SEA BASIN REPORT ANNEX 1

WIN
BIG

Project no.	**101111985**
Project acronym:	WIN-BIG
Project title:	**Women in Blue Economy Intelligence Gathering and Capacity Boosting**
Call:	EMFAF-2022-PIA-WBE
Start date of project:	01.05.2023
Duration:	**36 months**
Deliverable title:	Annex to D2.2 (*Women in EU Blue Economy Reports*)
Due date of deliverable:	31.10.2025
Actual date of submission:	30.01.2026
Deliverable Lead Partner:	**University of Galway**
Dissemination level:	Public/Sensitive
Citation:	Grigoryan, H. et al. (2026). Women in the Atlantic Sea Basin Blue Economy. WIN-BIG project Deliverable D2.2 (Women in EU Blue Economy Reports Annex 1)

Author list

Name	Organisation
Hasmik Grigoryan	University of Galway
Edel Doherty	University of Galway
Stephen Hynes	University of Galway
Jenny O'Leary	Marine Institute
Ingrid Mateo Mantecón	Universidad de Cantabria
Mariana Almeida	University of Aveiro
Liliana Silva	University of Aveiro
Helena Vieira	University of Aveiro
Gloria Bevilacqua	Geonardo
Ömer Ceylan	Geonardo

Estimating workforce and gender breakdown for EU blue economy industries

There is a lack of gendered statistics in the EU blue economy. Furthermore, while the EU blue economy observatory provides information about total workforce in certain sectors (e.g. living resources, coastal tourism, ports and shipping) there is no data about the workforce in a number of marine industries such as marine robotics or higher education and research related to marine. For the blue economy industries, where no employment data was available, the number of employees in a broader industry category was collected, followed by an estimate of the marine share. Where data were not available for certain countries, national reports or other sources were used. This research note provides further detail on how the total employment numbers and gender share were calculated for the WIN-BIG Sea Basin Reports.
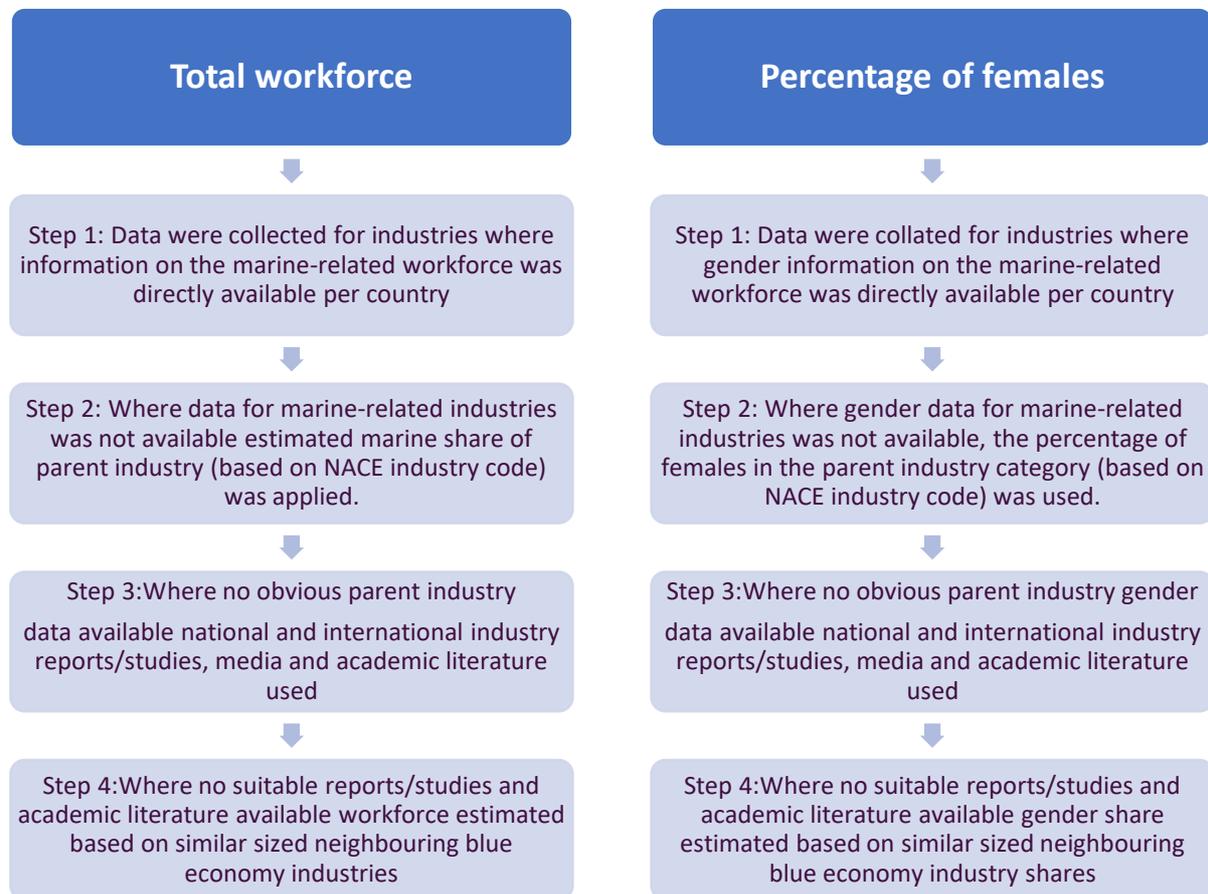
Total number of employees

The first step in data collection was to use sources that directly reported the total number of workers in marine-related industries. Direct workforce data was available for aquaculture, sea fisheries, seafood processing, coastal tourism, cruise tourism, offshore exploration & production (Oil and Gas, other minerals, salt), maritime transport, port activities, shipbuilding and repair, marine engineering, and marine renewable energy (MRE) — for MRE, own estimates were applied where data was missing for certain countries. For maritime defence, no single comprehensive source exists, so data was compiled from multiple sources.

For other industries, including blue bioeconomy/biotechnology, blue sports, marine-related public administration, marine robotics, marine R&D, third-level marine education, marine conservation and advocacy, marine environmental consulting services, and marine retail services (e.g., seafood retail, boat sales, marine equipment), direct workforce data was not available. In these cases, estimates were generated based on parent industry information, industry and national reports or other sources.

The figure below shows the breakdown of steps undertaken when collecting the total workforce number and percentage of females in the EU blue economy

Figure 1. Steps involved in estimating the total workforce number and percentage of females in the EU blue economy industries

Total workforce	Percentage of females
Step 1: Data were collected for industries where information on the marine-related workforce was directly available per country	Step 1: Data were collated for industries where gender information on the marine-related workforce was directly available per country
Step 2: Where data for marine-related industries was not available estimated marine share of parent industry (based on NACE industry code) was applied.	Step 2: Where gender data for marine-related industries was not available, the percentage of females in the parent industry category (based on NACE industry code) was used.
Step 3: Where no obvious parent industry data available national and international industry reports/studies, media and academic literature used	Step 3: Where no obvious parent industry gender data available national and international industry reports/studies, media and academic literature used
Step 4: Where no suitable reports/studies and academic literature available workforce estimated based on similar sized neighbouring blue economy industries	Step 4: Where no suitable reports/studies and academic literature available gender share estimated based on similar sized neighbouring blue economy industry shares

Percentage of females

Data on the percentage of female employees were directly available only for the following industries: aquaculture, sea fisheries, seafood processing, and maritime defence. For the remaining blue economy industries, where specific sources detailing female workforce participation were absent, the percentage of females in the overall corresponding NACE economic category was used as a proxy. In cases, where data were not available for certain industries or countries, national reports or other sources were used.

The table below provides a detailed explanation of the data sources utilized and elaborates on the estimation of the marine share for those sectors where direct data were unavailable.

Blue Economy Industry	Methodology for data collection/estimation of the total workforce[1]	Methodology for data collection and estimation of the female workforce percentage
Aquaculture (includes farmed finfish, algae, microalgae, seagrass, and shellfish)	The total workforce in the industry per country was available. The following source was used to collect the data: European Commission, Joint Research Centre, Scientific Technical and Economic Committee for Fisheries (STECF) – The 2024 Aquaculture Economic Report (STECF-24-14), Nielsen, R., Llorente, I., Virtanen, J., and Guillen, J. editor(s), Publications Office of the European Union, Luxembourg, 2025, https://data.europa.eu/doi/10.2760/5049952, JRC140767.	The gender breakdown in the industry was available. The following source was used to collect the data: Scientific, Technical and Economic Committee for Fisheries (STECF), Economic Report on the EU aquaculture (STECF22-17). Nielsen, R., Virtanen, J. & Guillen, J. (editors). Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/51391, JRC132648
Sea fisheries	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory, (1) capture fisheries (SSCF), capture fisheries (LSF), capture fisheries (DWF) categories. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	The gender breakdown in the industry was available. The following source was used to collect the data: Scientific, Technical and Economic Committee for Fisheries (STECF) – Social data in the EU fisheries sector (STECF-19-03). Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-76-09514-9, doi:10.2760/638363, JRC117517
Seafood processing	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory, (1) processing and preserving of fish, crustaceans and molluscs, (2) manufacture of oils and fats, (3) prepared meals and dishes, (4) other food products, (5) blue biotechnology – seafood categories. Note: the number of employees in "blue biotechnology – seafood" was removed from seafood processing industry, as blue biotechnology is considered as a distinct category. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	The gender breakdown in the industry was available. The following sources were used to collect the data: European Commission, Joint Research Centre, Scientific Technical and Economic Committee for Fisheries (STECF) Economic Report on the EU fish processing industry (STECF 23-14), Malvarosa, L., Tardy Martorell, M., Virtanen, J. and Guillen, J. editor(s), Publications Office of the European Union, Luxembourg, 2024, https://data.europa.eu/doi/10.2760/81639, JRC136367 Scientific, Technical and Economic Committee for Fisheries (STECF) – The EU Fish Processing Sector. Economic Report (STECF-19-15). Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-14666-7, doi:10.2760/30373, JRC119498
Blue bioeconomy/ biotechnology	The following steps were taken to estimate employment in blue biotechnology: The industry covers both (1) blue biotechnology – seafood and (2) research and experimental development.	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in blue biotechnology was estimated using female employment shares

	1. Employment data for blue biotechnology – seafood was available from the EU Blue Economy Observatory. 2. Using the total number of employees in living resources (including blue biotechnology – seafood) from the EU Blue Economy Observatory, the percentage share of blue biotechnology – seafood within living resources was calculated. 3. The total employment number for the broader NACE category 'research and experimental development on biotechnology' was obtained. 4. The previously calculated percentage of blue biotechnology – seafood in living resources was applied to estimate the portion of employment in research and experimental development on biotechnology attributable to blue biotechnology. 5. Finally, the employment numbers for blue biotechnology – seafood and blue biotechnology in research and experimental development were summed to obtain the total workforce. The following sources were used: The EU Blue Economy Observatory, blue biotechnology – seafood category. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en Eurostat, NACE Rev 2, M7211 research and experimental development on biotechnology: https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_17611860/default/table	from relevant overall category of the Eurostat NACE Rev. 2 codes: (1) C21 – Manufacture of basic pharmaceutical products and pharmaceutical preparations, and (2) M72 – Scientific research and development (professional, scientific, and technical activities). Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan2/default/table?lang=en&category=labour.employ.lfsa.lfsa_emp
Blue sports	The following steps were taken to estimate the number of employees in blue sports: 1. Employment data for the 'sport and recreation industry within tourism' was obtained from the OECD. 2. Employment data for coastal tourism was collected from the EU Blue Economy Observatory. This does not cover sport and recreation industry as it is defined by transport, accommodation and retail NACE code categories only. 3. Total employment in tourism was collected from Eurostat. 4. Using employment figures for coastal tourism, the share of marine-related employment within the overall tourism sector was estimated. 5. This estimated marine share was then applied to total employment figures from OECD estimates of 'sport and recreation industry within tourism' to derive an estimate of employment in blue sports.	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in blue sports was estimated using female employment shares from relevant overall category of the Eurostat NACE Rev. 2 codes: (1) R93 - Sports activities and amusement and recreation activities. Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan2/default/table?lang=en&category=labour.employ.lfsa.lfsa_emp

[1] In case no data were available for specific country in the EU Blue Economy Observatory or in Eurostat, the number of employees/percentage of employees was collected from various national reports or news sources. If this was also not possible, the number of employees in the neighbouring country was used or in a country that has a similar market size in the given industry.

	The following sources were used: OECD (2024), *OECD Tourism Trends and Policies 2024*, OECD Publishing, Paris, https://doi.org/10.1787/80885d8b-en. OECD (2022), *OECD Tourism Trends and Policies 2022*, OECD Publishing, Paris, https://doi.org/10.1787/a8dd3019-en. The EU Blue Economy Observatory, coastal tourism category. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en Eurostat, NACE Rev 2, TI total tourism industries https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_19330009/default/table	
Coastal tourism	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory defines coastal tourism as being comprised of (1) passenger transport, (2) other expenditure (retail) and (3) accommodation categories [NACE H55.10, H55.20, H55.30, H55.90, G47.30, G49.10, H49.30, H50.10, H51.10, G47.60, G47.70, I56.00]. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in coastal tourism was estimated using female employment shares from relevant overall category of the Eurostat NACE Rev 2 codes: I55 - Accommodation, I56 - Food and beverage service activities, N79 - Travel agency, tour operator and other reservation service and related activities. Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en
Marine renewable energy	The total workforce in the industry was available for most but not for all European countries. The available data are downloaded from the EU Blue Economy Observatory. Estimates are applied to the countries where the Observatory did not provide any data. The estimates for missing countries are based on the following methodology: 1. Total employment data for NACE Rev. 2 code D35 Electricity, gas, steam and air conditioning supply was obtained from Eurostat. 2. Based on various information sources each European country was then assessed to determine the status of its MRE sector. For countries still in the development and planning stage, 2% of total employment in the electricity, gas, steam and air conditioning supply sector was attributed to MRE. For countries with operational MRE installations, 5% of employment in the same sector was assumed to be attributable to MRE. The following source was used to collect the data:	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in MRE was estimated using female employment shares from relevant overall category of the Eurostat NACE Rev.2 code: D35 - Electricity, gas, steam and air conditioning supply Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en

	The EU Blue Economy Observatory (1) renewable energy category. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en Eurostat NACE Rev 2 code D35 Electricity, gas, steam and air conditioning supply. Available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en	
Offshore Exploration & Production (Oil & Gas, Other Minerals, Salt)	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory, oil and gas sub-sector. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in offshore Exploration & Production (Oil & Gas, Other Minerals, Salt) was estimated using female employment share from relevant overall category of the Eurostat NACE Rev.2 code: D35 - Electricity, gas, steam and air conditioning supply Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en
Maritime transport	The workforce number in maritime transport was collected based on several Eurostat codes and EU Blue Economy report data. Data was collected from: (1) Eurostat NACE Rev 2 codes H5020 freight water transport and N7734 Renting and leasing of water transport equipment, and (2) EU Blue Economy report annex, category "other transportation support activities". The following sources were used: Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_19330886/default/table European Commission (2022) The EU Blue Economy Report Annexes. Available at: https://op.europa.eu/en/publication-detail/-/publication/8ebb4561-db10-11ec-a95f-01aa75ed71a1/language-en	Gender-disaggregated data for the industry is based on the female employment share from relevant overall category of the Eurostat NACE Rev 2 code: H50 - Water transport Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en
Port activities	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory sub-sectors (1) cargo and warehousing and (2) port and water projects. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in port activities was estimated using female employment share from relevant overall category of the Eurostat NACE Rev.2 code: H52 - Warehousing and support activities for transportation.

		Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en
Shipbuilding and repair	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory sub-sectors (1) shipbuilding. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in shipbuilding and repair was estimated using female employment share from relevant overall category of the Eurostat NACE Rev.2 code: C30 - Manufacture of other transport equipment Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en
Public administration related to the marine	The number of employees in public administration related to the marine is based on estimates. The following steps were taken to estimate employment: 1. Total employment data was obtained for the overall category from Eurostat NACE Rev. 2 084 – Public administration and defense. 2. Since this figure also includes military personnel, the number of defense forces was collected from the NATO publication and subtracted from the Eurostat NACE Rev. 2 084 – Public administration and defense. 3. To estimate the marine-related share of employees in public administration, the number of ministries was collected for each European country, and the proportion of ministries that would likely have staff working on marine issues was calculated. This proportion was applied to the public administration portion of NACE Rev 2 code: 084. 4. An assumption was made that approximately 5% of staff in these ocean-related ministries were marine-related so 5% of the previous proportion was taken as the share of marine public admin employees. This is likely an underestimate given it ignores other state agencies' but it also avoids double counting as many of the employees in these marine state agencies' may not see themselves as working in public administration The following source was used to collect the data: European, Eurostat NACE Rev. 2 code: 084 - Public administration and defense available at: https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_19330886/default/table NATO (2024) Defense Expenditure of NATO Countries (2014-2025).	Gender-disaggregated data for the industry is based on the female employment share from relevant overall category of the Eurostat NACE Rev 2 code: 084 - Public administration and defense. Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en

Marine engineering	The total workforce in the industry per country was available. The following source was used to collect the data: The EU Blue Economy Observatory sub-sectors (1) equipment and machinery. Available at: https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in marine engineering was estimated using female employment share from relevant overall category of the Eurostat NACE Rev.2 code: C28- Manufacturing of machinery and equipment Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/lfsa_egan22d/default/table?lang=en
Marine robotics	The following steps were taken to estimate the number of employees: 1. Using the number of employees in marine engineering from the EU Blue Economy Observatory, the share of marine engineers was calculated relative to total manufacturing employment in Eurostat NACE C28 – Manufacturing of machinery and equipment. 2. Total employment data for Science, Technology, and Digital Society was obtained from Eurostat. 3. The estimated marine-related share from step 1 was applied to the total employment in Science, Technology, and Digital Society to derive the estimated workforce in marine robotics. The following sources were used to collect the data: Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_19330886/default/table Eurostat, Employed persons in science and technology (HRST). Available at: https://ec.europa.eu/eurostat/databrowser/view/hrst_st_nocc/default/table?lang=en	Gender-disaggregated data for the industry is based on the female employment share from the relevant overall category of the Eurostat: Human resources in science and technology by category, region and sex. Available at: https://ec.europa.eu/eurostat/databrowser/view/hrst_st_rsex/default/table?lang=en
Maritime Defense	The number of employees in maritime defense was collected from various national reports and media sources across all the European countries that provide figures for personnel in naval service.	The percentage of females in naval service was obtained from national reports and media sources.
R&D related to the marine	The following steps were taken to estimate the number of employees in R&D related to the marine: 1. The number of 'researchers' in R&D was downloaded from the Eurostat R&D personnel dataset, 2. The already estimated marine share in engineering was used as a marine share to calculate the researchers specifically in marine related topics out of the total number of researchers in R&D. The following sources were used to collect the data:	Gender-disaggregated data for this industry was not available. The percentage of females in R&D was used as a proxy for the percentage of females in R&D related to the marine. The data are available at Eurostat, R&D personnel and researchers by sector of performance. Available at: https://ec.europa.eu/eurostat/databrowser/view/rd_p_persreg/default/table?lang=EN

	Eurostat, R&D personnel and researchers by sector of performance. Available at: https://ec.europa.eu/eurostat/databrowser/view/rd_p_persreg/default/table?lang=EN	
Research and marine education (third level)	The following steps were taken to estimate employment in research and marine education (third level) related to the marine: 1. Total staff numbers for higher education institutions (HEIs) were downloaded from Eurostat – Tertiary Education Levels 5–8. 2. To calculate the share of academic staff related to ocean/marine fields, the total number of universities in each country was collected. 3. The number of universities offering degrees in ocean/marine-related fields was then identified. The percentage of marine-related universities was then calculated and an assumption made that approximately 5% of staff in these ocean related universities were contributing in the field of ocean and marine research and teaching. 4. This calculated share was applied to the total HEI staff numbers to estimate the number of employees working in marine-related higher education. The following sources were used to collect the data: Eurostat, Classroom teachers and academic staff by education level, programme orientation, sex and age groups. Available at: https://ec.europa.eu/eurostat/databrowser/view/educ_uoe_perp01__custom_19331997/default/table	Gender-disaggregated data for this industry was not available. The percentage of females in academic staff tertiary education levels 5-8 was used as a proxy for the percentage of females in research and marine education (third level) related to the marine. The data are available at Eurostat, Classroom teachers and academic staff by education level, programme orientation, sex and age groups. Available at: https://ec.europa.eu/eurostat/databrowser/view/educ_uoe_perp01__custom_19331997/default/table

Marine Retail Services (Retail of seafood in stores, boat sales, and marine equipment sales)	The following steps were taken to estimate the number of employees in Marine Retail Services: 1. The number of employees in 'Distribution of fish products' sub-sector was collected from the EU Blue Economy Observatory. 2. Average employment numbers for other marine retail services was known for certain countries from national reports. 3. The marine-related share of G46 and G47 was calculated using the average number of employees in other marine retail services for the available countries. This percentage was then applied to estimate marine employment in Eurostat NACE Rev. 2 Eurostat Nace codes G466 Wholesale of other machinery and equipment and G4764 Retail sale of sporting equipment in specialised stores. 4. The estimated marine employment in these two NACE codes G466 and G4764 was summed with the employees in "Distribution of fish products of the EU Blue Economy Observatory to calculate the total number of employees in Marine Retail Services. The following sources were used to collect the data: Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_19332091/default/table	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in Marine Retail Services was estimated using female employment shares from relevant overall category of the Eurostat NACE Rev. 2 codes: G46 -Wholesale trade, except of motor vehicles and motorcycles. G47 - Retail trade, except of motor vehicles and motorcycles. Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/LFSA_EGAN22D__custom_19331084/default/table
Marine Environmental Consulting Services	The following steps were taken to estimate the number of employees in Marine Environmental Consulting Services: 1. Total employment data was collected for Eurostat NACE Rev. 2 codes M7112 – Engineering activities and related technical consultancy and M7120 – Technical testing and analysis. 2. The previously estimated percentage of marine engineering employees was applied to the total employment in M7112 and M7120 to estimate the number of staff working in marine environmental consulting services. The following sources were used to collect the data: Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/sbs_ovw_act__custom_19332091/default/table	Gender-disaggregated data for this industry was not available. Therefore, the proportion of female employment in marine Environmental Consulting Services was estimated using female employment shares from relevant overall category of the Eurostat NACE Rev. 2 codes: M71- Architectural and engineering activities; technical testing and analysis. Eurostat NACE Rev. 2 database is available at: https://ec.europa.eu/eurostat/databrowser/view/LFSA_EGAN22D__custom_19331084/default/table