021-2030) https://www.oceandecade.org/

[4] Norton, D., Hynes, S. and Boyd, J. (2018). EPA Research Report No 239: Valuing Ireland's Coastal, Marine and Estuarine Ecosystem Services, EPA Publications, Wexford.

[5] European Commission (2022). The EU Blue Economy Report https://op.europa.eu/en/publication-detail/-/publication/156eecbd-d7eb-11ec-a95f-01aa75ed71a1

Ireland's Ocean Economy

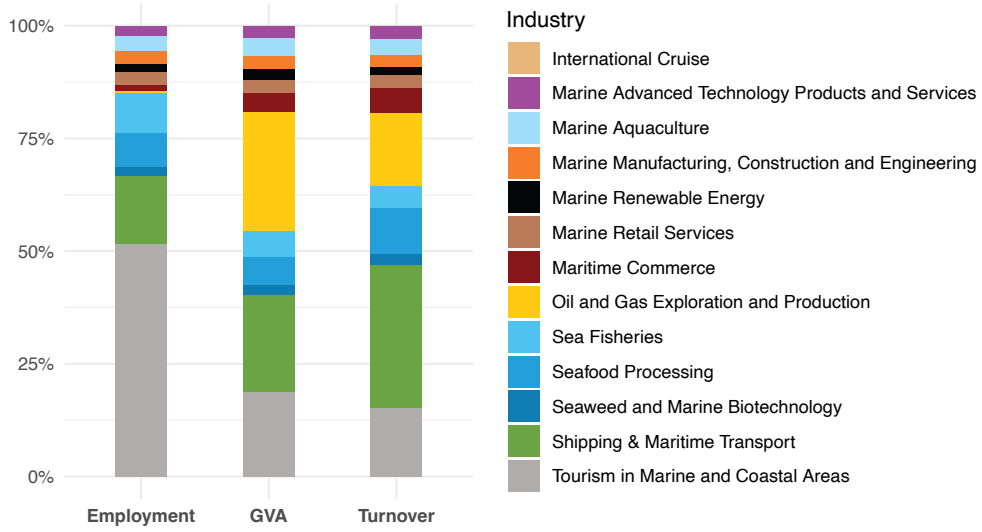
The overall turnover of Ireland's ocean economy in 2021 is estimated to be €4.98 billion, of which €2.11 billion is direct gross value added (GVA)[6]. The direct GVA from marine economic activity is approximately 1% of national output. Ireland's national output in 2021, as measured by Modified Gross National Income (GNI*), was approximately €234 billion. Employment from Ireland's ocean industries is estimated to be 32,100 Full Time Equivalents (FTEs). Table 1 and Figure 1 show the contribution of each industry in terms of turnover, GVA and employment.

Table 1: Direct Turnover, GVA and Employment by industry, 2021

2021 (estimates)	Direct Turnover € 000's	Direct GVA € 000's	Direct Employment (FTEs)
Shipping & Maritime Transport	1,587,667	456,463	4,847
Tourism in Marine and Coastal Areas	752,074	396,122	16,556
International Cruise	0	0	...
Marine Retail Services	152,602	64,093	897
Sea Fisheries	244,153	119,702	2,900
Marine Aquaculture	178,879	87,250	1,127
Seafood Processing	512,000	134,000	2,454
Oil and Gas Exploration and Production	800,633	561,750	155
Marine Manufacturing, Construction and Engineering	141,952	60,672	919
Maritime Commerce	272,624	84,513	401
Marine Advanced Technology Products and Services	141,533	55,198	708
Seaweed, Marine Biotechnology and Bioproducts	115,174	44,866	578
Marine Renewable Energy	78,593	50,748	558
Total	**4,977,883**	**2,115,377**	**32,100**

[6] GVA refers to a sector's turnover (output) minus intermediate consumption (the inputs into the production process). It is measured at basic prices, excluding taxes less subsidies on products.

Figure 1: Relative contribution (%) of each industry: turnover, GVA and employment, 2021



From 2020-2021, growth in the Irish economy was approximately 17%. In comparison, the ocean economy (based on GVA) grew by 44% over the same period. This significant increase in Ireland's ocean economy was mainly driven by GVA arising from gas production (Corrib Gas Field) linked to rises in energy prices. However, while the Irish economy declined by 5% from 2019-2020, the ocean economy suffered a deeper decline of 28%. This partially explains the more rapid recovery. Over the two-year period 2019-2021, there was 3% growth in the ocean economy. This was a slower growth rate compared to the growth rate in the general economy of 11%[7].

From 2020-2021, Ireland's ocean economy experienced increases of 25% for turnover and 20% for employment. For the 2019-2021 period, an overall decrease in turnover of 8% from €5.4 billion to €4.98 billion is reported, with a comparable decrease in employment of 8% over the same period.

Table 2: The Irish Ocean Economy key figures and trends

Ocean Economy	2017	2018	2019	2020	2021e
Turnover €millions	5,784.89	6,186.46	5,402.10	3,990.67	4,977.80
GVA €millions	2,290.88	2,509.83	2,051.92	1,469.05	2,115.38
Employment FTEs	31,452	32,027	34,920	26,818	32,100
Turnover Annual Change	5.46%	6.94%	-12.68%	-26.13%	24.74%
GVA Annual Change	-2.02%	9.56%	-18.24%	-28.41%	44.00%
Employment Annual Change	3.66%	1.83%	9.03%	-23.20%	19.70%

[7] Modified GNI at current market prices (GNI*) from the CSO was used as the measure of economic growth year on year. GNI* is an indicator that was recommended by the Economic Statistics Review Group and is designed to exclude globalisation effects that are disproportionally impacting the measurement of the size of the Irish economy when using standard GDP.

Figure 2: Turnover, GVA and Employment; All Marine Industries (2010-2021)

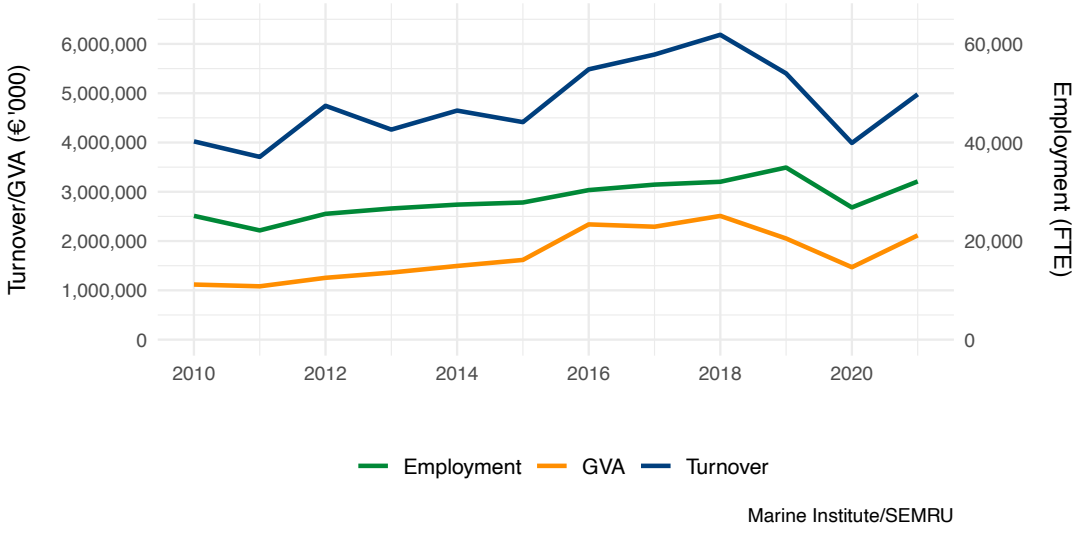
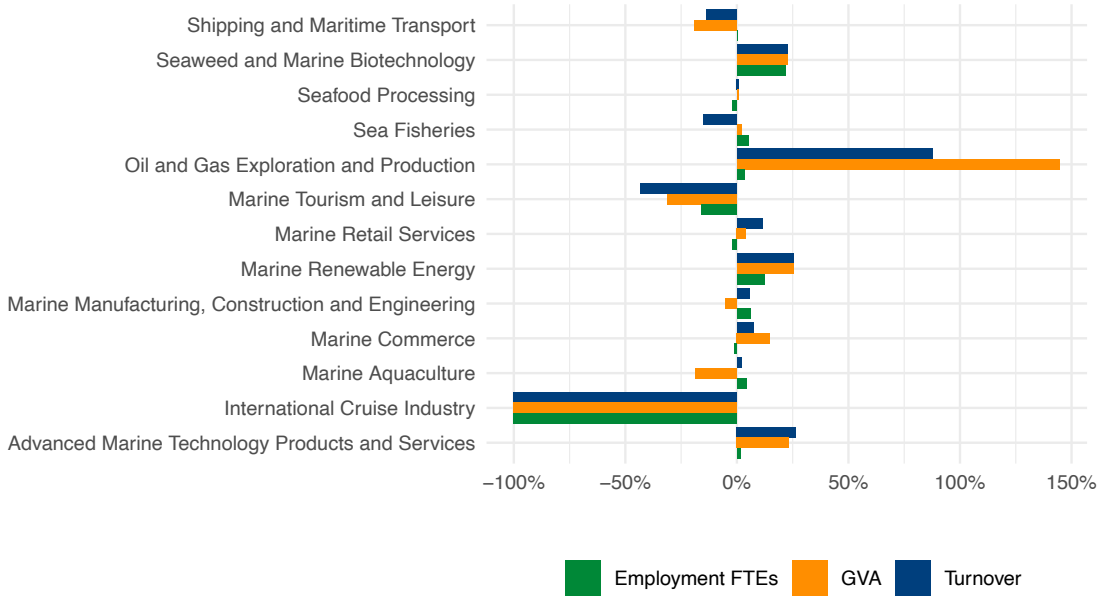


Figure 3 shows the rate of change in turnover, GVA and employment for all the marine industries in the 2019-2021 period. While some industries saw small increases in all three indicators over this two-year period, some of the larger more traditional industries saw significant decreases, particularly tourism and leisure in marine and coastal areas, and shipping and maritime transport. International cruise experienced the largest decrease in turnover and GVA due to cessation of activities related to the Covid-19 pandemic. In contrast, turnover and GVA arising from gas production increased by 88% and 145% respectively, driven by increases in energy prices. Emerging marine industries, such as those operating in renewables, blue bioeconomy and technology sectors, experienced increases during the same period in turnover and GVA of approximately 25%. Employment increased also by 10%.

Figure 3: Rates of change (%) in turnover, GVA and employment. All Industries, 2019-2021



Indirect Gross Value Added

Input-output tables are often used to understand the structural interdependencies between industries, tracing input requirements for each product back through the production cycle. The input-output tables are also used to calculate output, employer and GVA multipliers for each industry. The Irish Bio-Economy Input-Output Model[8] is used to trace the flow of activities between ocean and non-ocean industries. It is used to calculate the total (direct and indirect) GVA of the ocean economy in Ireland. According to the most recent Bio-Economy Input-Output Model results, shipping and maritime transport and seafood processing are associated with the largest GVA multipliers across all ocean related industries. The lowest GVA multipliers are associated with the primary production industries of capture fishing and aquaculture.

Table 3 provides a breakdown of the direct and indirect contribution of the ocean industries to the wider economy. According to the CSO, modified Gross National Income (GNI*), at current market prices, increased from €200 billion in 2020 to €234 billion in 2021. This represents a 17% change and compares to a 14.3% change in GDP over the same period. The total direct and indirect value of the Irish ocean economy is estimated to be €3.79 billion which represents 1.62% of GNI* in 2021. The total contribution to GNI* by Ireland's ocean economy in 2021 is estimated to be just 3% below the pre-pandemic value in 2019.

Table 3: Direct and Indirect GVA, 2021

	Direct GVA €000's	Indirect GVA €000's	Direct and Indirect €000's
Shipping & Maritime Transport	456,463	648,177	1,104,640
Tourism in Marine and Coastal Areas	396,122	233,712	629,834
International Cruise	0	0	0
Marine Retail Services	64,093	28,201	92,294
Sea Fisheries	119,702	37,108	156,810
Marine Aquaculture	87,250	34,027	121,277
Seafood Processing	134,000	168,840	302,840
Oil and Gas Exploration and Production	561,750	297,727	859,477
Marine Manufacturing, Construction and Engineering	60,672	62,492	123,164
Maritime Commerce	84,513	37,186	121,699
Marine Advanced Technology Products and Services	55,198	56,854	112,052
Seaweed, Marine Biotechnology and Bioproducts	44,866	46,212	91,079
Marine Renewable Energy	50,748	26,896	77,644
Total	**2,115,377**	**1,677,433**	**3,792,810**

International Studies

Table 4 provides a comparison of figures from a number of ocean economy studies around the world. The highest share of ocean economic activity in national GDP can be seen for countries such as Norway, Croatia, China, and the UK. The extremely high share of the ocean economy in GDP for Norway (30%) is mainly driven by the value of oil and gas for that resource rich economy. Oil and gas is also important in terms of the US ocean economy. Similar to the case in Ireland, shipping and maritime transport and tourism in marine and coastal areas are key marine industries in terms of

[8] Grealis, E. and O'Donoghue, C. (ed.) (2015). The Bio-Economy Input-Output Model: Development and Uses, Teagasc Publication, Dublin

contribution to economic value and employment for all maritime nations. For South Korea and China, shipbuilding and seafood are also important in terms of contribution to their ocean economies.

As noted in the methodology section of this report, there are a number of key differences between the figures generated in the EU Blue Economy report for Ireland's ocean economy compared to those generated in this report. *It should also be noted that there are differences in definitions and inclusion of industries across all studies that mean they are not directly comparable.* The USA, China and South Korea for example include the marine related public sector contribution in their statistics.

Table 4: Comparison of figures from ocean economy studies across countries

Country	Year	Direct Ocean GDP (€ billions)	% National GDP	% National Employment
USA	2020	352	1.7	1.5
Canada	2018	26.3	1.6	1.6
South Korea	2019	30.9	2.3	2.8
China	2019	1220	9	5
UK	2014	153	4.2	3
New Zealand	2017	2.3	1.8	1.3
Norway	2019	70.5	30	8.2
Australia	2018	28	2.3	2.1

Source: The original studies are referenced in the Data Sources appendix

Latest figures from the EU Blue Economy report estimate that the EU ocean economy accounted for approximately 4.45 million jobs and contributed €184 billion to EU GDP in 2019.

Table 5: EU Blue Economy Report (2019 data, published 2022)

Country	Direct Ocean GDP (€ billions)	% National GDP	% National Employment
Belgium	4.47	1	0.8
Croatia	3.6	8	9.9
Spain	32.8	2.9	4.6
France	22.4	1	1.4
Italy	24.4	1.5	2.4
Greece	8.3	5.1	15
Denmark	14	5.2	4.4
Netherlands	12.3	1.7	2
Portugal	5.8	3.2	5.5
Sweden	6.1	1.4	2.5
Ireland*	2.8	0.9	3.1

*EU reporting for Ireland does not include data for some industries where the data is not available from Eurostat e.g. oil and gas exploration and production.

Photograph ©Tourism Ireland

Ireland's Ocean Economy - Established Industries

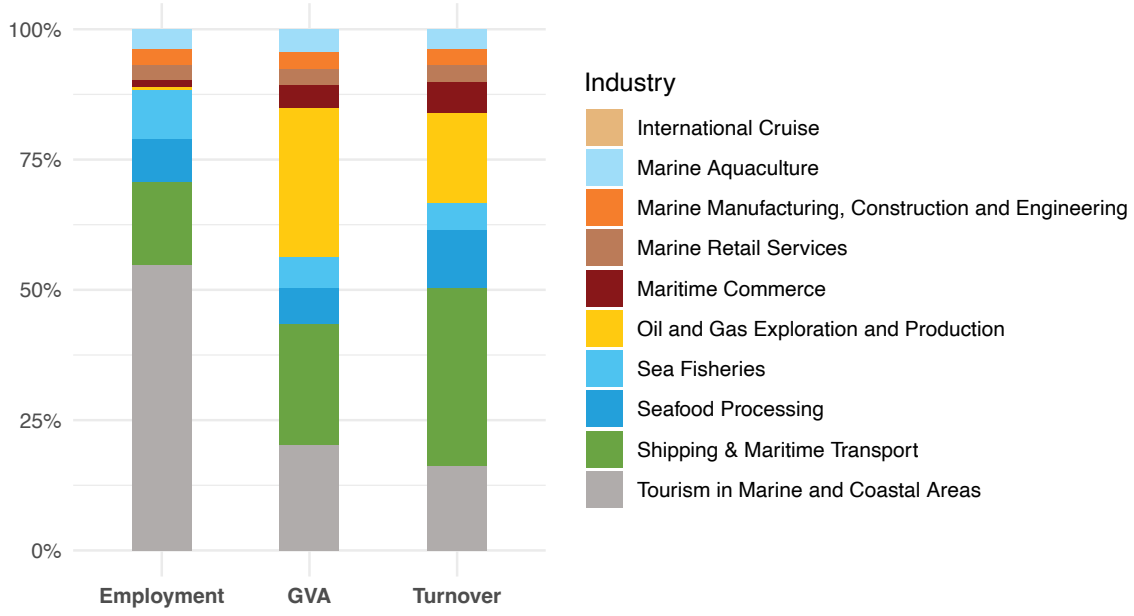
Ireland's Ocean Economy - Established Industries

- Shipping and Maritime Transport
- Tourism in Marine and Coastal Areas
- International Cruise
- Marine Retail Services
- Sea Fisheries
- Marine Aquaculture
- Seafood Processing
- Oil and Gas Exploration and Production
- Marine Manufacturing, Construction and Engineering
- Marine Commerce

Established Industries	2021 (estimates)
Turnover € 000's	€4,642,505
GVA € 000's	€1,964,564
Employment FTEs	30,256

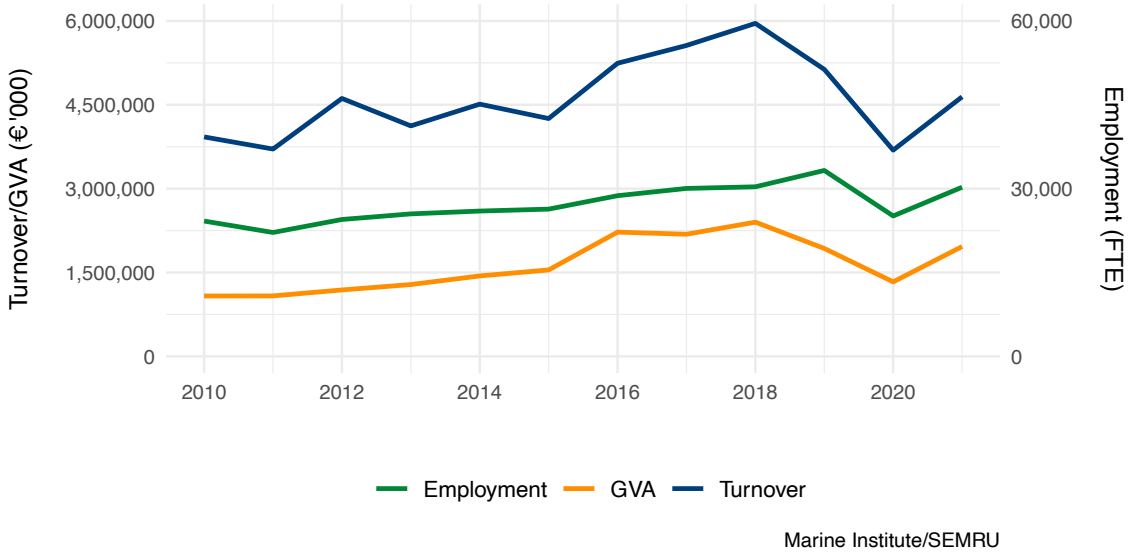
Ireland's established industries account for 93% of ocean economy turnover and GVA, and 94% of total employment. In terms of turnover, the largest contributory industry to Ireland's ocean economy was shipping and maritime transport. The largest industry in terms of GVA was the oil and gas exploration and production industry, with marine and coastal tourism remaining the largest contributor to employment.

Figure 4: Relative contribution (%) of each industry within the Established Marine Industries to turnover, GVA and employment, 2021



Although these industries are in a recovery phase after 2020, comparing 2021 estimates to the pre-Covid-19 pandemic year of 2019 shows a decrease in turnover of 9.5% and a decrease in employment of 9% (Figure 5). GVA increased by nearly 2% most likely due to the large increase in GVA in the oil and gas production industry due to higher energy prices in 2021.

Figure 5: Turnover, GVA and Employment; Established Marine Industries (2010-2021)



Marine Institute/SEMRU

Shipping and Maritime Transport

- Sea and coastal passenger water transport
- Sea and coastal freight water transport
- Services incidental to water transport
- Cargo handling
- Renting and leasing of water transport equipment
- Other transportation support activities

Location of activity:
The majority of shipping and maritime operations and services occur around commercial ports along the coast of Ireland: Cork, Drogheda, Dublin, Waterford, Dundalk, Dun Laoghaire, Galway, Shannon-Foynes.

Shipping and maritime transport provides supply chain integration and international trade connectivity for Ireland to the main global trade routes and markets. The industry has experienced significant disruptions in recent years due to Brexit, the Covid-19 pandemic and subsequent supply shocks. While freight transport saw a 6% decrease from 2018 to 2020, based on the iShip index[9], it has since recovered. The passenger transport segment of the industry experienced significant declines in passenger numbers in the period 2020-2021 due to travel restrictions but this has seen strong recovery in 2022[10]. The NACE category *H5229 - Other supporting transport activities* (which includes activities such as forwarding of freight, organising of transport operations by sea, activities of sea-freight forwarders and brokerage for ship space) is the key driver of the significant fluctuations observed for turnover and GVA in recent years for this industry.

Table 6: Shipping and Maritime Transport turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	2,215,776	2,316,353	1,834,510	1,463,047	1,587,667
GVA €000's	595,650	650,716	564,699	421,982	456,463
Employment FTEs	4,861	4,852	4,832	4,616	4,847
Turnover Annual Change	-	5%	-21%	-20%	9%
GVA Annual Change	-	9%	-13%	-25%	8%

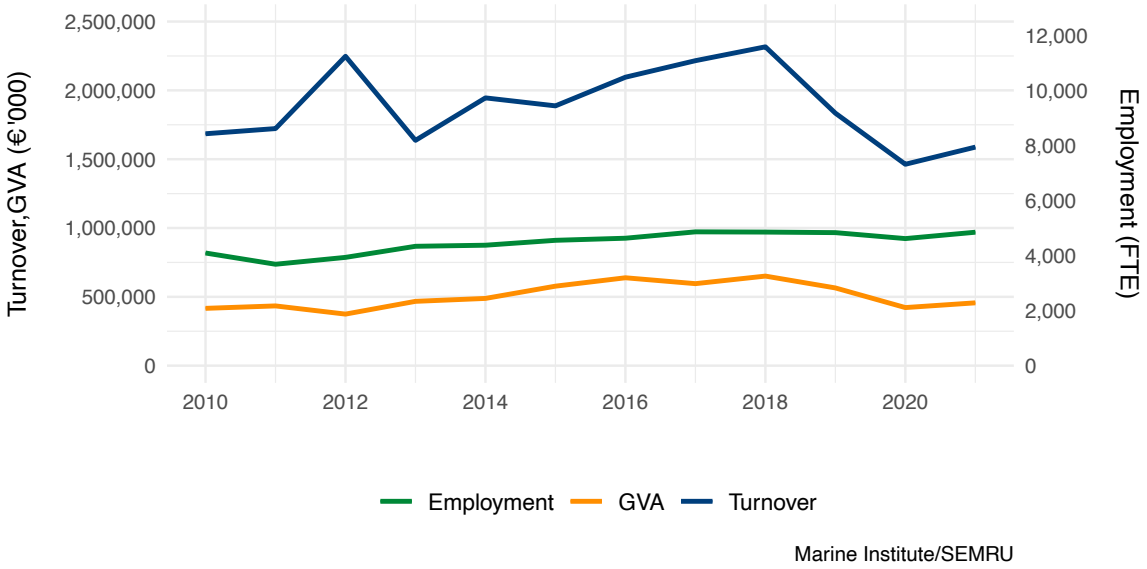
Source: CSO – Annual Services Inquiry (ASI), NACE Four-Digit Codes: 50.10, 50.20, 52.22, 52.24, 52.29, 77.34; IMDO iShip Index; CSO Quarterly National Household Survey; Figures for 2017 and 2018 are estimates[11]

[9] Irish Maritime Development Office (IMDO) (2022). The Irish Maritime Transport Economist Volume 19. Dublin, Ireland. http://hdl.handle.net/10793/1809

[10] CSO (2022). Air and Sea Travel Statistics September 2022 https://www.cso.ie/en/releasesandpublications/ep/p-ast/airandseatravelstatisticsseptember2022/

[11] See Appendix 1 for details on the methodology.

Figure 6: Shipping and Maritime Transport turnover, GVA and employment trends, 2010-2021



Source: CSO – Annual Services Inquiry (ASI), NACE Four-Digit Codes: 50.10, 50.20, 52.22, 52.24, 52.29, 77.34; IMDO iShip Index; CSO Quarterly National Household Survey; Figures for 2021 are estimates[12]

The years 2020 and 2021 saw significant constraints in terms of container shortages, lockdown-induced labour supply issues and general disruptions in supply chains. These constraints have eased in 2022, and in the latter half of the year have even reversed, leading to less port congestion and decreases in freight rates. Given the correlation between port activity and the trends in the national and global economy, growth in the shipping industry is expected to be sluggish, although the planned-for expansion in offshore wind energy offers additional growth opportunities for the port sector in the medium term.

Maritime transport and ports are also facing growing pressure to decarbonise and operate in a more sustainable manner. Shipping is expected to change its fuel mix and use new technology and ship designs. This also will require ports to invest in new fuel/energy infrastructure for berthing vessels. A recent study by SEMRU suggests that the impact of ships transitioning from fossil fuels to more expensive renewable and low carbon alternatives will not have any major effect on the economic performance of the industry in the short to medium term[13].

[12] See Appendix for details on the methodology.

[13] Ahearne, A and Cassidy, D. (2022). Implications of Fit for 55 on the Irish Maritime Sector and Wider Economy. Navigating to 2050 conference 15/16th November, Dublin Castle.

International Cruise Industry

The main ports of call for cruise liners include:

- Dublin
- Cork
- Waterford
- Galway
- Dun Laoghaire
- Bantry/Glengariff

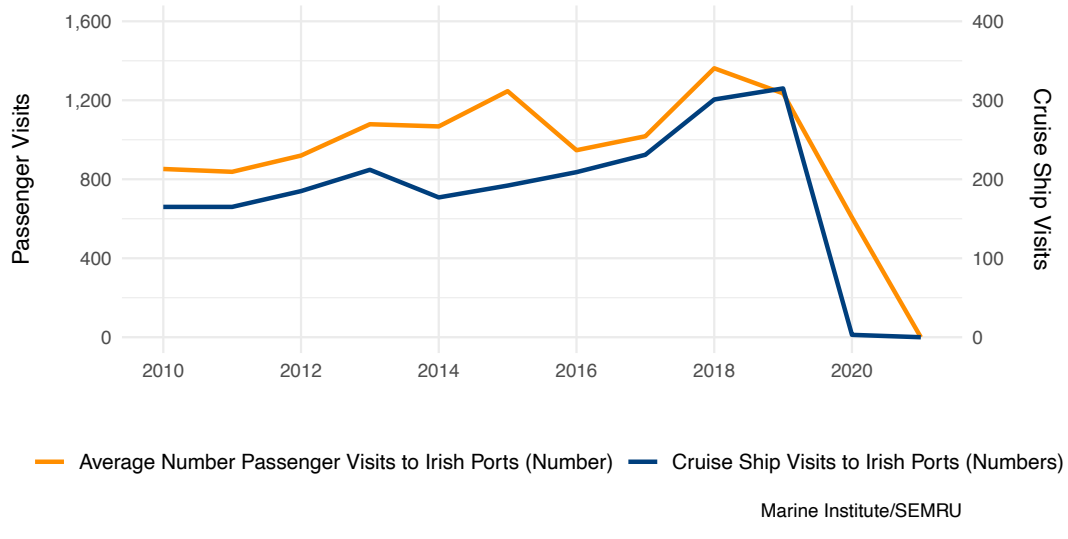
Before the Covid-19 Pandemic, cruise liner activity had seen significant growth in Ireland. However, with the Covid-19 outbreak, 2020 only saw three cruise liners visit Irish ports and, in 2021 there were none. This is in stark contrast to 2019 which saw the highest number of cruise ships berthed at Irish ports, 315, continuing the growth in the industry over the previous decade (Figure 7). The total expenditure by disembarking cruise passengers in 2019 was estimated at €55.1 million with GVA from cruise tourism expenditure in 2019 of €21.8 million (Table 7).

Table 7: International Cruise passengers, calls, expenditure, GVA, 2017-2021

	2017	2018	2019	2020	2021
Average passengers per port call	1017	1362	1348	606	0
Number of calls Irish ports	231	301	315	3	0
Total expenditure by disembarking cruise passengers €000's	36,627	51,439	55,139	201	0
Estimated Gross Value Added €000's	14,326	20,339	21,849	80	0
Expenditure Annual Change	-	30%	5%	-99%	-100%
GVA Annual Change	-	40%	7%	-99.6%	-100%

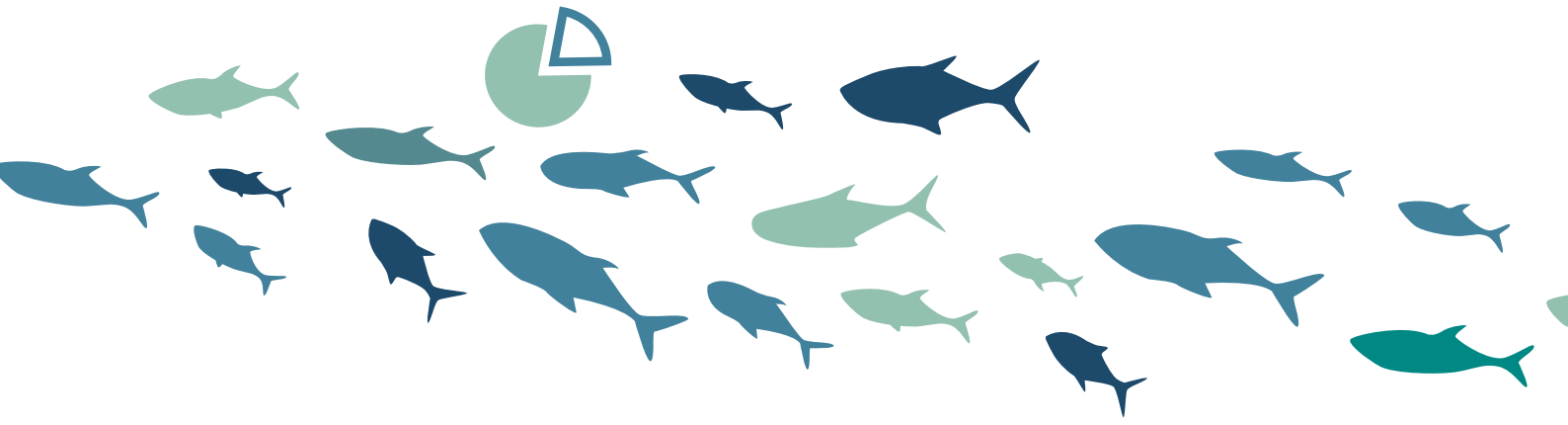
Source: IMDO - The Irish Maritime Transport Economist

Figure 7: Passenger and Cruise Ship visits to Irish Ports (Number) 2010 – 2021



Photograph © Tom Szumski

The international cruise industry has bounced back in 2022 although many ships are operating at lower capacity due to continuing Covid-19 restrictions[14]. Preliminary vessel numbers scheduled for 2023 suggest that the number of cruise ships visiting Irish ports may exceed the previous record set in 2019. There may also be a shift in the distribution of port traffic due to a cap on number of visits to Dublin Port introduced in 2021. This positive trend may be tempered by reductions in international tourism affected by tightening economic conditions and concerns regarding the Russian invasion of Ukraine.



[14] Healthy Gateways (2022). Guidelines for cruise ship operations in response to the COVID-19 pandemic https://www.healthygateways.eu/Portals/0/plcdocs/EUHG_Operational_guidelines_CoV_June2022.pdf?ver=2022-09-23-122422-017

Photograph © Chris Hill / Tourism Ireland

Tourism and Leisure in Marine and Coastal Areas

Watersports

- Sailing at sea
- Boating at sea
- Water skiing/Jet skiing
- Surfing, sail boarding
- Sea kayaking
- Scuba diving/ snorkelling
- Other sea sports

Seaside/Resort Trips

- Swimming in the sea
- Bird watching in coastal areas
- Whale/dolphin watching
- Visiting coastal natural reserves
- Other trips to the beach seaside and islands
- Coastal accommodation

Angling

- Sea angling from boats
- Sea angling from the shore

Location of activity:
Tourism and leisure in marine and coastal areas are offered all along the coast of Ireland. The Wild Atlantic Way, on the southern and western seaboard, is one of Ireland's key tourism offerings.

One of the key industries contributing to Ireland's ocean and coastal economies is tourism and leisure. Tourism and leisure in marine and coastal areas[15] continues to provide the highest employment numbers in Ireland's ocean economy. Due to the travel restrictions imposed during the Covid-19 pandemic, this industry saw significant falls in activity during 2020 and had not fully recovered by 2021. The industry contributed an estimated €1.3 billion in turnover in 2019 but saw a 58% decrease in 2020 to €557 million. There were associated falls in GVA and employment.

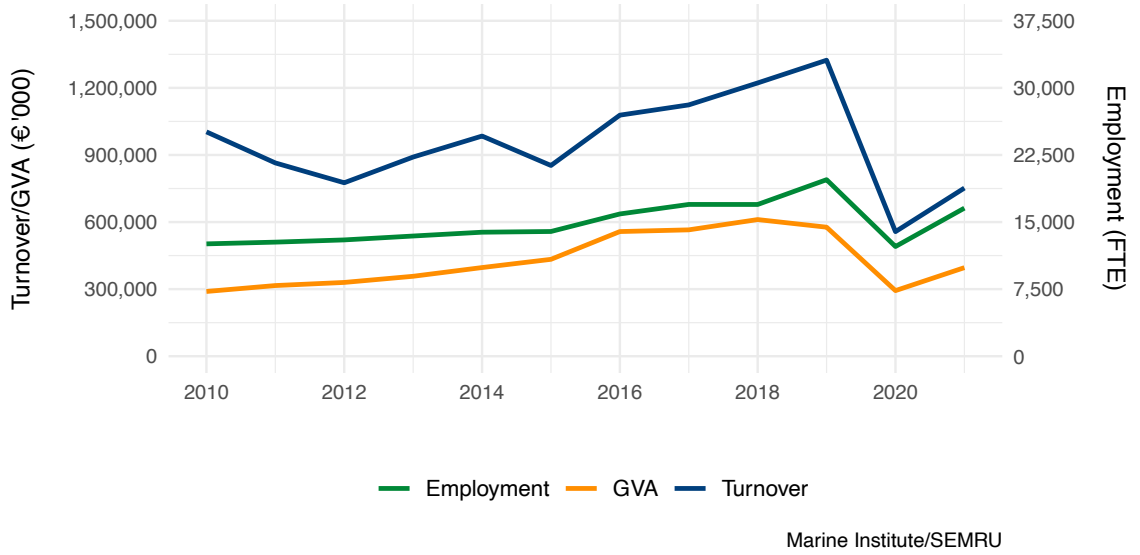
Table 8: Tourism and Leisure in Marine and Coastal Areas; turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	1,123,979	1,222,052	1,323,711	557,092	752,074
GVA €000's	565,133	611,154	577,056	293,424	396,122
Employment FTEs	16,970	16,964	19,736	12,264	16,556
Turnover Annual Change		9%	8%	-58%	35%
GVA Annual Change		8%	-6%	-49%	35%

Source: Source: CSO – Annual Service Inquiry (ASI); NACE Four-Digit Code: 5510, 5520, 5530, 9312, 9319, 9321, 9329; Fáilte Ireland statistics.

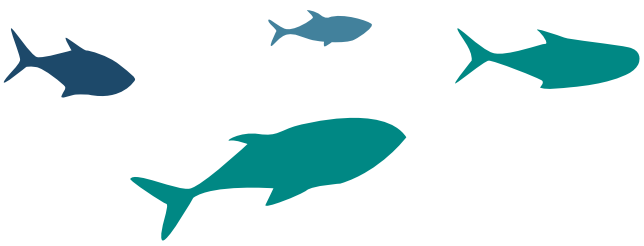
[15] For the purpose of this study, Marine and Coastal areas are defined as municipalities (LAU-2) that either border the sea or have 50% of their surface within a distance of 10 km from the sea). See the methodology in the Appendix for further details.

Figure 8: Tourism and Leisure in Marine and Coastal Areas; turnover, GVA and employment trends, 2010-2021



Source: CSO – Census of Industrial Production (CIP) NACE Four-Digit Code: 5510, 5520, 5530, 9312, 9319, 9321, 9329. Fáilte Ireland statistics.

Both Tourism Ireland[16] and ITIC[17] noted that 2022 saw a stronger than expected recovery due to pent up demand and higher savings. There is uncertainty if the trend will continue into 2023 with the industry facing a number of challenges. These include increasing interest rates, the invasion of Ukraine and cost of living increases that are expected to reduce demand due to rising prices and lower consumer confidence. At the same time, labour shortages and rising energy prices are increasing the costs for suppliers in the industry. At an operational scale, there is ongoing work needed to improve on the long-term sustainability of the industry[18]. A new Sustainable Tourism Policy is currently under preparation. Ensuring access for water-based activities is also an important objective outlined in the National Marine Planning Framework[19].



[16] Tourism Ireland (2022). Situation & Outlook Analysis Report October 2022 https://www.tourismireland.com/TourismIreland/media/Tourism-Ireland/Research/SOAR-October-2022_2.pdf?ext=.pdf

[17] ITIC (2022). Looking Ahead: Irish Tourism's Outlook https://www.itic.ie/RECOVERY/outlook-2023/

[18] Fáilte Ireland (2022). Tourism industry gather to drive collective Climate Action https://www.failteireland.ie/Utility/News-Library/Tourism-industry-gather-to-drive-collective-Climat.aspx

[19] DHLGH (2021). National Marine Planning Framework https://www.gov.ie/en/publication/60e57-national-marine-planning-framework/

Marine Retail Services

- Chandlery
- Boat sales
- Marine equipment sales
- Retail of seafood in fishmonger specialised stores
- Wholesale of seafood

Location of activity:
Marine Retail Services are located throughout Ireland, both along the coast and inland.

Marine Retail Services consist of various small and medium sized enterprises involved in the retailing of seafood in fishmonger shops, the sale of marine equipment, boat sales and chandlery.

The industry saw a decrease in turnover in 2019, mostly associated with a drop in the retail of seafood. Overall the industry managed to hold steady during the Covid-19 pandemic in 2020, with turnover of €137 million, GVA of €61 million and employment at 807 (FTEs).

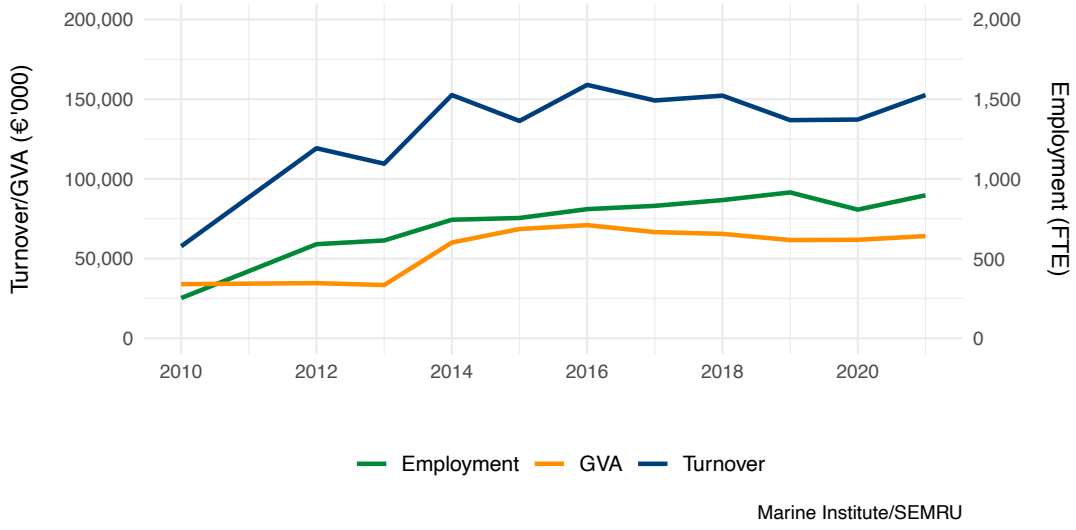
Photograph © Fáilte Ireland, Courtesy Resolute Photography

Table 9: Marine Retail Services; turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	149,195	152,255	136,857	137,232	152,602
GVA €000's	66,576	65,470	61,586	61,754	64,093
Employment FTEs	831	867	915	807	897
Turnover Annual Change		2%	-10%	0%	11%
GVA Annual Change		-2%	-6%	0%	4%

Source: SEMRU Company Survey, CSO – Annual Services Inquiry (ASI) NACE Four-Digit Code 47.23; CSO – Retail Services Inquiry; CSO – National Household Survey; Figures for 2021 are estimates.

Figure 9: Marine Retail Services turnover, GVA and employment trends, 2010-2021



Source: SEMRU Company Survey, CSO – Annual Services Inquiry (ASI) NACE Four-Digit Code 47.23; CSO – Retail Services Inquiry; CSO – National Household Survey; Figures for 2021 are estimates.

The marine retail industry is subject to similar challenges and opportunities as the overall retail sector in Ireland, while boat sales and marine equipment sales are more exposed to foreign currency risks. Consumer confidence, as measured by the Credit Union Consumer Sentiment Index[20], a key indicator for retail trade, was at its lowest in September 2022 but has since recovered slightly due to newly introduced Budget measures. There is still considerable uncertainty in the overall retail environment due to increases in the cost of living and interest rates, which will result in an overall reduction in customer demand in the near term.

[20] Credit Union Consumer Sentiment Index (2022). Job worries weigh on sentiment in November Consumer Sentiment Index Credit https://www.creditunion.ie/news/latest-news/job-worries-weigh-on-sentiment-but-irish-consumers/#:~:text=The%20Credit%20Union%20Consumer%20Sentiment,of%2042.1%20seen%20in%20September.

Sea Fisheries

Fishing Segments

- Polyvalent
- Beam-trawl
- Pelagic
- Specific

Top Ten Species 2021 (Tonnage landed by Irish Fleet) Source: BIM

1. Mackerel
2. Blue whiting
3. Jack and horse mackerel
4. Crab
5. Nephrops
6. Monkfish
7. Haddock
8. Hake
9. Megrim
10. Scallop

Location of activity:
Fishing communities are distributed around the coast of Ireland. Breakdown of Employment by Region: North (16%), North East and South (7%), West (6%), South East (5%), and South West (4%)[21].

Turnover generated by the industry in 2020 was €264 million, representing a decrease in revenue of 8% from 2019. The Irish fishing fleet had approximately 1,391 active vessels in 2020 (a decrease of 8% from 2019), and provided direct employment for 2,684 FTEs[22] (an increase of 6% from the previous year).[23] Recently released statistics from the Sea Fisheries Protection Authority (SFPA) indicate a value of €303 million of landings by the Irish fishing fleet in 2021[24].

In terms of sustainability, the Marine Institute's 'Annual Review of Fish Stocks in 2021 and Management Advice for 2022' reports an increase in the number of sustainably fished stocks from 33 (in 2020) to 35 (in 2021) out of a total of 74 (47%), showing gradual progress towards long-term sustainable utilisation of the resource base since 2012[25]. A similar trend is expected for 2022, with 53% of stocks reported as sustainably fished.

Table 10: Sea Fisheries turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e[26]
Turnover €000's	275,127	280,606	286,773	263,950	244,153
GVA €000's	165,266	172,386	152,578	161,605	119,702
Employment FTEs	2,608	2,745	2,758	2,684	2,900
Turnover Annual Change		2%	2%	-8%	-8%
GVA Annual Change		4%	-11%	6%	-26%

Source: Bord Iascaigh Mhara (BIM); Scientific, Technical and Economic Committee for Fisheries (STECF) - The 2022 Annual Economic Report on the EU Fishing Fleet (STECF 22-06), Prellezo, R., Sabatella, E., Virtanen, J. and Guillen, J. editors, Publications Office of the European Union, Luxembourg, 2022, doi:10.2760/120462, JRC130578.

[21] BIM (2022). The Business of Seafood Report 2021

[22] 2020 data. 2021 estimates have been provided by BIM

[23] BIM (2022). Annual Fisheries Report. A Snapshot pf Ireland's Fisheries Sector.

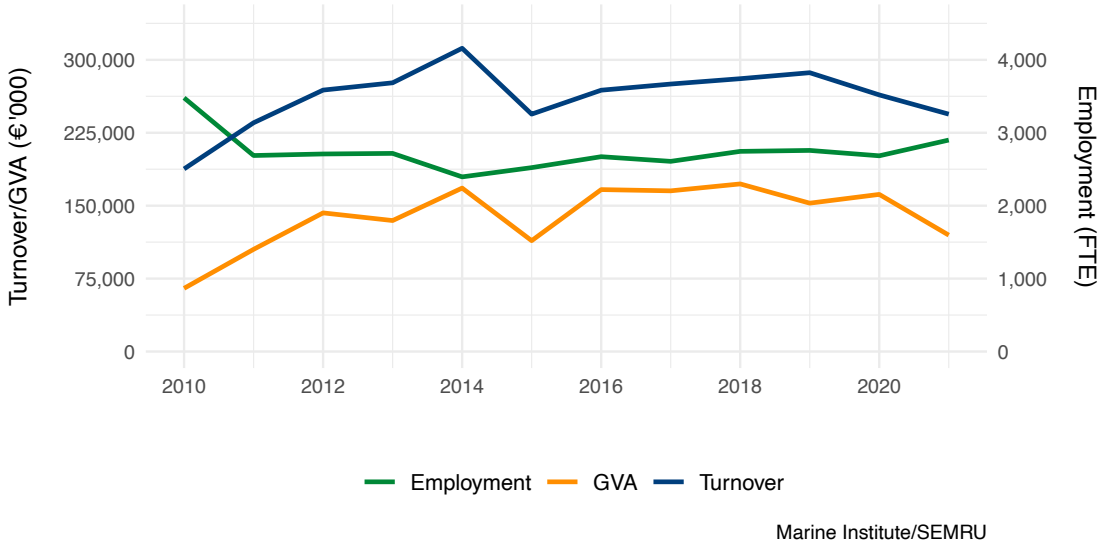
[24] https://www.sfpa.ie/Statistics/Annual-statistics/Annual-Statistics/2021-Statistics

[25] Marine Institute (2021). The Stock Book 2021: Annual Review of Fish Stocks in 2021 with Management Advice for 2022. http://hdl.handle.net/10793/1726

[26] This projection is based on STECF AER reporting and is expected to be updated in early 2023.

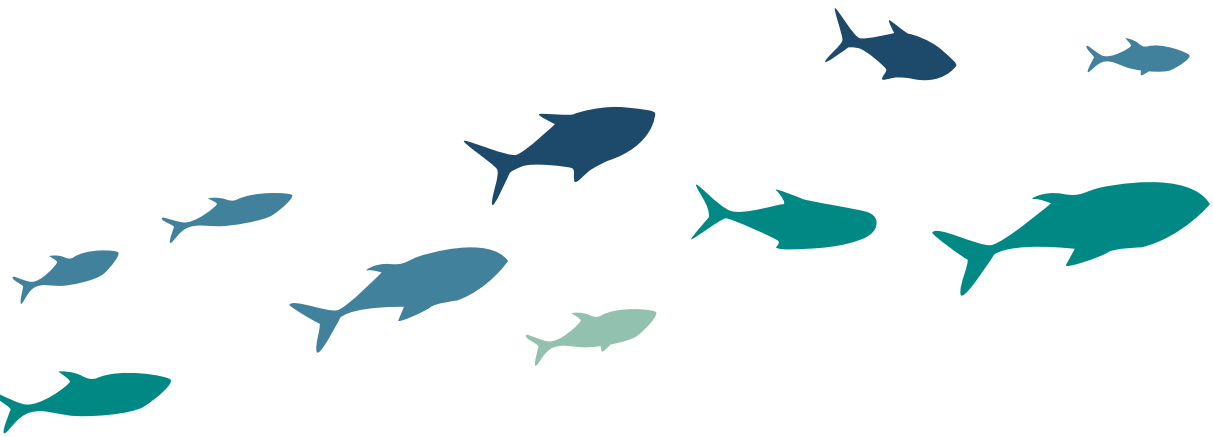
Photograph © Daniel Farrell and Ann Robinson, Coast Monkey

Figure 10: Sea Fisheries turnover and employment trends, 2010-2021



Source: Scientific, Technical and Economic Committee for Fisheries (STECF) - The 2022 Annual Economic Report on the EU Fishing Fleet (STECF 22-06), Prellezo, R., Sabatella, E., Virtanen, J. and Guillen, J. editors, Publications Office of the European Union, Luxembourg, 2022, doi:10.2760/120462, JRC130578.

Challenges for the sector are well documented by industry and government. These include quota reductions resulting from Brexit, as well as the impact of inflation and rising fuels costs. Ireland's Seafood Development Programme 2021-2027, aims to address a number of the challenges. This includes providing financial supports aimed at addressing climate actions such as reducing carbon emissions, replacement / modernisation of fishing vessels, as well as implementing recent EU environmental legislation aimed at minimising the impact of fishing activities on the marine environment. The Irish Government's commitments to expand MPAs to 30% by 2030, matched with the targets related to the introduction of offshore wind, are also important considerations for the industry.



Marine Aquaculture

Fin Fish

- Salmon
- Seawater Trout

Shellfish

- Rope Mussels
- Seabed Cultured Mussels
- Clams
- Bottom Mussels
- Scallops
- Irish Rock Oysters/ Pacific Oyster
- Native/Edulis Oyster
- Abalone
- Sea Urchins

Location of activity:
Shellfish aquaculture activities are widely distributed across the coast of Ireland, with particular concentrations in Co. Donegal, Connemara, Co. Galway, West Cork, Co. Waterford, Co. Wexford, and Carlingford Lough, Co. Louth. Finfish aquaculture is mainly restricted to the Western seaboard in counties Donegal, Mayo, Galway, Kerry and Cork.

The latest available data from BIM show the industry had a turnover of €175 million in 2019, with an estimated increase to €180 million in 2020[27]. Volumes are reported to have increased by 11% in 2021 (driven by shellfish primarily). Similar to the EU, difficult market conditions have led to price falls and declines in value for salmon. These price declines, however, are not seen in shellfish with strong performances reported in the oyster and the rope mussel sectors[28]. Employment in the industry has remained stable with BIM estimating an increase in FTEs in 2021 to 1,127 with an estimated 1,984 directly employed. Farmed shellfish and farmed finfish production accounted for 65% and 35% of overall aquaculture production volume respectively. Organic salmon continues to be the most valuable seafood export (€129 million)[29].

Table 11: Marine Aquaculture turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	200,571	179,456	175,289	179,784	178,879
GVA €000's	92,226	64,807	52,403	73,806	87,250
Employment FTEs	1,018	1,086	1,086	1,007	1,127
Turnover Annual Change		-11%	-2%	3%	-1%
GVA Annual Change		-30%	-19%	41%	18%

Source: EU Scientific, Technical and Economic Committee for Fisheries (STECF) – The Economic Performance of the EU Aquaculture Sector; Bord Iascaigh Mhara (BIM); Figures for 2017-2021 have been updated by Bord Iascaigh Mhara (BIM) as part of the Annual Economic Reporting to the STECF Committee arising from the Annual BIM Aquaculture Survey.

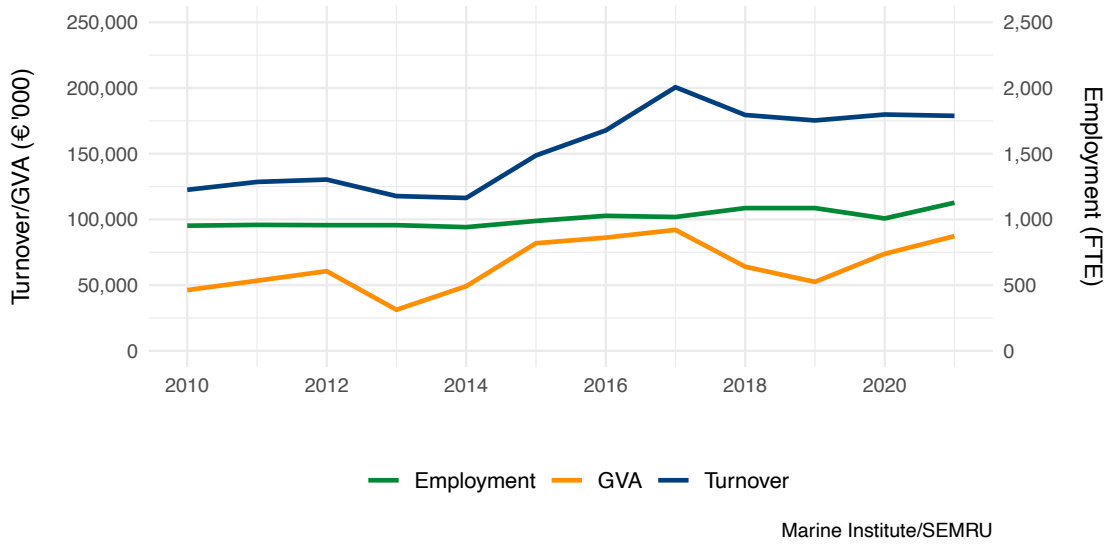
[27] BIM, pers comms

[28] BIM (2022). Business of Seafood 2021

[29] BIM (2022). The Business of Seafood 2021

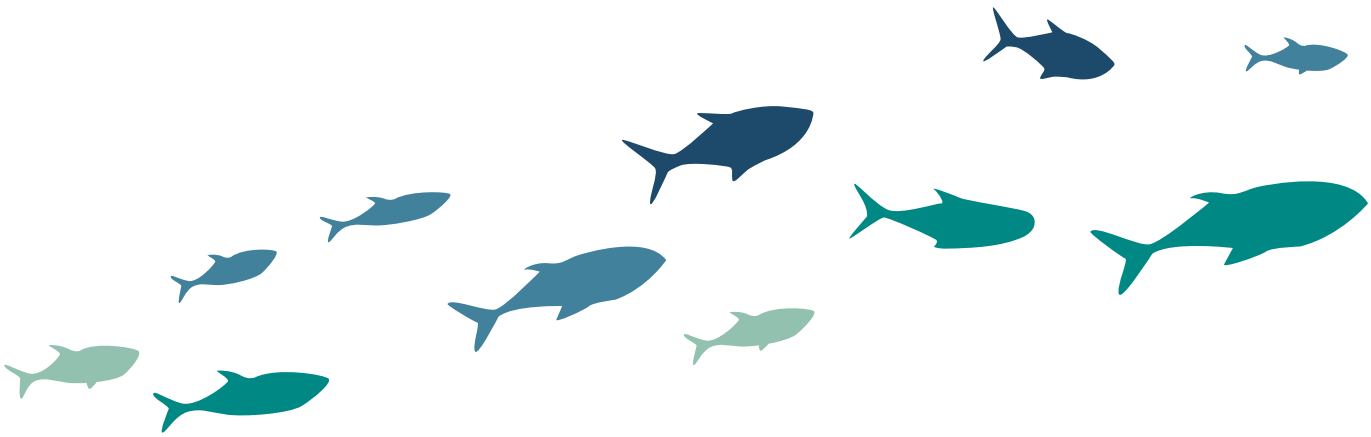
Photograph © Fionn O'Fearghail Marine Institute

Figure 11: Marine Aquaculture turnover , GVA and employment trends, 2010– 2021



Source: EU Scientific, Technical and Economic Committee for Fisheries (STECF) – The Economic Performance of the EU Aquaculture Sector; Bord Iascaigh Mhara (BIM); Figures for 2017-2021 have been updated by Bord Iascaigh Mhara (BIM) as part of the Annual Economic Reporting to the STECF Committee arising from the Annual BIM Aquaculture Survey.

In 2022, the Department of Agriculture, Food and the Marine launched a consultation on a new National Strategic Plan for Sustainable Aquaculture Development 2030 (NSPSA), which sets out a vision for the industry in line with the EU's new 'Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030'. Taking a 'food system' approach, the draft outlines the key priority areas of resilience and competitiveness; green transition; social acceptance; and increasing knowledge and innovation. The Strategy notes the previous targeted growth of significant output volume by 2023 and the lessons learned. The industry's growth will depend on challenges such as competing space, licensing (particularly for finfish licences) and social acceptance. Looking to the future, aquaculture has an important role to play in world food and protein output. The development of a Designated Marine Area Plan (DMAP) for aquaculture, as part of Ireland's National Marine Planning Framework (NMPF), will assist with achieving national and EU's Green Deal ambitions of transitioning to sustainable food production and consumption.



Seafood Processing

- Preparation and preservation of fish, crustaceans and molluscs
- Production of fish, crustacean and mollusc products
- Production of fishmeal for human consumption or animal feed
- Production of meals and solubles from fish and other aquatic animals unfit for human consumption
- Activities of vessels engaged only in the processing and preserving of fish

The Irish seafood processing industry is concentrated in the coastal regions of Donegal, Mayo, Cork, Kerry, Galway, the North East and the South East.

Turnover generated by seafood processing in 2020 was €483 million, estimated to increase by 6% in 2021 due to the recovery of exports. The year 2021 was very challenging for the industry with shortages in raw material supplies due to cuts in pelagic quota such as mackerel, as a result of the EU-UK Brexit deal. GVA for the industry was €134 million. GVA had been declining, with a 13% drop reported in 2019, rising again in 2020. Issues with raw materials in 2021 have resulted in an estimated 7% decline. Employment in the seafood processing industry was 2,371 FTEs in 2020, remaining relatively stable over the last five years.

Exports of primary seafood are estimated to be in the region of €485 million, with Bord Bia reporting a 6% increase over the last year. Influencing factors include a difficult 2021 for the pelagic sector, with mackerel quota decreasing due to the EU-UK Trade and Cooperation Agreement (TCA)[30]. Total shellfish exports were up by 25%, with good recovery reported by Bord Bia in Asian and EU markets.

Table 12: Seafood Processing turnover, GVA, employment, 2014, 2016 and 2018

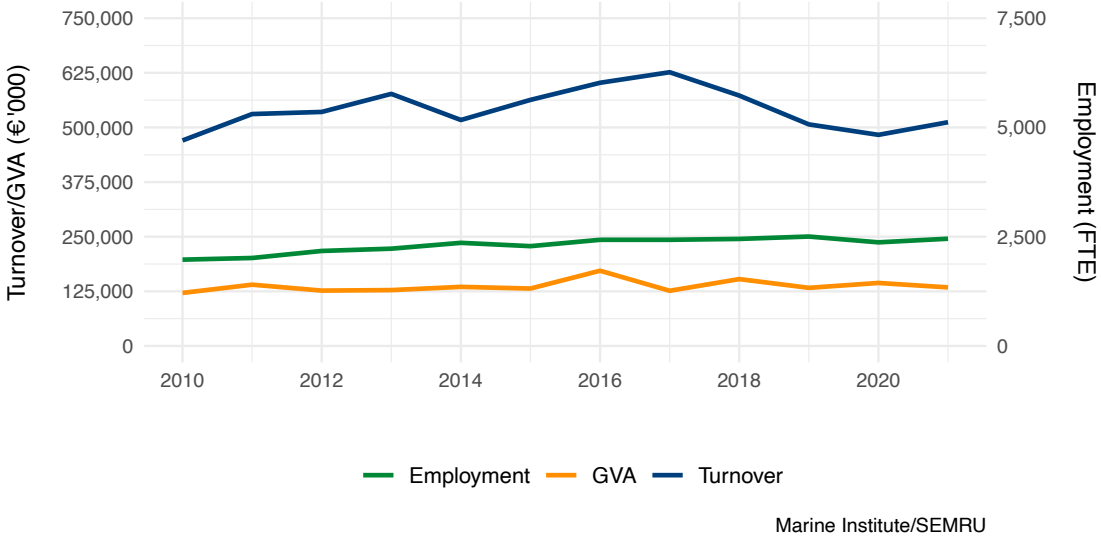
	2017	2018	2019	2020	2021e
Turnover €000's	626,378	573,000	507,000	483,100	512,000
GVA €000's	126,278	153,000	133,000	144,200	134,000
Employment FTEs	2429	2449	2504	2371	2454
Turnover Annual Change		-9%	-12%	-5%	6%
GVA Annual Change		21%	-13%	8%	-7%

Source: CSO – Census of Industrial Production (CIP) REV 2: NACE Four-Digit Code: 10.20; BIM Business of Seafood 2021[31]

[30] Bord Bia (2022). Export Performance and Prospects Report 2021-2022.

[31] See Appendix 1 for details on the methodology.

Figure 12: Seafood Processing turnover and employment trends, 2008-2021

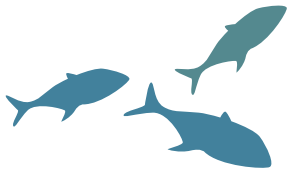


Source: CSO – Census of Industrial Production (CIP) 2012 – REV 1: NACE Four-Digit Code: 15.02; REV 2: NACE Four-Digit Code: 10.20; and Business of Seafood 2021 report[32]

The outlook for the industry is determined by the primary resource (capture fisheries and aquaculture), foreign vessel landings into Irish ports, as well as processing of imported raw materials. Cuts in quota for pelagic species, and the challenges outlined above, will impact on the industry. Bord Bia reports that a focus on value-added opportunities will be required to increase activity in the seafood industry.

[32] See Appendix for details on the methodology.

Oil and Gas Exploration and Production



- Extraction of crude petroleum
- Extraction of natural gas
- Support activities and natural gas extraction, including exploration services

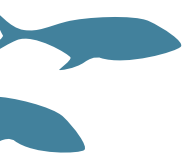
Location of activity:
Production is focused on the Corrib Gas field off the west coast of Mayo.

Ireland's oil and gas industry is focused mainly on the production of gas in the Northwest of Ireland from the Corrib gas field since 2016. Recently, the turnover and GVA in this industry has been highly volatile due to large swings in energy prices. A significant increase in prices for natural gas was seen in 2021 in particular, coming off the back of a large decrease in prices between 2019 and 2020. If the high prices continue, some of the industry's GVA may be captured by the Irish State if a windfall tax is introduced[33].

The industry had an estimated turnover of €800 million, a GVA of €562 million and employed an estimated 155 FTEs in 2021. With production in Corrib beginning in 2016, the industry saw significant initial growth with the volume of gas extracted slowing. The field was expected to cease production by the end of this decade, however, recent industry reports suggest that life expectancy of the site may be extended to 2038.

Table 13: Oil and Gas Exploration and Production turnover, GVA, employment, 2017-2021

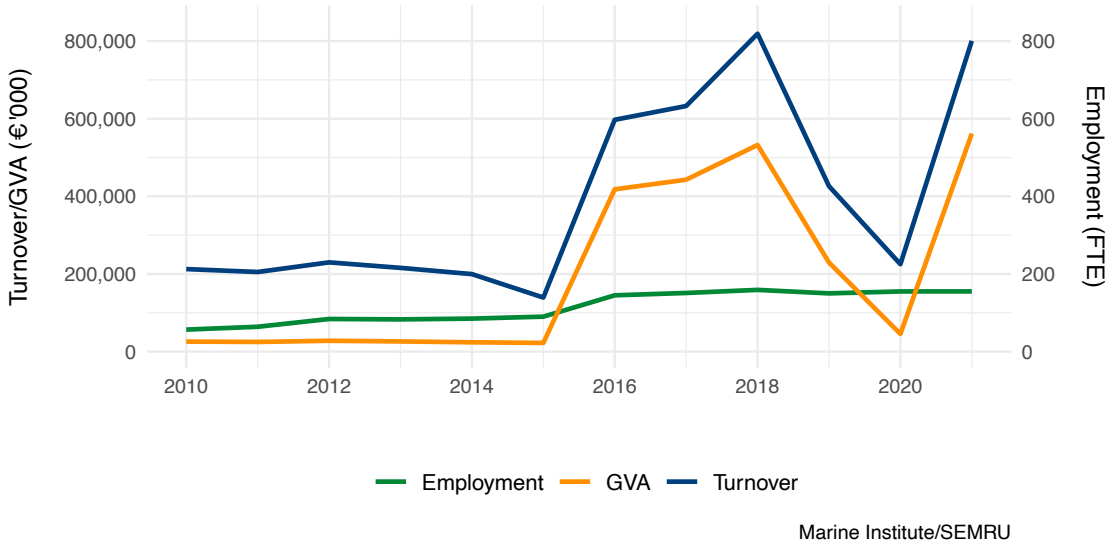
Marine Commerce	2017	2018	2019	2020	2021
Turnover €000's	632,761	819,000	426,290	225,226	800,633
GVA €000's	442,933	532,350	229,539	45,505	561,750
Employment FTEs	151	159	150	155	155
Turnover Annual Change		29%	-48%	-47%	255%
GVA Annual Change		20%	-57%	-80%	1134%



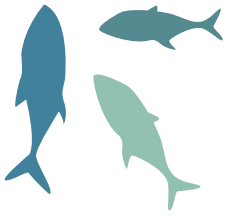
[33] Minister for Finance (2022). Dail Answer https://www.oireachtas.ie/en/debates/question/2022-06-02/210/

Photograph © Daniel Farrell and Ann Robinson, Coast Monkey

Figure 13: Oil and Gas Exploration and Production turnover, GVA and employment trends, 2010-2021



Energy prices have increased again in 2022 and are expected to remain high due to sanctions on Russia associated with its invasion of Ukraine in 2022. In the longer term, developments in this industry will be constrained by the Government's commitment not to issue new licenses for the exploration and extraction of gas and oil in Irish waters[34].



[34] Department of the Environment, Climate & Communications (2022). Policy Statement on Petroleum Exploration and Production in Ireland https://assets.gov.ie/231818/e707df54-6a03-44b7-acb3-c036a426263e.pdf

Marine Manufacturing, Construction and Engineering

- Boat and Related Equipment Manufacturing
- Boat Manufacturing
- Boat and Ship Repair
- Net manufacturing
- Water Construction
- Marine Industrial Engineering
- Other Marine Manufacturing
- Marine and Environmental Consultancy
- Safety & Security Services

Location of activity:
Companies involved in marine manufacturing are found throughout Ireland, both along the coast and inland. Clusters of particular marine product manufacturing can be found in certain areas, particularly in Co. Donegal (marine industrial engineering), Cork Harbour, and counties Galway and Cork (boat building).

Ireland maintains a sizeable marine construction, manufacturing and engineering industry composed mainly of specialised small and medium sized enterprises (SME's). Similar to the broader construction and manufacturing industries, the marine component experienced decreases in turnover, GVA and employment (FTEs) during the first year of the pandemic but saw slow recovery in 2021. GVA was more affected due to increased costs of materials associated with supply shocks. In 2021, the industry had a turnover of €141 million, a GVA of €61 million and employed 919 FTEs.

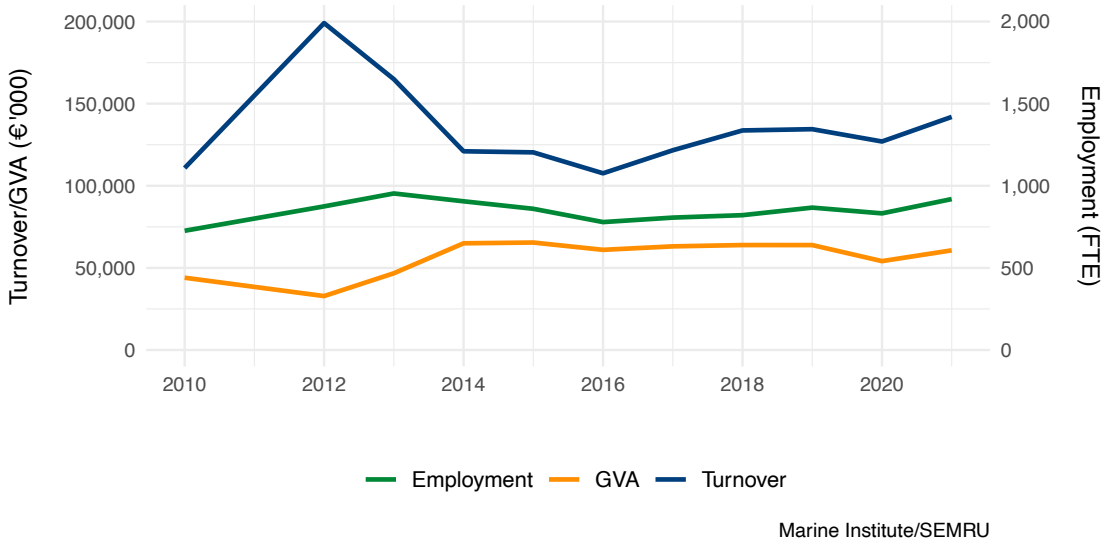
Table 14: Marine Manufacturing, Construction and Engineering; turnover, GVA and employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	121,613	133,703	134,462	126,969	141,952
GVA €000's	63,111	63,891	63,880	54,115	60,672
Employment FTEs	806	821	867	832	919
Turnover Annual Change	-	10%	1%	-6%	12%
GVA Annual Change	-	1%	0%	-15%	12%

Source: CSO – Census of Industrial Production; CSO – Building and Construction Inquiry; REV 2: NACE Four-Digit Codes: 30.11, 30.12, 33.15, 42.91; CSO – Industrial Turnover Index; CSO – National Household Survey; SEMRU Company Survey; Figures for 2017 and 2018 are estimates[35]

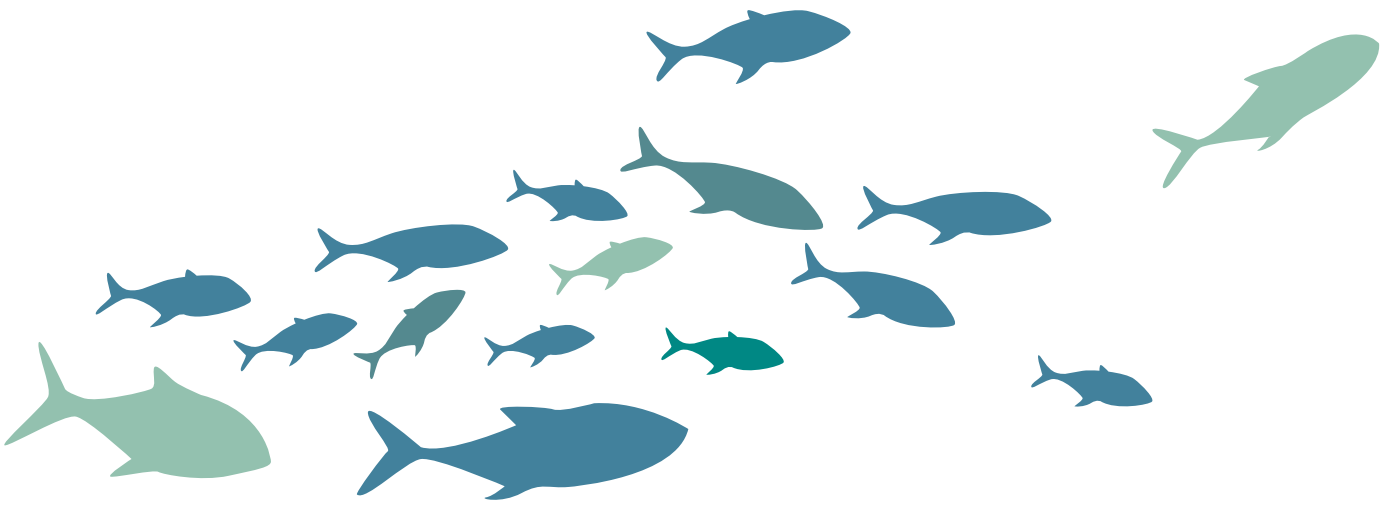
[35] See Appendix 1 for details on the methodology.

Figure 14: Marine Manufacturing, Construction and Engineering; turnover, GVA and employment trends, 2010-2021



Source: CSO – Census of Industrial Production; CSO – Building and Construction Inquiry; REV 2: NACE Four-Digit Codes: 30.11, 30.12, 33.15, 42.91; CSO – Industrial Turnover Index; CSO – National Household Survey; SEMRU Company Survey; Figures for 2017 and 2018 are estimates[36]

The industry's medium-term outlook is positive as there is expected to be significant construction and engineering work related to the development of the offshore wind industry. This will involve engineering consultancy services, construction of new infrastructure in harbours and ports to service the offshore platforms, and increases in the requirement for offshore service vessels. The industry faces challenges, particularly in finding suitably qualified and experienced personnel, as well as increased costs of construction materials and energy.



[36] See Appendix for details on the methodology.

Marine Commerce

- Marine Financial Services
- Marine Legal Services
- Marine Insurance
- Ship Surveyors

Spatial Distribution: Companies that provide marine commerce services are primarily located in Dublin, Cork and Galway. Other activities such as ship leasing and ship management services, which generally would be considered as important marine commerce activities, are already accounted for within the NACE codes used to calculate the figures for the Shipping and Maritime Transport industry.

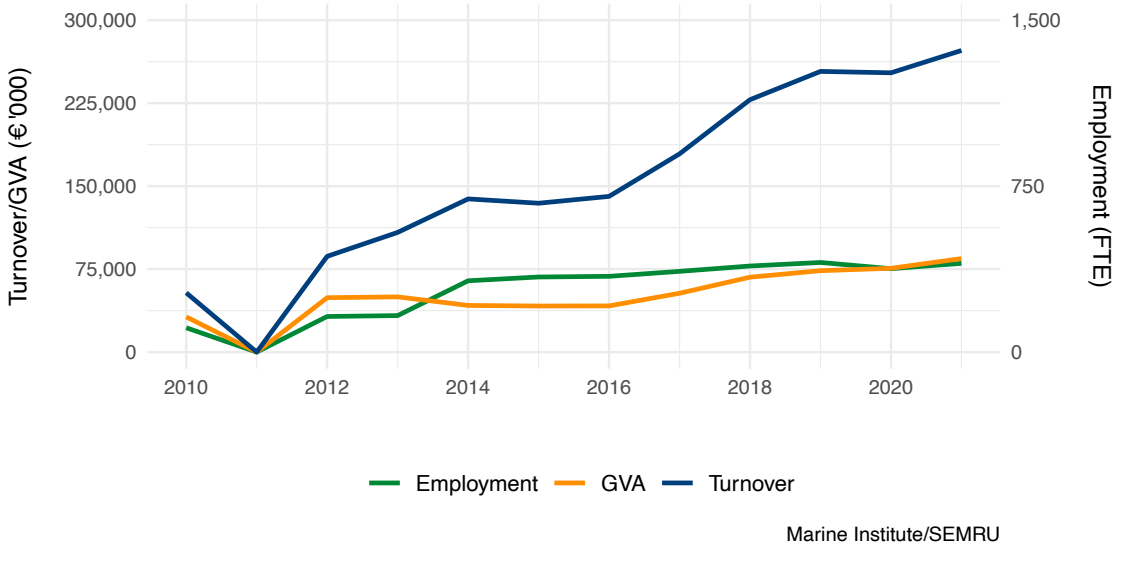
Marine/ maritime commerce is a growing service industry in Ireland. Overall, in 2021 the industry had a turnover of €272 million, GVA of €85 million and employs an estimated 401 FTEs. The industry grew by over 30% between 2017 and 2019. More moderate rates of growth were seen during the pandemic years of 2020 and 2021.

Table 15: Marine Commerce turnover, GVA and employment, 2017-2021

Marine Commerce	2017	2018	2019	2020	2021e
Turnover €000's	179,185	228,146	253,698	252,430	272,624
GVA €000's	53,174	67,700	73,572	75,729	84,513
Employment FTEs	365	389	405	377	401
Turnover Annual Change		27%	11%	0%	8%
GVA Annual Change		27%	9%	3%	12%

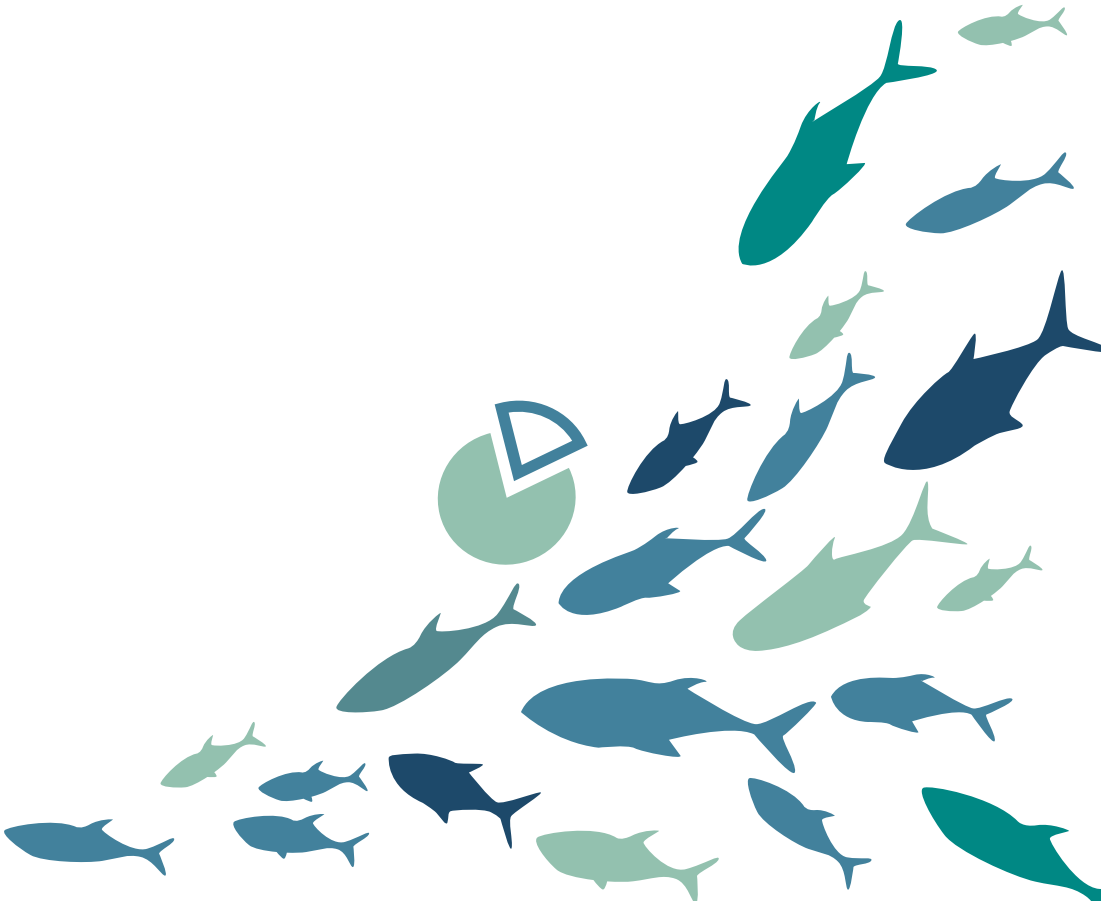
Source: Marine Institute/SEMRU Marine Enterprise Survey

Figure 15: Marine Commerce turnover, GVA and employment trends, 2010-2021



(Source: Marine Institute/SEMRU Marine Enterprise Survey)

After a period of uncertainty due to both Covid-19 and Brexit, the marine commerce industry is expected to maintain growth in the near term based on the industry being located in the only remaining English speaking country within the EU and the substantial experience that Ireland has in financial services more generally. Additionally, in the medium term there may be opportunities surrounding the expected expansion in offshore renewables particularly in regards to financing the purchase of assets such as ships, tugs and barges, port infrastructure and wind-farm servicing. Marine environmental and maritime law is also expected to increase.



Ireland's Ocean Economy - Emerging Marine Industries

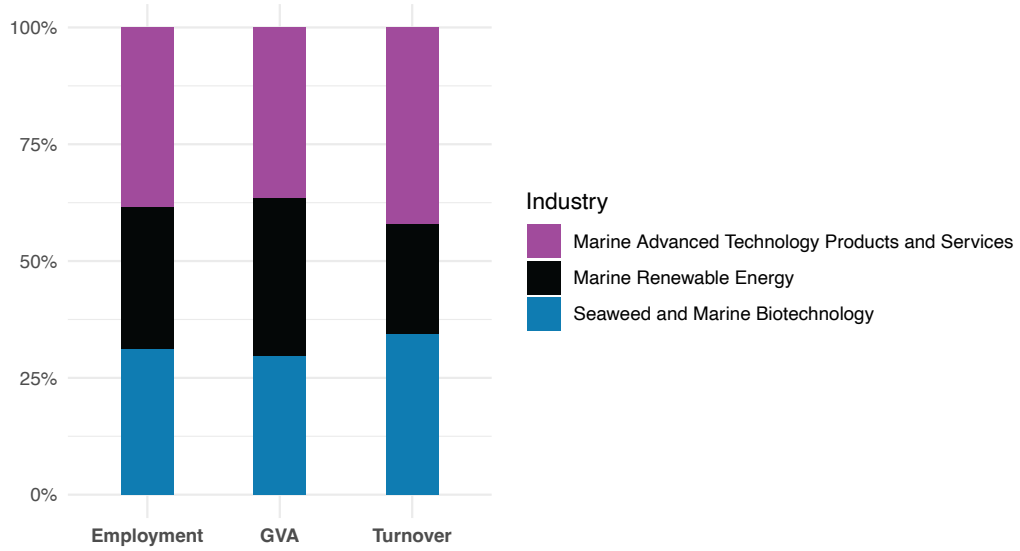
Ireland's Ocean Economy - Emerging Marine Industries

Advanced Marine Technology Products and Services
Seaweed, Marine Biotechnology and Bio-products
Marine Renewable Energy

Established Industries	2021e
Turnover € 000's	€335,300
GVA € 000's	€150,812
Employment FTEs	1,844

Emerging marine industries account for approximately 7% of Ireland's ocean economy (turnover and employment). Advanced marine technology products and services contributed the largest proportion across turnover, GVA and employment. This was followed by seaweed, marine biotechnology and bio-products for turnover and employment, and marine renewable energy for GVA (Figure 16).

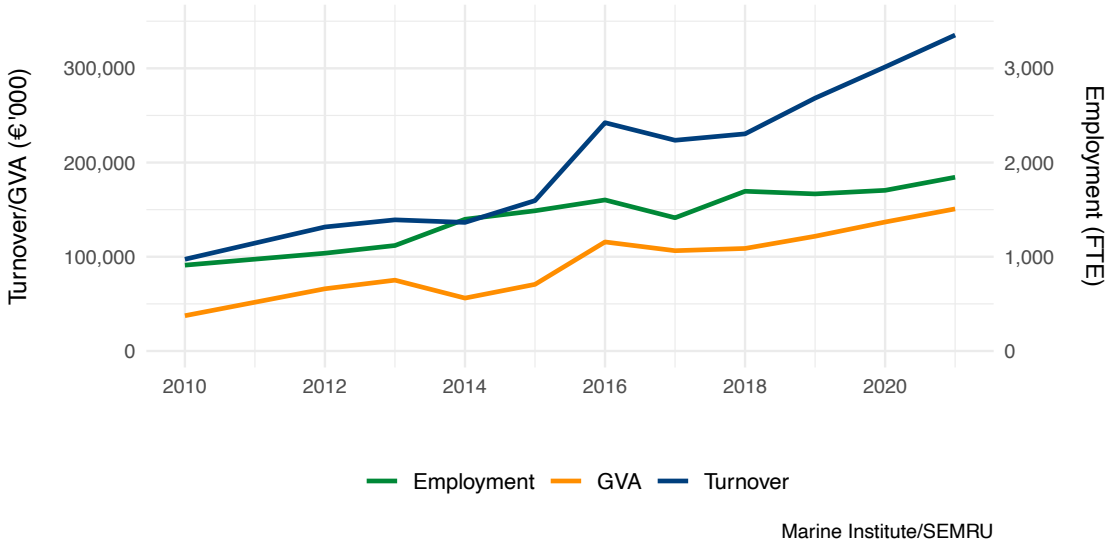
Figure 16: Relative contribution (%) of each subsector within Emerging Irish Marine Industries to turnover, GVA and employment, 2021



Photograph © Daniel Farrell and Ann Robinson, Coast Monkey

Overall, the emerging marine industries were able to maintain growth throughout the Covid-19 pandemic, averaging 12% growth in turnover and GVA from 2019-2021. Employment grew at a slower rate of 5% (Figure 17).

Figure 17: Turnover, GVA and employment; Emerging Marine Industries (2010-2021)



Advanced Marine Technology Products and Services

- Sensors
- Marine Instrumentation
- Meteorological Consultancy, Products & Services
- Marine Technology Development/ Solutions
- Aquaculture Technology
- Geo-Informatics Services
- Yacht Design
- Software

Location of activity:
Technology companies are located across Ireland, both on the coast and inland. However, the majority of companies are located within the larger cities, primarily Galway, Cork and Dublin.

Ireland's already existing capabilities in ICT and engineering has provided a solid foundation for marine technology markets and informatics. These companies create and support technology that is used across a variety of marine and maritime industries underpinning development, safety and sustainability throughout the 'blue economy'.

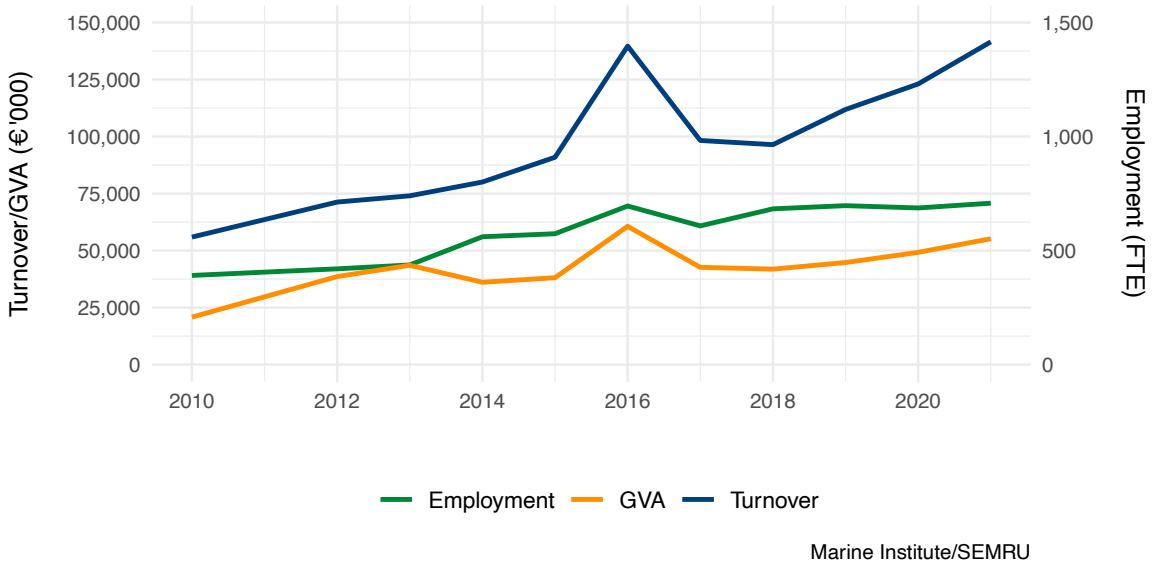
In 2021, turnover is estimated to have been €141 million, GVA €55 million and employment an estimated 708 FTEs (Table 16). As shown in Figure 18 this industry saw strong growth in recent periods, posting an increase during the pandemic.

Table 16: Advanced Marine Technology Products and Services; turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	98,287	96,452	111,884	123,072	141,533
GVA €000's	42,664	41,868	44,754	49,229	55,198
Employment FTEs	608	683	697	687	708
Turnover Annual Change		-2%	16%	10%	15%
GVA Annual Change		-2%	7%	10%	12%

Source: Marine Institute/SEMRU Marine Enterprise Survey

Figure 18: Advanced Marine Technology Products and Services; turnover, GVA and employment trends, 2010-2021



Source: Marine Institute/SEMRU Marine Enterprise Survey

Despite the recent strong growth in the industry, recent interest rate rises will increase the cost of external funding and may dampen the risk appetite of investors vital to the industry. With the industry dependent on research and development, some companies have had permitting issues for licencing their technology thus affecting the short-term outlook. In the long-term, development in other industries, particularly in relation to the automatisation and digitisation of port activities and navigation systems, offer growth opportunities for the industry.

Seaweed, Marine Biotechnology and Bio-products

- Seaweed Harvesting
- Whole or unprocessed foods and processed foods for consumption
- Industrial texturants, including foods, toothpaste and paints
- Plant fertilisers in agriculture
- Animal feeds in agriculture and fish feeds in aquaculture
- Bioactives and biostimulants for health, medicine and cosmetics

Location of activity:
Seaweed harvesting takes place around the coast of Ireland, with particular concentrations in Co. Galway, Co. Donegal, Co. Sligo, Co. Kerry and Co. Cork. Other activities in this industry are not confined to coastal counties and have a wide geographical distribution across the country.

In 2021, the seaweed, marine biotechnology and bio-products industry had an estimated turnover of €115 million, while total GVA generated was €45 million and employment amounted to an estimated 578 FTEs. This industry experienced an increase in turnover and GVA in recent years, even throughout the pandemic, as shown in Table 17.

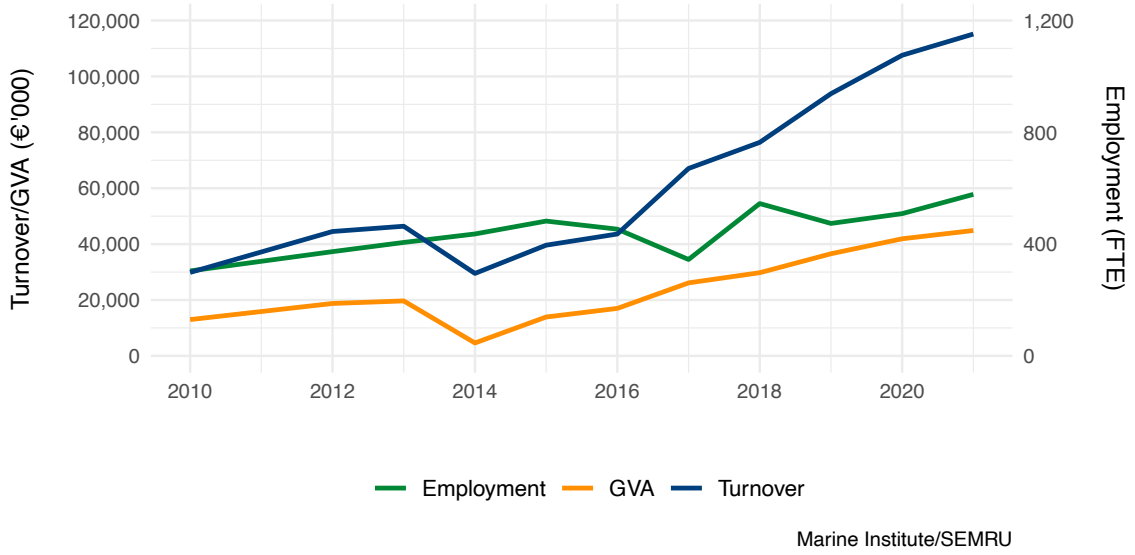
Table 17: Seaweed, Marine Biotechnology and Bio-products turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	67,068	76,409	93,830	107,579	115,174
GVA €000's	26,127	29,767	36,552	41,908	44,866
Employment FTEs	345	545	474	509	578
Turnover Annual Change		14%	23%	15%	7%
GVA Annual Change		14%	23%	15%	7%

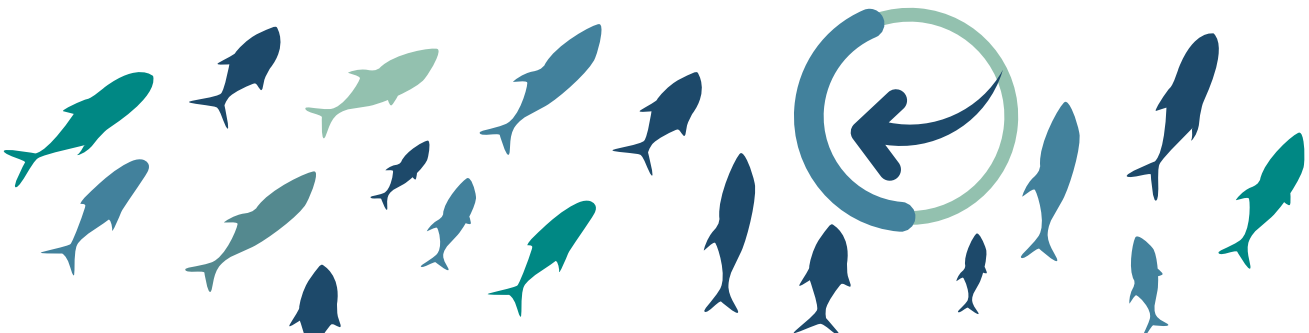
Source: MTU/Marine Institute/SEMRU Marine Enterprise Survey

Photograph © Daniel Farrell and Ann Robinson, Coast Monkey

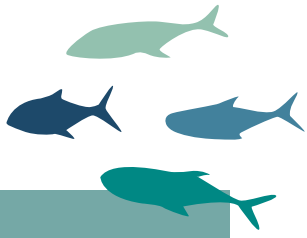
Figure 19: Seaweed, Marine Biotechnology and Bio-products turnover, GVA and employment trends, 2010-2021



The outlook for the seaweed, marine biotechnology and bio-products industry is positive, as demonstrated by recent increases in turnover and employment. A significant number of companies in this industry are involved in research and development, particularly on higher value-added products with larger companies focused on export markets. The industry still faces certain barriers and risks. Higher energy prices for processing of raw materials, securing supply of raw materials and issues with licensing were seen as barriers by respondents to the company surveys, while those reliant on export markets are open to currency risks.



Marine Renewable Energy



- Offshore Wind Energy Production and Services
- Wave Energy Production and Services (Pre-Commercial)
- Tidal Energy Production and Services (Pre-Commercial)

Location of activity:
Currently Ireland's only wind farm is located off the east coast and the Irish and Celtic Seas are where most activity is expected in the short-term, moving to the Atlantic coast using floating wind turbines in the longer term.

The marine renewable energy industry in Ireland is dominated by the generation of power from offshore wind which is expected to see significant growth in the near future driven by EU and Irish green energy policies, and the energy crisis associated with the Russian invasion of Ukraine.

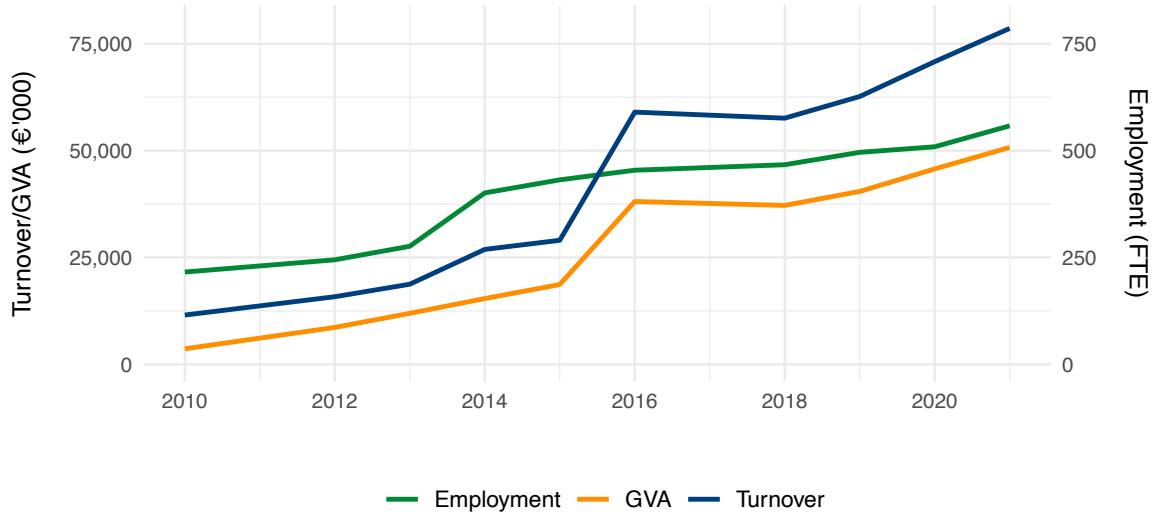
Overall, the industry in 2021 had a turnover of €79 million, GVA of €51 million and employed an estimated 558 FTEs. The industry has experienced steady growth since 2019. The turnover and GVA figures are reflective of current activity and do not necessarily reflect the substantial level of investment that Irish offshore companies and their subsidiaries are building up in anticipation of the expansion of this industry.

Table 18: Marine Renewable Energy turnover, GVA, employment, 2017-2021

	2017	2018	2019	2020	2021e
Turnover €000's	58,292	57,591	62,659	70,805	78,593
GVA €000's	37,640	37,187	40,459	45,719	50,748
Employment FTEs	461	467	496	509	558
Turnover Annual Change	-	-1%	9%	13%	11%
GVA Annual Change	-	-1%	9%	13%	11%

Source: Marine Institute/SEMRU Marine Enterprise Survey

Figure 20: Marine Renewable Energy turnover, GVA and employment trends, 2010-2021



Marine Institute/SEMRU

The outlook for this industry is positive, with the Irish Government increasing the 2030 offshore wind target from 5GW to 7GW by 2030[37] and the passage of the Maritime Area Planning Act[38] establishing a new marine planning body, the Maritime Area Regulatory Authority (MARA). These changes will provide further confidence to the offshore industry in terms of making investment and helping to lower the risks. In October 2022, Phase One maritime area consents for offshore wind have been granted[39], allowing these projects (comprising nearly 4GW) to begin their planning applications.

In the longer term, the Atlantic is expected to see significant development based on floating offshore wind, with recent analysis showing that wind energy in general could create GVA of between €170-€400 million in the region by 2037, with 80% of this related to offshore wind[40]. Despite this positive outlook, barriers identified by the industry include concerns regarding the level of state capacity in marine planning and grid connections processing, and being able to secure sufficient staff with the right experience and qualifications.

[37] Government announces Sectoral Emissions Ceilings (2022). https://merrionstreet.ie/en/news-room/news/spotlights/government_announces_sectoral_emissions_ceilings_setting_ireland_on_a_pathway_to_turn_the_tide_on_climate_change.174624.shortcut.html

[38] Maritime Area Planning Act (2021). https://www.irishstatutebook.ie/eli/2021/act/50/enacted/en/html

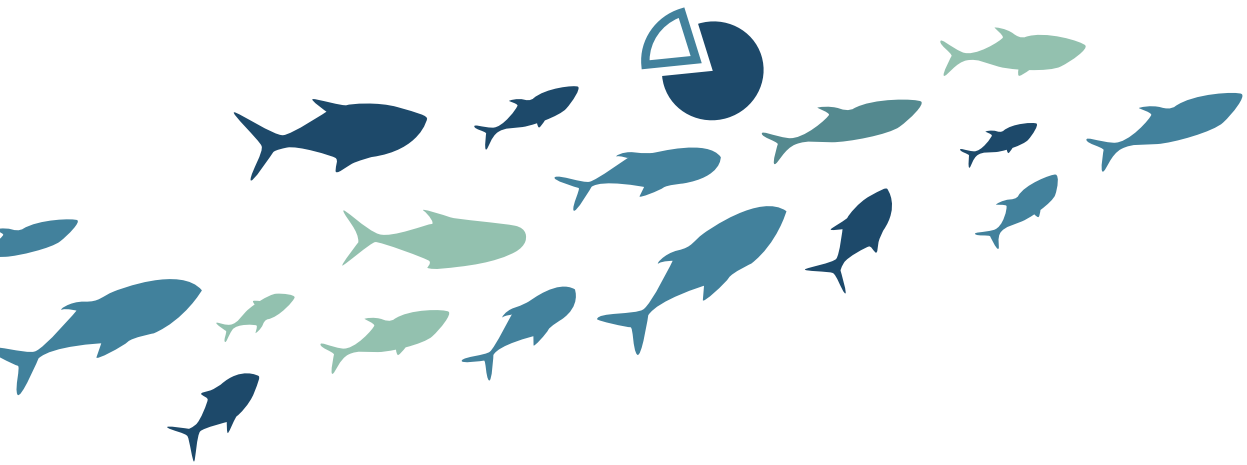
[39] https://www.gov.ie/en/press-release/d73ed-government-approves-terms-and-conditions-for-first-offshore-wind-auction-under-the-renewable-electricity-support-scheme/

[40] Dublin Offshore (2022). Growth of Onshore to Offshore Wind – Atlantic Region Wind Energy & Supply-Chain Feasibility Study https://westerndevelopment.ie/wp-content/uploads/2022/10/Growth-of-Onshore-to-Offshore-Wind-Atlantic-Region-Full-Report.pdf

Spatial Distribution of Enterprises and Employment in Ireland's Ocean Economy

The ocean economy, as detailed in this report, measures the marine related economic activities, whereas, the coastal economy measures any economic activity in the coastal zone irrespective of its relationship to the marine. However, these aren't as separate as the definitions might imply as a majority of businesses related to many ocean economy industries are based in the coastal zone. It is these businesses that link economic activity in the ocean economy to the communities in the coastal areas. Those coastal areas with high concentration of marine related businesses strengthen their links to the sea. Without sufficient diversification these areas may be exposed to sector specific risks.

Using the Marine Institute's Marine Business Directory, the density of marine businesses is mapped out in Figure 21 based on the number of marine businesses per electoral district (ED). Some individual coastal regions are shown in Figure 22. It is clear from the figures that coastal EDs have, as expected, a higher density of marine businesses. Recent work by the Marine Institute and SEMRU has expanded on this mapping approach by using a spatial microsimulation model to map the spatial distribution of marine related employment in Ireland. This allowed the impact of Covid-19 on the employment in the ocean economy to be assessed at micro regional level in Ireland[41].



[41] Hynes, S., O'Donoghue, C., Burger, R., and O'Leary, J. (2021). Spatial Microsimulation for Regional Analysis of Marine Related Employment. *Journal of Ocean and Coastal Economics*, 8(2), 5. https://doi.org/10.15351/2373-8456.1149

Figure 21: Marine Related Business per Electoral Division.

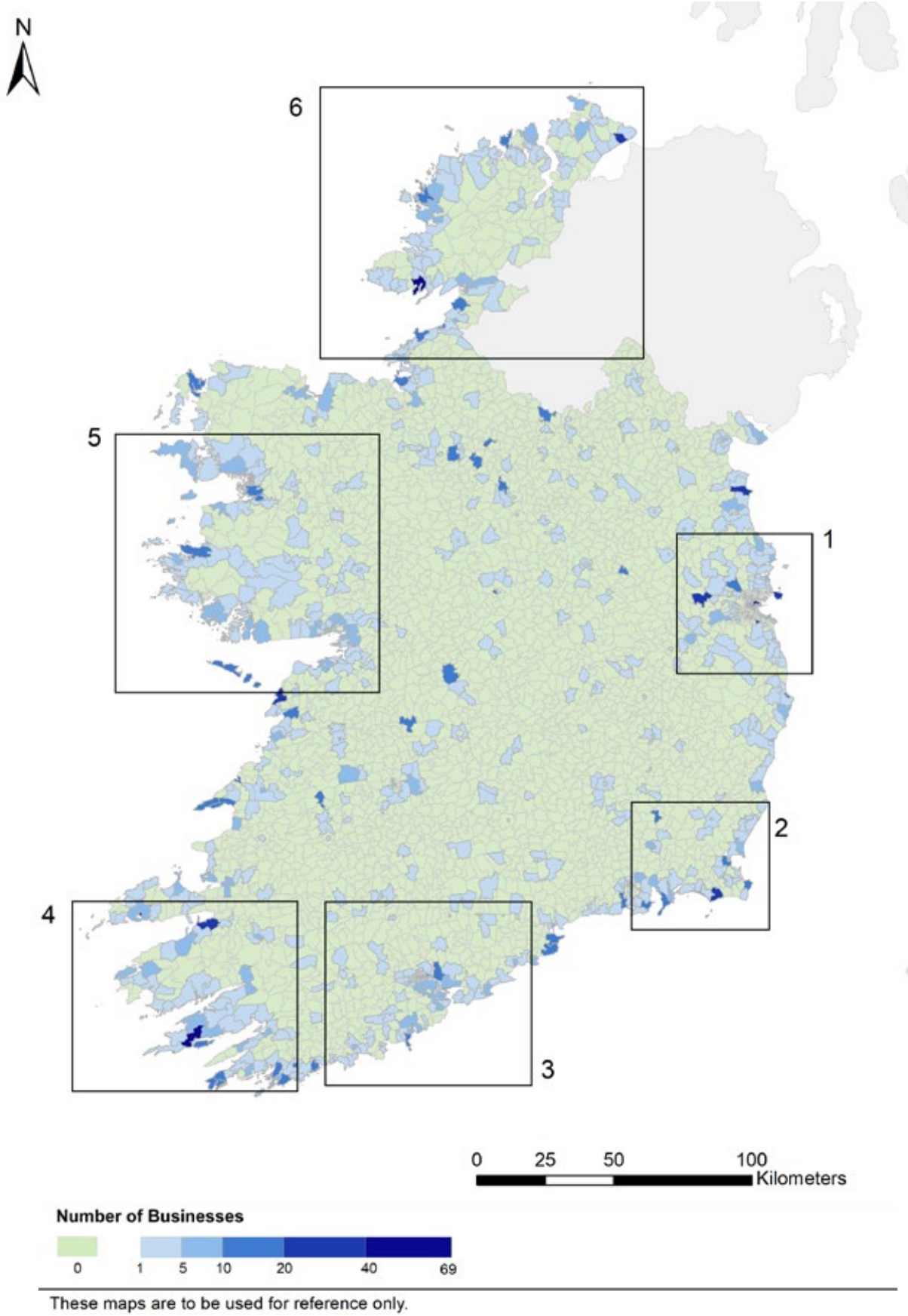
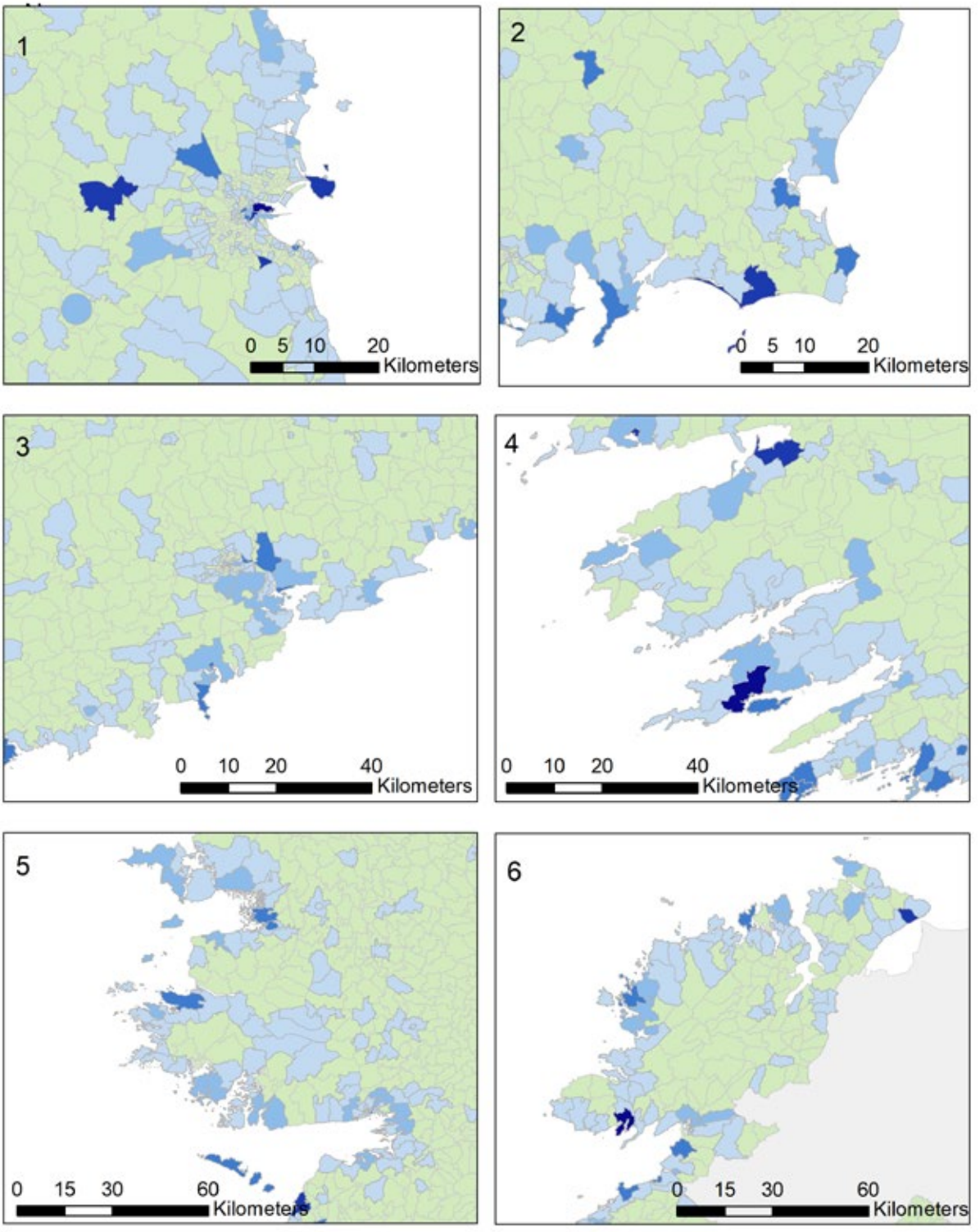


Figure 22: Marine Business per Electoral Division (Regions)

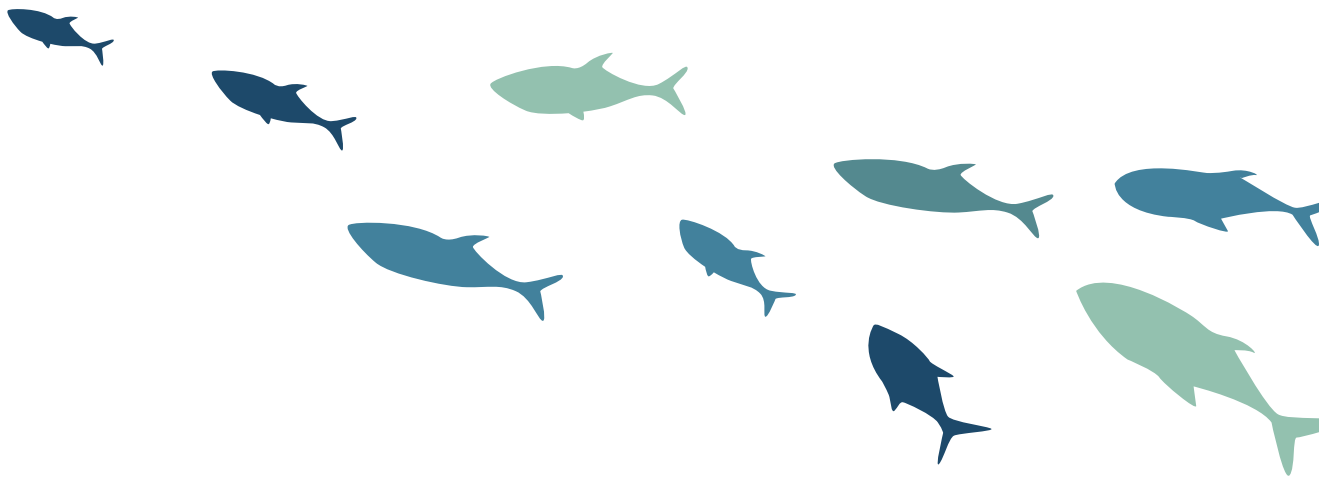


Ireland's Coastal Economy

Based on the 2016 census figures, the CSO[42] found that 40% of the Irish population lived 5km or less from the sea. With this in mind, a key objective under the 'Thriving Maritime Economy' section of the National Marine Planning Framework is to "promote the development of vibrant, accessible and sustainable rural coastal and island communities"[43]. Population size and growth are important determinants of economic growth and, in turn, vibrant coastal communities. Using the preliminary population estimates from the Census 2022[44], the differences in the changes in population of coastal areas compared to nationally for the period 2016-2022 are examined.

Characteristics of Ireland's coastal regions vary based on the definition used. In this report, we have aligned our definition of coastal areas with the EU Tercet definition of a coastal local administrative unit (LAU), that is "A coastal area consists of those municipalities that border the sea or that have 50% of their surface within a distance of 10km from the sea".

Using the Maritime Area Planning Act[45] definition of sea, which includes tidal water bodies, 1,527 Electoral Districts (EDs) were classed as coastal (See Figure 23). The urban/rural designation for EDs was defined using population weighted Central Statistics Office (CSO) Small Areas urban or rural definition[46] and are shown in Figure 24.



[42] CSO (2017). Census of Population 2016 - Profile 2 Population Distribution and Movements https://www.cso.ie/en/releasesandpublications/ep/p-cp2tc/cp2pdm/pd/

[43] DHLGH (2021). National Marine Planning Framework https://www.gov.ie/en/publication/60e57-national-marine-planning-framework/

[44] CSO (2022). Census of Population 2022 - Preliminary Results https://www.cso.ie/en/csolatestnews/presspages/2022/censusofpopulation2022-preliminaryresults/

[45] Maritime Area Planning Act (2021). https://www.irishstatutebook.ie/eli/2021/act/50/enacted/en/html

[46] CSO (2019). Urban and Rural Life in Ireland, 2019 https://www.cso.ie/en/releasesandpublications/ep/p-urli/urbanandrurallifeinireland2019/

Figure 23 (Left): Coastal areas in Ireland.
Figure 24 (Right): Urban and rural electoral divisions in Ireland

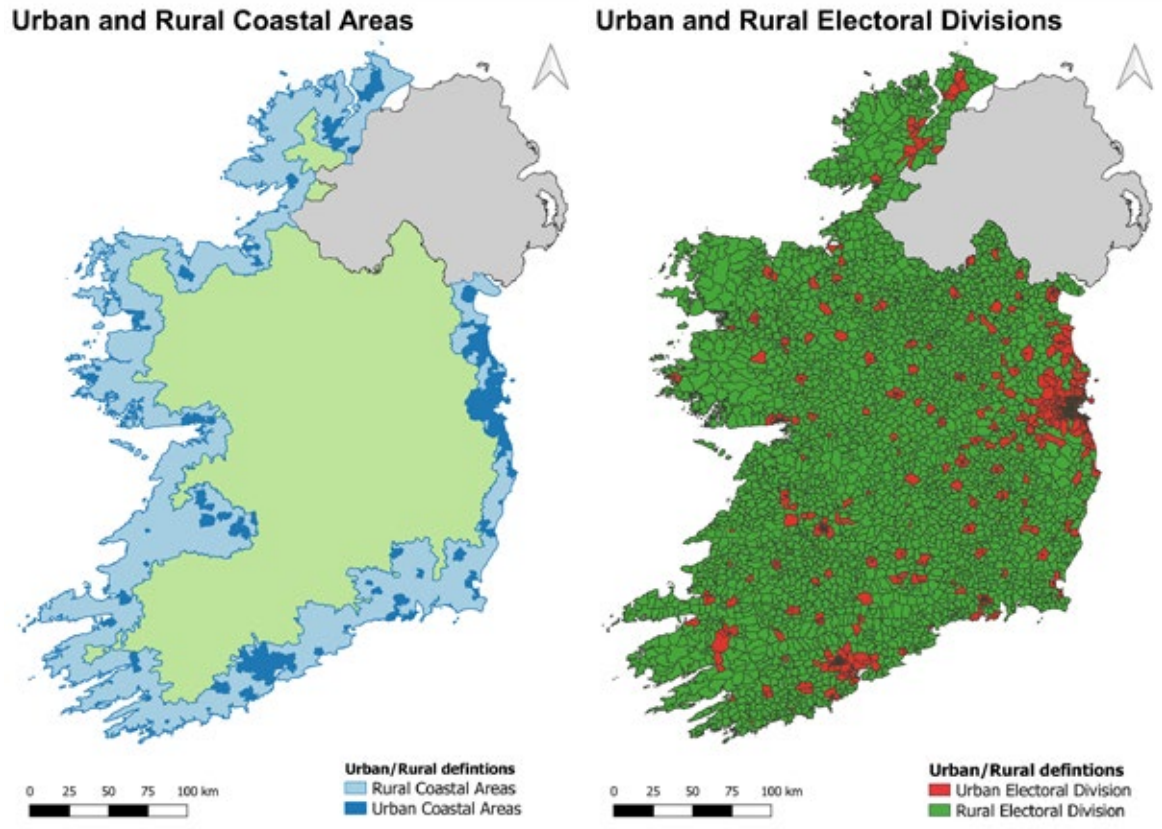


Table 19 shows the census 2022 population breakdown nationally and by NUTS 2 regions. Nationally, nearly 63% of Ireland's population lives in a coastal area, with nearly half living in a coastal urban area. This is driven by the location of Ireland's cities around the coast.

Examining the NUTS2 regions, it can be seen that the Eastern and Midland region has over two thirds (67%) of its population in the coastal area compared to the Northern and Western region, which has less than half (46%). Looking at the coastal rural areas, the Northern and Western region has the highest proportion, with nearly a quarter of their population living in their coastal rural areas. This contrasts again with the Eastern and Midland region where only 2.6% of the region's population live in a coastal rural area. This reflects the high proportion of urban EDs along this region's seaboard.

Photograph © Daniel Farrell and Ann Robinson, Coast Monkey

Table 19: Preliminary census 2022 population estimates in coastal areas and as a percentage of overall population in coastal areas

Region	Population	Coastal Areas	Coastal Urban Areas	Coastal Rural Areas
National Total	5,123,536	3,200,264	2,514,802	685,462
	(100%)	(62.5%)	(49.1%)	(13.4%)
Eastern and Midland	2,529,358	1,696,143	1,630,256	65,887
	(100%)	(67.1%)	(64.5%)	(2.6%)
Northern and Western	900,937	412,227	189,300	222,927
	(100%)	(45.8%)	(21.0%)	(24.7%)
Southern	1,693,241	1,091,894	695,246	396,648
	(100%)	(64.5%)	(41.1%)	(23.4%)

Table 20 presents population growth both nationally and across the three NUTS2 regions. Nationally, the Irish population is the highest recorded in a census since 1841. Irish population growth is currently one of the highest in the EU and is projected to experience the second highest growth (37% increase) across EU countries up to 2100[47].

Table 20: Population change in Ireland and its coastal areas

Ireland	2016	2022	% Change 2016 - 2022
National Total	4,761,865	5,123,536	7.6%
Coastal	2,987,460	3,200,264	7.1%
Coastal Urban	2,342,016	2,514,802	7.4%
Coastal Rural	645,444	685,462	6.2%

The national population growth rate of 7.6% is slighter higher than the growth in the coastal areas by 0.5 percentage points (Table 20). Within the coastal area itself, more growth is occurring in the urban coastal areas relative to the coastal rural areas nationally. Figure 25 shows the population percentage changes at ED scale for coastal areas in Ireland.

[47] EUROPOP2019 (2020). https://ec.europa.eu/eurostat/statistics-explained/index.php?oldid=497115#Population_projections_by_country

Figure 25: Population percentage change in Irish coastal electoral divisions (EDs)

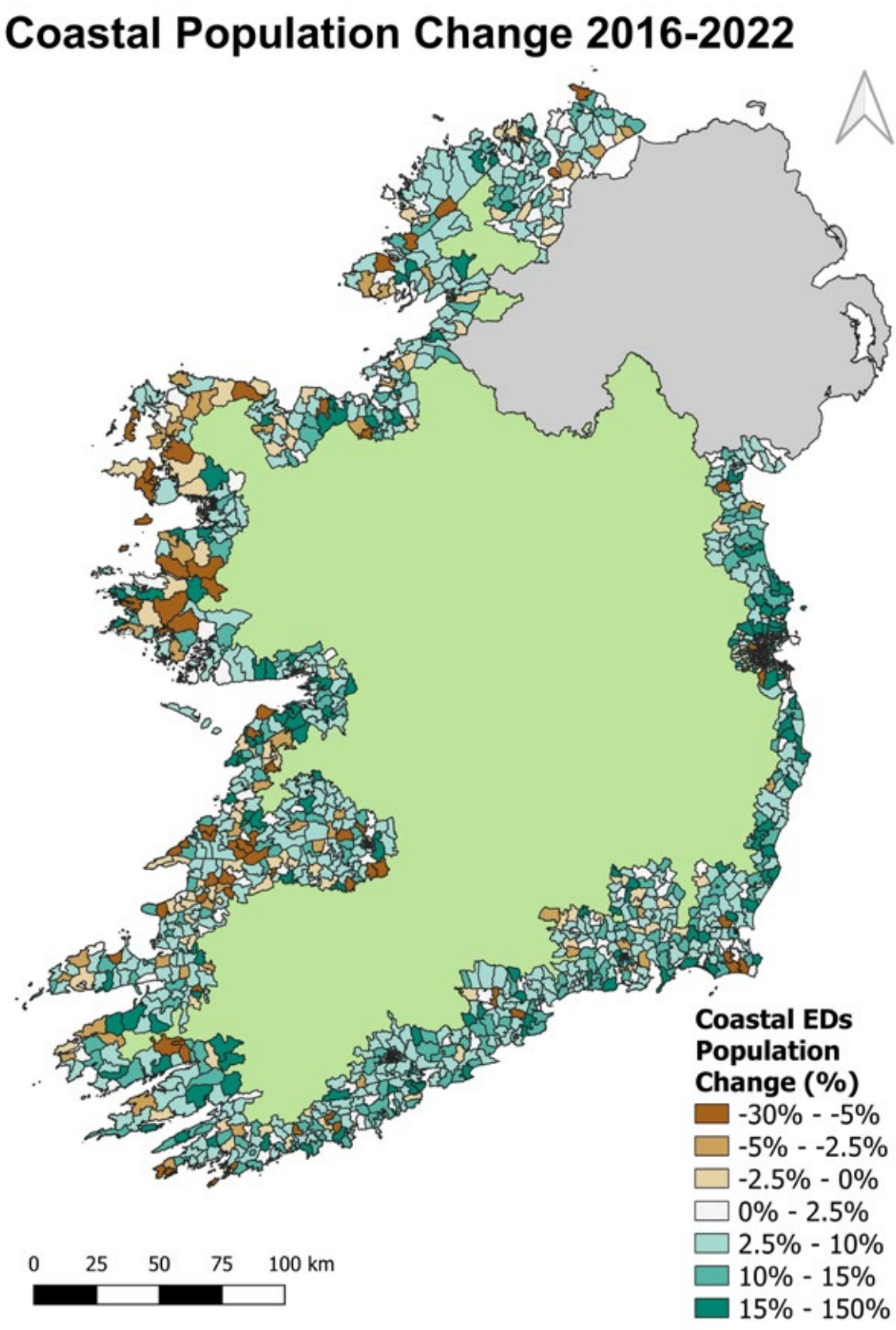


Table 21: Population change in Eastern and Midland region and its coastal areas

Eastern and Midland	2016	2022	% Change 2016 - 2022
Regional Total	2,328,517	2,529,358	8.6%
Coastal	1,577,997	1,696,143	7.5%
Coastal Urban	1,516,695	1,630,256	7.5%
Coastal Rural	61,302	65,887	7.5%

The Eastern and Midland region with Dublin at its centre experienced the highest growth across the regions with an increase of 8.6%. Coastal areas all had lower growth of 7.5% with no difference between urban and rural coastal areas (Table 21).

Table 22: Population change in Northern and Western region and its coastal areas

Northern & Western	2016	2022	% Change 2016 - 2022
Regional Total	847,442	900,937	6.3%
Coastal	390,227	412,227	5.6%
Coastal Urban	178,622	189,300	6.0%
Coastal Rural	211,605	222,927	5.4%

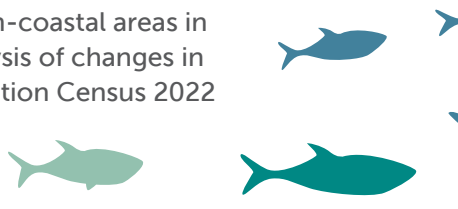
The Northern and Western Region saw the lowest population growth across the three regions and its coastal areas experienced even lower growth at 5.6% (Table 22). This was driven by the relatively low growth (5.4% increase) for the Northern and Western coastal rural area, which was the lowest across all coastal areas examined.

Table 23: Population change in Southern region and its coastal areas

Southern	2016	2022	% Change 2016 - 2022
Regional Total	1,585,906	1,693,241	6.8%
Coastal	1,019,236	1,091,894	7.1%
Coastal Urban	646,699	695,246	7.5%
Coastal Rural	372,537	396,648	6.5%

The Southern region was the only region where the population in the coastal area is increasing at a faster rate (7.1%) than the region as a whole (6.8%). This is driven by growth in its coastal urban areas which are growing at 7.5%. However, this is still lower than the overall national growth rate of 7.6%.

Overall, the trends suggest that coastal areas are growing at a slower rate than non-coastal areas in Ireland, except for urban coastal areas in the Southern Region. More detailed analysis of changes in employment and location of employment will be explored when small area population Census 2022 results are released by the CSO in 2023.

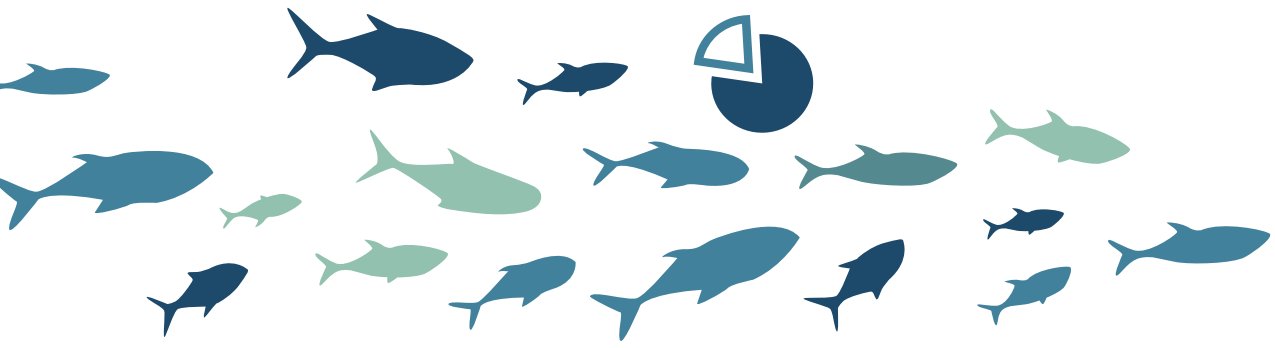


Ireland's Marine Ecosystem Services

In addition to the economic contributions of the main ocean industries, consideration must be given to the importance of protecting the ocean environment and the biodiversity that underpins the sustainable development of the sector. Consideration also needs to be given to the many vital ecosystem services delivered by the marine environment to Irish society. Previously, SEMRU[48] analysed the provisioning, regulating and cultural services provided by the Irish marine environment. In particular, the study estimated the value of waste assimilation services, coastal defence services, carbon absorption services, recreational services, offshore and inshore capture fisheries, aquaculture and seaweed harvesting and the contribution proximity to the coast can make to the value of residential property. The value of such services was found to be a multiple of the direct contribution of the ocean industries.

In 2020, as part of the Programme for Government, Ireland reaffirmed its commitments to the principles and ambitions of the EU Biodiversity Strategy. The Government also committed to develop comprehensive legislation for the identification, designation, and management of Marine Protected Areas (MPAs) in Irish territorial waters. In line with Aichi Target 11, the Government set a target of having 10% of Ireland's maritime area as Marine Protected Areas (MPAs) as soon as was practicable, aiming for 30% by 2030. In October 2020, the Marine Protected Area Advisory Group to the Department of Housing, Local Government and Heritage published its "Expanding Ireland's Marine Protected Area Network" report. The report advised on the need to widen Ireland's MPA network, the benefits and costs of the expansion, and made recommendations on how Ireland should proceed. The network has yet to be established. The report estimates that at present 10,420 km^2, which is just 2.13% of Ireland's total maritime area of nearly 488,762 km^2, is protected and managed under the Natura 2000 framework.

There is also considerable interest at present in the restoration of marine ecosystems and the possibility of using them as nature-based solutions (NBS) for climate adaptation. For example, Cuan Beo, a community-based group operating in Galway Bay area, in association with the Marine Institute, are engaged in a native oyster reef restoration programme in the bay. The box below highlights one recent study that examined the cost effectiveness of restoring native oyster reefs as a NBS for climate adaptation versus the grey alternative of a revetment – information that is needed for climate adaptation and flood management planning.



[48] Norton, D., Hynes, S. and Boyd, J. (2018). EPA Research Report No 239: Valuing Ireland's Coastal, Marine and Estuarine Ecosystem Services, EPA Publications, Wexford.

The costs and benefits of protecting a coastal amenity from climate change-related hazards*

This research examines the non-market benefit values associated with a coastal walking trail under threat from increased episodes of storm surges and coastal erosion, and the cost of alternative grey and nature-based infrastructure options that could protect it. These options involve restoring a native oyster reef bar that would act as a natural breakwater versus a hard engineering solution such as an impermeable revetment. Research, in which the monetary costs and benefits of NBS versus grey alternatives are compared, is still limited and this study provides additional information to help fill that gap. The study was carried out at a coastal walking trail on Galway Bay on the west coast of Ireland. In order to obtain information relating to the demand for recreational walking along the coastal path, an on-site survey of users was conducted while relevant cost information was compiled for the two protection alternatives. The results of the on-site survey of users of the amenity and a negative binomial travel cost model demonstrated that the coastal trail has considerable recreational use value to local communities. In terms of a cost benefit analysis (CBA), it was found that both protection options resulted in a positive net benefit over a 20-year time horizon but the nature-based solution had a benefit cost ratio multiple times larger than the grey infrastructure alternative. The conclusions of the analysis remained valid under the sensitivity analysis. The results suggest a compelling case for embedding NBS in climate adaption and flood management planning for low lying coastal areas where coastal infrastructure is under threat as it can be not only more cost effective but may also offer other ecosystem benefits to coastal communities.

* Full details of this analysis are available in Hynes, S., Burger, R., Tudella, J., Norton, D. and Chen, W. (2022). Estimating the costs and benefits of protecting a coastal amenity from climate change-related hazards: Nature based solutions via oyster reef restoration versus grey infrastructure. *Ecological Economics*, 194, 107349 https://doi.org/10.1016/j.ecolecon.2022.107349

As noted in the National Marine Research & Innovation Strategy 2017–2021, achieving a shared understanding of the marine ecosystems and their contribution to Irish society "enables ecosystem goods and services derived from the marine resource to be sustainably managed into the future". In an effort to foster this understanding, the UN System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA-EA) has emerged as a framework of international standards measurement and recommendations for national ecosystem accounting. The SEEA-EA is a means of integrating ecosystem values into national planning by providing guidance on measuring ecosystems and their contribution to the economy. The SEEA-EA specifically involves gathering data about ecosystem stocks (extent and condition) and flows (services and benefits) and aligning the accounts with the System of National Accounts (SNA) to create a platform to facilitate and address the need for more integrated decisions for nature and the economy.

Although it has the potential to support marine policy by evaluating the effects of ocean economy practices on natural capital and ES, the SEEA-EA has not yet been used to do so in Ireland. The Central Statistics Office (CSO) has adopted the SEEA-EA and provides preliminary ecosystem accounts for extent and condition of peatland, grassland, and cropland assets, but as yet no accounts for marine ES. It is also expected that ecosystem accounting for EU statistical institutes will become mandatory by 2026 under an amendment of Regulation 691/2011. As part of a Marine Institute Cullen Award in 2022, SEMRU, working with the CSO, the Marine Institute and other relevant projects that are mapping marine ecosystems services, aim to develop a preliminary set of ocean ecosystem accounts that will demonstrate how the SEEA-EA can be applied to Ireland's coastal and marine ecosystems.

Conclusions

Ireland's ocean economy in 2021 had a turnover of €5 billion, contributed €2.1 billion in GVA and employed 32,100 FTEs. The ocean economy in 2021 is still recovering from the Covid-19 pandemic and while all aggregate indicators have increased from 2020 levels, turnover and employment are 8% down on 2019. This is mainly due to decreases observed in the marine tourism, cruise line, and shipping and transport industries. GVA is estimated to have increased by 3% in 2021 on 2019 figures driven by strong growth in the oil and gas industry due to dramatic increase in the price of gas in 2021.

The recent high level of fluctuations of input and output prices is of concern for future reporting on Ireland's ocean economy. Over the lifetime of the Ocean Economy Report Series (2008 to 2021), inflation has been at a relatively low level averaging 0.5% annually. However, in 2022, inflation has reached an annual growth level of 9.2%[49]. While this report provides values in nominal terms, high inflation in 2022, and potentially beyond, means that methodologies will need to be adjusted with turnover and GVA reported in real terms in future.

Gaps also still remain in the knowledge base on the contribution of the oceans to Ireland's economy and society. Work by the OECD has begun to develop new methodologies for reporting on the ocean economy[50] including the formation of ocean satellite accounts. As noted by the OECD, "Satellite accounting frameworks that collect and compile comparable data on ocean economic activity in a supply and use framework offer an opportunity for improved understanding of ocean economies and enhanced evidence-based policymaking". Countries such as Norway, Portugal and the USA have already produced their own ocean supply and use tables and the OECD is currently working on a pilot ocean satellite account for a number of countries, including Ireland.

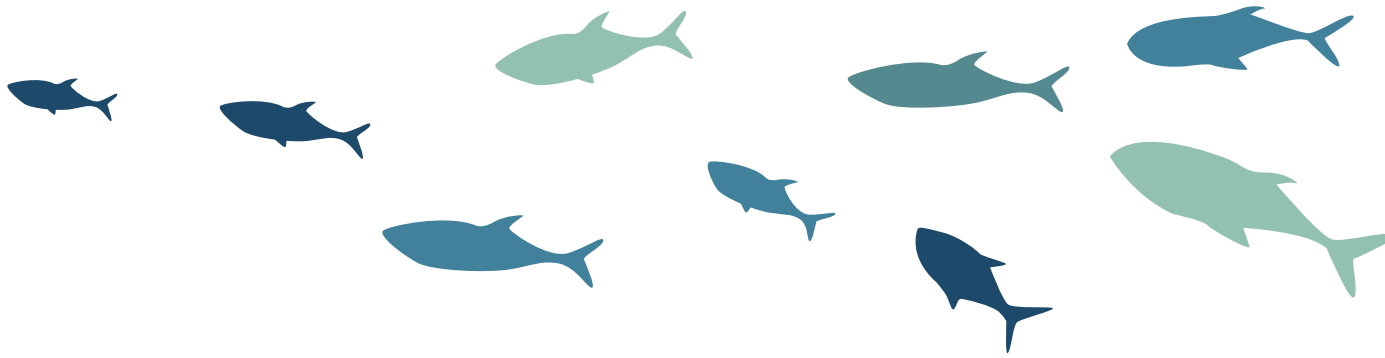
In line with the UN System of Environmental-Economic Accounting – Ecosystem Accounting (SEEA-EA) approach there is also a need to create ocean natural capital accounts that measure marine ecosystem extent, condition, use and supply of marine and coastal ecosystem services. Research, in collaboration with the CSO, will assist in addressing some of these policy research questions in collaboration with national and international partners. The possibility of linking the marine ecosystem value estimates into an ocean satellite account for Ireland is another area for further research. There is also a need to develop a comprehensive understanding of the value that is generated by public service activities connected with the marine environment.

[49] CSO (2022). Consumer Price Index October 2022 https://www.cso.ie/en/releasesandpublications/ep/p-cpi/consumerpriceindexoctober2022/

[50] Jolliffe, J., C. Jolly and B. Stevens (2021). Blueprint for improved measurement of the international ocean economy: An exploration of satellite accounting for ocean economic activity, OECD Science, Technology and Industry Working Papers, No. 2021/04, OECD Publishing, Paris

In a period of significant economic and political uncertainty, this report provides policy makers and other interested stakeholders with a profile of Ireland's ocean economy and industry-by-industry economic projections against which future marine socio-economic data can be compared. The figures generated also provide useful information to support Ireland's implementation of the EU Marine Strategy Framework Directive (MSFD) and Maritime Spatial Planning (MSP) Directive. The latter is being implemented in Ireland through the National Planning Framework[51] and the Maritime Area Planning Act[52].

Following the challenging trading environment over the previous two years, the rebound in the activity of the ocean economy industries could be seen in 2021 and continues to be evident in 2022 although, as mentioned, inflation will likely remain a challenge in the short term, particularly in relation to energy and fuel prices, as will achieving a more sustainable growth path for many of the ocean industries. These concerns aside, the many opportunities for blue growth that are evident across the sector suggest that the outlook for the ocean economy is once more positive.



[51] DHLGH (2021). National Marine Planning Framework https://www.gov.ie/en/publication/60e57-national-marine-planning-framework/

[52] Maritime Area Planning Act (2021). https://www.irishstatutebook.ie/eli/2021/act/50/enacted/en/html

Appendix

Methodology and Data Sources

Methodology

DEFINITIONS OF MARINE-BASED INDUSTRIES WITHIN THE OCEAN ECONOMY DIFFER ACROSS COUNTRIES. THE GENERAL APPROACH TAKEN IN THIS REPORT IS TO:

1. Revise and update the industries from previous reports that are part of the ocean economy
2. Identify the marine industries for which there is publically available data
3. Estimate the proportion of economic activity that is marine-based using proxies
4. Record levels of turnover, employment and gross value-added for each industry that is in the ocean economy
5. Identify industries where alternative data collection methods must be developed, i.e. surveys

Certain industries are clearly identifiable as fully marine, for example shipping and maritime transport or sea fisheries. Data on other marine activity can be more difficult to obtain; for example, marine engineering data cannot be differentiated from general engineering using the data collected by the Central Statistics Office (CSO). Therefore, these industries require additional work (surveys/proxies) to ensure that they are represented in the ocean economy.

The general approach adopted in this report for assessing Ireland's ocean economy has been concerned with production activity: net output/turnover, gross value added, and employment. The Business Demography (BD) and Structural Business Statistics (SBS) Division in the CSO provides data on turnover, GVA, employment, and where available, exports for each sector within the Irish economy. The data are collected across a number of censuses and surveys. The CSO census and surveys used for the collation of the data on Ireland's ocean economy include;

- The Census of Industrial Production (CIP)
- The Annual Services Inquiry (ASI)
- Building and Construction Inquiry (BCI)
- Business Register
- Intrastat

The data relating to marine activity from these censuses and surveys is provided at the NACE four-digit level. The NACE code system is a Pan-European classification system that groups enterprises according to their business activities by assigning a unique 2, 3 and 4 digit code to each industry. Where data are not available from CSO sources, a survey developed by the Marine Institute and SEMRU was conducted for particular marine industries. The companies surveyed are compiled using a wide range of database sources, including the Marine Institute's company database. For a number of companies, Company Registration Office (CRO) financial data was also used.

Methodology by Industry

The reference year for this report is 2020. This is the most recent year that data is available currently from the CSO for the above mentioned surveys. In the case of fishing and aquaculture, projections for 2021 were also available from BIM, as was cruise liner information from the IMDO. Estimates based on economic projections for the performance of the other ocean economy industries in 2021 are also presented in this report. These estimates are the result of a forecasting exercise of the future turnover, GVA and employment in Ireland's ocean economy on a sector-by-sector basis. This methodology is based on published socio-economic data from the CSO, government economic forecasts and information obtained from interviews with marine-related enterprises and relevant government departments and agencies.

Shipping and Maritime Transport

Shipping and maritime transport is one of the marine industries that can be directly identified in the standard NACE classification. The data for the Shipping and Maritime Transport industry is obtained entirely from the CSO (ASI). The NACE codes include some activities that are not fully marine such as 'Other transportation support activities' (NACE Rev (2) 52.29) and Cargo Handling (NACE Rev (2) 52.24). Proxies are used to account for the percentage of relevant maritime activity, i.e. trade by sea.

Economic projections for turnover and GVA in 2021 are based on the performance of the shipping and maritime transport industry reported by the Irish Maritime Development Office (IMDO) in their iShip index (Irish Maritime Transport Economist, 2021). Estimates for employment are obtained from the annual growth rate reported by the CSO in their Quarterly National Household Survey (Transport and storage).

Tourism and leisure in marine and coastal areas

The tourism and leisure in marine and coastal areas industry is made up of seven NACE codes as follows: 5510 - Hotels and similar accommodation, 5520 - Holiday and other short stay accommodation, 5530 - Camping grounds, recreational vehicle parks and trailer parks, 9312 - Activities of sports clubs, 9319 - Other sports activities, 9321 - Activities of amusement parks and theme parks, 9329 - Other amusement and recreation activities. Each of these codes, however, are considered only partly marine or coastal related as these activities may not occur in marine and coastal areas.

Based on the Fáilte Ireland Accommodation Occupancy Survey, it is possible to calculate the number of bed nights in Fáilte Ireland Registered/Approved hotels, guesthouses, B&Bs, self-catering accommodation, hostels and Caravan/Camping grounds. This bed night information is broken down between coastal and non-coastal areas where coastal is defined as municipalities (LAU-2) that either border on the sea or have 50% of their surface within a distance of 10 km from the sea. The share of 'Immediate urbanised & Coastal' and 'Thinly populated & Coastal' bed nights out of total bed nights indicates that 28% of all visitor bed nights are spent in coastal areas. The category 'Densely populated & Coastal' is not included in the calculation of coastal bed nights as this generally reflects visits to Ireland's larger coastal cities, which in the majority of cases are not in any way marine related, whereas visitors to areas outside of cities do so in order to get close to the natural environment. 28% of the total value for turnover, GVA and employment is taken from the accommodation NACE

categories' 5510, 5520 and 5530, as a fair estimate of the contribution from tourism in marine and coastal areas.

Based on the share of marine related leisure enterprises (information on marine enterprise numbers comes from the Initial Assessment for the Marine Strategy Framework Directive Assessment for Ireland) in the total number of enterprises recorded for the leisure sector NACE categories (9312, 9319, 9321, 9329) from the CSO Business Registry, we estimate a 9.8% share of marine enterprises across the leisure sector industries. We therefore take 10% of the total value for turnover, GVA and employment from these NACE categories as a fair estimate of the contribution from marine leisure activities.

Adding the estimates for the tourism in marine and coastal areas based on the share of bed nights described above and the estimate of the contribution from marine leisure based on the share of marine leisure enterprises provides the total values for turnover, GVA and employment for the sector tourism and leisure in marine and coastal areas.

Economic projections for turnover and GVA in 2021 are based on estimates provided by Fáilte Ireland and the CSO in terms of international and domestic tourism numbers and Bank of Ireland accommodation outlook. Estimates for employment are obtained from the annual growth rate reported by the CSO in their Quarterly National Household Survey (Accommodation and food service activities).

International Cruise Industry

International cruise data differs from other sectors as it captures passenger expenditure rather than cruise ship turnover. For this report, cruise data on the total number of passengers was provided by the Irish Maritime Development Office (IMDO) for all years up to and including 2021. This information was used in conjunction with the average expenditure by port by disembarking passenger previously reported by Fáilte Ireland. Expenditure levels are adjusted for inflation accordingly.

Marine Retail Services

An online survey was designed by SEMRU and administered to the companies conducting boat sales, chandlery services and marine equipment engineering in autumn/summer 2022. Additional data for seafood retail establishments is obtained from the CSO – Annual Services Inquiry.

Economic projections for turnover and GVA in 2021 are based on reported data from the Retail Sales Inquiry, published by the CSO. Estimates for employment are obtained from the annual growth rate reported by the CSO in their Quarterly National Household Survey (Wholesale and retail trade).

Sea Fisheries

Figures for turnover, GVA and employment are provided by BIM and the EU Scientific, Technical and Economic Committee for Fisheries.

Marine Aquaculture

Figures for turnover, GVA and employment are provided by BIM. Economic projections for GVA in 2021 are projections reported by BIM (Aquaculture survey)/STECF.

Seafood Processing

Seafood Processing can be directly identified in the standard NACE classification provided by the CSO. The data was collected under the NACE code 10.20 'Seafood Processing' from the Census of Industrial Production (CIP).

Economic projections for turnover, GVA and employment figures in 2021 are estimated as a function of the level of seafood production reported by BIM.

Oil & Gas exploration and production

Oil & Gas can be directly identified in the standard NACE classification. The data for the Oil & Gas sector was obtained in part from the CSO, CIP - NACE 06.10, 06.20, 09.10. The data is confidential for some codes in certain years due to the small number of companies operating under the certain Oil & Gas NACE codes.

To supplant confidential data, economic figures for turnover, GVA and employment are estimated on the basis of company data sourced from shareholder annual financial information for companies involved in the Corrib Gas field in addition to CRO financial accounts for companies within the sector.

Marine Manufacturing, Engineering & Construction

The marine manufacturing sector data was collected primarily from the Census of Industrial Production and the Building and Construction Inquiry, CSO. The data reported also include marine engineering activities. A survey was also administered to marine engineering companies in summer/autumn 2022, as it is not possible to identify specifically marine engineering in the main engineering NACE codes.

Economic projections for turnover, GVA and employment in 2021 are estimated on the basis of historic trends in the sector as measured by SEMRU previous surveys and overall trends in general manufacturing from the CSO.

Advanced Marine Technology Products and Services

An online survey was designed by Marine Institute/SEMRU and was administered to relevant companies in July – October 2022.

Marine Commerce

An online survey was designed by Marine Institute/SEMRU and was administered to relevant companies in July – October 2022.

Biotechnology – Seaweed

An online survey was designed by MTU/Marine Institute/SEMRU and was administered by MTU to relevant companies in September/October 2022.

Marine Renewable Energy

An online survey was designed by Marine Institute/SEMRU and was administered to relevant companies in July – October 2022.

International Studies

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Emily Stebbings, E. Papathanasopoulou, E., Hooper, T., Austen, M. and Yan, X. (2022). The marine economy of the United Kingdom. Marine Policy 116, 103905

European Commission (2022). The EU Blue Economy Report https://op.europa.eu/en/publication-detail/-/publication/156eecbd-d7eb-11ec-a95f-01aa75ed71a1

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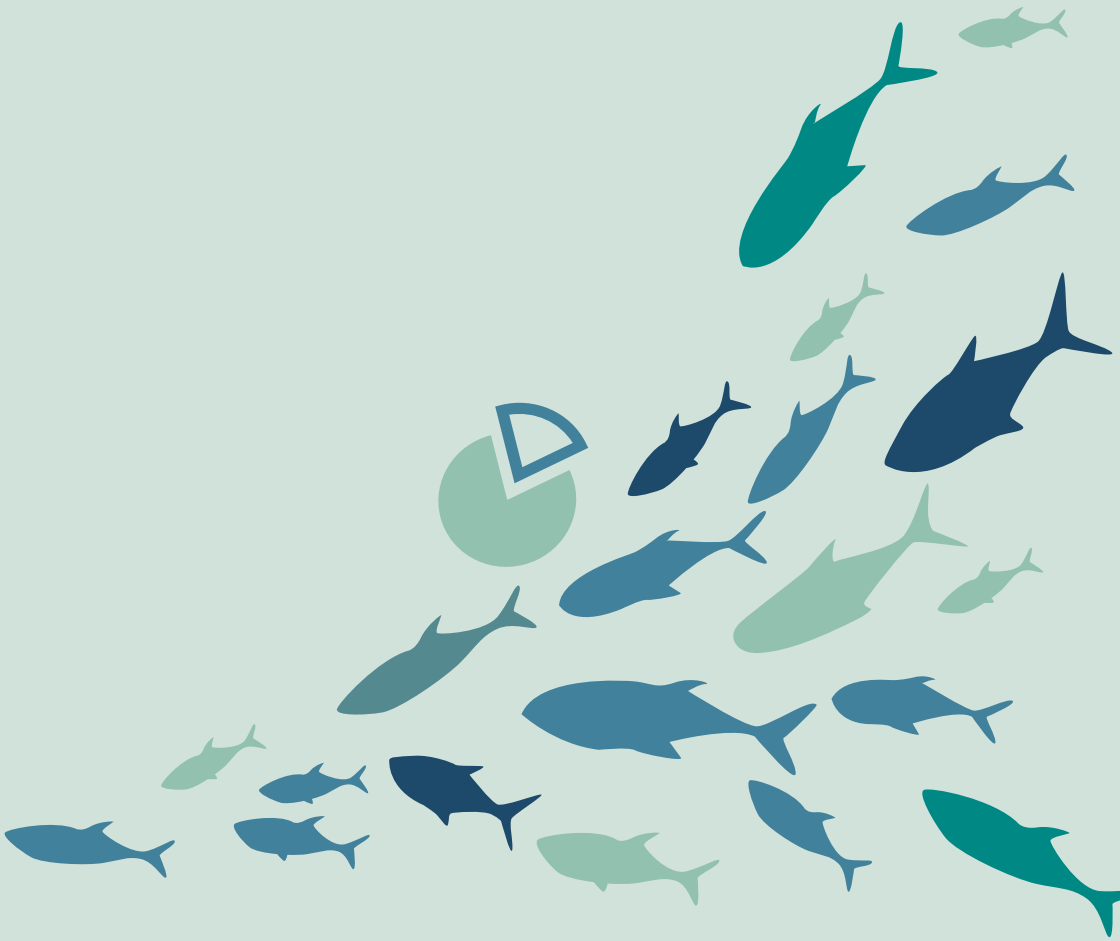

A Note on the EU Blue Economy Report 2022

The European Commission published their fifth European ocean economy report[53] earlier this year. This series provides an overview of the size of the ocean economy in the European Union. It provides details on GVA and employment across a number of industries by member state, including Ireland. It should be noted, however, that there are a number of key differences between the figures generated in the EU report for Ireland's ocean economy compared to those generated here.

Firstly, since their first ocean economy report, Marine Institute/SEMRU have always provided estimates of turnover and GVA at basic prices. The EU report calculates the same indicators at factor cost. Secondly, the definitions used for a number of the industries varies across both reports as does the data sources used. For example, the EU's definition for marine and coastal tourism is much broader than the one used by Marine Institute/SEMRU and results in an estimate for marine and coastal tourism that is a multiple of that produced here. Finally, the Marine Institute/SEMRU ocean economy report has a broader coverage in terms of the number of industries compared to that of the EU report. This is the case for oil and gas production, where data is confidential so alternative methodologies are used. For other industries, Eurostat data is not available, the Marine Institute/SEMRU conduct additional surveys.

These differences aside, both the EU and Marine Institute/SEMRU reports demonstrate a very similar pattern of development of Ireland's ocean economy where similar sectors are covered and for overlapping time periods. While more limited in coverage, the EU report is also extremely useful when comparing performance in the ocean economies across Europe.

[53] European Commission (2022). The EU Blue Economy Report. Publications Office of the European Union. Luxembourg

Data Sources

Shipping and Maritime Transportation Logistics

- Annual Services Inquiry 2008 - 2020, CSO
- iShip Index 2008-2021, IMDO
- Quarterly National Household Survey (Transport and storage) 2021, CSO

Tourism and leisure in marine and coastal areas

- Annual Services Inquiry 2008 - 2020, CSO
- Quarterly National Household Survey (Accommodation and food service activities) 2021, CSO

Sea Fisheries

- BIM Annual Fisheries Report 2022
- STECF - The 2022 Annual Economic Report on the EU Fishing Fleet

Aquaculture

- The Business of Seafood 2021, BIM.
- STECF – Annual Economic Reports

Seafood Processing

- Census of Industrial Production 2008 - 2020, CSO

International Cruise

- Irish Maritime Transport Economist 2012 to 2021, IMDO
- Maritime Statistics, CSO

Oil and Gas Activity

- Census of Industrial Production 2008 - 2020, CSO
- Marine Institute/SEMRU company survey
- CRO financial reports

Renewable Energy

- Marine Institute/SEMRU Company Survey

Water Construction

- Buildings and Construction Inquiry 2008 - 2020, CSO

Marine Engineering

- Marine Institute/SEMRU Company Survey
- Quarterly National Household Survey (Industry) 2020, CSO
- Industrial Turnover Index 2021, CSO

Boat Building

- Census of Industrial Production 2008 – 2020, CSO
- Industrial Turnover Index 2021, CSO

Advanced Marine Technology Products and Services

- Marine Institute/SEMRU Company Survey

Marine Commerce

- Marine Institute/SEMRU Company Survey

Marine Retail Services

- Annual Survey Inquiry 2008 - 2020, CSO
- Retail Sales Inquiry 2020, CSO
- Quarterly National Household Survey (Wholesale and retail trade) 2021, CSO
- SEMRU Company Survey

Seaweed, Marine Biotechnology & Bio-products

- MTU/ Marine Institute/SEMRU Company Survey

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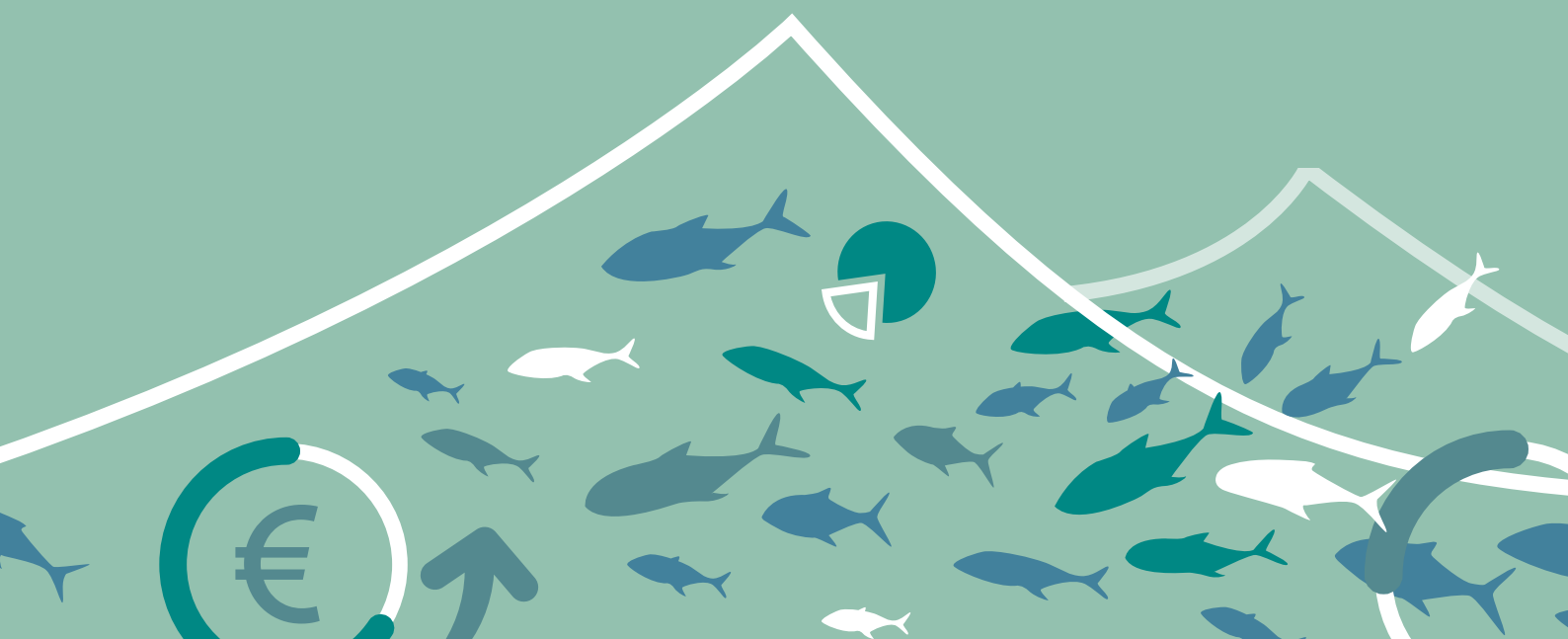
Glossary of Acronyms/Terms

AER	Annual Economic Report
ASI	The Annual Services Inquiry
BCI	Building and Construction Inquiry
BD	Business Demography
BIM	Bord Iascaigh Mhara
CBA	Cost Benefit Analysis
CIP	Census of Industrial Production
CRO	Company Registration Office
CSO	Central Statistics Office
DHLGH	Department of Housing, Local Government and Heritage
DMAP	Designated Marine Area Plan
ED	Electoral District
EU	European Union
FI	Fáilte Ireland
FTE	Full Time Equivalents
GDP	Gross Domestic Product
GNI*	Modified Gross National Income
GVA	Gross Value Added
ICT	Information & Communication Technology
IMDO	Irish Maritime Development Office
IMP	Integrated Marine Plan
ITIC	Irish Tourism Industry Confederation
JRC	European Joint Research Centre
LAU	Local Administrative Unit
MARA	Maritime Area Regulatory Authority
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
MSP	Marine Spatial Planning
MTU	Munster Technological University

NACE	Statistical classification of economic activities in the European Community
NBS	Nature-Based Solutions
NMPF	National Marine Planning Framework
NSPSA	National Strategic Plan for Sustainable Aquaculture Development 2030
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
R&D	Research and Development
REV 2	Revision 2 of the NACE code system (post 2007)
SBS	Structural Business Statistics
SEEA-EA	System of Environmental-Economic Accounting – Ecosystem Accounting
SEMRU	Socio Economic Marine Research Unit
SFPA	Sea Fisheries Protection Authority
SME	Small or Medium Sized Enterprises
SNA	System of National Accounts
STECF	Scientific, Technical and Economic Committee for Fisheries
TCA	EU-UK Trade and Cooperation Agreement
UN	United Nations



Ollscoil na Gaillimhe
University of Galway

Foras na Mara
Marine Institute