The JERICO-S3 project is funded by the European Commission's H2020 Framework Programme under grant agreement No. 871153. Project coordinator: Ifremer, France.

DELIVERABLE TITLE:
JERICO-S3 D9.1: User requirement and classification

DELIVERABLE NUMBER: **D9.1**

WORK PACKAGE N° and NAME: WP9 A sustainable JERICO-RI: Preliminary design towards implementation

Authors: V. Fernández, I. Puillat, B. Tagliana, A. Lara-Lopez, I. Lips

Involved Institution: EuroGOOS, IFREMER

Due date // Submission date: 31.07.2021 // 29.07.2021

Nature: **R**
(R = Report, P = Prototype, D = Demonstrator, O = Other)

Dissemination level : **PU**
PU = Public, PP = Restricted to other programme participants (including the Commission Services), RE = Restricted to a group specified by the consortium (including the Commission Services), CO = Confidential, only for members of the consortium (including the Commission Services)

GRANT N°: 871153
PROJECT ACRONYME : JERICO-S3
PROJECT NAME : Joint European Research Infrastructure for Coastal Observatories - Science, services, sustainability
COORDINATOR : Laurent DELAUNEY - Ifremer, France - jerico@ifremer.fr

DOCUMENT TECHNICAL DESCRIPTION

Document ID	JERICO-S3-WP9-D9.1-28.07.2021-V2.0

JERICO-S3 DELIVERABLE

Joint European Research Infrastructure network for Coastal Observatory
Science, Services, Sustainability

DELIVERABLE n° WP and full title	JERICO-S3 D9.1: User requirement and classification
Description	Mapping and analysing the role of users and stakeholders in the JERICO-RI to establish a "User strategy".
Lead beneficiary	EuroGOOS
Lead Authors	V. Fernández, I. Puillat, B. Tagliana, A. Lara-López, I. Lips
Contributors	
Submitted by	I. Lips

REVISION HISTORY

Revision	Date	Modification	Author
V1.0	10 June 2021	1st Draft	I. Lips
V2.0	28 July 2021	Final	V. Fernández, I. Puillat, B. Tagliana, A. Lara-López, I. Lips

APPROVALS

	Name	Organisation	Date	Visa
Coordinator	Delauney Laurent	Ifremer	29 July 2021	LD
WP Leaders	Ingrid Puillat	Ifremer	29 July 201	IP

Diffusion list

Consortium beneficiaries	Third parties	Associated Partners	other
x			

Executive Summary

The JERICO Research Infrastructure (JERICO-RI) aims to improve the benefit of Ocean Observing Systems (OOS) for science and society. It is essential for the sustainability of the research infrastructure (RI) to identify and gather users, assess their needs *vs.* the currently offered services in JERICO-RI. Therefore, a mapping and classification of the different users of the infrastructure, as well as an identification of their requirements, including the regional specificity is needed to formulate a user engagement strategy.

To perform this analysis, information of the current users of the RI was collected by the different region contact points, who have access and knowledge of the main users at regional level. A total of 470 users of the JERICO-RI were identified among 11 marine European regions covering 17 European countries.

The user analysis has allowed to identify the main user profiles and better understand the socio-economic landscape around the RI as well as the scientific needs which are supported by the JERICO infrastructures. The analyses showed that only two sectors represent more than 50% of the users: the *Coastal protection and management* (28%) and the *Fundamental and applied research* (24%) sectors. Looking into the proportion of these two sectors among the regions, they are represented in all the regions, but with regional specificities for each sector, which implies the need for implementing regional approaches to better engage regional users.

Regarding the distribution of users by typology (e.g., *Private*, *Public*, *Academia*, *NGO*s, *Military* or *General Public*), the majority of identified users are from the *Public* category with 42%, whereas *Academia* represents 28% of the total users and is in second position, followed by the *Private* sector with 18%. All of these typologies are represented in all the considered regions, but with regional specificities in the proportions of each sector at regional level.

Regarding access to the RI, the main type of access is via *Virtual Access*, 15% more than the *Physical Access* to the different JERICO-RI facilities, indicating that the efficiency of the RI depends very much on its capacity to provide both access modes.

Finally, a quantitative methodology of ranking the users among four categories (*Keep satisfied* and *Manage closely* for high power, and *Monitor* and *Keep informed* for low power) illustrated through a *Power* vs. *Interest* matrix has been established and applied to the pool of JERICO-RI users. As a result of this analysis, users and stakeholders with high influence are mostly well represented by the *Coastal protection and management,* and *Fundamental and applied research* sectors, but also including some of *Maritime safety* and *crisis response* sector. Users and stakeholders with a high capacity of influence and a strong interest in JERICO-RI will be the core members of the JERICO-RI User Committee (JUC) and are considered as stakeholders to manage closely.

Finally, it is important to mention that the number of users identified may be an underestimate when considering the potential of the JERICO-RI. However, it gives a good overview of the diversity of the European user community.

1. Introduction

The JERICO Research Infrastructure (JERICO-RI) intends to provide viable Products and Services (P&S) to a wide community of users and thereby support a broad range of economic, societal and policy making activities across Europe. JERICO-RI is distributed at locations across 14 different countries and covers different marine and maritime regions with diverse scientific priorities, user needs and geo-political rules. This results in a heterogeneous community of intermediate and end-users, among nations, marine and maritime regions, both in terms of sector of activities and scientific problems. Therefore, user needs and expectations are diverse and may vary a lot in time and from one region to another, making it challenging to satisfy. The JERICO-RI user community includes stakeholders, as key external users as well as internal ones at various strengths of engagement and interest, such as scientists, national, regional, or local funding bodies, private companies, industries, citizens, etc. It is essential, for the sustainability of the RI, to identify and gather user information, and assess their needs *vs.* the currently offered services in JERICO-RI.

In order to implement an effective strategy, the user focused actions (dissemination, communication, product development, management) need to be tailored to the specific user groups. Indeed, the user landscape of an infrastructure is heterogeneous, encompassing various usage and needs of the scientific outcomes. Therefore, the user analysis must provide a relevant typology to classify the users into groups that share common needs and similarities. The analysis must also assess the distribution of the users among those groups to provide an overview of the user landscape. The choice of the typology is strategic and depends on the RI own characteristics.

To improve the socio-economic benefit of the infrastructure, the products and services provided by the RI need to be fit-for-purpose to end-user activities over time. The analysis should also identify each user group needs and expectations (cf. identification), from the JERICO-RI and its fields of expertise.

The objective of this deliverable is to map the different users of the JERICO-RI, identifying their needs and specificity by region. The information of the community of users was compiled in a purposely built table where all the information was collected by the different contact points for each region. These contact points have access to information about the main users in their respective regions.

In the following chapter the methodology, the typology of users and the information collected, is described. In chapter 3 and 4 the user mapping results by region, sector, category, and scientific disciplines, highlighting the regional specificities and the user's current usage of the infrastructure, needs and expectations, is presented.

2. Methodology

User information compilation was initiated by a small group (5 persons) at the initial phase of the project to agree on the methodology (typology of the users, information to compile, etc.). Then, the region principal investigators (PIs) and key people in each region were contacted to collect the information on the (User table). The information collected was organised in three main sections:

1. **Definition of the JERICO users typology: Identification and classification of users**. To identify the main users a relevant typology was elaborated to classify them according to sector (economic activity), category (*Private*, *Public*, *Academia*, *NGO*s or *General Public*), subcategory (use of JERICO-RI), and scientific field. This is the first step to assess users needs and expectations in terms of communication and dissemination at least.
2. **Identification of the users current usage of the infrastructure, needs and expectations**. Two timescales are of importance: first, the analysis must assess what is the current usage and second, it should enable to anticipate the evolution of these needs (expectations). The output of the needs and expectations assessment will then support the formulation of strategic choices to target specific groups of users (sectors/categories/etc) with specific actions (dissemination, communication and of course P&S development). However, the development of P&S encompasses many possibilities and various actions: what developments to prioritise? which are the already developed P&S to update? promote? for which users? Indeed, improving the effectiveness of the P&S encompasses simple dissemination and communication of already existing P&S and the technological development of new ones. Hence, the user analysis related to P&S was adapted accordingly with the current developmental priorities of the infrastructure (RI structuration, development of new P&S etc.).
3. **Identification of the stakeholder's capacity to influence the RI.** To become sustainable, a user-driven infrastructure wants long-term actions to engage users. This close collaboration is the key to monitor user's requirements and make sure that their needs and expectations are integrated directly into the long-term design of the infrastructure. The user analysis must clarify the level of involvement of the different users (e.g., through workshop, dedicated committees etc.). To define users' level of involvement, two main variables should be considered: the level of interest in the RI and the capacity to influence the infrastructure actions. To this end, infrastructure managers must agree on a definition of the *interest* and *influence* over the RI. The definition will depend on the infrastructure singularities and own choice on user involvement.

To verify the compiled information, a User Story Survey was developed (results not available by the submission time of the current deliverable). The aim of the survey was to gather input directly from JERICO-RI users in relation to who they are, what they do, how they use JERICO-RI services and if they have any special requirements. This survey is also very helpful to gauge the level of interest in JERICO-RI, which is a key to later engagement strategy. This information is needed to refine the P&S provided by JERICO-RI and enhance the user experience.

2.1 User typology

The JERICO-RI user community is very heterogeneous. A relevant typology was built to classify the users according to their categories, sectors, scientific fields and very important to the regional approach, their maritime / oceanic region. The choice of the typology and the definition of the different categories used to classify the users was made according to the already existing knowledge of JERICO-RI user community, and pre-existing typologies used in other RI (Heslop et al., 2019).

Categories: Sets of users defined according to the nature of the activity they are running: *Private*, *Public*, *Academia*, *NGO*s, *Military* or *General Public*.

Table 1. Typology of user categories.

CATEGORY	DEFINITION
Private	Profit organisations
Public	Governmental organisations
Academia	Universities, research institutes, schools
General Public	People, non-commercial
NGOs	Non-governmental organisation
Military	Military organisations
Other	*(In case it doesn't fit in with any category above)*

Table 2. Subcategories - ensemble of users defined according to the type of usage of the JERICO-RI (observation systems, data, products, services).

CATEGORY (see above)	SUBCATEGORY according to the category
Academia	Research & Development (R&D) Education
Public services	Policy makers Users of data User of services
Business & Industries	Technology providers Downstream services Industry end-users
Other	other

Subcategories work together with categories. It means for each category, there are specific subcategories. For instance, if a user belongs to the category *Academia* it can only fit in with the subcategories *R&D* or *Education* and it cannot belong to any other.

Sectors: Part of the economy / activity undertaken by users (from any category). Sectors work independently from categories and subcategories. It means that a user can belong to any sector, regardless of the categories and subcategories it belongs to.

Table 3. Typology of user's sectors.

Sectors	example of users
Aquaculture	Aquaculture, sustainability manager
Fisheries	Fisheries managers, fisheries scientists, commercial fishermen
Oil & Gas	Oil and gas companies

Offshore wind	Wind energy companies, environmental impact assessors
Other ocean energy (wave, current, OTC, tide)	Energy companies
Maritime safety / crisis responses	SAR operators, coastguard, oil spill response managers, maritime emergency managers, aquaculture managers, HABs observers
Shipping	Port manager, ferry companies / captains, cruise companies
Ocean technology	Equipment and service providers
Blue biotechnology	Biotechnological companies
Insurance	Insurance companies
Weather services and ocean forecasting	Weather forecast centres (data for model validation, assimilation)
Tourism & recreation	Recreational sailors, sport sailors, surfers, divers, swimmers
Coastal protection & coastal management	Local, regional, national governments, environmental and emergency response providers, beach and coastal planning managers, managers of marine environment
Education for scholars	School kids and teachers
Fundamental and applied research	Research laboratories and institutions / companies
High level Education	Universities

Scientific fields of application or research: These fields of application and research are considered to implement a holistic approach of the observation and study of the coastal marine environment. They are historically the same since the JERICO-NEXT project (H2020, 2015-2019).

Table 4. Scientific fields of application or research.

Scientific fields	**Meaning**
Hydrodynamics and transport	Related to surface and subsurface currents, associated transport of matter (including suspended matter, sediments etc.) and erosion
Biodiversity, eutrophication and habitat	Related to study of biodiversity at low trophic level, including phytoplankton and benthic communities

Contaminants (chemical & biological)	Mainly related to organic compounds but not restricted to, observed in the water and their distribution in the biotic compartments
Carbonate system / Carbon cycle	Related to studies of carbonate fluxes to and from the coastal marine zone
Numerical modelling of the coastal marine system	JERICO RI contribution to improve ocean forecasting via providing more dedicated observations

Other information compiled includes:

- the geographical area of action of the users: oceanic region, nation involved, the scale of its business as local, national, regional, EU, international;
- the nature of the existing relationship between the user and the JERICO project partners: existing agreement or not, potential future user;
- the name of the user entity and the partner contact point.

Table 5. Examples of user typology.

User	**Region**	**Category**	**Sector**	**Scientific field**
OSPAR	English Channel / Irish coastal seas / Bay of Biscay / North-East Atlantic	Public	Coastal protection and management	Biodiversity / eutrophication / habitat + contaminants (chemical & biological)
National University of Ireland Maynooth	Irish coastal seas	Academia	Fundamental and applied research	Hydrodynamics and transport
COPERNICUS/ CMEMS	(All region)	Public	Weather services and ocean forecasting	not relevant to this user
WWF	(All region)	NGO	Other	not relevant to this user
SASEMAR (Spanish institution for SAR operation in national waters)	Bay of Biscay, Iberian Atlantic Margin / North-Western Mediterranean	Public	Marine safety / Crisis responses	Hydrodynamics and transport

2.2 Needs for Products and Services

The information on JERICO-RI users and stakeholders will guide the development of P&S, ensuring they are fit-for-purpose to the end-users needs. Moreover, it should enable the infrastructure to anticipate the evolution of the users' expectations and address their future needs. To that end, a methodology was developed to gather information on i) the type of JERICO-RI P&S users that are already benefiting or would in the future, ii) the purpose of this use and iii) their needs. The focus was the potential trends and evolution of users' needs to anticipate the future requirements from the RI.

The focus was set on the P&S usage according to their type of access (*Physical Access*, *Virtual Access*, *Access to calibration facilities*, *Access to knowledge and expert advice*). A catalogue listed the currently available P&S of JERICO-RI. The future needs, demands and assessment of other potential interests of the users were also collected, enabling a qualitative analysis of the potential trends in societal needs. Together with the data related to user identification (sector, category, regions), the analysis provides a better understanding of the users and demands and will support strategic choices by targeting specific sectors / categories / regions with tailored products. Such information will be key to improve the efficiency of P&S now and in the future.

JERICO-RI classification of Products and Services access type:

- *Physical Access*:
  - Fixed platforms (16 available)
  - Ferryboxes (8 available)
  - Gliders (7 available)
  - Cabled observatories (5 available)
  - Multiplatforms (3 available)
- *Virtual Access*:
  - 22 providers available
- *Access to calibration facilities*:
  - 5 providers available
- *Access to expert advice*:
  - Expert advices
  - Best practices
    - Training and education
    - Computing codes
    - JERICO scientific bibliography

The analysis provides the list of the above-described P&S that each identified user is utilising. It also enables to estimate the distribution of the *Access type* to the infrastructure.

2.3 Analysis of interest and impact

JERICO-RI strives to build a strong JERICO User Committee (JUC) that will enhance the interaction between the infrastructure and the user community over the long term. To define the level at which users will engage in the decision making, there is a need to understand their level of interest in the JERICO-RI, their *weight* or *importance*, their level of resources, etc. To

quantify *interest* and *impact*, the institutional position of users in the national and EU landscape and user relations with JERICO-RI were identified as indicators. The more power (institution position, market position) a user has, the more influence the user will have in the RI. On the other hand, the higher the interest of the user in the scientific achievements of JERICO-RI, the more likely it is for the user to get involved with the RI. The ability (*Power*) and the willingness (*Interest*) to interact in the RI are therefore complementary variables upon which the engagement actions should be based.

A methodology has been established in which the *Power* and the *Interest* of users consist each in a score from 0 to 80 which derives from the aggregation of several variables. On the one hand, the *Power* score depends on the binding agreement between the users and the RI, its financial and / or in-kind contribution as well as its position in its national landscape. On the other hand, the *Interest* score depends on the number of JERICO-RI P&S on which the user relies, its frequency of interaction with its P&S provider as well as how much its activity relies on the Ocean Observing System and in JERICO-RI in particular. According to these two variables, it is possible to rank the users among four categories, which will each be targeted with a specific management strategy. This can be simply illustrated through a *Power vs. Interest* matrix. This method was applied to the pool of JERICO-RI users and with a focus on the main sectors. This methodology will be further refined in the user engagement strategy.

3. Mapping of users

Up to the 6 of July 2021, region representatives have identified 470 Users of JERICO-RI data and services among the RI's 11 regions, which cover 17 European countries. The current number of users may be an underestimate when considering the potential of the whole JERICO-RI, but it provides a good sub-selection for further analysis. The summary tables with the distribution of the users and the access to the RI are included in the Annex at the end of the Report.

3.1 Distribution of users by region and country

This distribution of users per region (Figure 1) highlights the impact of nationally acknowledged and known RIs. However, the differences in the number of users per region does not reflect the relative importance of the regions, but rather the availability of information and connection with users, given that all these regions are characterised by their strong coastal and maritime socio-economic activities. The results may also indicate in which regions JERICO-RI needs to work to better disseminate and communicate about the infrastructure. At the same time, the lowest number of users identified, e.g., in the Norwegian Sea region, does not necessarily indicate the lower interest or less effort in communication towards the national RI and JERICO-RI but may be a result of grouping (e.g., single fishermen are grouped under the *Fishery* sector).

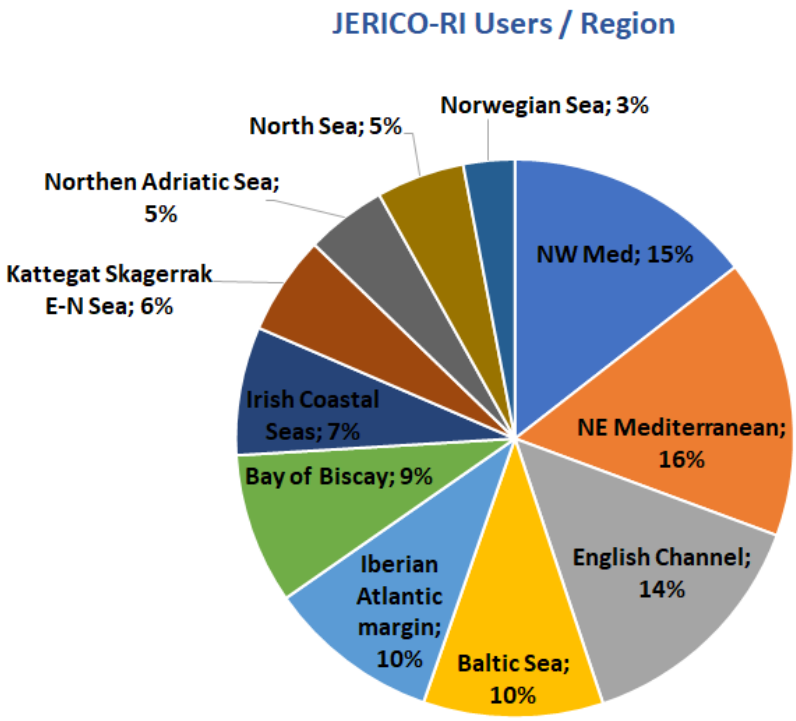


Figure 1. Distribution of the users by region.

Large part of the identified users come from three main countries: France, Spain and Greece, the total number of users from these three countries represent 41% of the total number of identified users (Figure 2). These countries are closely followed by Ireland, Finland and Italy each representing over 7% of the identified users.

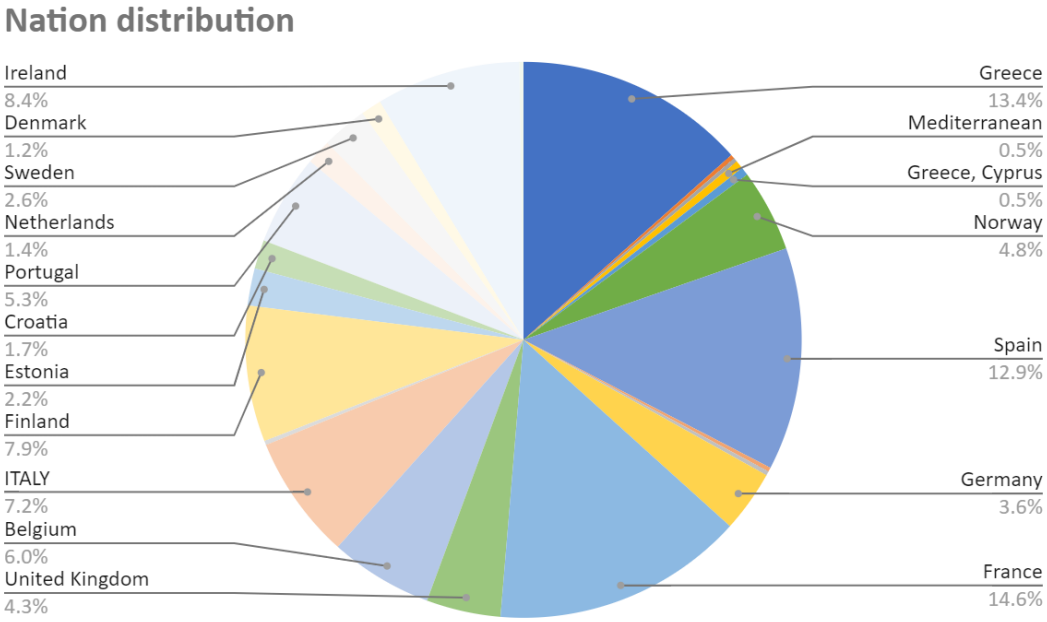


Figure 2. Distribution of users by country.

3.2 Distribution of users per category

The majority of the identified users are from the *Public* category with 42%, whereas the *Academia* category represents 28% of the total users and stands in second position, followed by the *Private* category with 18% (Figure 3).

The results highlight the specificity of the coastal domain, and long-standing links with public bodies on coastal management issues. It also highlights the importance for the RI to meet the needs of the *Public* category as its primary user, and also those from *Academia*. There are regional specificities, as can be seen in more detail in Chapter 3.5. Users from the *Public* category are more numerous in all regions except for the NE Mediterranean.

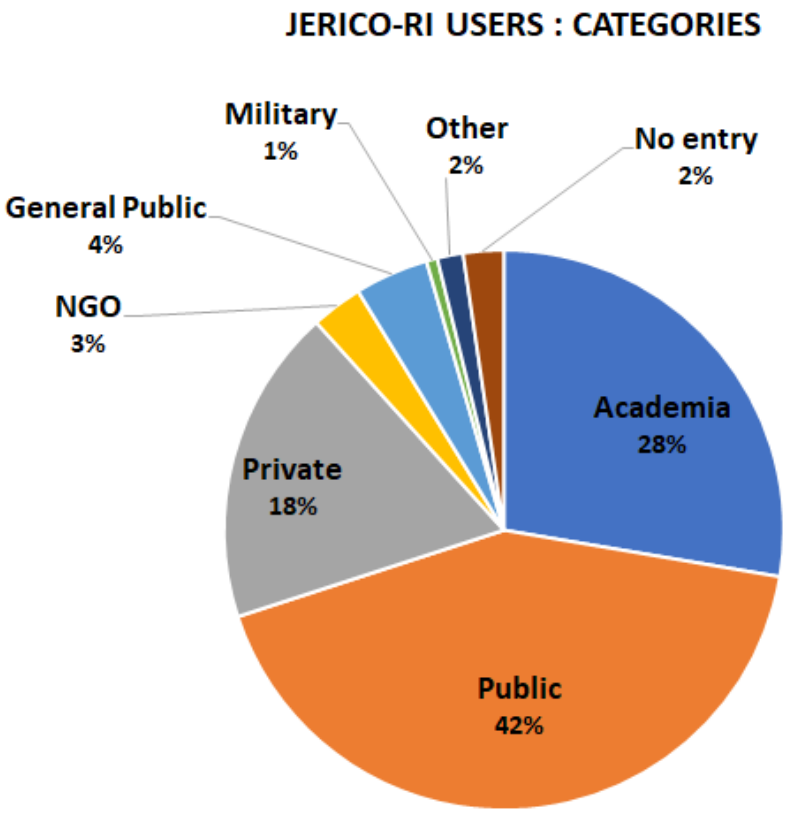


Figure 3. Distribution of users per category.

3.3 Distribution of users per sector

The concentration of human population around the coastal areas implies that coastal and shelf seas are highly impacted by anthropogenic disturbances, which in turn place these resources and services under threat. This led nations and Europe to aim for better management and protection of this area. The latter is illustrated by the sectoring of the users (Figure 4) with a majority of users belonging to the *Coastal management and protection* sector (28%), followed by the *Fundamental and applied research* sector with 24%. Other sectors are represented by a lower proportion of less than 10%, of which *Weather and ocean forecasting* is the most important (7%). This first result would suggest that sector grouping helps to illustrate JERICO-RI user's main activities and where it can improve impact on societal benefits.

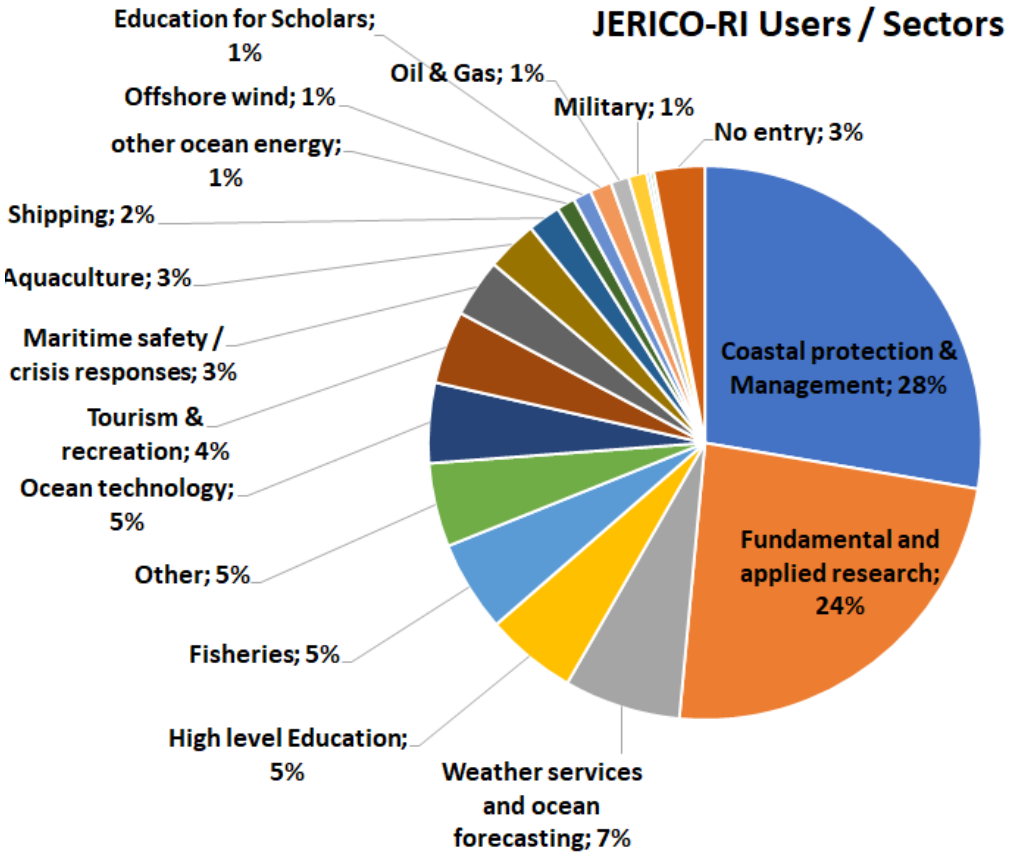


Figure 4. Distribution of users per sector.

This initial analysis underlines also that users from the *Public* and *Academia* sectors are more familiar with JERICO-RI activities, and that regional differences in user distribution are to be expected. Regional specificities deserve particular attention, as some regions are characterised by the prevalence of specific sectors that can be underrepresented at the larger scale. These particularities also call for a targeted approach to the users in these regions. A quantitative analysis is required to better assess the regional differences to elaborate user engagement strategies.

3.4 Distribution of users per scientific fields

In spite of the fact that many users have not declared scientific fields, *Biodiversity / eutrophication / habitat* had the most number of users (95 users), followed by *Hydrodynamic and transport* (66 users) (Figure 5). The latter field is especially important in the English Channel region (35 users) as can be seen in the tables in the Annex with more detailed information of the number of users by scientific fields.

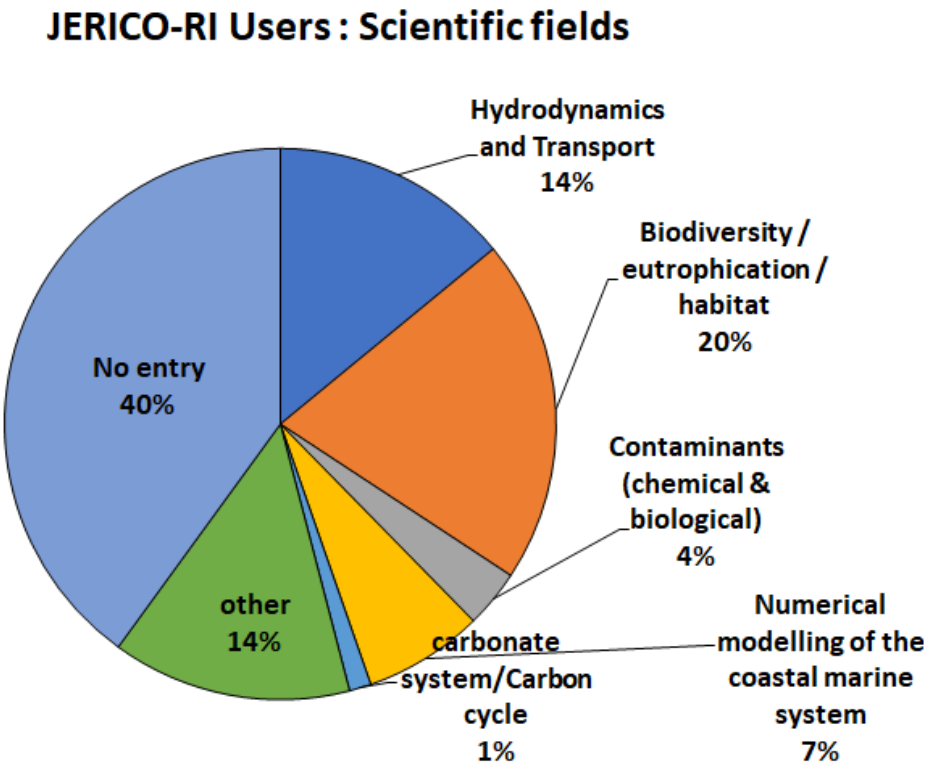


Figure 5. Distribution of users per scientific field.

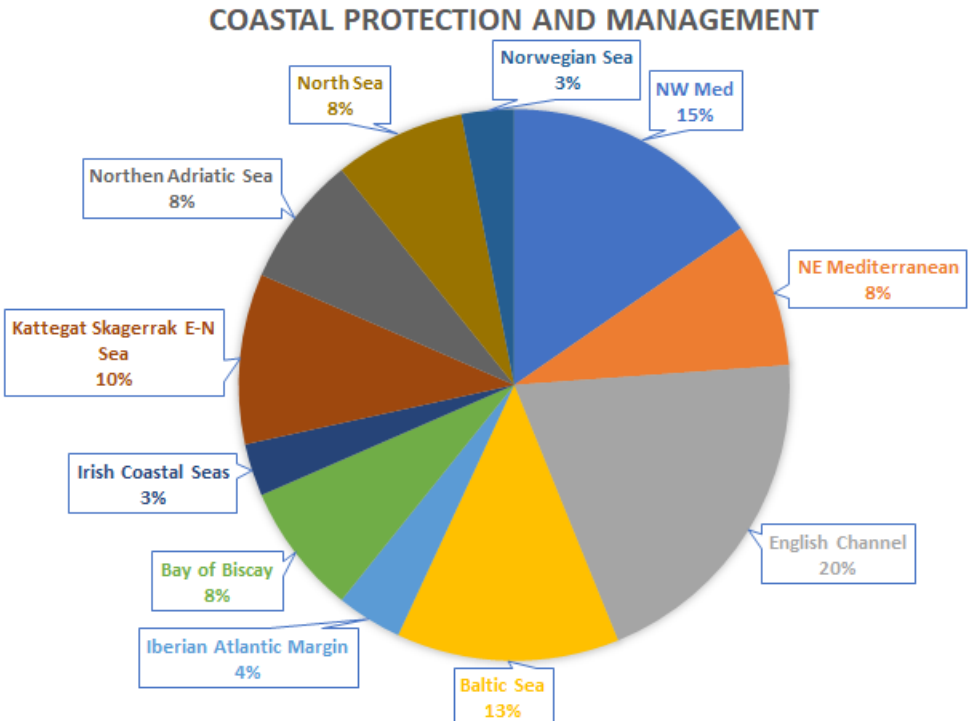
3.5 Regional users specificities

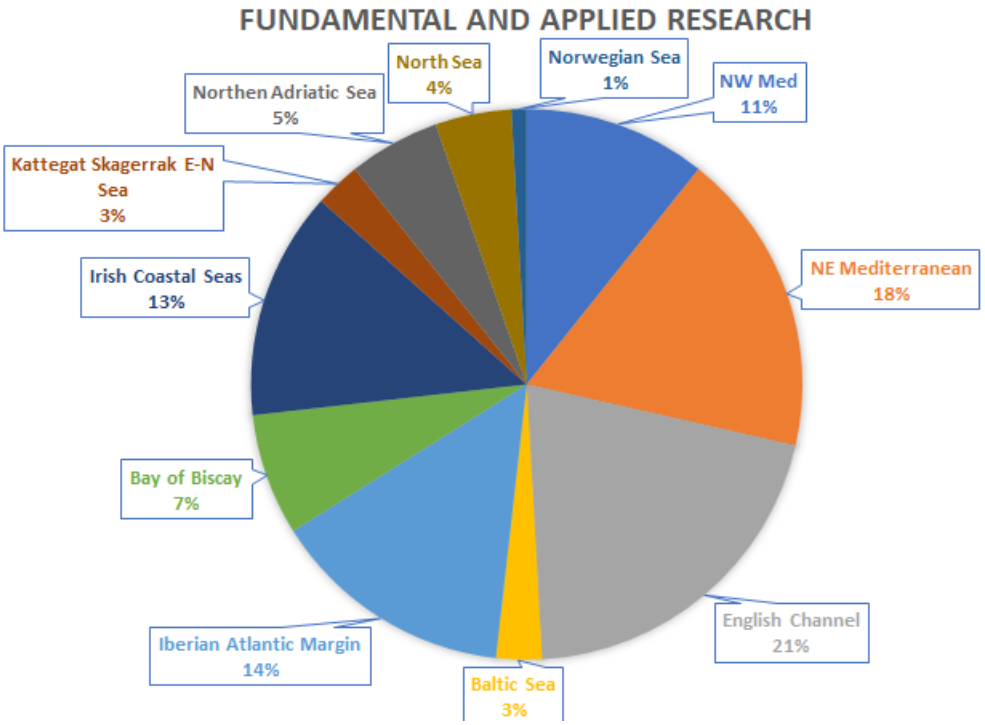
Concerning regional users' specificities, some conclusions can be drawn from the results of distribution by sector, category and region. Because most of the inputs for a single region come from one to three JERICO region representatives, person-induced and knowledge based bias needs to be considered when analysing and interpreting the results.

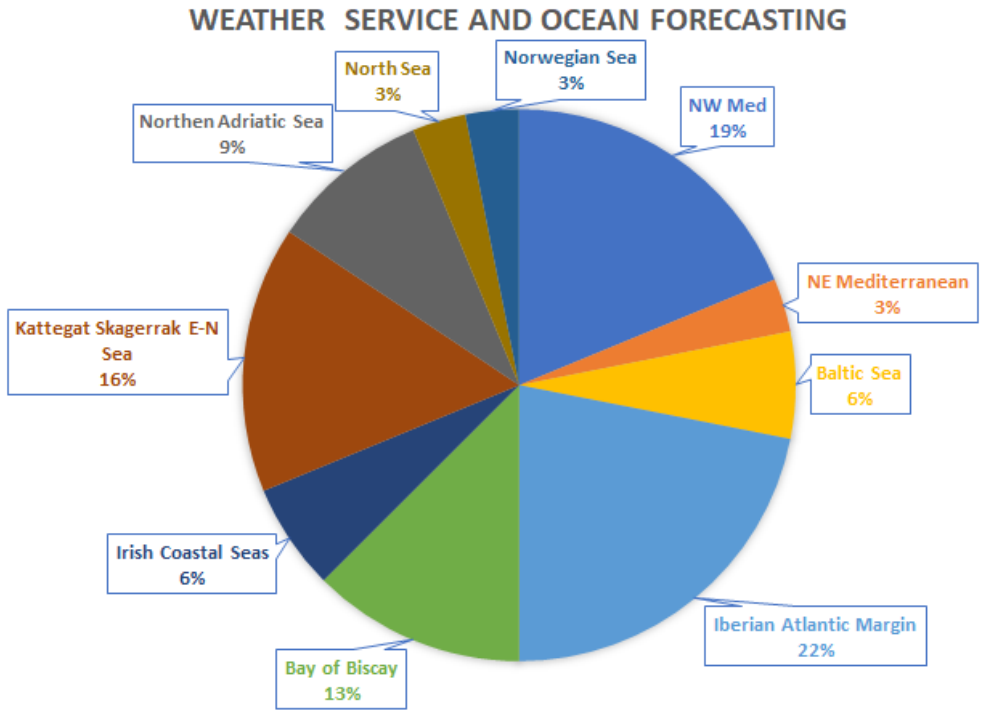
By sector: The results below and the table in the Annex 1 show the number of users for each sector by region (sectors with wider regional representation are illustrated on Figure 6 as proportional share of the total):

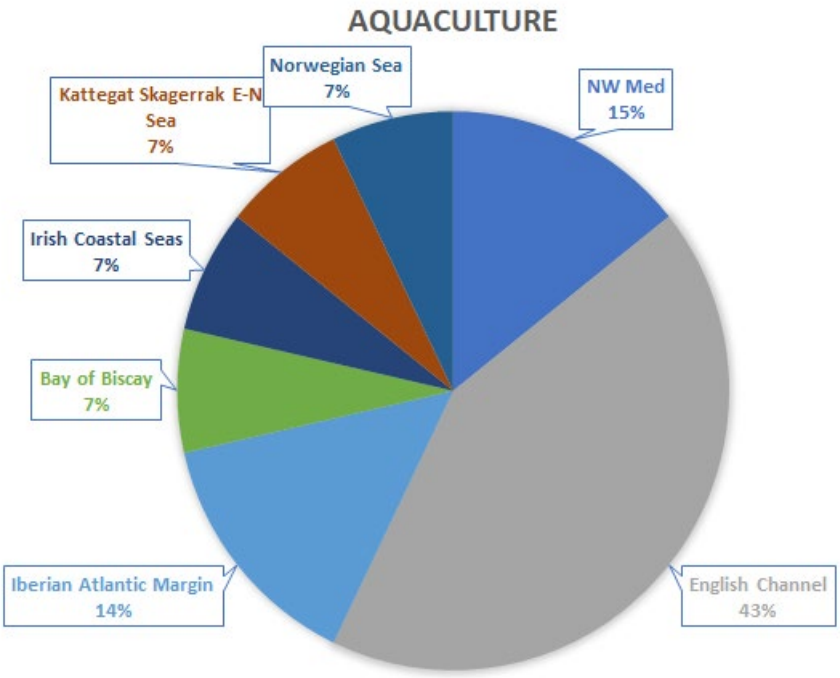
- Users from the *Coastal protection and management* sector (130 users) and *Fundamental and applied research* sector (112 users) are represented in all the 11 regions considered in this study.
- The *Weather services and ocean forecasting* sector has users in all regions except in the English Channel. The largest proportion of users identified for this sector are in the Iberian Atlantic Margin (6 users in that area) followed by the NW Mediterranean.
- The *Aquaculture* sector is important, by their number of users, in the English Channel, NW Mediterranean and Iberian Atlantic Margin regions.
- *Tourism and recreation* sector is important in the NE Mediterranean with 50% of the users.
- *High level education* users are especially important in the Baltic Sea, followed by the NW and NE Mediterranean.
- The *Fisheries* sector is important in the NE Mediterranean followed by the NW Mediterranean and with an even proportion of users (8%) in five other regions. Surprisingly, no users were identified for this sector in the Iberian area.

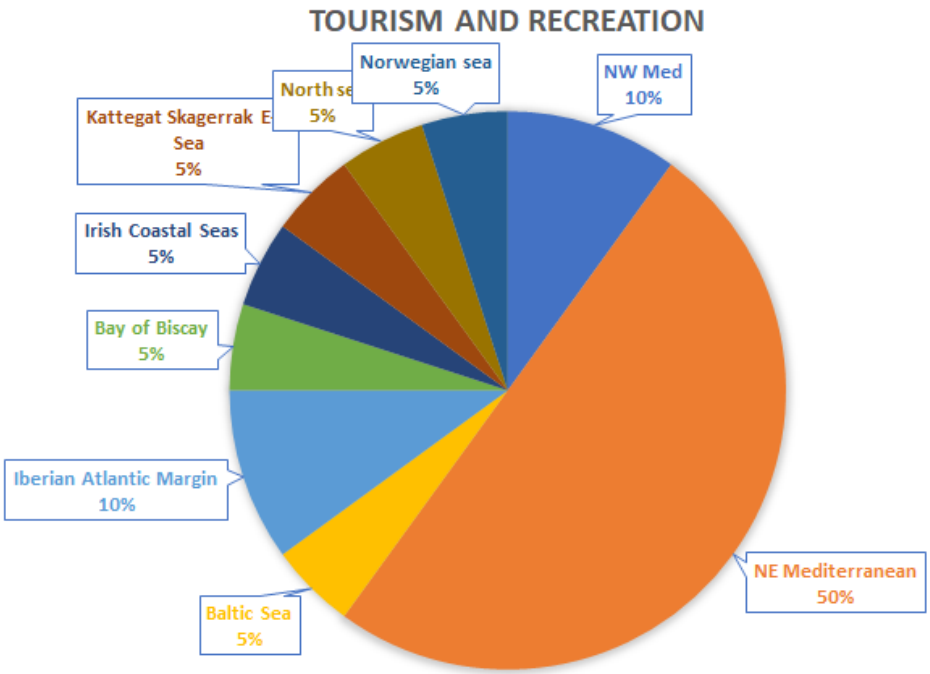
- The users from *Ocean technology* sector were identified in many of the regions, with the largest proportion in the NE Mediterranean.
- Users in the *Military* sector are only identified in Norwegian Sea, Kattegat and NE Mediterranean.
- Users in the sector *Oil and Gas* are only identified in NW Mediterranean, NE Mediterranean and Irish Coastal Seas.
- *Insurance Companies* are only indicated as users in the NW Mediterranean.

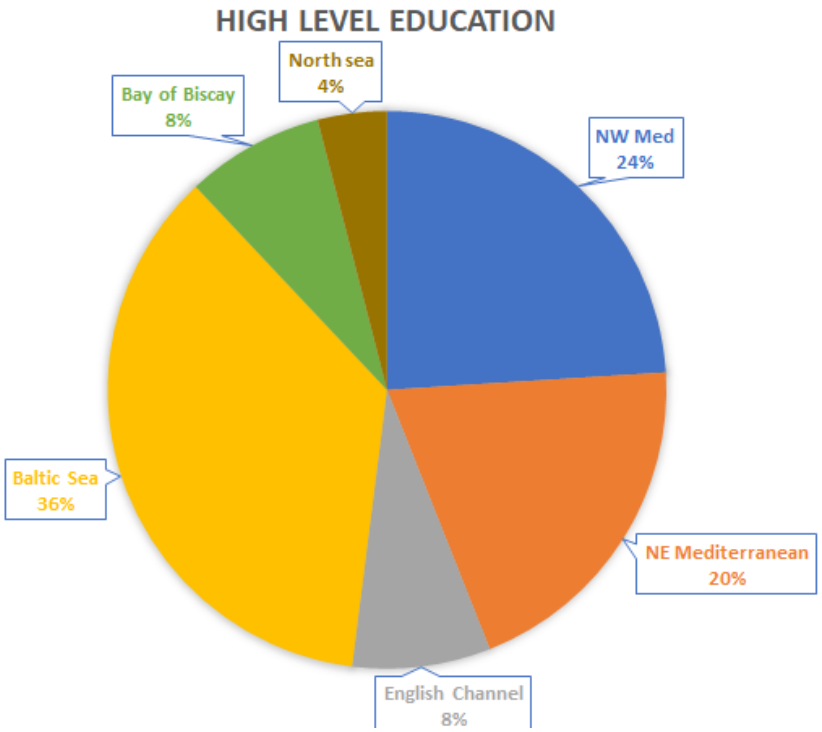


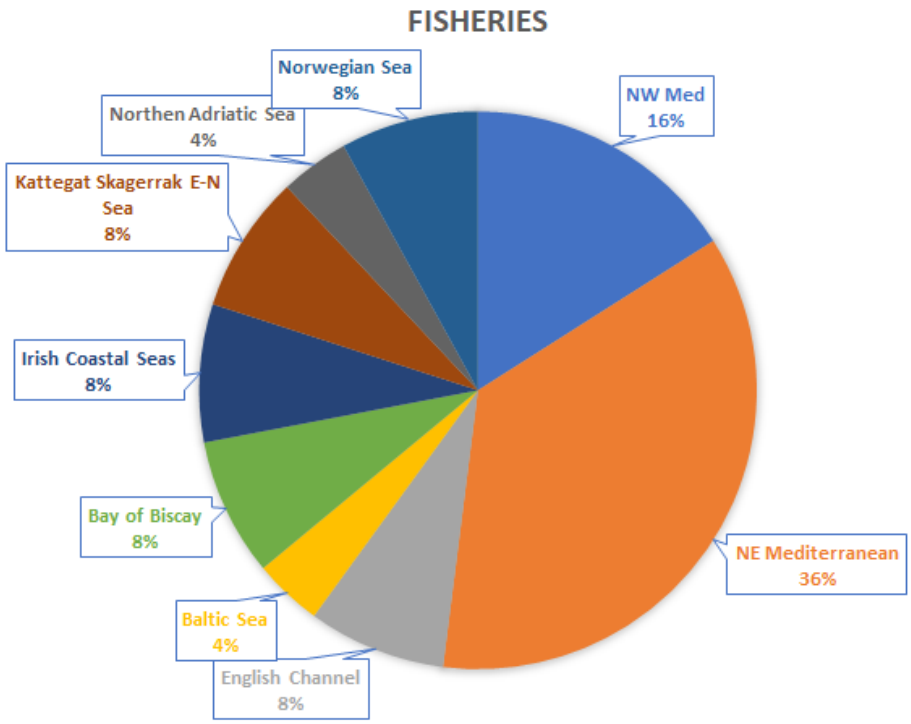

FUNDAMENTAL AND APPLIED RESEARCH
North Sea 4%
Norwegian Sea 1%
NW Med 11%
Northen Adriatic Sea 5%
Kattegat Skagerrak E-N Sea 3%
NE Mediterranean 18%
Irish Coastal Seas 13%
Bay of Biscay 7%
English Channel 21%
Iberian Atlantic Margin 14%
Baltic Sea 3%


WEATHER SERVICE AND OCEAN FORECASTING
North Sea 3%
Norwegian Sea 3%
NW Med 19%
Northen Adriatic Sea 9%
NE Mediterranean 3%
Kattegat Skagerrak E-N Sea 16%
Baltic Sea 6%
Irish Coastal Seas 6%
Iberian Atlantic Margin 22%
Bay of Biscay 13%


AQUACULTURE
Norwegian Sea 7%
NW Med 15%
Kattegat Skagerrak E-N Sea 7%
Irish Coastal Seas 7%
Bay of Biscay 7%
Iberian Atlantic Margin 14%
English Channel 43%


TOURISM AND RECREATION
Norwegian sea 5%
NW Med 10%
North se 5%
Kattegat Skagerrak E Sea 5%
Irish Coastal Seas 5%
Bay of Biscay 5%
Iberian Atlantic Margin 10%
NE Mediterranean 50%
Baltic Sea 5%


HIGH LEVEL EDUCATION
North sea 4%
Bay of Biscay 8%
NW Med 24%
Baltic Sea 36%
NE Mediterranean 20%
English Channel 8%


FISHERIES
Norwegian Sea 8%
NW Med 16%
Northen Adriatic Sea 4%
Kattegat Skagerrak E-N Sea 8%
Irish Coastal Seas 8%
Bay of Biscay 8%
NE Mediterranean 36%
Baltic Sea 4%
English Channel 8%

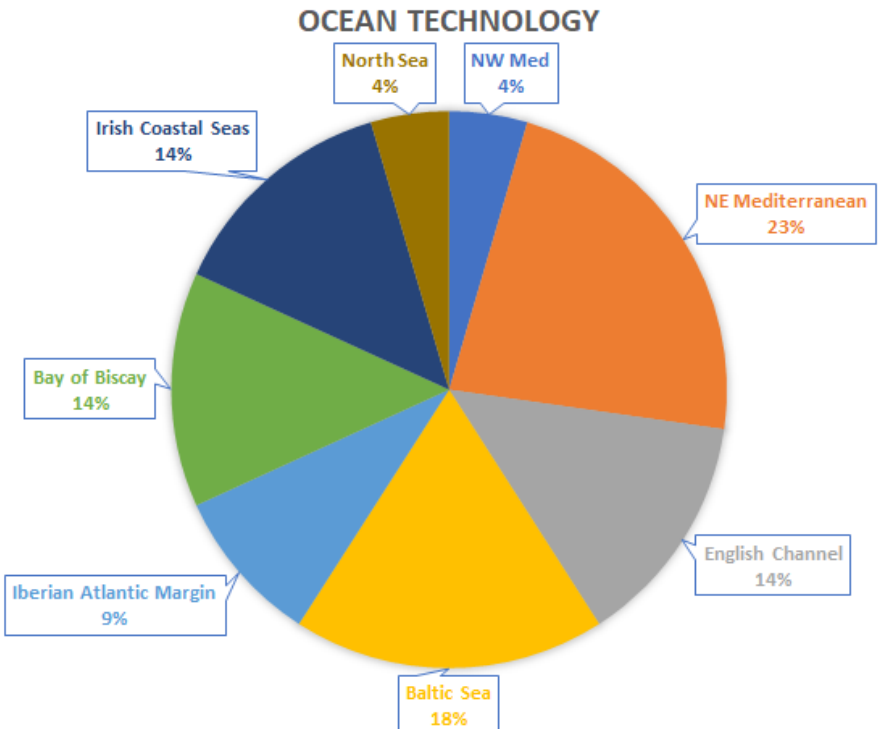
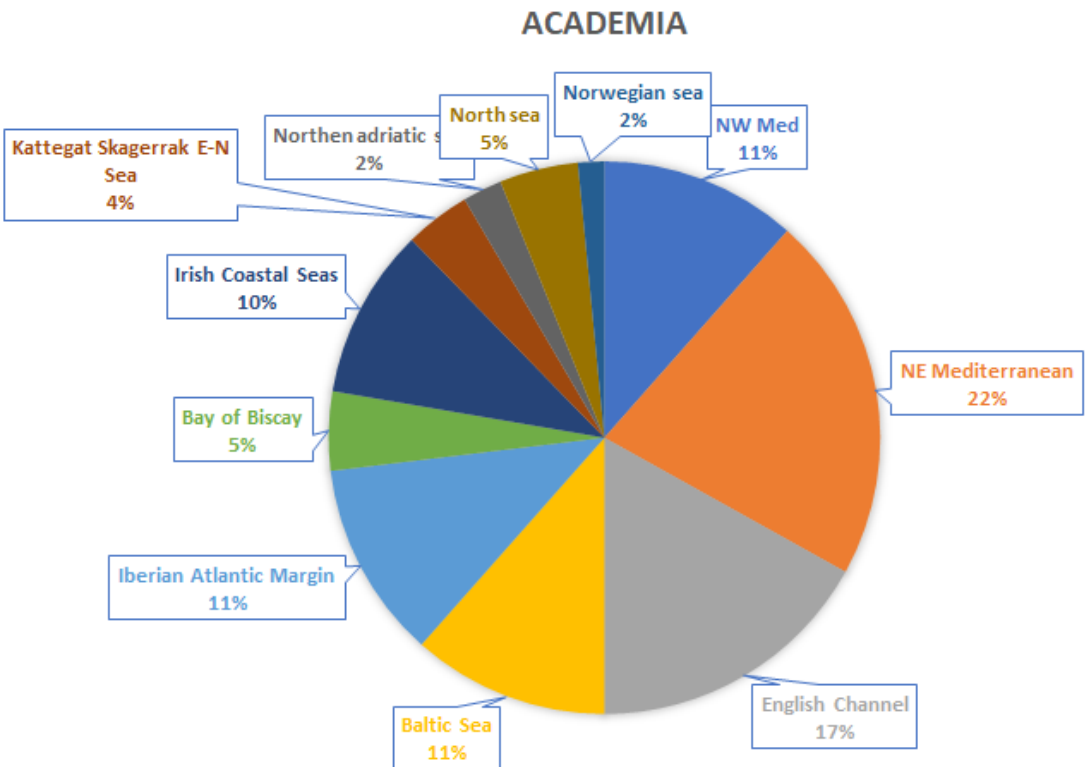
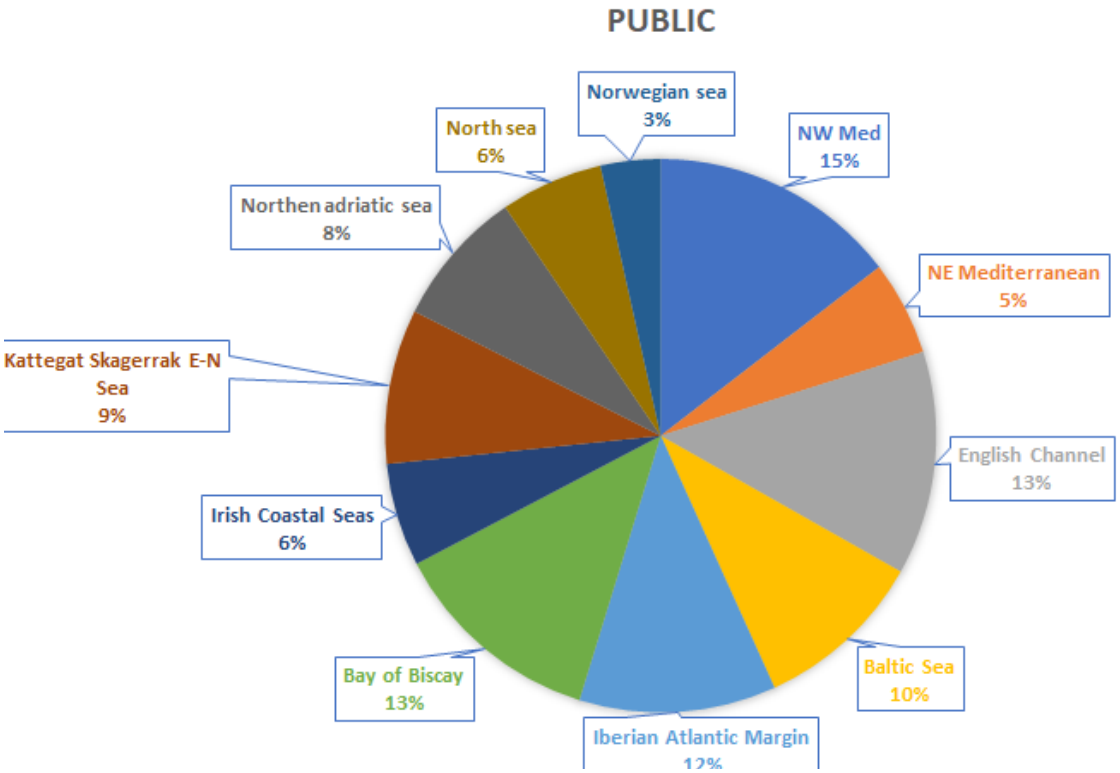


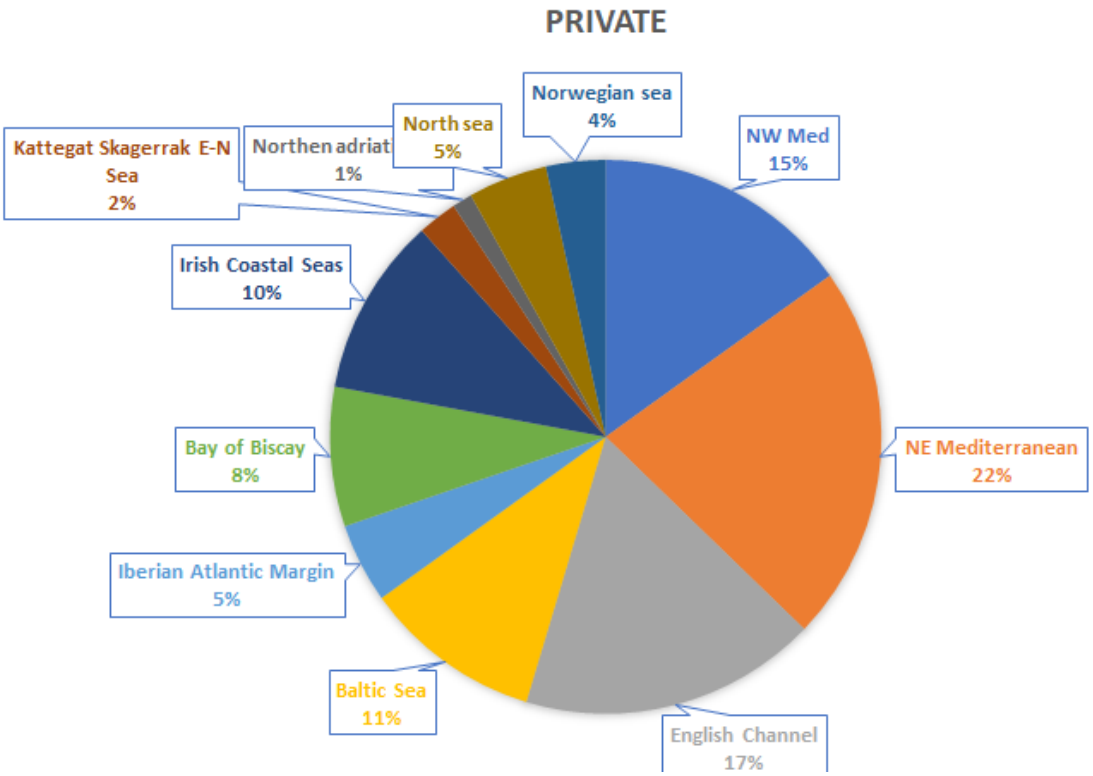
Figure 6. Distribution of regions by sector.

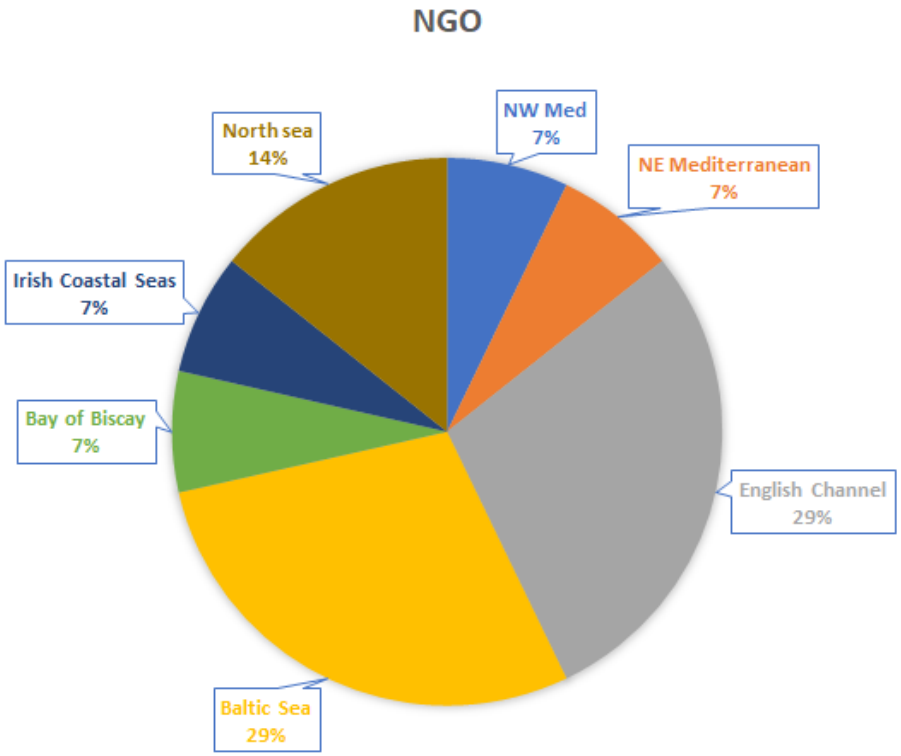
By Category: The results below show the regional distribution of users by some of the categories (Figure 7):

- Users from *Academia*, *Public* and *Private* categories are present in all 11 regions considered in this study.
- The majority of users in the *Academia* category were identified in the NE Mediterranean (22%) followed by the English Channel (17%) and an even proportion of users for the Baltic Sea, Iberian Atlantic Margin and NW Mediterranean (11%).
- There is a more even distribution of users in the *Public* category ranging from 3% in the Norwegian Sea to 15% in the NW Mediterranean, with most regions having 8 - 15% of users.
- Users from the *NGO* category are present in all regions except for Iberian Atlantic Margin and are relevant in both Baltic Sea and English Channel (both representing 29% of users).
- Users for the *General Public* category are especially relevant in NE Mediterranean (representing 75% of users).


ACADEMIA
Norwegian sea 2%
North sea 5%
NW Med 11%
Northen adriatic s 2%
Kattegat Skagerrak E-N Sea 4%
Irish Coastal Seas 10%
NE Mediterranean 22%
Bay of Biscay 5%
Iberian Atlantic Margin 11%
English Channel 17%
Baltic Sea 11%


PUBLIC
Norwegian sea 3%
North sea 6%
NW Med 15%
Northen adriatic sea 8%
NE Mediterranean 5%
Kattegat Skagerrak E-N Sea 9%
English Channel 13%
Irish Coastal Seas 6%
Baltic Sea 10%
Bay of Biscay 13%
Iberian Atlantic Margin 12%


PRIVATE
Norwegian sea 4%
North sea 5%
Northen adriat 1%
Kattegat Skagerrak E-N Sea 2%
NW Med 15%
Irish Coastal Seas 10%
Bay of Biscay 8%
NE Mediterranean 22%
Iberian Atlantic Margin 5%
Baltic Sea 11%
English Channel 17%


NGO
NW Med 7%
North sea 14%
NE Mediterranean 7%
Irish Coastal Seas 7%
Bay of Biscay 7%
English Channel 29%
Baltic Sea 29%

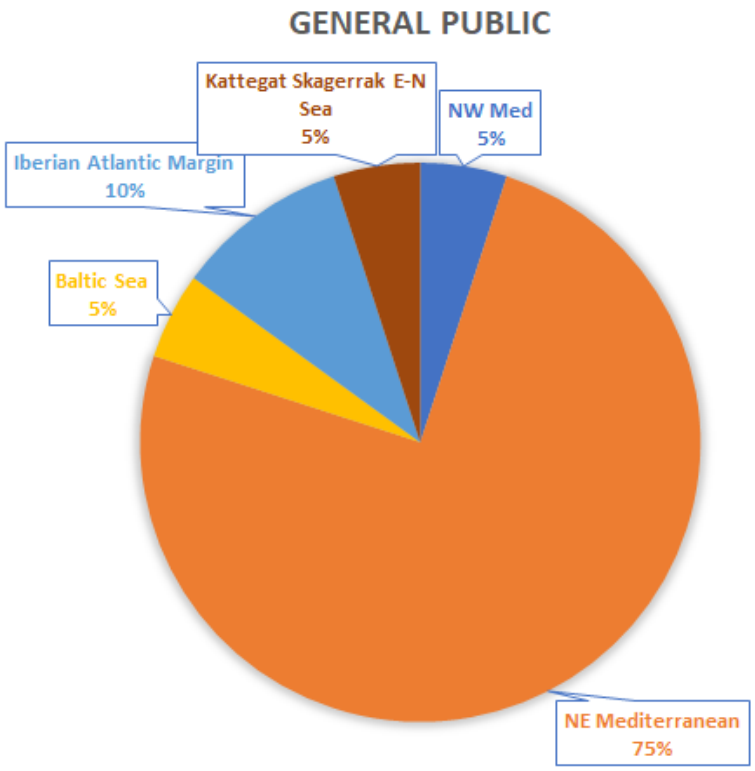


Figure 7. Distribution of user categories by region.

By Region: In the following sub-chapters the specificities of user classification by different sectors and categories region by region are presented. The information from the total number of users is summarised in the Annex.

3.5.1. Baltic Sea

Similar to the overall distribution, the main user categories in the Baltic Sea region are from *Public* (41%), *Academia* (31%) and *Private* (18%) categories. Looking at the sector distribution the largest proportion of users are from the *Coastal protection and management* sector (35%) followed by *High level education* (18%). Of note is that the Baltic Sea region has the most users of the latter sector when compared to all other regions.

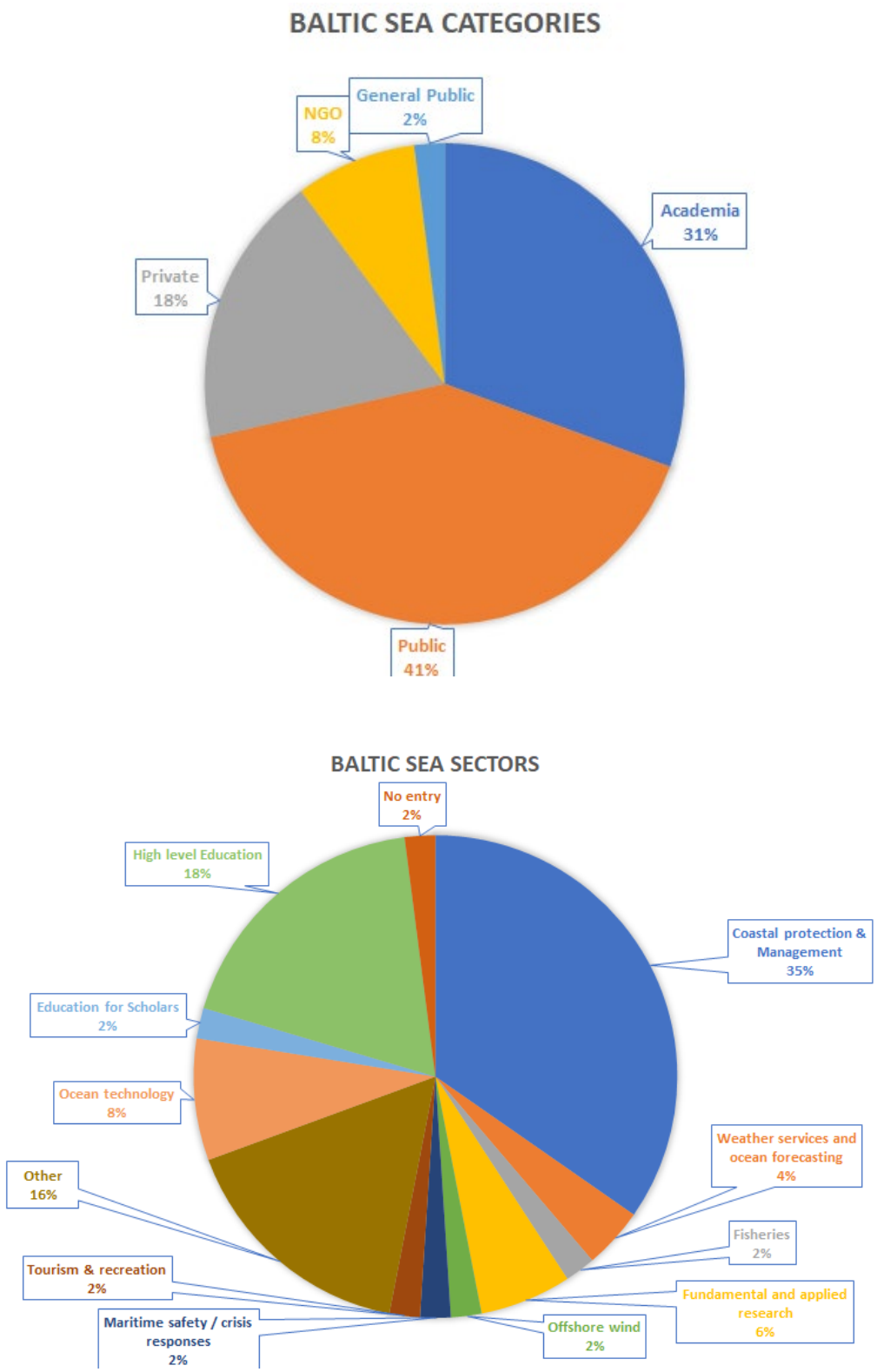


Figure 8. The distribution of users by categories and sectors in the Baltic Sea region.

3.5.2. Kattegat and Skagerrak

For the Kattegat and Skagerrak region, the *Public* category dominates all others with over 65% of the users. Similarly, if to look at the user classification by sector, one sector is dominant, the *Coastal protection and management* with almost half of all users. Also of importance is the

Weather services and ocean forecast with nearly 20% of users identified. Of note is that the Kattegat and Skagerrak region is one of the three regions with users identified for the *Military* category and sector.

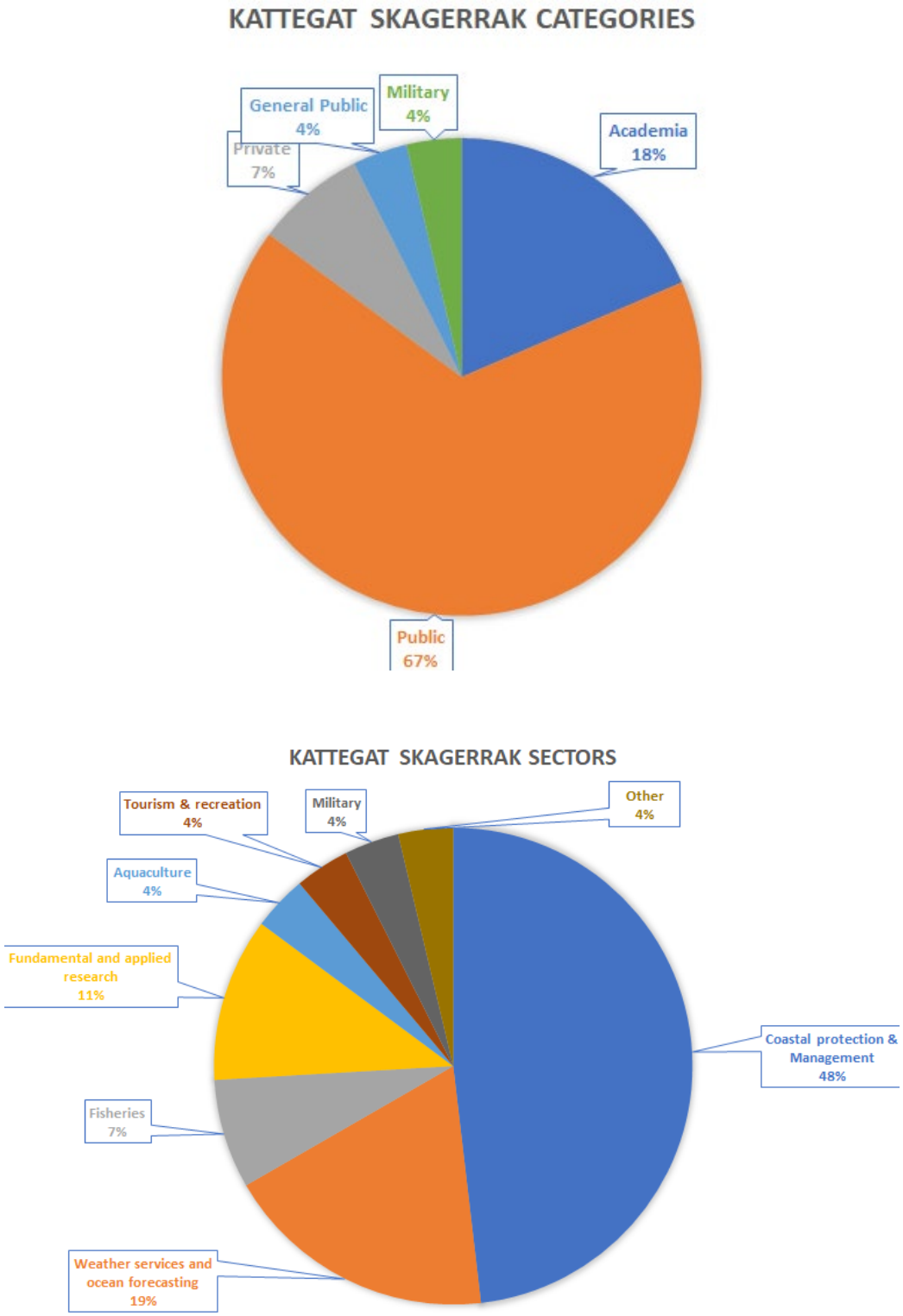


Figure 9. Distribution of users by categories and sectors in the Kattegat and Skagerrak region.

3.5.3. Norwegian Sea

For the Norwegian Sea region, the *Public* (50%) and *Private* (22%) categories account for nearly three quarters of the users. Whereas the *Coastal protection and management* sector (29%) has the largest proportion of users. Note also that 7% of users have been identified for the *Military* sector in this region. It is also important to note that only 14 users were identified for this region.

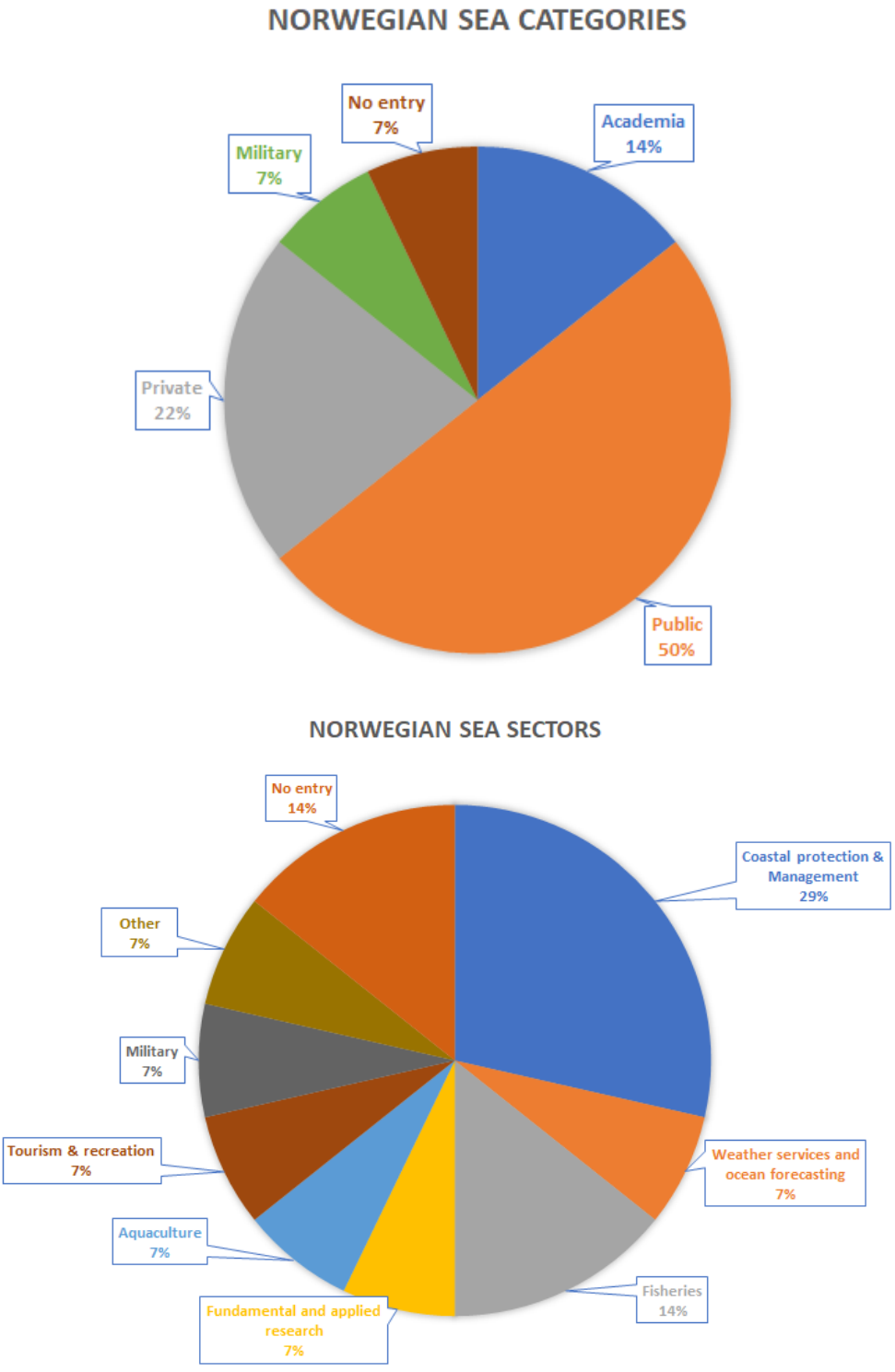


Figure 10. Distribution of users by categories and sectors in the Norwegian Sea region.

3.5.4. North Sea

For the North Sea region, the *Public* category (50%) was the largest, whereas the *Coastal protection and management* (42%) was the largest sector. The *NGO* category also had users identified accounting for 8% of the total for the region.

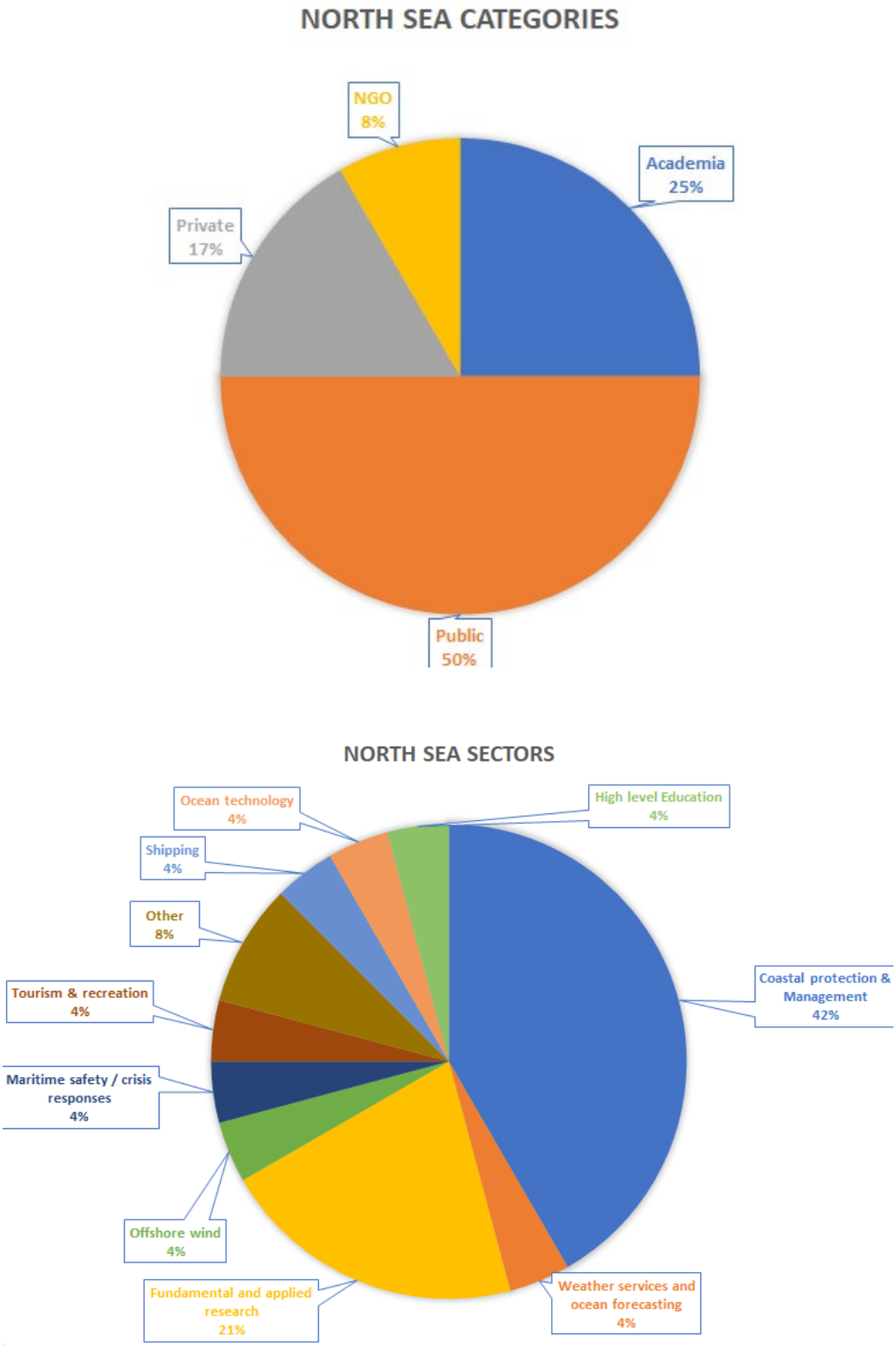


Figure 11. Distribution of users by categories and sectors in the North Sea region.

3.5.5. Irish Coastal Seas

In the Irish Coastal Seas, the *Academia* category has a slightly higher proportion of users (37%) compared to *Public* (34%), while the *Private* category also accounts for approximately a quarter of all identified users. The 2nd largest sector overall, *Fundamental and applied research*, is the dominant sector in this region, with 43% of users. In addition, the *Ocean technology*, *Other ocean energy* and *Coastal protection and management* sectors are almost evenly represented (9%, 9% and 11%, respectively).

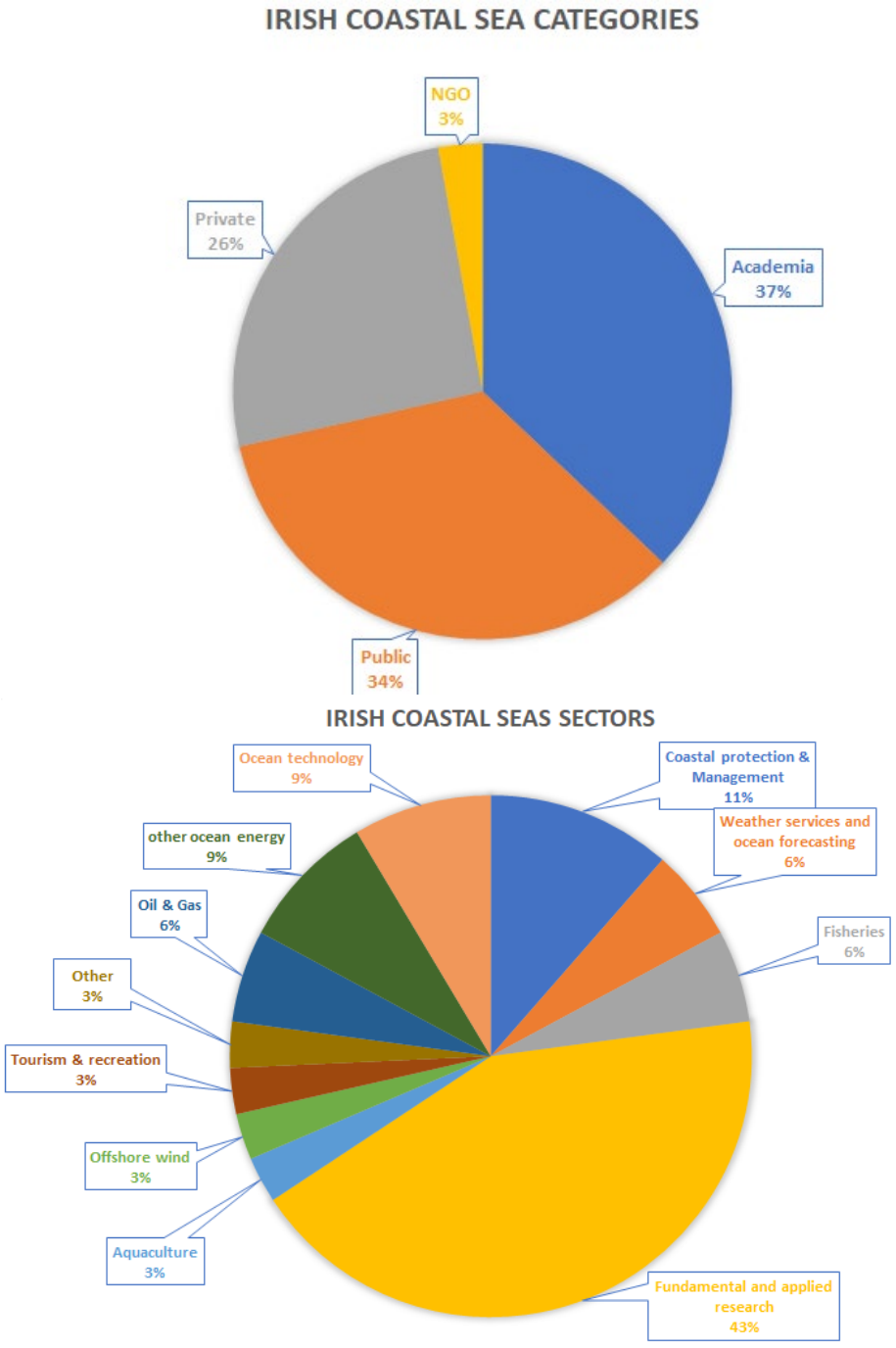


Figure 12. Distribution of users by categories and sectors in the Irish Coastal Seas.

3.5.6. Bay of Biscay

The *Public* (61%) category and *Coastal protection and management* (24%) sector have the largest proportion of identified users in the Bay of Biscay. This region also has most of the sectors represented with 13 out of the 16 sectors accounted for.

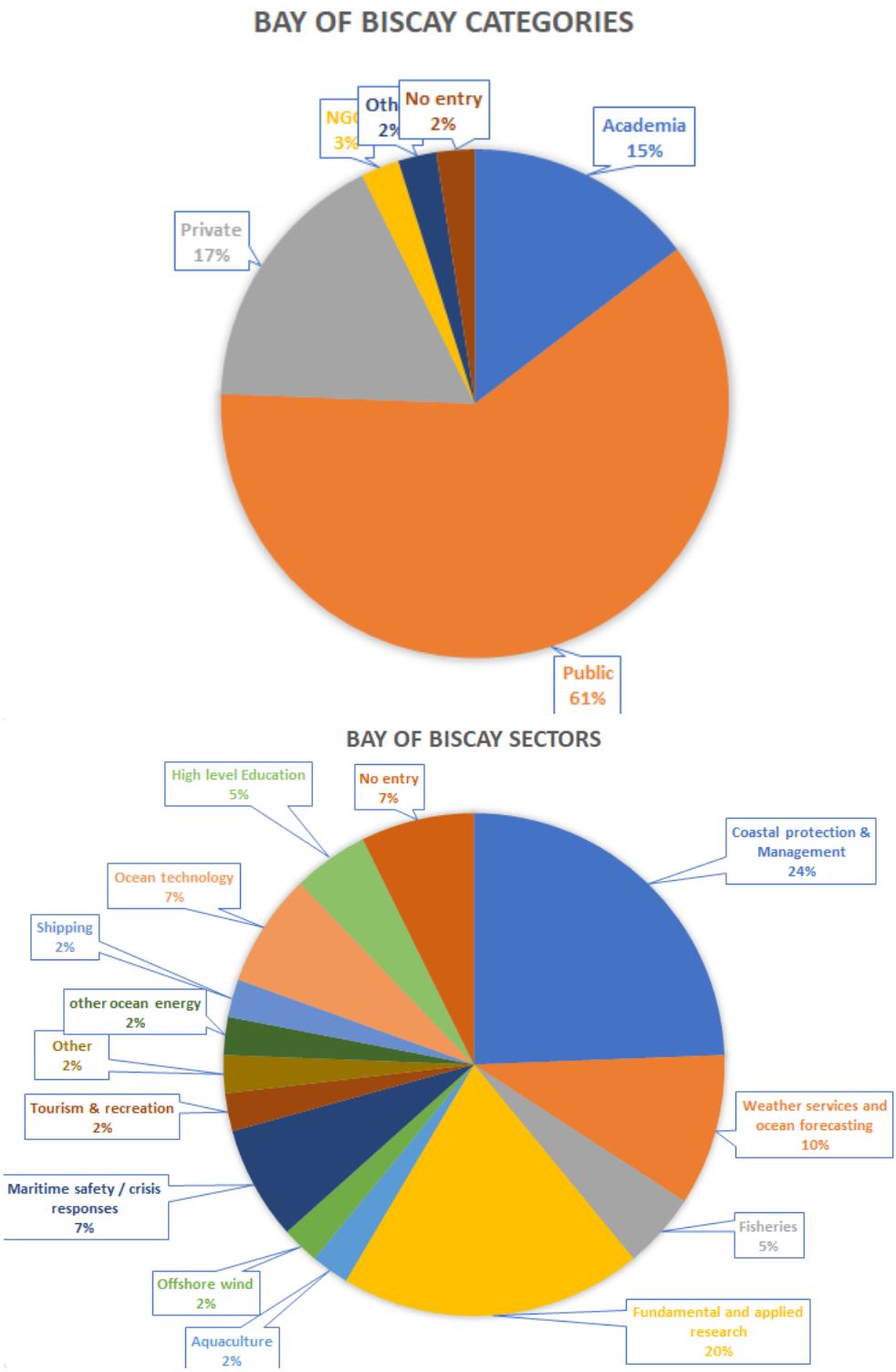


Figure 13. Distribution of users by categories and sectors in the Bay of Biscay region.

3.5.7. Iberian Atlantic Margin

The *Public* category dominates the Iberian Atlantic Margin region, accounting for ~50% of users. This is followed by *Academia* with 32%. The *Fundamental and applied research* sector has the largest proportion of users with 34%, followed by *Weather and ocean forecasting* with 15% of users. The *Maritime safety / Crisis responses* and *Coastal protection and management* sectors are evenly represented.

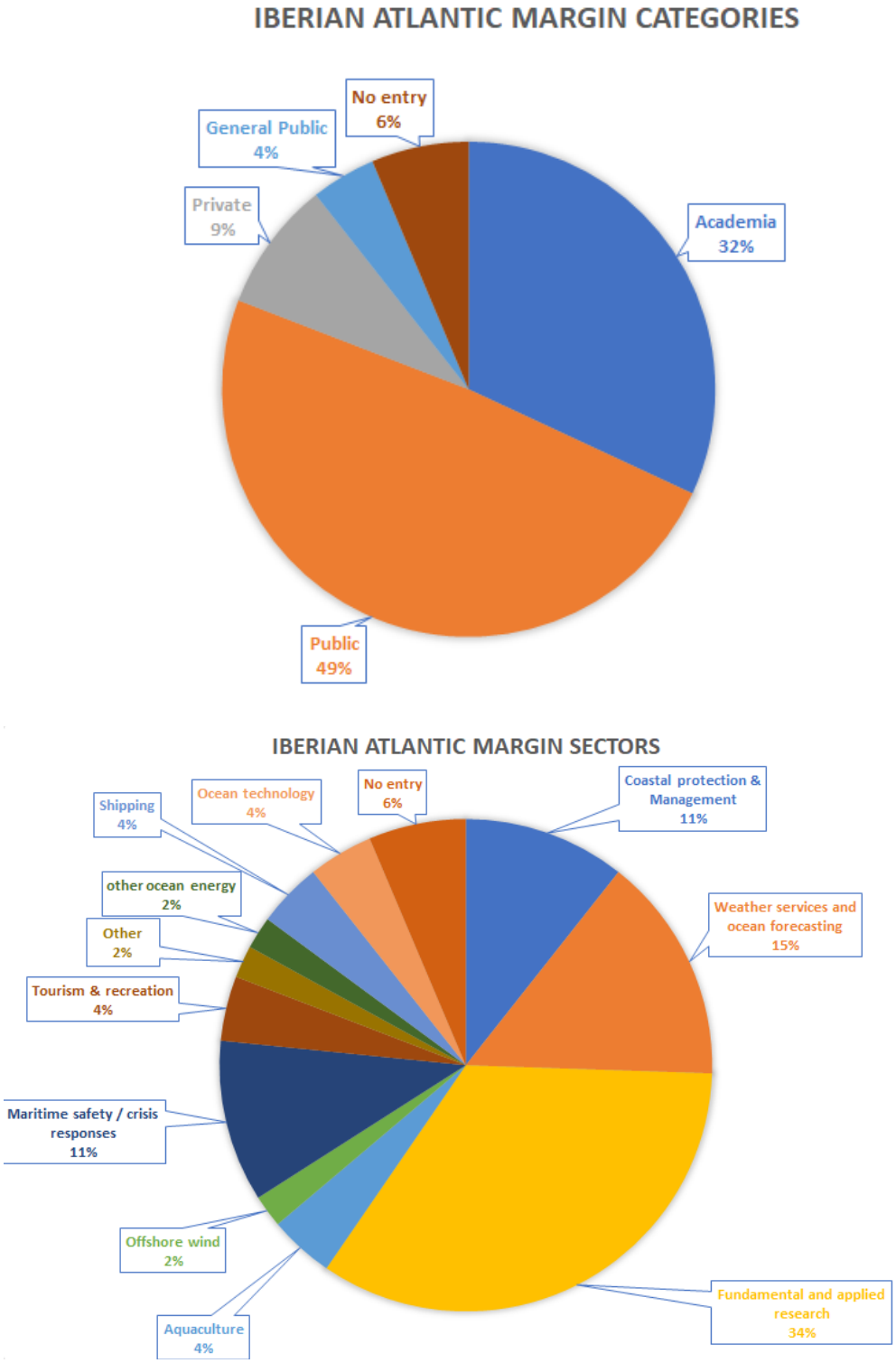


Figure 14. Distribution of users by categories and sectors in the Iberian Atlantic Margin region.

3.5.8. English Channel

The *Public* (39%) category and the *Coastal protection and management* (39%) sector have the largest proportion of users in the English Channel. Of note is the absence of identified users for the *Weather services and ocean forecasting* sector, which is represented in all the other regions. The *Aquaculture* sector has 9% of the users, the third largest in this region and higher than any of the other regions.

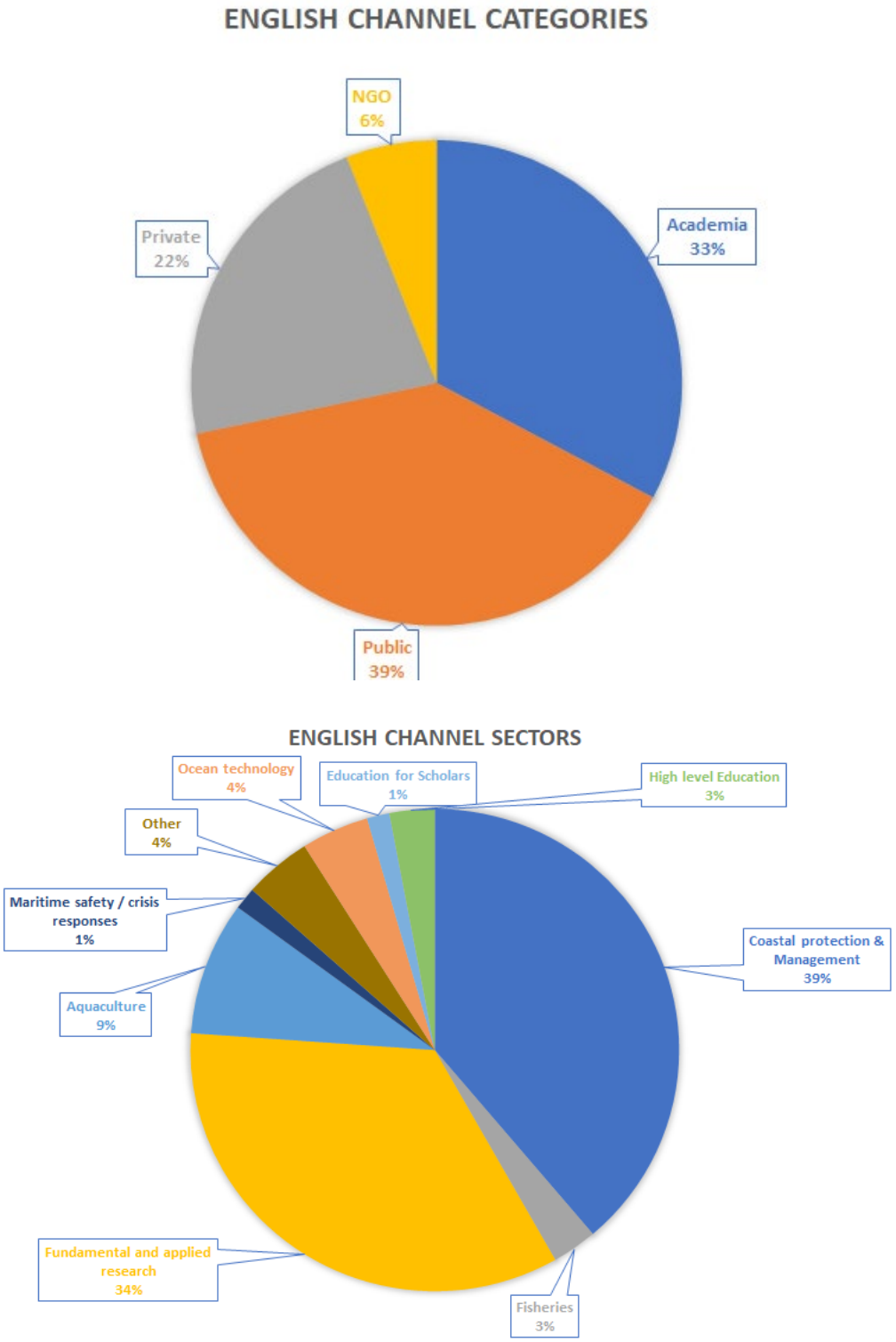


Figure 15. Distribution of users by categories and sectors in the English Channel region.

3.5.9. North-West Mediterranean

Users have been identified for all categories in the NW Mediterranean region, with the *Public* (29 users) category accounting for 43% of users. Similarly, this region has most of the sectors represented with users identified for 14 out of 16 sectors. The *Coastal protection and management* (29%) sector is the largest, followed by *Fundamental and applied research* (18%). Note that the *Tourism and recreation* sector is only represented with 2 users (3%).

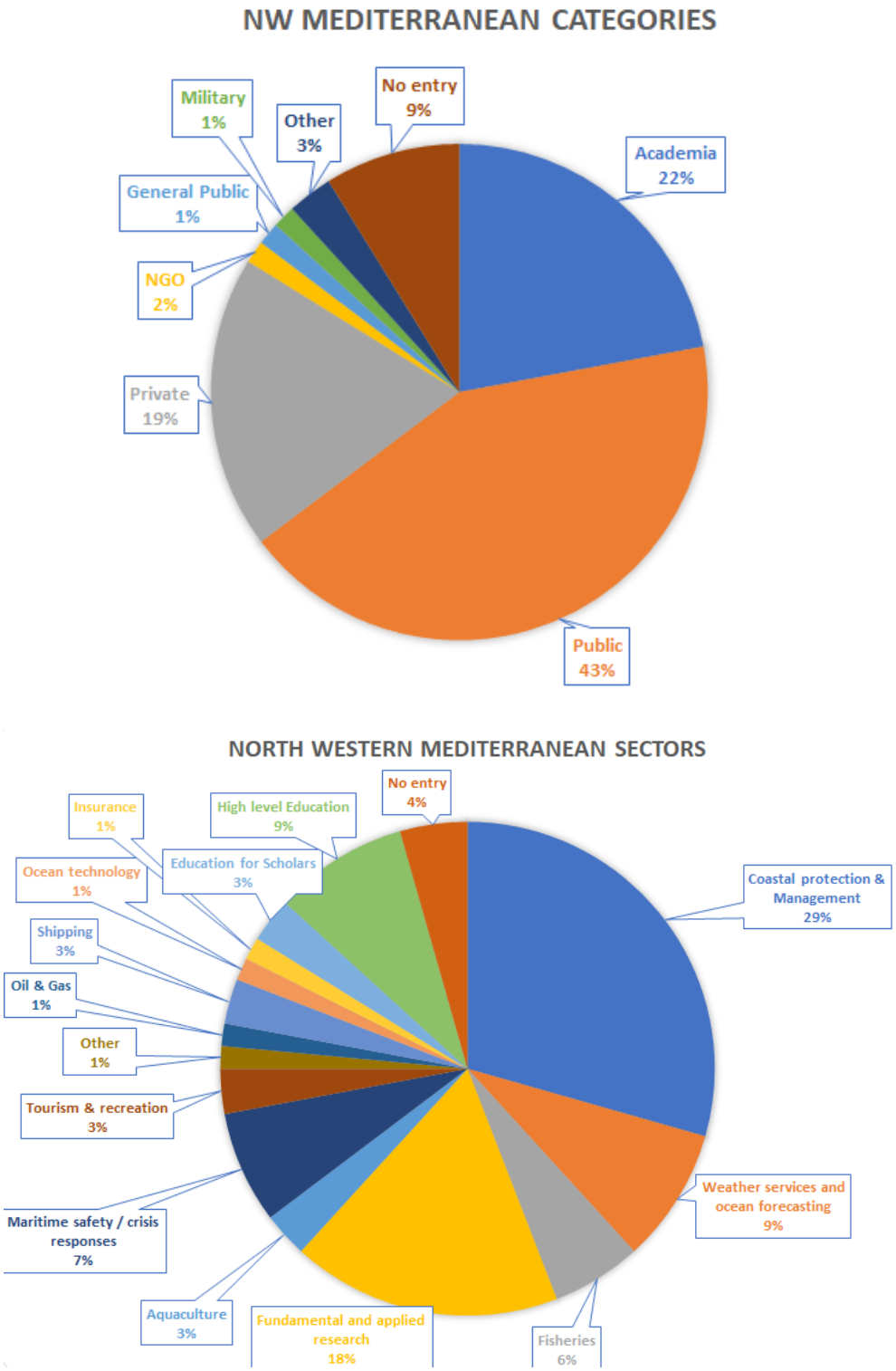


Figure 16. Distribution of users by categories and sectors in the NW Mediterranean region.

3.5.10. North-East Mediterranean (Cretan Sea)

The NE Mediterranean is the only region where the *Academia* category has the largest proportion of users (37%) compared to the *Public* category which accounts for only 14% of the users, and lower than the *General public* (20%) and *Private* (25%) categories. This trend is also reflected in the sector classification, with the *Fundamental and applied research* sector having the largest proportion of users (26%) *Coastal protection and management* (14%), *Tourism and recreation* (13%) and *Fisheries* (12%) are almost evenly represented.

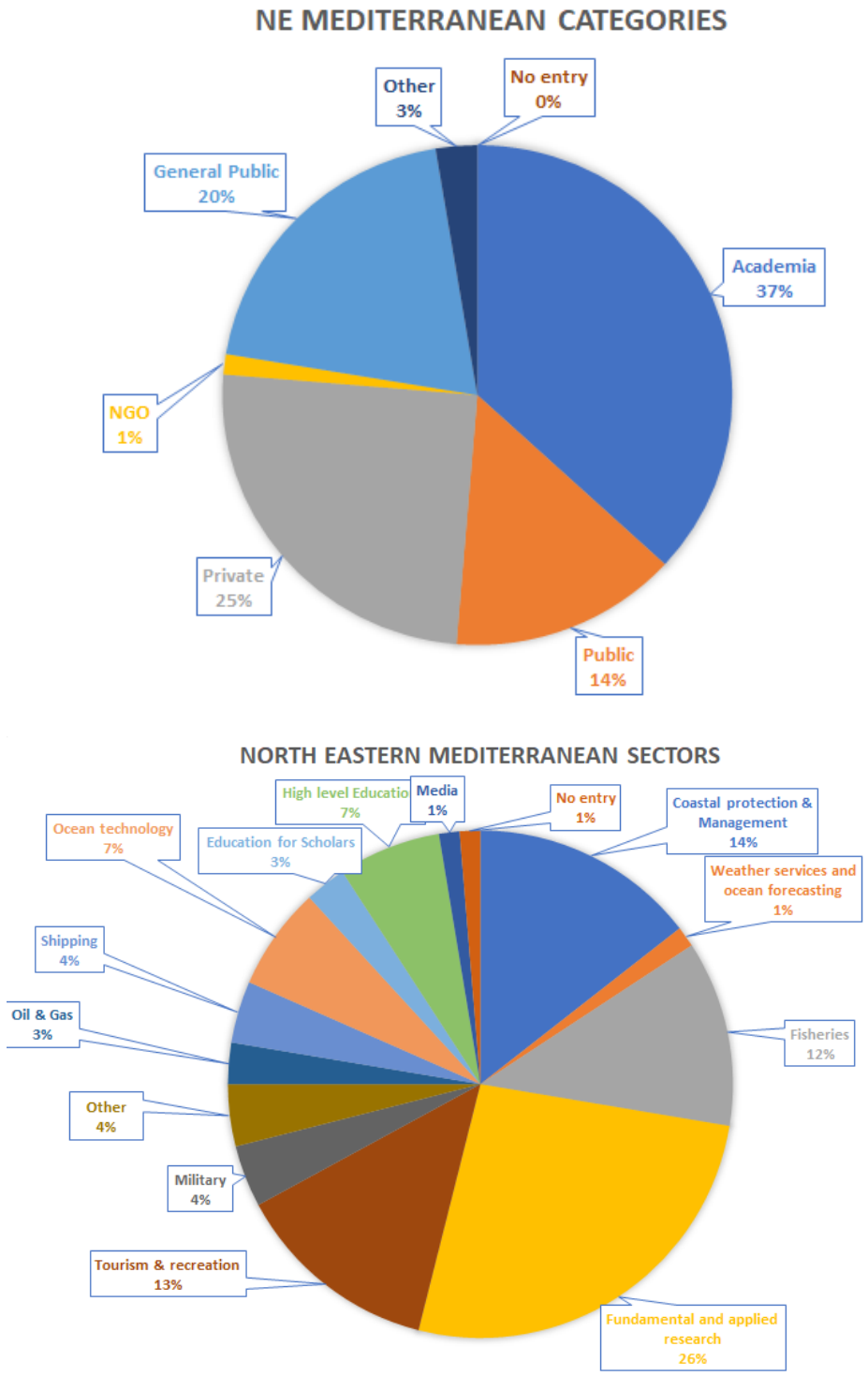


Figure 17. Distribution of users by categories and sectors in the NE Mediterranean region.

3.5.11. Northern Adriatic Sea

In the Northern Adriatic Sea, the *Public* category dominates all others with 73% of all users. Only five sectors are represented in this region with the *Coastal protection & management* sector accounting for 45% of the users, followed by F*undamental and applied research* with 27%.

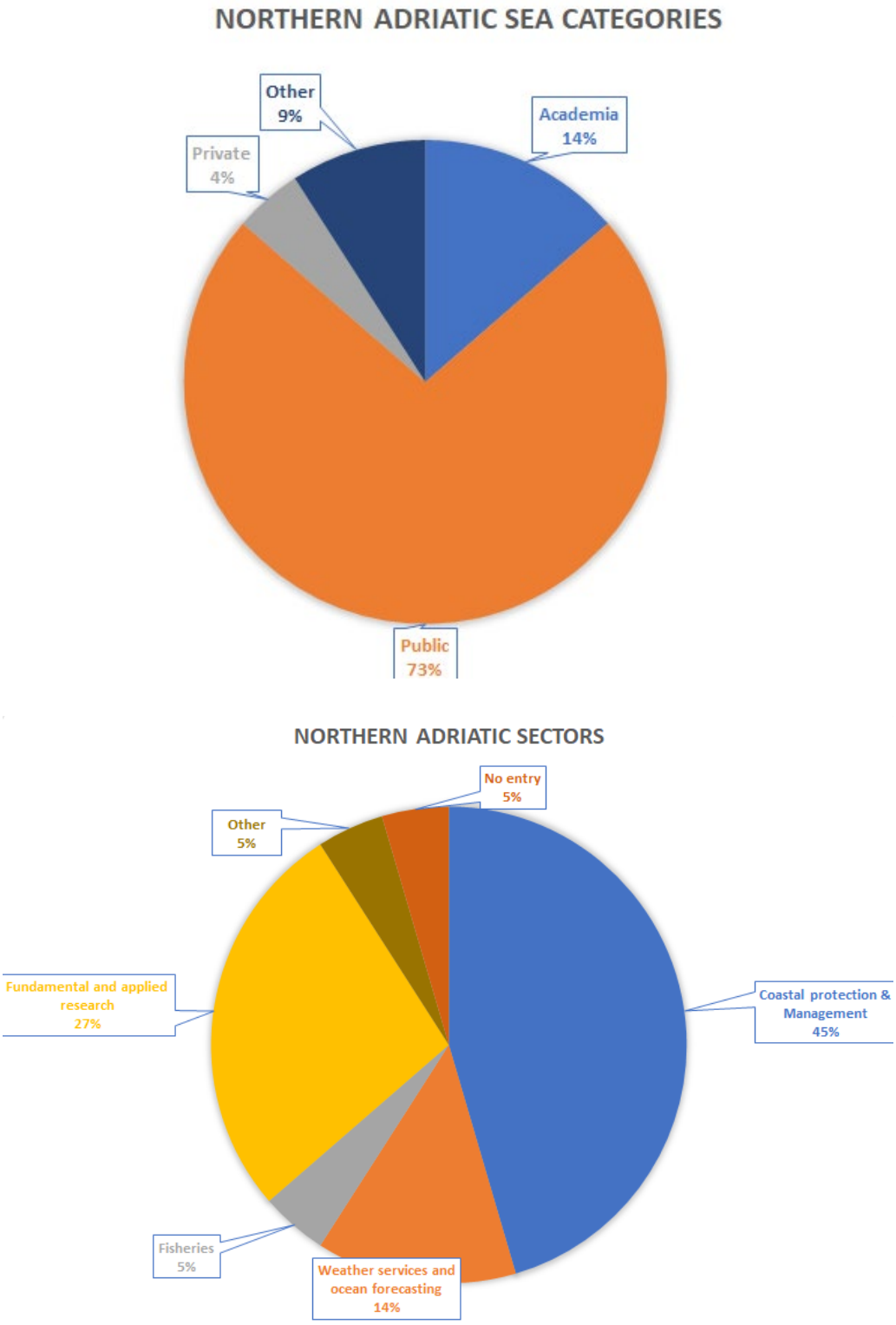


Figure 18. Distribution of users by categories and sectors in the Northern Adriatic Sea.

4. Users and their needs of products and services development

Together with the previous data related to user identification (sector, category, regions), this analysis will provide a better understanding of the type of access, uses and demands. It will also support strategic choices by tailoring products to specific sectors / categories / regions. Such information will be key to improving the effectiveness and uptake of JERICO-RI P&S now and in the future.

The main objectives of the future user strategy are derived from the Mission and Vision statements of the RI. These statements significantly highlight the willingness to develop open-access and fit-for purpose P&S and thus improve the synergy between European scientists and services users. These considerations imply two main objectives for the user strategy:

- **Engagement of stakeholders**: The development of an efficient user driven infrastructure that involves specific users in the governance of the RI. These stakeholders will be part of a JERICO-RI User Committee (JUC) which will act as an interface between the users and the RI to keep track of societal needs.
- **Product and Services development**: The user strategy should aim to ensure that the P&S provided by JERICO-RI are fit-for-purpose to the end users activities and needs now and in the future.

To improve the societal benefit of the P&S provided by JERICO-RI, the investigation of the current uses of users is needed. This information is key to improve the effectiveness of the services provided now and in the future. The output of this kind of study will then support the formulation of JERICO-RI P&S Elaboration Roadmap to enable more strategic choices, that is to target specific groups of users (sectors / categories / regions) with specific actions (dissemination, communication and of course product and services development).

In this analysis, the focus was set on the P&S usage according to their type of access (*Physical Access*, *Virtual Access*, *Access to calibration facilities*, *Access to knowledge and expert advice*). This choice was made because it is important from the perspective of the design of the access policy to *Physical Access* and the future development of JERICO-RI e-infrastructure, which will be built on the current *Virtual Access*. Below are the main results of the P&S uses and needs analysis.

The outcome shows that *Virtual Access* is the most widely used service of JERICO-RI with 121 users (43% of total) identified. This is about 15% more than the *Physical Access* to the different JERICO-RI facilities. This result highlights the fact that the efficiency and effectiveness of the JERICO-RI will also depend on its capacity to provide *Virtual Access*. This brings comfort about the consortium's choice to put large effort in the elaboration of JERICO-RI e-Infrastructure to complement the *Physical Access* mode as it is reaching most of our users.

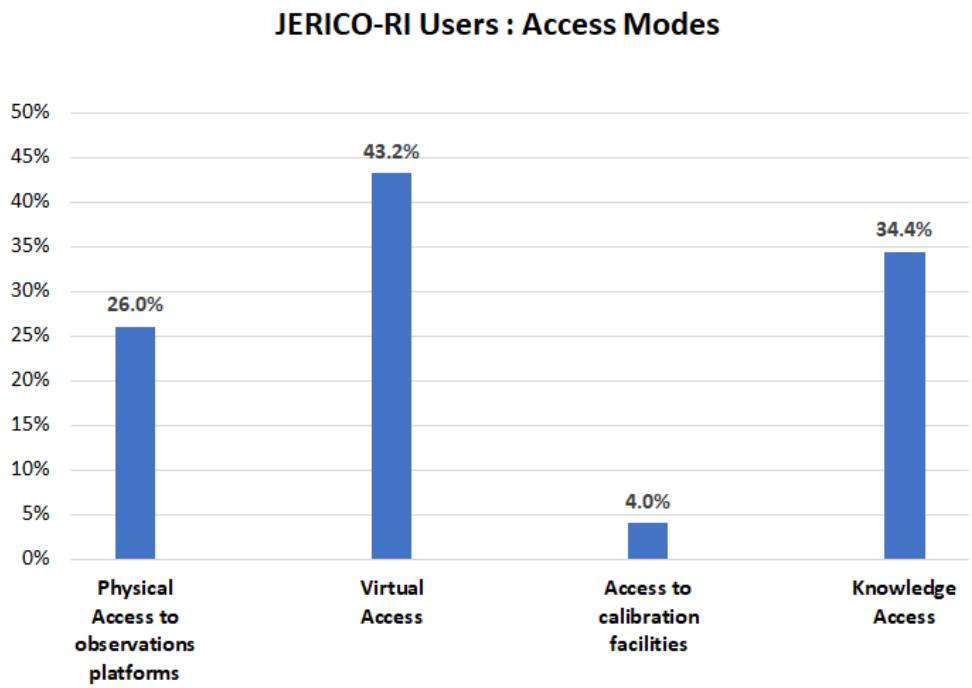


Figure 19. Ratios (%) of users per targeted access types. Users may target several access types.

Virtual Access plays a very important role among some "small sectors" (e.g., *Military*, *Shipping*, *Fisheries*, *Tourism and recreation* or *Ocean technology*), even more than in some larger sectors (e.g., *Coastal protection and management*, *Weather and ocean forecasting*) (Figure 20). Indeed, it suggests that *Virtual Access* is a key access mode to the JERICO-RI infrastructure for those specific sectors.

By contrast, the use of *Physical Access* mode reveals that there are several sectors that strongly rely on this access mode (e.g., *Oil and Gas*, *Offshore wind*, *Ocean technology*, *Other ocean energy*), some even twice or more than their use of *Virtual Access*. Because they are also "small sectors" it is possible to increase the number of users through targeted strategies promoting this specific access type.

A similar conclusion can be made within categories (Figure 21). The *Virtual Access* mode is more important to several "small categories' (*General public*, *Military*) than to 'big categories' such as *Public* or *Private*.

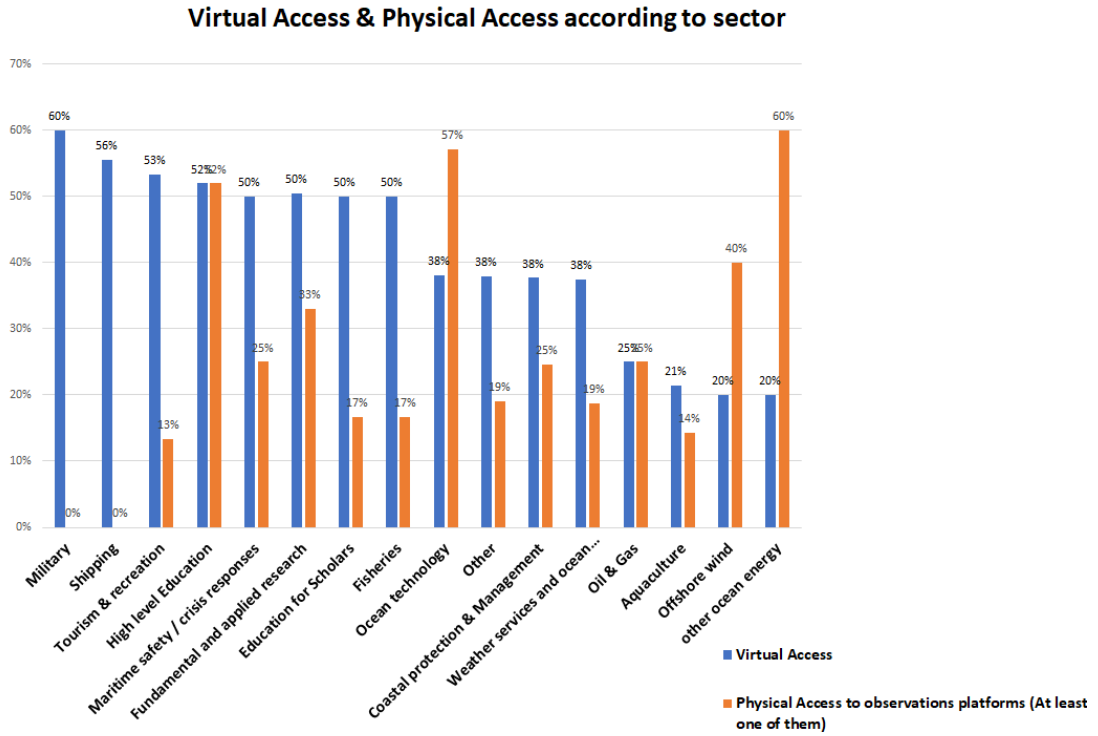


Figure 20. Comparison of ratios (%) of users per sector targeting *Virtual Access* with those targeting *Physical Access*.

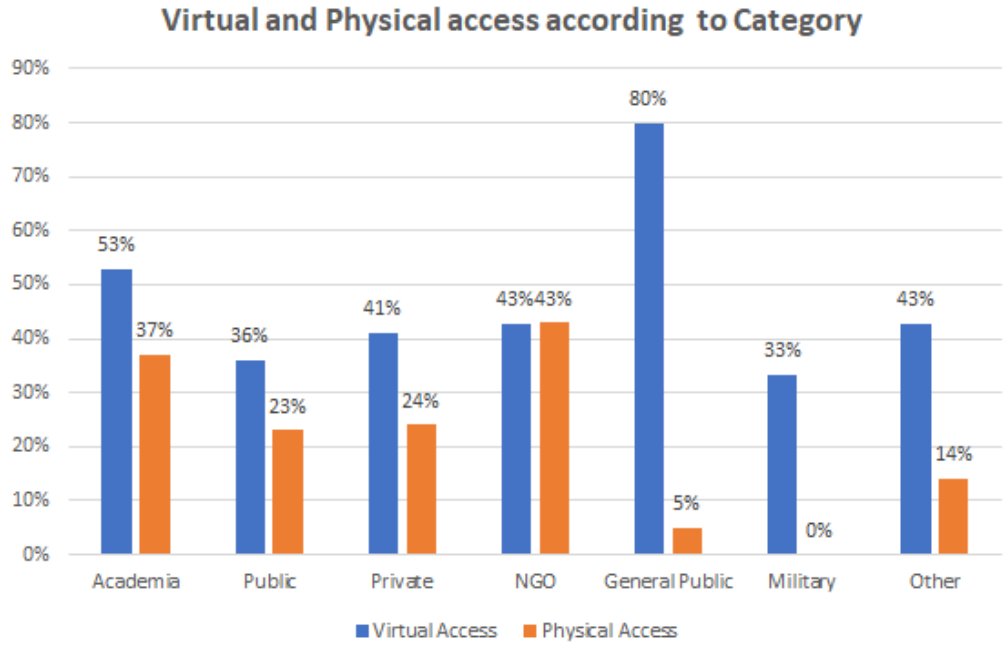


Figure 21. Comparison of ratios (%) of users per categories targeting *Virtual Access* with those targeting *Physical Access*.

Summarising the analysis above, it can be conclude that:

- *Virtual* and *Physical Access* are the two main access modes. However, the use of the *Virtual Access* mode is larger compared to the *Physical Access*.

- Many "small sectors" are characterised by the use of one specific access mode. This means that they are strongly reliant on *Physical* or on *Virtual Access*.
- The larger sectors are characterised by an even use of both *Physical* and *Virtual Access* type.

5. Users classification by *Interest* and *Power*

The quantitative analysis (see Section 2.3) allowed to allocate each user a *Power* and *Interest* score and rank them according to these variables. Based on the *Power* and the *Interest* scores, users were distributed on a four cells matrix, with each quadrant representing a "management action" category: *Keep satisfied* and *Manage closely* for high power, and *Monitor* and *Keep informed* for low power (Figure 22).

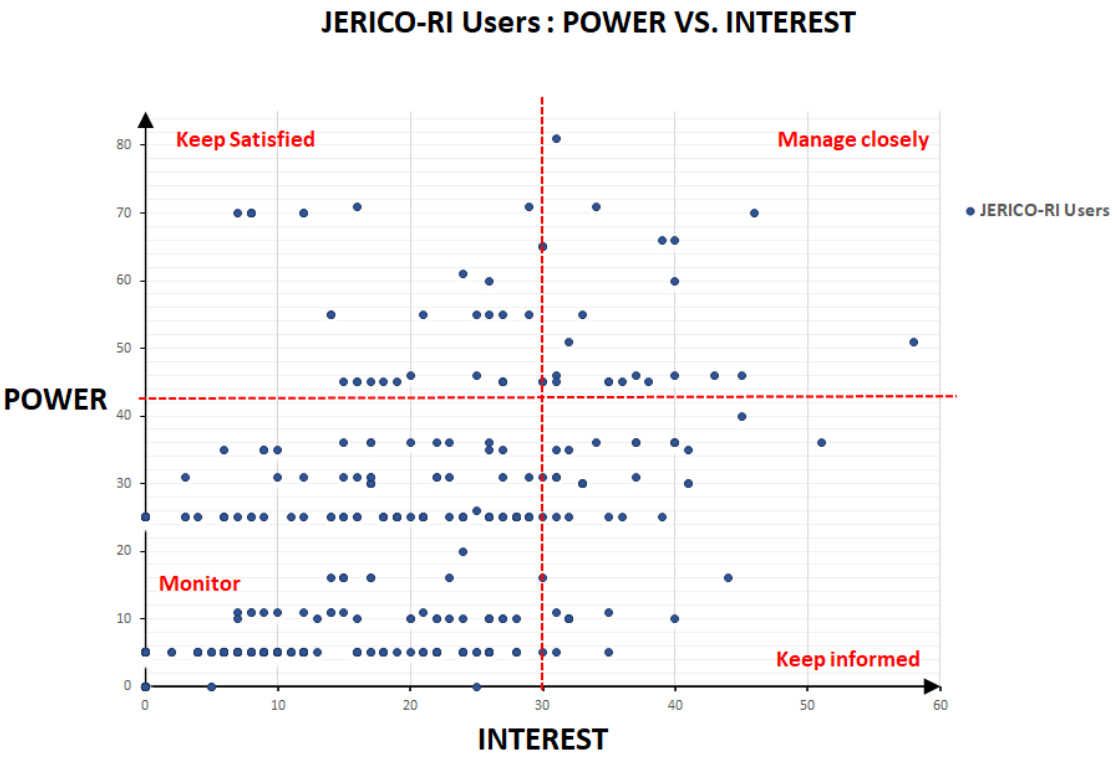


Figure 22: JERICO-RI users classification according to *Power* and *Interest*.

Users that fall in each of these quadrants will be targeted with a specific management action:

- **Group 1 *Manage Closely***: Includes users with both a high *Power* and high *Interest* level. These users are key users and need to be involved. The JERICO User Committee (JUC) will be composed from this group.
- **Group 2 *Keep Satisfied***: Includes users with high *Power* and low *Interest*. These users need to be kept updated and informed about the JERICO-RI actions but should not be bothered with its messages.
- **Group 3 *Keep informed***: Includes users with a low *Power* but a high *Interest*. These users are important users because they are very interested in JERICO-RI services. They need to be targeted with specific communication and dissemination plans according to their needs so that they remain aware of the JERICO-RI capabilities.

- **Group 4 *Monitor***: Includes users with both a low level of *Power* and *Interest*. These users should be monitored in each of the user strategy processes.

The analysis helps prioritise the users JERICO-RI needs. However, many users are falling in the high level of *Power* quadrant in this preliminary analysis. To investigate who these users are, their distribution according to sectors of JERICO-RI users was analysed (Figure 23).

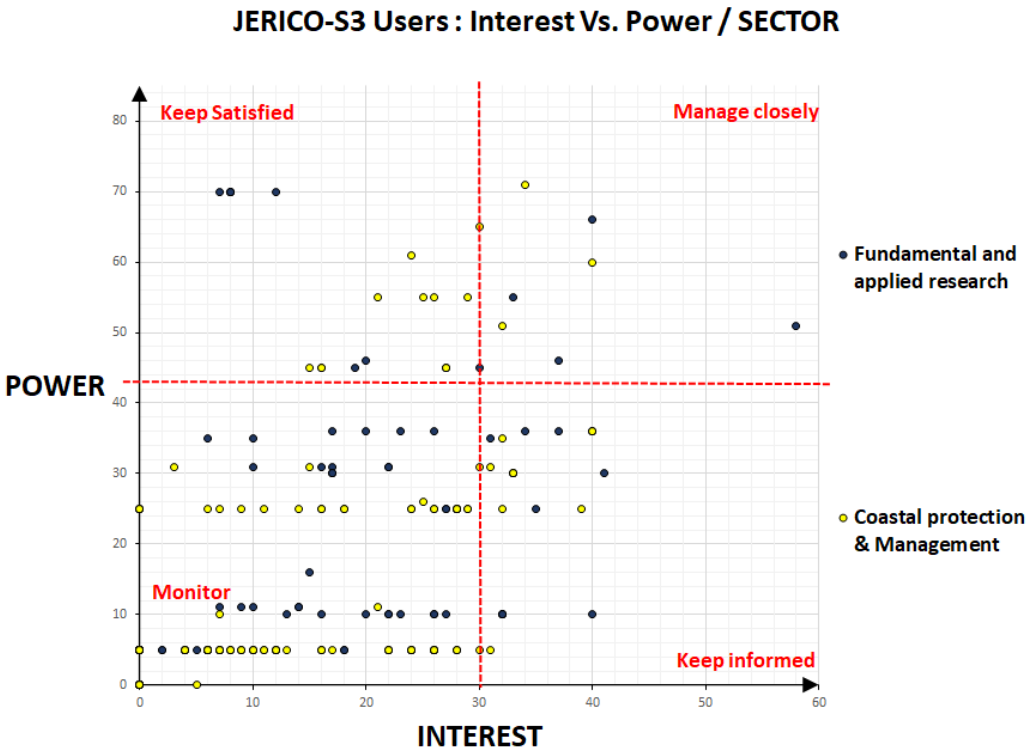


Figure 23: JERICO-RI users classification according to *Power* and *Interest* for *Fundamental and applied research* sector and for *Coastal Protection and management* sector.

The two JERICO-RI main sectors (those with more users) show similar distributions with regards to *Power* and *Interest*. Large part of them falls in the *Monitor* quadrant, but many of them belong to the groups *Manage closely* and *Keep satisfied* (Figure 23).

It is interesting to notice that the sector *Marine Safety / Crisis responses*, despite its relative low importance in terms of number of users, is characterised, on average, by a quite high level of *Power* and *Interest* (Figure 24). It thus stresses the need to take these users seriously into account in further qualitative analysis.

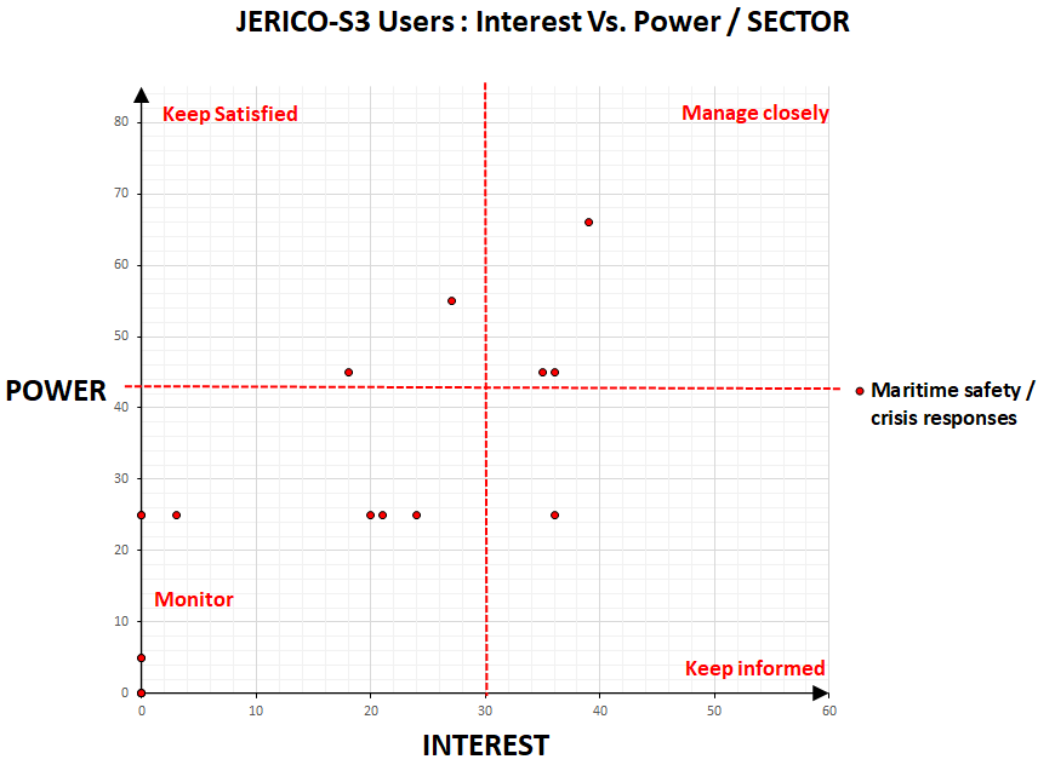


Figure 24: JERICO-RI users classification according to *Power* and *Interest* for *Maritime safety / Crisis response* sector.

On the other hand, the less represented sectors (in terms of number of users) are characterised, as expected, by a structural low *Power* and low *Interest* and therefore most of them are to be monitored. However, there is a number of users that fall in the *Keep informed* quadrant (Figure 25). This implies the need for targeted communication so that they remain aware of JERICO-RI capabilities.

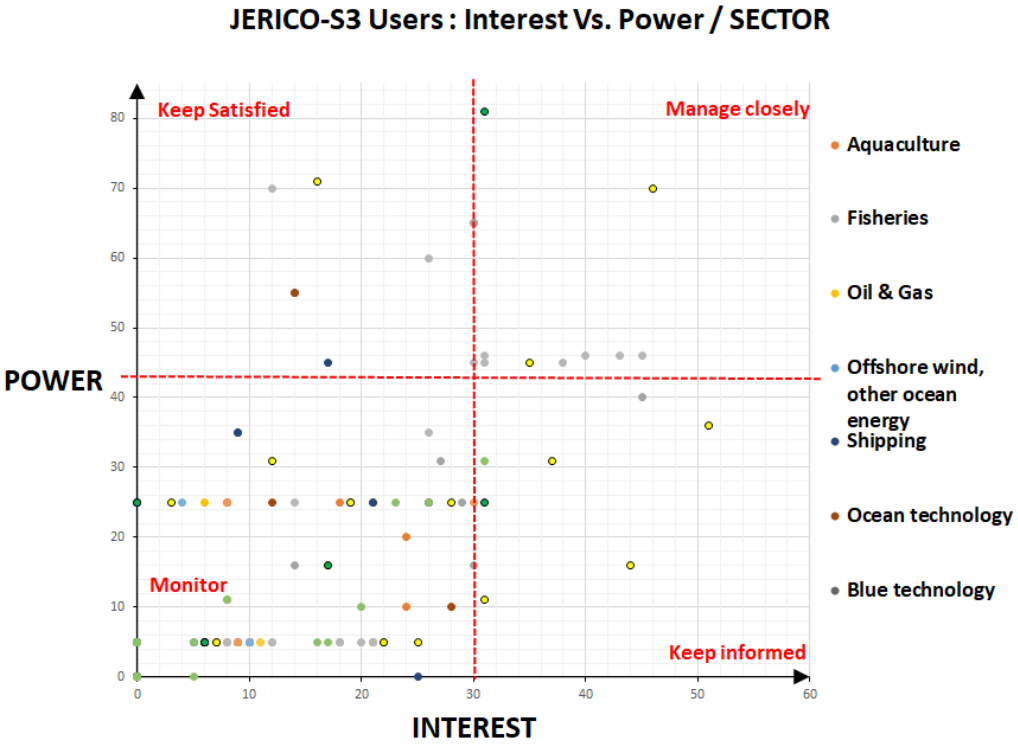


Figure 25: JERICO-RI users classification according to *Power* and *Interest* for sectors with less number of users.

Conclusions

We can infer some preliminary conclusions from the analysis of the information collected from a total of 470 users of the JERICO-RI, distributed among 11 regions. This analysis helps better understand the typology of users, as well as their needs and expectations. The analysis will be further enlarged to other regions (e.g., Tyrrhenian Sea, Southern Adriatic or Cretan Sea).

We have to note that the identified number of users may be an underestimate when considering the potential of the JERICO-RI, but gives a good picture of the heterogeneity of the European user community. Also, there might be a high degree of subjectivity and bias in the analysis due to the fact that the information compiled of the users is based on the knowledge and inputs of few JERICO region representatives for each of the regions. The ongoing Jerico User Story Survey will be used to validate and, when necessary, improve the information collected so far.

Regarding the mapping of users, we can conclude that most of the users pertains to the three main Sectors identified in the analysis, and that are present in all the 11 regions: *Coastal protection and management* (130 users), *Fundamental and applied research* (112 users) and *Weather services and Ocean forecasting* (32 users).

Regarding the distribution of users by the category typology, the majority of identified users are from the *Public* category with 42%, whereas *Academia* represents 28% of the total users and stands in second position, followed by the *Private* category with 18%. All three of them have users represented in all regions.

There are regional specificities in the distribution of the users by sector and category that need to be considered.

The main access mode to the JERICO-RI is *Virtual Access* with 121 users, 15% more than the *Physical Access* mode to the different JERICO-RI facilities. This result highlights the fact that the efficiency and effectiveness of the RI depends on its capacity to provide both access types.

Users and stakeholders with high influence are mostly well represent*ed by the* sectors *Coastal protection and management, Fundamental and applied research*. Users and stakeholders with a high capacity of influence and a strong interest in JERICO-RI will be the core members of the JERICO-RI User Committee and are considered as stakeholders to manage closely.

References

Heslop, E., Tintoré, J., Rotllan, P., Álvarez-Berastegui, D., Fontera, B., Mourre, B., Gómez-Pujol, Ll., March, D., Casas, B., Nolan, G., Durand, D. (2019) SOCIB integrated multi-platform ocean observing and forecasting: from ocean data to sector-focused delivery of products and services, Journal of Operational Oceanography, 12:sup2, S67-S79, DOI: 10.1080/1755876X.2019.1582129.

Annexes

Table A1. Distribution of users in the different regions, sectors, categories and scientific fields. How to read: e.g., 7 users in the Iberian Atlantic Margin belong to the sector *Weather services and ocean forecasting*.

		TOTAL of USERS in Sectors:	NW Med	NE Mediterranean	English Channel	Baltic Sea	Iberian Atlantic Margin	Bay of Biscay	Irish Coastal Seas	Kattegat Skagerrak E-N Sea	Northen Adriatic Sea	North Sea	Norwegian Sea
	TOTAL of USERS in Regions:	**470**	**68**	**76**	**67**	**49**	**47**	**41**	**35**	**27**	**22**	**24**	**14**
SECTORS	Coastal protection & Management	130	20	11	26	17	5	10	4	13	10	10	4
	Fundamental and applied research	112	12	20	23	3	16	8	15	3	6	5	1
	Weather services and ocean forecasting	32	6	1	0	2	7	4	2	5	3	1	1
	High level Education	25	6	5	2	9	0	2	0	0	0	1	0
	Fisheries	25	4	9	2	1	0	2	2	2	1	0	2
	Other	23	1	3	3	8	1	1	1	1	1	2	1
	Ocean technology	22	1	5	3	4	2	3	3	0	0	1	0
	Tourism & recreation	20	2	10	0	1	2	1	1	1	0	1	1
	Maritime safety / crisis responses	16	5	0	1	1	5	3	0	0	0	1	0
	Aquaculture	14	2	0	6	0	2	1	1	1	0	0	1
	Shipping	9	2	3	0	0	2	1	0	0	0	1	0
	other ocean energy	5	0	0	0	0	1	1	3	0	0	0	0
	Offshore wind	5	0	0	0	1	1	1	1	0	0	1	0
	Education for Scholars	6	2	2	1	1	0	0	0	0	0	0	0
	Oil & Gas	5	1	2	0	0	0	0	2	0	0	0	0
	Military	5	0	3	0	0	0	0	0	1	0	0	1
	Insurance	1	1	0	0	0	0	0	0	0	0	0	0
	Media	1	0	1	0	0	0	0	0	0	0	0	0
	Blue biotechnology	0	0	0	0	0	0	0	0	0	0	0	0
	no entry	14	3	1	0	1	3	3	0	0	1	0	2
CATEGORIES	Academia	130	15	28	22	15	15	6	13	5	3	6	2
	Public	199	29	11	26	20	23	25	12	18	16	12	7
	Private	86	13	19	15	9	4	7	9	2	1	4	3
	NGO	14	1	1	4	4	0	1	1	0	0	2	0
	General Public	20	1	15	0	1	2	0	0	1	0	0	0
	Military	3	1	0	0	0	0	0	0	1	0	0	1
	Other	7	2	2	0	0	0	1	0	0	2	0	0
	No entry	11	6	0	0	0	3	1	0	0	0	0	1
SCIENTIFIC FIELDS	Hydrodynamics and Transport	66	19	4	10	1	10	9	12	0	0	1	0
	Biodiversity / eutrophication / habitat	95	18	3	35	6	2	11	14	1	0	5	0
	Contaminants (chemical & biological)	16	3	1	5	2	0	2	1	1	0	1	0
	Numerical modelling of the coastal marine system	33	9	4	9	1	0	5	2	2	0	0	1
	carbonate system/Carbon cycle	6	2	1	2	0	0	0	0	1	0	0	0
	other	66	4	7	3	37	0	5	6	0	3	0	1
	No entry	188	13	56	3	2	35	9	0	22	19	17	12

Table A2. Type of access to the JERICO-RI by sector of the user. How to read: e.g., 2 users in the sector *Marine safety* / *Crisis management* have access to gliders.

		SECTORS																			
	TOTAL of USERS	Coastal protection & Management	Fundamental and applied research	Weather services and ocean forecasting	High level Education	Fisheries	Other	Ocean technology	Tourism & recreation	Maritime safety / crisis responses	Aquaculture	Shipping	other ocean energy	Offshore wind	Education for Scholars	Oil & Gas	Military	Insurance	Media	Blue biotechnology	no entry
Physical Access to observations platforms *(At least one of them)*	**122**	**32**	**36**	**6**	**13**	**3**	**4**	**13**	**2**	**4**	**2**	**0**	**3**	**2**	**1**	**1**	**0**	**0**	**0**	**0**	**14**
Access to cabled observatories	**25**	2	11	2	2	1	0	2	1	1	0	0	2	1	0	0	0	0	0	0	0
Access to fixed platforms	**65**	21	20	6	5	1	2	5	0	0	0	0	3	1	0	1	0	0	0	0	0
Access to ferryboxes	**13**	9	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Access to gliders	**30**	7	8	5	4	1	0	1	1	2	0	0	0	0	1	0	0	0	0	0	0
Access to special equipment	**5**	1	1	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Access to multiplatforms	**31**	2	10	1	7	1	2	5	0	1	2	0	0	0	0	0	0	0	0	0	0
Virtual Access	**203**	**49**	**55**	**12**	**13**	**16**	**8**	**9**	**13**	**8**	**3**	**5**	**1**	**1**	**3**	**2**	**3**	**0**	**1**	**0**	**1**
Access to calibration facilities	**19**	2	3	0	8	0	2	3	0	0	0	0	0	0	0	0	1	0	0	0	0
Knowledge Access	**171**	50	29	11	15	16	7	9	12	6	4	2	3	2	3	0	1	0	1	0	0