



Stakeholders in changing human-water relations

FLOW Report on stakeholder and gender analysis



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1 Introduction

This deliverable, D1.3, of the Project *FLOW: Future Lives with Oceans and Waters*, contains the stakeholder analysis (Section 2) and gender analysis (Section 3). In contribution to the EU mission Restore our Oceans and Waters by 2030, FLOW is an international and interdisciplinary project studying young generations' relations and engagement with water and oceans, their expectations, and emotions (FLOW, 2023). The FLOW consortium consists of four partners: Radboud University (The Netherlands), Fraunhofer ISI (Germany), UiT The Arctic University of Norway (Norway), and Volonteurop (Belgium).

The main objectives of FLOW are to explore the connection of young generations with sea and waters and to co-create actionable, scalable, and reflexive stewardship assemblages, which are designed on the basis of research, evidence, and foresight on human-waters relations. The project seeks to increase the understanding of the engagement that young generations have with the oceans, seas, and waters, by developing iteratively the conceptual transdisciplinary inFLOW lens that synthesises theory and empirical research findings on changing human-water relations. Moreover, a foresight study on changing human-waters relations will be performed by capturing signals, drivers, and expectations, hopes, and fears of the young generation, as portrayed in cultural sources.

Furthermore, the project aims to study five already existing pioneering stewardship initiatives focused on oceans and waters, as well as the motivations of involved young adults to act for nature and their emotional relation to oceans and waters. FLOW also consists of experiential futures workshops for young adults from seven regions across Europe, in which the young generations' expectations, hopes and fears concerning human-water relations, are studied and ocean literacy¹ as well as their engagement for oceans, seas and waters is fostered. We aim for diversity of participants in terms of gender, age, ethnicity, education, socio-cultural and geographical aspects. Through dialogue and experiential learning, the participants will become actively involved in the workshops. In its final phase, the project will facilitate the co-creation, communication and testing of blueprints for stewardship assemblages, thereby bringing together young adults, with marine and maritime and freshwater stakeholders, from research, innovation, education, blue economy and policymaking.

This deliverable summarizes our approach and findings of the stakeholder and gender analysis. The former aims to contribute to an exploration of relevant stakeholders in different domains (i.e. nature utilization or nature conservation) that shape human-water relations in the seven regions engaged with in FLOW (Figure 1). It furthermore reflects on the interest, influence and positionality of these stakeholders in shaping human-water relations in the region the stakeholder operates in. The gender analysis, both reflects on the internal project team and helps our research to adopt a critical and intersectional lens.

¹ In FLOW, we adopt a broad understanding of ocean literacy, in line with McKinley and colleagues (2023). As such, we do not understand ocean literacy only as knowledge, but as including emotions, behaviour, and attitudes as well.



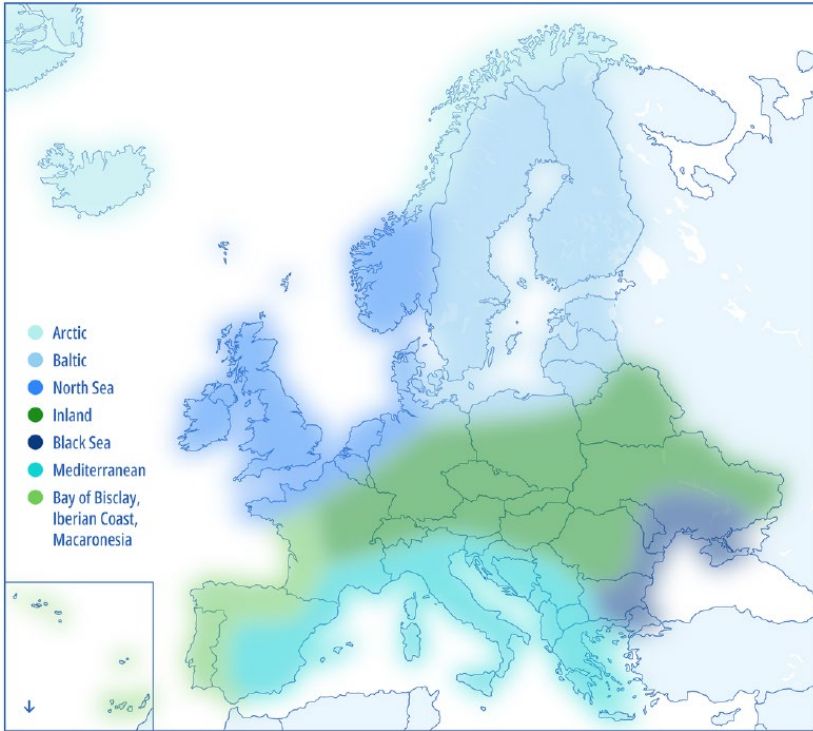


Figure 1 The seven bio-geographical regions described in FLOW (2022).



2 Stakeholder analysis

The first part of this report comprises the stakeholder analysis. In section 2.1 we describe the objectives and in section 2.2 the approach we took for the stakeholder analysis. In section 2.3, we describe the findings of the stakeholder analysis per region. Finally in section 2.4 we provide an overall conclusion on the stakeholder analysis.

2.1 Objectives of the stakeholder analysis

'Stakeholder analysis' may mean many things to many people and may take different shapes or forms (Reed et al., 2009). In sustainable transformations, such as the one FLOW aims to contribute to, stakeholder analyses are central (Lyon et al., 2020). The stakeholder analysis within FLOW aims to ensure wide participation and engagement by building a web of present and future human, non-human and more-than-human stakeholders, in which we are attentive to gender and diversity. Our stakeholder analysis is an iterative process (Brugha & Varvasovszky, 2000), not only within Work Package (WP) 1 and this deliverable, but as the aims of the stakeholder analysis are project-broad (e.g. ensuring broad participation), it is used, adjusted and complemented throughout the project.

In the context of FLOW also more-than-human are of relevance and will be included since missed stakeholders may be the leverage points toward transformation (Lyon et al., 2020). Only few stakeholder analyses include these types of stakeholders and argue extending stakeholder analyses to also include non-human entities or features (Lyon et al., 2020; Starik, 1995) and mental-emotional constructs such as future or past generations (Hubacek & Mauerhofer, 2008; Reed et al., 2009).

Whilst analysing the stakeholders, the intent and aims of doing this stakeholder analysis need to remain top of mind (Lyon et al., 2020), especially given the potentially ever-expanding task when including more-than-human and future stakeholders. Therefore, based on our project proposal (FLOW, 2022), the objectives of FLOW's stakeholder analysis are:

- ensure wide participation and engagement in the project;
- building a web of innovative stakeholders for the project;
- complement and finetune description of the FLOW regions;
- contribute to the objectives of the projects' Communication, Dissemination and Exploitation plan.

2.2 Approach of stakeholder analysis

Reed and colleagues (2009) describe several steps in stakeholder analyses. In terms of context, they describe the need to identify focus and system boundaries (Lyon et al., 2020; Reed et al., 2009). Central to FLOW's stakeholder analysis are European (future) human - water relations with a focus on the following domains: *Nature utilisation*, *Nature conservation*, *More-than-human stakeholders* and *Youth engagement*. The system boundaries are the seven FLOW bio-geographical regions in Europe and cross-region stakeholders.

The next step is identifying stakeholders and their stake. Therefore, stakeholders need to be differentiated and categorized and the relationships between the stakeholders need to be studied (Reed et al., 2009). The first part of the analysis is based on Ocean Mission's documents, web research and document analysis. Stakeholders that emerged in the media, or in the process of Horizon Scanning (FLOW, 2022) were also included as the stakeholders visible in public debate have a role in influencing visions on human-water relations. As the stakeholder analysis is a lively/dynamic document, additional information gathered via the pioneering initiatives (WP3) and workshops (WP4) later in the project can be added.

The domains and subdomains are identified in Figure 2. The codes of these domains were used in the excel file where we inventory the different stakeholders. Each stakeholder is placed within one of the



domains, together with a short description, website or contact info and the region(s) applicable to them. If multiple domains are applicable to the stakeholder, other domain codes were added in the “remarks” column. In addition to this identification, the stakeholder function and stakeholder type was chosen and listed (see Text box 1 and 2).

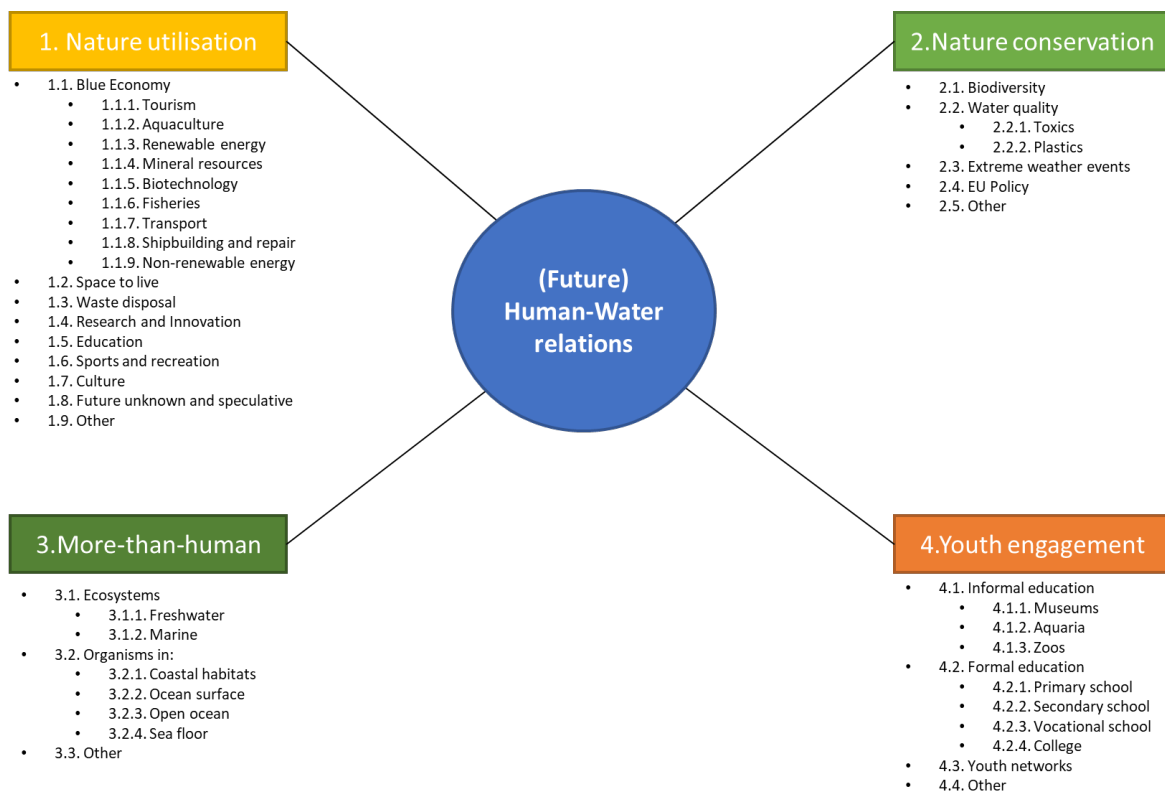
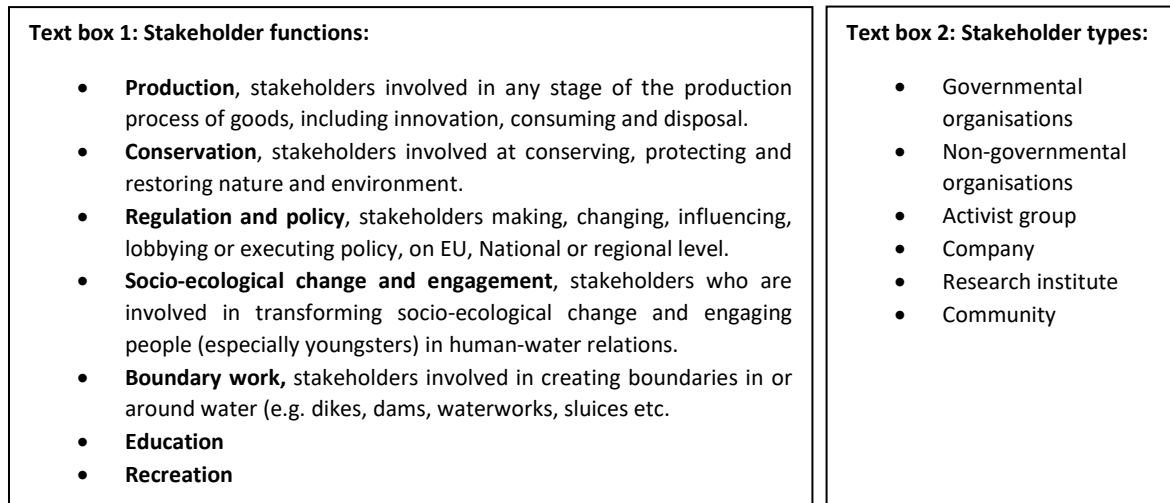


Figure 2 Mindmap of domains and subdomains included in the stakeholder analysis.

Since the stakeholder analysis is on (future) human-water relations, there are different elements to the relationship – or connectedness – between humans and water. To show this range, we adopted the dimensions described by Ives and colleagues (2018) on nature connectedness:

- Material (e.g., consumption of materials from nature);
- Experiential (e.g., direct interactions with nature);

- Cognitive (e.g., knowledge about nature);
- Emotional (e.g., positive and negative feelings about nature);
- Philosophical (e.g., reflecting on values of nature and on how humans should interact with nature).

These dimensions are not strictly separated and range from external (material) to internal (philosophical) connections, where the internal connections are considered to have most leverage in sustainable transformation.

In analysing the stakeholders, we have studied and described in each domain the type of stakeholders that emerged and perceived their influence and interest in shaping human-water relations. This analysis is explorative and therefore not comprehensive.

2.3 Stakeholder analysis per region

In the following sections, we describe the findings of the stakeholder analysis per region. Due to differences in the regions and the stakeholders that emerged in the regions, some regions are described in a slightly varying way. In all regions, first a geographical description is provided, next a description of the stakeholders in the four domains (Figure 2) and finally challenges and opportunities in relation to changing human-water relations in the region.

2.3.1 Arctic

Geographical description

The Arctic Ocean is located around the North Pole and is the Earth's smallest ocean (Ostenso, 2023). It is located in between three continents (North America, Europe and Asia) and borders the following countries: Canada, Finland, Greenland, Iceland, Norway, Russia, Sweden, and the United States. Through the Fram Strait (in between Spitsbergen and Greenland) and the Barents sea it is connected to the Atlantic Ocean and through the Bering Strait to the Pacific Ocean (Timmermans & Marshall, 2020).

As it is centred around the North Pole, it can be covered by sea ice entirely in winter, which can shrink by two thirds in summer (Timmermans & Marshall, 2020). The Arctic is warming twice as fast as the global mean (Koenigk et al., 2020), which means that in the next decades the interior of the Arctic Ocean is ice free in summer, and sea ice is thin and mobile in winter. This has large consequences not only for marine ecosystems and communities surrounding the arctic, but also for the larger-scale climate (Huntington et al., 2022; Timmermans & Marshall, 2020).

Stakeholders in the four domains

Like all the other bio-geographical regions described in the FLOW project, in the Arctic region there is a diverse array of stakeholders in relation to human-water connectedness, each driven by distinct interests. Regarding *nature utilization*, Indigenous communities, the primary custodians of Arctic territories, possess a deep cultural and material interest in preserving their ancestral waters spaces. For them, the waterways represent not just a source of livelihood through fishing, hunting, and transportation, but also the embodiment of cultural heritage and traditional knowledge, making the preservation of water quality and marine life a paramount concern. Governments and policymakers have a multifaceted interest in Arctic area in general and Arctic waters in particular. Overlapping with industrial actors, economic opportunities, often linked to shipping (new routes as the ice melts), tourism, and resource extraction (fishing, offshore oil extraction), drive their involvement and indicates that the material and experiential connectedness to the Arctic is increasing, with the actors involved here having both high interest and high influence.

With growing global awareness (made also possible through the use of charismatic species such as Polar bears and seals, and of ice as an entity that is affected by global warming), there is also an increased interest in *nature conservation*, cultural preservation, and sustainable development in an area that is also heavily impacted by climate change. As such, it seems that the emotional and philosophical connectedness to the Arctic waters is becoming stronger, with the actors involved here having a high interest but less influence. Non-governmental organizations and academic institutions are mainly motivated by a commitment to scientific discovery (e.g., discovering new marine species), environmental preservation, and protection of indigenous rights. As such, the cognitive connectedness to the Arctic waters is on the rise, with the actors involved here having high interest but moderate influence. Their influence manifests through research efforts, educational initiatives, and community engagement programs, enriching the understanding of Arctic ecosystems and empowering local communities. Successful navigation of this complexity is pivotal for safeguarding the Arctic's unique social-ecological system for generations to come.

Efforts to *engage youth* in the Arctic region and beyond in human-water aspects have been gaining momentum. Youth engagement initiatives have been instrumental in raising awareness about the challenges faced by Arctic waters and fostering a sense of responsibility among younger generations. In the Arctic region, various indigenous and non-indigenous youth-led organizations, such as the [Arctic Youth Network](#), have been actively involved in water-related projects on topics such as sustainable fishing, water conservation, and traditional knowledge preservation. Many times these efforts are community-driven, emphasizing the importance of indigenous wisdom in maintaining the health of the Arctic. Moreover, youth from non-Arctic regions have shown increasing interest in Arctic affairs (from conservation to climate change impacts), with various international programs (e.g. [Arctic Basecamp](#)), academic exchanges, and cultural initiatives facilitating interactions between young people from diverse backgrounds and geographical regions. Digital platforms and social media (e.g. Instagram: @arcticyouthnetwork; @arcticyouthambassadors; @gcarcticangels) have played a significant role in connecting youth globally to Arctic concerns. Online campaigns, webinars, and social media movements have amplified the voices of young activists, advocating for sustainable ecosystem management practices and policies that address the unique challenges faced by the Arctic. Through all this engagement, the youth is connecting with the Arctic mainly along the experiential, cognitive, emotional, and philosophical dimensions, with the material dimension being seen through a critical lens.

The Arctic region is home to a diverse array of *more-than-human stakeholders*, including various animal species and ecological components crucial to the delicate balance of the ecosystem. Iconic mammal species such as polar bears, Arctic foxes, seals, and different whale species are integral to the Arctic marine food web. Migratory birds like snow geese and peregrine falcons depend on the Arctic environment during their journeys. The Arctic's flora, such as lichens, mosses, and specific shrubs, is essential for soil stability and provides food for herbivores. Marine life, ranging from phytoplankton to fish species like the Arctic char, forms the foundation of the Arctic marine ecosystem. Sea ice, a defining feature of the Arctic, plays a vital role in this one. It serves as a platform for animals like polar bears to hunt and rest and influences global climate patterns. As a new category of more-than human stakeholders one can consider the organisms that are losing their cover due to melting of ice. These organisms are now included in bioprospecting activities seeking for genetic material for pharmaceuticals and biotechnological innovations. This activity raises ethical questions about preserving the Arctic's genetic heritage while advancing scientific knowledge.



Table 1 in Appendix A includes the analysis of some of the stakeholders of the FLOW Arctic biogeographical region, their mapping into human-water connectedness dimensions, and their influence and interest in this domain, including the risk of conflict with other stakeholders categories.

Challenges and opportunities

A big challenge in the Arctic Region is that a lot is still unclear about how the Arctic responds to global warming (Changing Arctic Ocean NERC, n.d.; Quillérou et al., 2020). The challenge of climate change is strongly interrelated with for example economy (like fishery and tourism), nature conservation and livelihood and culture of indigenous communities.

As sea ice is thinning, new natural resources are potentially available, which is an opportunity for nature utilization. However, this has to be done with a socially and ecologically sustainable design as it will otherwise drastically impact the whole ecosystem and the livelihood of local communities (Changing Arctic Ocean NERC, n.d.; Quillérou et al., 2020). Another opportunity in shaping human-water relations is that awareness may raise as climate change and its consequences become increasingly visible, for example the consequences on visible and charismatic species.

2.3.2 Baltic Sea

Geographical description

The Baltic Sea is a large inland sea located between Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. The Baltic Sea is an arm of the North Atlantic Ocean enclosed by Kattegat, the strait between Sweden and Denmark (Couper et al., 2023). The Baltic Sea is the largest brackish sea in the world, with relatively low salinity, which makes it especially vulnerable to anthropogenic pressure (Dobrzycka-Kraheil & Bogalecka, 2022).

The Baltic Sea's catchment area is inhabited by approximately 85 million people and is intensely used for, among others, tourism and fishery. Currently, the Baltic Sea is one of the most polluted seas in the world, with much of the pollution of the sea originating from land or in inland waters (Dobrzycka-Kraheil & Bogalecka, 2022).

Stakeholders in the four domains

In the Baltic Sea Region there are ongoing debates between different stakeholders which are increasingly converging towards a promotion of sustainable resource use, as portrayed in visions of the sustainable and circular blue economy. Stakeholders from the *nature utilization*, from both established and emerging sectors, providing employment for about one million people in the region (European Commission, 2022), have a strong influence and interest in shaping decision-making processes in the region. Their influence and interest on shaping human-water relations however is only medium, focussing on connecting humans and the Baltic Sea in a cognitive and material way. Additionally, the large sub-sector of coastal tourism is exceptionally influential and interested in creating experiential and emotional connectedness.

As our desk research for the stakeholder list has shown, there are numerous organizations and initiatives in the Baltic Sea Region that contribute to this field. For a more comprehensive overview over the many actors in this region, see the actors map of the [SUBMARINER NETWORK](#) and the webpage of the regional lighthouse project Blue Mission [BANOS](#). Many of these actors are highly committed in developing a sustainable blue economy in the Baltic Sea Region. Their converging efforts show the potential to reconfigure research and development, business models, training programs, regional value chains, and products and practices at the heart of everyday social life such as dining. As such, they are likely to be the future incumbent stakeholders when it comes to changing human-water relations.



Interestingly, many of the innovations pursued by blue economy stakeholders are built around the idea of so-called nature-based solutions. *More-than human entities* such as macroalgae, jellyfish or mussels play a central role in the visions of a sustainable blue economy in the Baltic Sea. More research should be encouraged to better acknowledge, understand and anticipate the role of these de-facto multi-species assemblages for enabling socio-technical imaginaries of a sustainable blue economy. For the moment being, we refrain to the observation that non-human life forms have a stake, not only in the conservation of their marine habitats, but also in the process of developing a sustainable blue economy in the Baltic Sea Region. They are the dormant stakeholders in changing human-water relations.

In a region that has suffered ecological and economic loss from decades of over-fishing, eutrophication and fertilizer pollution, *conservation stakeholders* have great interest, solid arguments and many projects (e.g. see <https://baltcf.org>), but not necessarily sufficient influence on decision-making as opposed to incumbent stakeholders from the blue economy sector. Thus, conservation stakeholders remain demanding stakeholders without power or legitimacy in decision-making processes. Despite their limited influence, they are interested in shaping human-water relations in cognitive and experiential ways to promote knowledge and advocate for human-water relations in the Baltic Sea that go beyond resource use.

The various EU, national and sub-national *policy and regulation* stakeholders engaged with the Baltic Sea, such as the national and supra-national environment agencies and ministries of environment, constitute a multi-level governance system. While their added influence on human-water relations, especially in the experiential and material connectedness dimensions, is high, they barely aim to regulate human-water relations directly. Through strategies or directives, such as the Marine Strategy Framework Directive, they facilitate the assessment, monitoring and regulation of issues concerning biodiversity, ecosystem health or water quality.

There are few stakeholders in shaping human-water relations in the Baltic Sea region that explicitly focus on the young generation. Rather we observe stakeholders from different domains invest in activities directed towards the youth. *Youth engagement* is promoted through organizations such as science centres and museums, conservation unions, volunteering groups and activist groups who aspire to change the cognitive and emotional connectedness of the young generation with the sea. Blue economy stakeholders, on the other side, reach the young generation through training activities and job offers emphasizing a more experiential and material connection to the sea.

Table 2 in Appendix A includes an overview of stakeholder influence and interest in the Baltic Sea region.

Challenges and opportunities

The Baltic Sea is surrounded by many countries, providing challenges to collectively protect the sea from anthropogenic stressors (Torpman, 2018) Given current security-related incidences, such as reoccurring attacks on critical infrastructure in the Baltic Sea, diplomatic tensions and naval armament have increased, which partly limits the international coordination of dealing with challenges as well as produces new issues.

At the start of the project, we described that an agreement by the countries surrounding the Baltic Sea, for example on reduction of fishing and use of fertilizers would make most impact for protecting and restoring the Baltic Sea (Torpman, 2018). Given the challenge described in the previous paragraph this might be more difficult in the light of the current geopolitical situation. This might enforce the importance of local volunteering and activist groups described under youth engagement and the opportunities for shaping human-water relations they may provide. Additionally, the stakeholders in the blue economy appear to embrace a shift towards more sustainable use of resources. Although this may lead to further



exploitation the Baltic Sea as technology pushes the boundaries of nature utilization, it may also provide an opportunity for improving human-water relations. In collaboration with for example conservation stakeholders and youth engagement stakeholders that actively try to shape human-water relations towards relationships of care or - as we also see in the North sea (section 2.3.3) - to include more-than-human perspectives, this may provide an opportunity for a more balanced relationship between blue economy and the conservation and restoration of the Baltic Sea.

2.3.3 North Sea

Geographical description

The North Sea is located between the coasts of the Belgium, Denmark, England, France, Germany, the Netherlands, Norway and Scotland (Paramor et al. 2009). The inflow of Atlantic water is mixed with fresh water from rivers (from the UK and European continent) before it flows out of the North Sea as the Norwegian Coastal Current (Winther & Johannessen, 2006). This stresses the connection with the inland region of our FLOW project.

The coast of the North Sea is densely populated, with 80 million people living within a radius of 150 km of the shores and the sea is rich in biodiversity (Wageningen University and Research, n.d.). The North Sea is also an ecosystem that is being utilised intensively (Montefalcone et al., 2011), as it is one of the busiest sea areas in shipping, fisheries, energy production, sand extraction and tourism (Leemans, 2017). The North Sea is expected to undergo many changes in the next decades with rising sea temperature, sea level and storms due to climate change (Wageningen University and Research, n.d.).

Stakeholders in the four domains

Looking at the stakeholders in *nature utilization* in the North Sea region it appears that fisheries were not explicitly visible in the public debate we followed with our explorative approach (section 2.2), despite the area being a large fishery area (Leemans, 2017). Possibly, the sector is rather established and stable and therefore not dominantly visible in recent debates. Moreover, they may not have interest in playing an explicit role in shaping (future) human-water relations. Stakeholders in energy production were more visible also as this is a sector in transition. For example in the Netherlands, the government aims to only use energy from sustainable resources by 2050 (Rijksoverheid, n.d.). The North Sea played an important role in oil and gas production from beneath the North Sea, with approximately 160 locations in the Dutch part of the North Sea (Noordzeeloket, n.d.). For a sustainable energy transition to be feasible, the Dutch government decided in 2019 and 2021 that this requires wind energy parks at sea (21 GW by 2030). Two wind parks have been built between 2020 and 2023, and more wind parks are scheduled for 2023 – 2031 (Rijksoverheid, n.d.). Moreover, the energy sector is developing the North Sea as a place for CO₂ storage, especially since the infrastructure already exists, at least partially, because of the oil and gas production in the past (Basisregistratie Ondergrond, 2021). Recently, the Porthos project was approved, which is the first Dutch North Sea CO₂ transport and storage (Skopljak, 2023). Throughout history, material wealth in this region has been attained through using the North Sea as a springboard for trade and colonialism, but also due to direct exploitation of resources in the North Sea (Ormrod 2015). Nowadays, the North Sea is still has an important role in economy through nature utilization, implying strong influence not only on the societies around the North Sea, but also on shaping human-water relationships with instrumental and economic values as dominant factors.

Many stakeholders that emerged in shaping human-water relations in the North Sea regions, can be found in the domain of *youth engagement*. There are many museums focussing on shaping (young generations') relationship with water. These museums may have different focal points. To show a few examples: the Dutch Watersnoodmuseum (The North Sea floods museum) predominantly focusses on the floods in



1953, protective measures from high water and “the ever going battle” against water (Watersnoodmuseum, n.d.). The Sandefjord Museum in Norway is specialized in whales and the whaling industry (The Whaling Museum, n.d.). The museum Universum in Sweden is an interactive museum that explicitly aims to discover “how everything is interconnected”, and wants the visitor to be aware of their “part in influencing the future” (Universum, n.d.). The different museums reflect how the North Sea is a crucial part of society and the different types of relationships humans have with the North Sea. The different museums have influence and a strong interest in shaping human-water relationships, with each of them highlighting and shaping a different aspect of human-water relationships. In addition to museums, the stakeholder analysis also shows other (professional) training and education targeting at young adults, for example the European Junior Water Programme and the IHE Delft Institute for Water Education. Another programme, more closely related to activism is the Sea Rangers Service where people are mobilized towards a maritime career and protect coastal and maritime regions. Though these museums and education programs have a strong interest in shaping human-water relationships, the question raises whether their influence matches the implicit but daily constituted frame of humans being entitled to use the North Sea for food, energy and economic prosperity.

There is, relatively seen, a lot of attention for more-than-human perspectives in relation to the North Sea. Despite the high production value of the North Sea for the surrounding countries (Leemans 2017), in recent years there has been a growing attention for including perspectives of more-than-human stakeholders, such as the North Sea itself or specific species. Stakeholders that emerged were for example Taal voor de Toekomst (Language for the Future) which is about co-creating a language in which not only humans but also more-than-humans can speak. The North Sea is a specific entity they strive to speak with (Taal voor de Toekomst, n.d.). Latour (2020) wrote the book “The Parliament of Things” about representation of non-humans; Laura Burgers, Eva Meijer and Evanne Nowak (2020) continued this line of thought with their book about “The Voice of the North Sea”. A key stakeholder in this regard is the Embassy of the North Sea, whose design contest for student is one of the five pioneering initiatives studied in FLOW. Stakeholders such as the Embassy of the North Sea and Language for the Future, have a strong influence in shaping human-water relationships towards a more balanced relationship in which the more-than-human stakeholders gain new and stronger influence than they had been allowed in the past. These efforts to include more-than-human voices in debates are still pioneering but already strongly influencing the debate. For example, in the Sustainable Top 100 (a yearly list made by a Dutch newspaper), rank three was about rights for nature (including sea and rivers) and rank nine was about providing more-than-humans their autonomous status (Trouw, 2023).

The stakeholders that emerged in the domain of *nature conservation* reflect the findings within the other domains. In addition to the interregional stakeholders (such as EU BANOS project, the High Sea Alliance and the UN International Maritime Organisation), North Sea specific stakeholders emerge, for example De Rijke Noordzee (The Rich North Sea). The Rich North Sea is an organisation that aims at combining sustainable energy and wind parks (see domain of nature utilisation) and nature development, restoring natural reefs and biodiversity (De Rijke Noordzee, n.d.). Another example is the aforementioned Language for the Future, where together with Living Landscapes the North Sea is given a decision-making role in working towards sustainable and biodiverse environments (Taal voor de Toekomst, n.d.). Through combining different stakes and different domains, such stakeholders may broaden and strengthen their influence in shaping human-water relationships and engage other stakeholders in sharing their interest.

Challenges and opportunities

In the previous paragraphs, the many different functions and the different stakes of stakeholders have been described. This provides a tension between economy on the one hand, and nature conservation on



the other. There are challenges in balancing this tension for this region, as has also been described in the grant agreement (FLOW, 2022). Some of the stakeholders that emerged from the analysis specifically aim to balancing these different stakes and an opportunity is that they could function as intermediaries in this challenge.

A second challenge that emerged from the stakeholder analysis is that by intensifying technology (e.g. energy production) out-of-sight in the sea, people are less aware of its impact on the North Sea. The recent increased interest in giving voices to the North Sea may be an opportunity in meeting this challenge and in striving towards a more balanced view on human-water relationships.

2.3.4 Inland

Geographical description

Inland water encompasses a wide range of (fresh) water systems, within each EU member state. The EU's Water Framework Directive (WFD) focusses moreover also on fresh groundwater (in addition to inland surface water and coastal surface water; European Commission, 2023). The extent of the EU's freshwater ecosystems comprises approximately more than "(...) 1.3 million km of total river length, 84,000 km² of lake surface, 297,000 km² of riparian land, and 367,000 km² of potentially flooded areas", as small streams are missed in this calculation (Biodiversity Information System for Europe, n.d.). Rivers cross all of Europe's cultural, demographic, socioeconomic and political gradients (Tockner et al., 2009).

In protecting Europe's waters, the WFD consists of river basin management plans and common implementation strategies to cooperate in protection of – amongst others – inland waters (European Commission, 2023). Given the range of threats to inland water, the WFD assesses both ecological as chemical elements for surface waters and chemical status and quantitative status for groundwater (WISE Freshwater, n.d.).

Stakeholders in the four domains

The ongoing debates between different stakeholders concerning freshwater, both groundwater and river basins, differ immensely between countries, but also in regard to specific river basins. Stakeholders from the domain of *nature utilization* have a strong influence and interest in shaping decision-making processes regarding freshwater ecosystems. Their influence and interest on shaping human-water relations however is only medium, focussing on connecting humans and water mainly in a material way, e.g. viewing rivers as critical infrastructure.

As our desk research for the stakeholder list has shown, there are numerous organizations and initiatives active for specific rivers or parts of rivers, from upper basin to delta. Most actors and networks focus on specific rivers or particular parts of rivers. Only few superregional or transnational networks exist that bind the many actors concerned with freshwater, groundwater and river basins. One example, which also shows a range of stakeholders, is the Danube lighthouse project or related projects (e.g. [EcoDaLi](#)). Many of actors are highly committed in developing a sustainable blue economy in river basins. The converging efforts of blue economy stakeholders have the potential to reconfigure human-water relations in the near future.

Nature *conservation stakeholders* build on a long history of engaging with freshwater ecosystems, especially rivers. Their influence on decision-making is low to medium, increasing for some specific river basins. Conservation stakeholders' engagement can be viewed as both cause and effect of novel concepts in water and land management such as river restoration or river rewilding. Despite their limited influence, they are interested in shaping human-water relations in cognitive and experiential ways to promote knowledge and advocate for human-water relations that go beyond seeing rivers as mere waterways. A



growing number of activists raise public awareness on questions of water security and justice questions concerning distribution of freshwater amidst times of climate change and droughts. Additionally, ecojurisprudence networks gain influence, proposing the establishment of radically new human-water relations through debating and supporting discourses on rights of nature (e.g. Parlement de Loire)

The uptake of concepts such as rewilding in land and water management or the discourse on rights of nature has put increased emphasis on *more-than-human entities*. Semiaquatic rodents, like beavers, or wetland plants in floodplains now come to the fore as engineers of waterways that are needed for restoration efforts. Not only are emblematic beings a focal point for connecting humans with water, over a myriad of different practices, from wildlife photography over hunting and fishing towards care, their agency is increasingly viewed as crucial for fostering flood resilience.

The various EU, national and sub-national *policy and regulation stakeholders* engaged with freshwater ecosystems, such as the national and supra-national environment agencies and ministries of environment, constitute a multi-level governance system. While their added influence on human-water relations, especially in the experiential and material connectedness dimensions, is high, they barely aim to regulate human-water relations directly. Through strategies or directives, such as the Water Framework Directive, they facilitate the assessment, monitoring and regulation of issues concerning amongst others wastewater, water reuse, floods or biodiversity.

There are few stakeholders in shaping human-water relations that explicitly focus on the young generation. Rather we observe stakeholders from different domains invest in activities directed towards the youth. *Youth engagement* is promoted through organizations such as science centres and museums, conservation unions, volunteering groups and activist groups who aspire to change the cognitive and emotional connectedness of the young generation with rivers. Also, popular (youth) trends like beach bars, river swimming or ice dipping create actor groups that shape human-water relations through experience.

Challenges and opportunities

Inland water covers a large surface in Europe, and is connected to large and varying types of land. Consequently, there are stressors impacting inland water not only in water (e.g. hydropower or fishing), but also from land (e.g. agriculture, urban stressors; Filipe et al., 2019). A challenge in shaping human-water relations for inland water is the broad array of stakeholders directly or indirectly influencing inland water, for example by overlooking the influence from land. Though not a part of blue economy per se, agriculture is a major stakeholder with high impact on river health and freshwater use. At the same time agricultural stakeholders often have little interest in conservation or an increased connectedness of humans with rivers.

Within the EU, there is potential in a better cross-national cooperation for forecasting, monitoring and assessing surface waters to improve conservation and avoid further degradation (Filipe et al., 2019). In terms of shaping human-water relations, opportunities arise as well. Especially, in the case of rivers, it is plausible that new practices in water management and urban development, but also new trends, which all increase the visibility of water ecosystems in peoples' everyday lives, create foundations for reconnecting humans with water on multiple dimensions.

Table 3 in Appendix A includes an overview of stakeholder influence and interest in the Inland region.



2.3.5 Black Sea

Geographical description

The Black Sea is the world's largest land-enclosed sea (Bakan & Büyükgüngör, 2000). The Black Sea is often considered to also include the Sea of Azov, East of Crimea, connected through the Kerch. Through the Strait of Bosphorus, the Black Sea interacts with the Mediterranean sea (Poulos, 2020). The Black Sea has many large inflowing rivers (e.g. Danube, Dnejr & Dnjestr). Because of the rivers' inflow (350 cubic kilometres a year) from densely populated areas and 87% of the sea being anoxic, the Black Sea is subject to pollution and eutrophication (Pokazeev et al., 2021; UN Environment Program, n.d.). The Black Sea is also overly exploited by fisheries (Bakan & Büyükgüngör, 2000; Tsikliras et al., 2015; Zaitsev et al., 2008). In the last few years large discoveries of natural gas have been found in the Black Sea and more are expected to be found in the future (Hernandez, 2023; Ilie & Balmer, 2022), which could increase the role of gas production companies in the region.

The Black Sea borders both European and Asian countries, alphabetically: Bulgaria, Georgia, Moldova, Romania, Russia, Turkey, Ukraine. This makes the Black Sea a strategic water body and results in geopolitical tensions in the area (Anastasov, 2018). Most media coverage on the Black Sea since February 2022 has been on the war in Ukraine. Recent developments in human-water relationships in the Black Sea region must also be seen in that light. Consequently, other aspects could have been underexposed in this stakeholder analysis, such as recreation and tourism.

Stakeholders in the four domains

Looking at the stakeholders that emerged from the stakeholder analysis, within the domain of *nature utilization*, we found primarily European research projects on regulation and policy. These projects have a broader EU focus than only a focus on the Black Sea. As is also evident from the description in the previous paragraphs, gas production companies (such as OMV Petrom and Romgaz, both in Romania) and (anchovy) fishing companies (such as Black Sea Fisheries Bourgas JSC) were found. Although these stakeholder groups do have high interests and influence in the region, their focus is not explicitly on shaping (future) human-water relations, however they do so indirectly via economic interests. The Black Sea Blue Growth Initiative however has a more explicit focus on including stakeholders and aim to "advance a shared vision for a productive, healthy, resilient, sustainable and better valued Black Sea by 2030" (Connect Black Sea, n.d.^a). In striving for a sustainable blue economy, they do focus on human-nature relationships by empowering citizens and capacity building of 'blue skills' through education (Connect Black Sea, n.d.). Through their large network, this stakeholder may have a lot of influence in shaping human-water relationships in this domain.

Also within the domain of *nature conservation*, stakeholders emerged that have an EU-wide perspective, both as governmental actors (e.g. International maritime organisation, part of the UN) and NGO's (e.g. High Sea Alliance). These stakeholders have a primary focus on regulation and conservation, and changing human-water relations to them is a means to the end of nature conservation. Specific for the Black Sea region, research institutes and an NGO emerged that collaborated in the ANEMONE project. In this project, public engagement and citizen science were central to interact on the topic of marine litter and cetaceans (Gheorghe et al., 2021). Through their focus on public engagement, they did have a strong influence and interest in changing human-water relations. The project came to an end, but the collaborating stakeholders (among others Mare Nostrum NGO in Romania and the Institute for Oceanology "Fridtjof Nansen" in Bulgaria) are stakeholders that are still relevant in shaping human-water relations.



In the domain of *youth engagement*, again there are some Europe-wide initiatives (such as the European Junior Water Programme and EuroActive) involved in engaging young adults with water. Specific for the Black Sea, there is the Black Sea Young Ambassador programme, which is linked to the previously mentioned Strategic Research and Innovation Agenda and developed under the H2020-funded Black Sea CONNECT, with the aim to engage young professionals from different domains (research, policy, industry, etc; (Connect Black Sea, n.d.^b) for the future of the Black Sea, for a healthy, resilient, and the sustainable Black Sea. Through connecting young professionals, the influence of the young ambassadors reaches into the different domains as well.

Within the domain of *more-than-humans*, species with large stakes we came across were anchovies, especially the Black Sea anchovies, and other fish species that fisheries catch. The cetaceans were an explicit stakeholder in the ANEMONE project. The Black Sea itself has a high stake in the issue of pollution and eutrophication and the influx of polluted water from the rivers. We did not come across initiatives that aim for collaborating with more-than-human species in this region, and despite the high interest, few influence is shared with them.

Challenges and opportunities

In the Grant Agreement (FLOW, 2022) we mentioned challenges in shaping human-water relationships for restoration of the Black Sea: geopolitical interests clashing, (chemical) pollution and overfishing. These challenges resonate with the stakeholders that emerged in this explorative analysis. Especially the geopolitical situation hinders collaboration across countries and continents. Within this challenge and governmental and political stakes, initiatives aiming at public engagement on a smaller geographical scale may be promising. For example, Mare Nostrum in Romania monitors waste management in the Romanian Coast and includes volunteers in beach and litter monitoring (Mare Nostrum, n.d.). Similarly to one of the pioneering initiatives of FLOW, Clean Rivers, this may make them key stakeholders for the FLOW project given their influence on a network of volunteers and their interest in engaging people in bottom-up action against pollution.

The opportunities explored in the Grant Agreement (FLOW, 2022) were encouraging small-scale local fishing of species that are less exploited to enable ecosystem restoration. Also restoration of habitats and raising public awareness were mentioned as promising targets. As still 92% of the fishing stocks inventoried by the EEA are exploited at unsustainable levels in the Black Sea (EEA, 2019) and with the fish' more-than-human perspectives in mind, other opportunities to restore ecosystems are perhaps more sustainable. Given the large networks already in place on stimulating the blue economy in the Black Sea area, this could be an influential vein in which the inclusion of nature conservation, sustainability and inclusion of more-than-human perspectives deserve more attention in order to restore habitats and raise public awareness.

2.3.6 Mediterranean sea

Geographical description

The ancient name of the Mediterranean Sea ('between lands sea') already suggests the large number of countries bordering the sea (Boxer & Salah, 2023): Albania, Algeria, Bosnia and Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Morocco, Slovenia, Spain, Syria, Tunisia, Turkey. The Mediterranean Sea is semi-enclosed (Tanhua et al., 2013) and connects to the Atlantic Ocean through the Strait of Gibraltar (between Spain and Morocco) in the West and to the Black Sea (via the Strait of Bosphorus) and the Red Sea (via the Suez Canal) in the East (Boxer & Salah, 2023).



As the Mediterranean Sea is located in between (densely) populated areas (Tanhua et al., 2013), it has been a valuable source of goods and services, since ancient civilizations at least 4000 years ago used it for fishing and trade (Sardá, 2013). However, this also makes the Mediterranean Sea sensitive to anthropogenic stressors and threats (Tanhua et al., 2013). This “marine biodiversity hot spot” (Coll et al. 2010; p.1) with over approximately 17.000 marine species however is threatened by – most importantly – habitat degradation, pollution, over exploitation, invasive species, eutrophication, and climate change (Coll et al., 2010).

Stakeholders in the four domains

The Mediterranean Sea hosts a rich pallet of stakeholders related to human-water relations. As in the other regions, these stakeholders have sometimes competing interests and various degrees of influence. The material connectedness seems to be high, as the Mediterranean stands out with its distinctive historical, geographical, natural, and cultural attributes. Positioned at the meeting point of three continents, with Europe to the North, Western Asia to the East, and North Africa to the South, in terms of *nature utilization*, it serves as a hub for diverse exchanges, holding strategic significance regionally (in the Euro-Mediterranean context) and globally. Moreover, it encapsulates pronounced global imbalances, be they environmental, social, or economic, in a concentrated and intensified manner.

Nature conservation stakeholders in the Mediterranean Sea region are vital guardians of its rich biodiversity. Non-Governmental Organisations like the Mediterranean Association to Save the Sea Turtles ([MEDASSET](#)) and the WWF Mediterranean Program (WWF Mediterranean Program) work to preserve endangered species such as the loggerhead sea turtle and the Mediterranean monk seal. Scientific institutions like the Mediterranean Science Commission ([CIESM](#)) conduct research, enhancing the understanding of marine ecosystems. National agencies actively engage in marine protected area management, enforcing conservation regulations. Coastal communities, with their community led initiatives, are crucial actors in terms of conservation of this region.

Youth engagement in the Mediterranean region is strong. Youth-led initiatives like the Mediterranean Youth for Water Network (MedYWat) empower young people to tackle water-related challenges. Projects such as the "[Youth Innovating with Wastewater for a Sustainable Mediterranean](#)" competition (2017) encourage creative solutions, fostering awareness about water conservation and pollution. Youth organizations collaborate with local communities for beach clean-ups. Social media campaigns, such as "[Invest in our Planet](#)" (2023) amplify voices, connecting young advocates across the region.

The Mediterranean Sea region hosts a rich array of *more-than-human* stakeholders, including diverse marine species, ecosystems, and natural phenomena. These entities play vital roles in the ecological balance, ranging from phytoplankton to apex predators like the bluefin tuna. Coral reefs, seagrasses, and migratory birds are integral parts of this complex web. Additionally, geological features such as underwater caves or deep-sea brine pools contribute to the region's uniqueness.

Table 4 in Appendix A includes the analysis of some of the stakeholders of the FLOW Mediterranean Sea bio-geographical region, their mapping into human-water connectedness dimensions, and their influence and interest in this domain, including the risk of conflict with other stakeholders categories.

Challenges and opportunities

The region grapples with significant challenges: climate change, water scarcity, unemployment, migration, terrorism, economic development, conflicts, and demographic shifts. These all having a potential impact on human-water relations. With climate change, these interconnected challenges may worsen, making the Mediterranean Sea a climate change vulnerability hotspot (EuroGOOS, n.d.; Finnegan, 2013).



With the increased use of this water region as a migratory route, the experiential, philosophical and emotional connectedness seem to gain new angles for our nowadays society. Likewise, the increased attention to plastic pollution drives a rise in the cognitive connectedness, as governments, industrial actors, and scientists alike are engaged in understanding the problem but also finding ways to tackle it providing opportunities for the Mediterranean Sea region.

2.3.7 Bay of Biscay, Iberian coast, Macaronesia

Geographical description

This FLOW region consists of the Bay of Biscay, Iberian coast and Macaronesia. It borders Spain, France and Portugal. The Bay of Biscay is a wide inlet of the Atlantic Ocean in which the Loire, Adour, Dordogne and Garonne flow (Britannica, 2023). The Iberian coast surrounds the Iberian Peninsula (Spain and Portugal). The west coast is the Atlantic Ocean and to the east the Mediterranean Sea. Macaronesia includes 40 islands in the Atlantic Ocean, west to the coast of Africa and the Iberian Peninsula (Florencio et al., 2021). The Portuguese islands are the Azores and Madeira islands, and Spanish islands are the Canary Islands.

The Bay of Biscay and its marine life is being disturbed by pollutants and physical disturbances due to human extractive and industrial activities, infrastructure and transport. Future challenges for the Bay of Biscay include biodiversity loss, invasive species and global warming (Borja et al., 2019). The Iberian coast is one of the world's largest upwelling areas where upwelling of nutrient-rich water allows for intense fisheries. This upwelling is decreasing leading to fewer fish production with socio-economic consequences for the region (Pérez et al., 2010). In Macaronesia, the marine megafauna is particularly evident, supporting e.g. ecotourism and fisheries. These however are under threat and one-third of the marine mega fauna is at risk of extinction due to fisheries, marine traffic, pollution and climate change (McIvor et al., 2022).

Stakeholders in four domains

Regarding *nature utilization*, as the region of Golf of Biscay, Iberian Coast, and Macaronesia is rich in natural resources, it has always had a high level of material human-water connectedness. In terms of experiential connectedness, especially Macaronesia has experienced an increase since the half of the last century, as it became a major touristic attraction. In the last couple of years, due to extreme heat waves in other parts of Europe, the Iberian Coast, became more attractive for tourists. However, in the last decade, Macaronesia also became a migratory route, something that brought new aspects into the emotional and philosophical connectedness with this region.

Nature utilisation stakeholders seem to have both high interest and high influence, while *nature conservation* stakeholders, despite their high interest, do not have the same influence as they might have in other regions (e.g., Arctic). The *more-than-human* stakeholders (like the charismatic species of Loggerhead Sea Turtle in Macaronesia) seem to be known mainly locally, having thus a low influence though a high interest. The *youth engagement* seems to be on the rise, with strong involvement of science centres, museums, and schools (e.g., the Ciência Viva network in Portugal that integrates 22 science communication spaces).

Table 5 in Appendix A includes the analysis of some of the stakeholders of the FLOW Golf of Biscay, Iberian Coast and Macaronesia bio-geographical region, their mapping into human-water connectedness dimensions, and their influence and interest in this domain, including the risk of conflict with other stakeholders categories.

Challenges and opportunities



One of the challenges in this region is that climate change is impacting biodiversity, but only 1% is protected (Le Marchand et al., 2020; Oceana, n.d.; Pınarbaşı et al., 2020). This may pose a challenge for some nature utilization stakeholders, though utilization of the area for tourism becomes increasingly important. Another challenge is that there is an increase of Macaronesia being used as a migratory route. These developments may lead to more tensions that require cross-border governance.

In our proposal (FLOW, 2022), we described cross-border governance as an opportunity for protecting the marine region, as well as expanding (coastal) protection areas. Based on the stakeholder analysis, we also see an opportunity in youth engagement and increasing the role of youth mainly via science museums and science centres and schools projects and shaping human-water relations via a cognitive approach. Given the extent of the challenges ahead in the region, there is an opportunity in shaping human-water relations if these stakeholders to also expand to including more emotional and reflective dimensions of human-water relations.

2.4 Conclusion of stakeholder analysis

In this conclusion, we combine our findings of the regions in challenges and opportunities for shaping human-water relations in each of the domains. Before specifying the domains, we want to address to more general issues.

Firstly, this stakeholder analysis is not – nor intends to be – a complete analysis of all stakeholders who hold influence or interest in shaping human-water relations in the seven European regions FLOW distinguishes. Given the otherwise ever-expanding task, in stakeholder analyses, intent and aims need to remain top of mind (Lyon et al., 2020). Our stakeholder analysis on the one hand serves the process of the entire project (e.g. to ensure wide participation) and on the other hand serves to get a better grasp on the seven regions in terms of changing human-water relations.

Secondly, we conclude that there is a broad array of stakeholders – across the four domains – with competing interests. This may be a challenge but also provides opportunities for finding intermediaries across domains and regions (e.g. North Sea and Inland). Secondly, the regions have different characteristics, not only in terms of geography and ecology, but also in terms of for example culture, politics and socio-economic factors. Consequently, the challenges vary across regions and not all opportunities are equally feasible in each region.

Nature utilisation

In terms of nature utilisation, we see challenges as there are many competing interests. Depletion of resources may drive new technologies that may lead to further pushing the boundaries of exploitation, however this may also provide an opportunity to improve human-water relations, for example in collaboration with stakeholders in other domains (e.g. Baltic Sea). In addition to depleting resources, new resources may also be found (e.g. gas discoveries in the Black Sea or new resources due to thinning sea ice in the Arctic Sea). This puts a tension between local stakes and interests and the stakes of (larger) nature utilization stakeholders, for example in the case of indigenous communities in the Arctic Sea. Socially and ecologically sustainable design is needed for these challenges in order not to further disturb human-water relations.

Nature conservation

The aquatic ecosystems in the regions of FLOW are complex in terms of nature conservation due to the interrelatedness of environmental problems that are already complex in itself: climate change, pollution, biodiversity loss, habitat degradation, invasive species, drought, floods (which noteworthy did not emerge as a dominant theme in this analysis). And not only the environmental issues are complex, they provide



challenges for human-water relations in nature conservations as they are interrelated with social problems as well: questions of climate justice, distribution of water for instance in case of droughts caused by global warming. Consequently, there are large geopolitical factors at play (e.g. war in the Black Sea region, migration in the Bay of Biscay or attacks on critical infrastructure in the Baltic Sea) that shed a completely different light on human-water relations. On the other hand, increased visibility and awareness (for example of plastic pollution in Mediterranean Sea) and increased interest in nature conservation and sustainability practices might provide an opportunity for shaping human-water relations.

Interestingly, discourse arenas such as sustainable, circular blue economy or new concepts in water management and nature conservation constitute to the emergence of novel stakeholder coalitions that have the potential to align the interest of economic stakeholders, policy and regulation stakeholders, non-human lifeforms and activists/youth groups.

More-than-humans

Including more-than-human stakeholders in a stakeholder analysis proved to be a challenge in itself. We cannot ignore that more-than-human entities play a central role in the actions and discourses of incumbent stakeholders. Neither can we ignore that the success of many transitions and imaginaries of a sustainable blue economy rely on the agency of non-human stakeholders. As such, algae are mobilized for blue economy innovations or beavers are tasked to support rewilding and water management. Despite of these empirical observations, that show that non-human agency is crucial to many debates, the question of how to represent, give a voice to, more-than-human actors in research remains somewhat open. While ecojurisprudence organizations, like in the North Sea, provide examples of how such representation may be organized or look like in the future, we find ourselves confronted with a lack of possibilities, both in terms of knowledge and communication, to explore other species' intentionalities. More research can encourage acknowledgement of more-than-human stakeholders, understanding their role and importance, and risks of extinction.

Some regions have charismatic species that already now help to raise awareness for the stake of more-than-human actors: for example the polar bear has a global impact on human perceptions of the Arctic and their emotional connectedness to it. Acknowledgements like this, by more or less emblematic figures are a necessary first step, to shape human-water relationships towards more care.

Youth engagement

Youth engagement strongly varies between the regions, though there seems to be a growing youth engagement (beyond education), for example through youth ambassador projects (e.g. Arctic, Black Sea and North Sea regions) or activism (e.g. Inland or North Sea region). An opportunity in shaping human-water relations through youth engagement is to make explicit links to everyday realities of young people. Examples of doing so can be through dining (see Baltic Sea and Inland regions) or through engaging young people in visible environmental issues (for example plastic pollution in the Mediterranean sea region or melting ice caps in the Arctic).

Our research provides many examples for the myriad ways in which young adults in Europe organize themselves or engage in activities to protect and connect to oceans, seas, lakes and rivers. It is plausible to believe that this engagement will have a long-lasting effect on the future shaping of human-water relations.



3 Gender analysis

In studying human-water relations, the FLOW project adopts a critical and intersectional lens. This means that we consider the interaction of multiple axes of identity in human-water relations, across factors such as gender, ethnicity, and socioeconomic background, and how these identities enact and interact with societal power and determine people's agency and access to knowledge – with the intention of being as mindful as possible to people's unique circumstances as we pursue research that aims to nurture positive social and environmental transformation. Gender, a key element of FLOW's intersectional lens, is a structure within which all human beings articulate themselves and their relationship to society and the world. *D1.3b Gender Analysis* focuses on the aspect of gender in relation to FLOW's work, in compliance with the European Union's guidance for gender equality in research funded under Horizon Europe. Similar analysis could be produced on the FLOW project's work on race, disability, decoloniality, and socioeconomic background in the context of human-water relations, and indeed such social structures cannot be separated from FLOW's commitment to intersectional analysis.

FLOW's first deliverable (D1.1) included an open-access transdisciplinary encyclopaedia which outlined the project's understanding of a range of critical theories relevant to the project, which prominently included gender theory as well as the related theories of queer theory, ecofeminism, and xenofeminism (Mashiur et al., 2023). These concepts inform Section 3.1 'Conceptualizing Gender' where we outline gender theories and then follow with the European Union's gender definitions, recommendations and requirements as outlined in the European Commission's *Horizon Europe guidance on gender equality plans* and *Gender in EU-funded Research* toolkits (European Commission, 2011; 2021). The FLOW approach to gender as a synthesis of critical gender theory and European Union (EU) guidelines is then outlined, paying attention to how we address potential conflicts between the broader theoretical understanding of gender and the European Union's focus on gender as a site of discrimination against women.

Section 3.2 is a gender analysis of the participants of FLOW, analysing the gender distribution of the members of the project team as well as the other participants in the project: the Youth Advisory Board of selected youth adults, the Sounding Board of policy and industrial professionals, and the identified stakeholders of the project (first part of this deliverable). We will discuss how gender equality will be maintained among the young participants of the (upcoming at this time of writing) experiential futures workshops (scheduled November 2023 to June 2024).

Section 3.3 is devoted to an examination of gender and intersectionality within the FLOW research approach. The *FLOW Encyclopaedia* is a useful reference tool for a range of concepts that are both core and tangential to FLOW's interests, and as an object of analysis for gender dimensions it can be too broad in scope. As a distillation of the FLOW conceptual approach, we will think through the gendered implications of the core concepts of the *D1.2. inFLOW* lens (Priebe et al., 2023), which offers a novel transdisciplinary summation of FLOW's approach to mapping human-water relations.

Through this gender analysis we show that the FLOW project respects and follows the EU's guidelines on gender as an awareness on systemic discrimination against women and avoids subsuming the presence of women in the project, and at the same time adopts a perspective on gender that moves beyond the gender binary and the focus on gender as women's issues and instead embraces a holistic approach that is queer-friendly and intersectional – inspired by the fluidity of water and the importance of more-than-human relations. Intersectional reflections have been and will continue to be an integral part of the project work in FLOW.

3.1 Conceptualizing Gender

3.1.1 Gender theory: overview

Gender Theory argues that ‘gender’ and ‘sex’ are not synonyms, but describe two distinct yet interrelated concepts. Sex is a set of biological characteristics while gender is socially constructed. The differences between male and female bodies are then compounded by sets of rules, customs, expectations and limitations that are imposed by society upon these bodies (Connell & Pearse, 2015). Raewyn Connell and Rebecca Pearse (2015) argue that these socially-constructed gender labels are defined by a relationship of difference between ‘men’ on the one hand and ‘women’ on the other, but gender theory is not concerned with the difference as such but the relations between and within genders, particularly changing power relationships. Gender is a complex, multidimensional experience whose characteristics are in continual flux (Connell & Pearse, 2015).

While gender theory derives from feminist thought and is thus often associated with the study of femininity and women, gender theory is also concerned with masculinity and men. Moreover, gender theorists question the binary construction of men and women and thus experiences that cut across these seemingly rigid categories (transgender experiences, queer practices, intersex humans, historical and non-Western examples of gender experience beyond the binary such as South Asia’s hijras, etc.). Queer theory is concerned with challenging gender binaries, as well as binary distinctions made in identity construction more generally – so, not just the binary of male/female, heterosexual/homosexual, but also the class distinctions of rich/poor and the global divides of West/Rest, North/South, and so on (Thiel, 2018). By moving beyond the reification of the binary category of ‘man’ and ‘woman’, queer theory helps us understand gender as intersectional and attentive to the dynamics of oppression within groups, and cutting across seemingly disparate groups too (Crenshaw, 1993; Nash, 2008). Postcolonial theory also charts the historical emergence and negotiation of gender norms as inextricably wound together with other categories such as class and race (McClintock, 1995; Nash, 2008). Such a postcolonial lens is taken up by ecofeminists, who argue that the systems of patriarchal, imperial, and capitalist dominance that feminists challenge in the social sphere are exactly the same forces that are destroying the environment, and thus argues for a politics of solidarity and care in the face of capitalist alienation and division from the environment and within society (Gaard, 2017; Mies & Shiva, 2014). Xenofeminism, a new wave of theory, takes this concept further and argues that there is ultimately no normality that characterises anyone’s experience – and thus, we are all to some degree alienated under global, heteronormative, patriarchal neoliberal capitalism. In the face of this common feeling of estrangement a united politics of care and solidarity must move beyond the particularities of identities (Cuboniks, 2023).

We thus see that the academic theory of gender is highly critical – that is, concerned with issues of power and emancipation – and that ‘gender’ is a broad camp that incorporates a wide range of themes, concerns, and identities.

3.1.2 Gender in Horizon-funded research

The European Union’s rules for gender equality in funded research are primarily concerned with gender equality within the binary of men and women, wherein women are systematically disadvantaged. The European Commission’s toolkit on gender in EU-funded research defines key terms such as ‘gender’, ‘gender equality’, and ‘equal opportunities for women and men’ in ways that indicate this binary division and unequal power relation. In this respect, the EU framing of gender issues is a more focused approach that is dedicated to correcting the lack of female participation in research and opportunity in research and the tendency for research to become ‘gender blind’, which is to ignore the gendered implications and outcomes of research (European Commission, 2011).



The EU requires that research funded under the Horizon Europe framework submit Gender Equality Plans for the purpose of integrating a gender perspective holistically in research – ‘gender mainstreaming’ (Svarstad, n.d.). Gender Equality Plans must provide for a healthy work-life balance in the structure of the research team’s tasks, maintain a gender balance in the leadership and decision-making roles of the team, show gender equality in promotion to roles, integrate a gendered dimension into the research activities², and incorporate measures against sexual harassment (European Commission, 2021).

Crucially, the gender equality requirement is that at all levels of research, the less represented gender make up at least 40% of the participants (European Commission, 2011; 2021).

3.1.3 Gender in FLOW

The FLOW project takes a balanced position between the broader understanding of gender in academic theory that sees gender as an aspect of a wider range of intersectional themes and the more instrumental approach of EU funding requirements toward correcting women’s disenfranchisement in academia and research outcomes. As an EU-funded project, FLOW aims for gender equality, by aiming for at least a 40% representation of men and women in the project’s management, and aiming for equivalent gender representation in other aspects of the organizational structure and the across the various categories of entities in the project (e.g., Youth Advisory Board, Sounding Board).

FLOW also ensures that a gender lens is incorporated throughout the research findings of the project with a particular attention to how women participate in, and are affected by, the research conducted. The role of gender officer is crucial in ensuring compliance with these guidelines. As an academic project, we seek to ensure that our research reflects analyses that incorporate gender as an aspect of a broader critical lens, and that our research critically interrogates and incorporates the role of men in the research, as well as gender identities beyond the male-female binary.

3.2 Analysis of participants in the FLOW project

Project Team

The FLOW Project is coordinated by Radboud University (hereafter: RU), with two academic partners – UiT The Arctic University of Norway (hereafter: UiT), and Fraunhofer Institute for Systems and Innovation Research ISI (hereafter: ISI) – and a non-academic partner, Volonteuropé (hereafter: VOLE).

FLOW maintains a gender balance in favour of women within the academic team of the project. The project leader is a woman, moreover two of the three academic partners are led by women. Out of the ten academics engaged in FLOW, six are women. The gender officer for FLOW is one of the male academics. The non-academic partner skews the gender balance toward men; however, its team is ethnically and regionally diverse and thus contributes to the diversity of FLOW in aspects beyond gender representation. The proportion of women in the project team is thus six out of fourteen, or 42%, and thus the FLOW project attains the gender ratio requirement for women as the under-represented gender.

² “There is no set answer to how to incorporate a gender perspective in research, as this end can be achieved through various theoretical and methodological approaches. Gender perspectives in research do not necessarily mean investigating gender differences, but rather how gender is a factor in different contexts. Investigating the significance of gender can make it easier to spot other social dimensions, such as the importance of income and level of education, class or status, age, ethnicity and where people live.” (Korsvik, n.d.). For a checklist that can guide addressing gender dimension in research, see Korsvik, & Rustad (2018).



The FLOW partner organizations have their own internal protocols for maintaining work-life balance, gender sensitivity, and the prevention of sexual harassment, and thus FLOW has no special provisions in place within the project team.

Youth Advisory Board

The Youth Advisory Board (YAB) consists of fourteen members, two from each of the seven bioregions indicated by the FLOW project. Seventy-eight applicants between the ages of 18 and 30 responded to an open call from VOLE: fifty-four women, twenty-three men, and one non-binary person. Of the final fourteen, ten are women. Three out of fourteen members, including two women, strongly identified as of non-European ethnicity. While only four out of fourteen – 28% – of the members of the YAB are men, which is less than the 40% threshold for gender equality, it is an outcome of selecting the most suitable candidates to ensure good diversity across the seven bioregions from a candidate pool that itself skewed heavily toward women.

The YAB's activities with FLOW are in accordance with work-life balance needs and with full financial support offered for any activities that require it, which are in accordance with EU guidelines on gender sensitive practice. The YAB engages with FLOW at a volunteer level, with careful consideration given to their existing responsibilities. Travel costs for participating FLOW workshops and events are covered by the project.

Sounding Board

The Sounding Board consists of policy and industry professionals. The Board thus far has three confirmed members, of whom two are women.

Stakeholders

The selection and analysis of stakeholders of human-water relations (the first part of this deliverable) reflects FLOW's intersectional, multi-species understanding of human-water relations, which includes a gender-sensitive lens. Identified stakeholders cover a broad ground, including environmental protection agencies, fisheries industry participants and bodies, indigenous rights groups, as well as non-human stakeholders such as water bodies and ecosystems and the non-human species that live within them. Such more-than-human analysis adopts an ecofeminist approach incorporating human societies and the natural world as partners.

Pioneering Initiatives

FLOW has identified five European 'pioneering initiatives' that showcase in practice engagements between young adults, communities, and water. These five initiatives offer case studies for FLOW through methods outlined in *D3.1 Workplan: Studying Pioneering Initiatives* (van den Born et al., 2023). Of relevance to this gender analysis are the interviews and focus groups held with the members of the pioneering initiatives, particularly with the young volunteers engaged with their work. FLOW will interview the 'initiators' (founders, managers, etc.) of these initiatives and then speak to young participants. Diversity in terms of gender, age, and background are prioritized in selecting the young adult interviewees. As FLOW, for research purposes, focuses on 'youths' aged 18-30, these interviewees are not minors. Safeguarding is ensured through consent forms and information letters that outline protections of personal data and allow for the withdrawal of consent to various forms of research data collection. The data collected and the reflections drawn from them will be shared with the young adult interviewees afterwards, giving them an opportunity to critique, comment and clarify, ensuring the agency of the participants and providing richer – and more gender-sensitive – data.



Workshops

FLOW will conduct seven experiential futures workshops that are scheduled between November 2023 and June 2024. Each will be held in one of the seven bio-geographical regions in turn. The project aims to have a range of 20 to 25 youths (aged 18-30) in attendance at each workshop. These workshops will be coordinated by VOLE with their regional partner, who will invite participants through their networks of activity. These participants will be selected for diversity across a range of factors including but not limited to gender: age, ethnicity, education, socio-cultural, and geographical aspects. Two particular commitments regarding this diversity and equitability are notable: the decision to bring in participants with backgrounds not usually seen participating in research-oriented workshops, and to bring Ukrainian and possibly Georgian youths in the Black Sea regional workshop. Workshop participants will be provided a robust consent form that outlines the voluntary nature of the activity and to withdraw consent to any form of recording of their participation by the FLOW researchers present at the workshops. These and other details about the workshop may be found in *D4.1 Final Agenda and Methodology for the FLOW Workshops* (Priebe et al., 2023).

3.3 Analysis of main FLOW conceptual approach

FLOW applies an intersectional perspective on the future of youth relations with water, and gender is a prominent aspect of this intersectional lens. In this section, we unpack the gender dimensions of FLOW research. First, we provide a brief introduction to FLOW's topic of human-water relations and the relevance of a youth orientation to this research. We then introduce the *InFLOW lens* and its key concepts, and, as a synecdoche for the FLOW project's research, we open up these concepts to a gender analysis.

Broadly speaking, human-water relations are the point of intersection between the human activity and the hydrological system (Simmons et al. 2007), however, they are part of part of the socio-ecological interaction, which is broader than only economy. They are an aspect of human-nature relations, a growing body of research that seeks to describe various areas such as people's environmental attitudes, the intersection of human values and economic activity and the natural world, and the perceived division between the human and the natural. There exist various paradigms within which humans enact a relationship with the natural world, for example those from environmental philosophy, described by Van den Born (2008)³. One of these paradigms sit alongside more recent scholarship that argues for a view wherein humanity is considered a part of the natural world and not separated from it (Plumwood, 2006; Zylstra et al., 2014).

Part of the research on environmental attitudes and relations focuses on young people, particularly on the problem of how to encourage youth engagement with environmental issues (Boeve-de Pauw & van Petegem, 2017; de Groot & van den Born, 2003; Ganzevoort & van den Born, 2020; Rana et al., 2020; Sass et al., 2018; Tam et al., 2013; van den Born et al., 2001). Youth attitudes on the climate oscillate between inactivity and detachment, and political mobilisation, which is part of a growing trend of youth mobilisation on social issues worldwide (Barron, 2018; Han & Ahn, 2020; Kuzio, 2006; Neas et al., 2022; Shehata, 2010). How do factors such as gender and ethnicity come into play in shaping youth attitudes and willingness to engage with public issues such as the state of the environment? Literature shows that gender is a crucial factor in determining political engagement on social media (in that online spaces may put forward masculinist, patriarchal discourse that prevent the engagement of women; Ahmed & Madrid-Morales, 2021) and in shaping perceptions, engagements, and level of awareness about threats to marine life (women may be on average more concerned about such threats than men; Gkargkavouzi et al., 2020).

³ Though it is outside the scope of this review to delve into these paradigms.

The wide breadth of FLOW's research area is exemplified by the scope of the *FLOW Encyclopaedia* (Mashiur et al., 2023). A transdisciplinary *inFLOW* lens takes some of the key concepts (as identified by the FLOW researchers) from the encyclopaedia and provides a summary and visualisation of the research that in turn enables users of the Lens to view human-water relations through a unified 'FLOW perspective'. Gender is not an explicit element of the *inFLOW* lens, but it and other intersectional themes inform the *inFLOW lens'* topics.

The gendered dimensions of human-water relations are often highlighted in development literature, particularly in terms of water access and security in rural communities, health, the traditional role of women as water-carriers, the safety of women using sanitation facilities, among other themes (Fröhlich et al., 2018; O'Reilly, 2006; O'Reilly et al., 2009). Scholarship on gender dimensions in water governance and reform discusses the need for an underlying feminist theory of power when analysing women's relationship to water systems, to prevent women only being inserted into the water economy without any reform of underlying power inequalities that may hamper their lived relations to water (Ahlers & Zwarteveen, 2009; Harris, 2009). Further economic analyses observe the gendered dimensions of water-based economic activity, such as in fisheries and aquaculture, wherein women's participation is often less visible than men's but is embedded throughout the supply chain (Frangoudes & Gerrard, 2019; Weeratunge et al., 2010; Weeratunge-Starkloff & Pant, 2011; Williams, 2008).

FLOW also studies the cultural, experiential and emotional dimensions of relations with water, such as the act of fishing (both recreational and commercial) as a masculine act wherein men are fishermen or captains of vessels and women are absent, waiting on the shore, and the fracturing of these traditional gender dynamics in the modern economy (Bull, 2009; Gerrard, 2013; Munk-Madsen, 2000). The emotional impacts of water-related stresses such as water shortages have also been studied from a gendered lens to suggest that women are disproportionately impacted by such shortages (Sultana, 2011; Wutich & Ragsdale, 2008), and there also exist some explorations of emotional connections to water outside the context of crisis (Gay, 2023; Harry & Malepane, 2021). Of particular interest to FLOW's *inFLOW* Lens is the presence of mermaids in culture, with a surge in recent pop culture references to mermaids, and recent developments such as the practice of mermaiding – wearing mermaid tails and swimming – which has inspired recent literature from a medical standpoint to evaluate health risks, but has also been studied as an exploration of a gendered fantasy (in that mermaiding is done most often by women, and the mermaid itself is a female-coded figure) that enables fresh engagements with water and blurs the human-nature divide (Guitton, 2017; Porter & Lück, 2018).

In the context of this existing literature, FLOW is interested in exploring through the workshops and interventions of the Youth Advisory Board how youth attitudes and approaches relate to gender and other intersectional factors when it comes to economic, lifestyle, cognitive, emotional, experiential, and philosophical dimensions of relating to water (fish consumption, swimming, climate anxiety, etc.). Notably, the literature on climate anxiety suggests that it disproportionately impacts young adults, which is to be expected, but how gender relates to such anxieties is not clear. Some studies show that women are more likely to feel climate anxiety, others suggest that there is no gendered difference (Heeren et al., 2022; Mouguiama-Daouda et al., n.d.; Ramírez-López et al., 2023; Rothschild & Haase, 2023; Whitmarsh et al., 2022; Wullenkord et al., 2021). Literature on people's relationship to nature indicates not much difference between genders (Calderón Moya-Méndez et al., 2022; Duong & van den Born, 2019), but women may display a greater awareness and concern toward environmental issues (Tiscareno-Osorno et al., 2022). What patterns emerge in FLOW's research will contribute to our knowledge of gender differences in human-nature and human-water relationships.



More-than-human relations and perspectives are often associated with feminist thought, and thus there exists a range of discussions that approach the idea of incorporating perspectives outside the anthropocentric through a gendered lens (Clark, 2023; Dashper, 2020; Dichman, 2023; Dombroski, 2018; Gruen, 2009; Mitten, 2018; O’Gorman & Gaynor, 2020; Taylor et al., 2012). Queer and indigenous articulations of more-than-human relations also inform FLOW’s theoretical lens (Taylor & Blaise, 2017). Much of the literature on human-water relations is written through these myriad understandings and incorporations of the theme of gender (Dennis & McLafferty, 2020; Hurst et al., 2022; Knott et al., 2022; Luong, 2022; Probyn, 2014; Viaene, 2021).



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Appendix A – Additional tables stakeholder analysis

Arctic region

Table 1 Examples of various categories of stakeholders of the FLOW Arctic bio-geographical region, their mapping into human-water connectedness dimensions (following the dimensions described in Ives et al., 2018), and their influence and interest in this domain (including the risk of conflict with the interests of other stakeholders categories). The analysis in the third column is made based on the category of stakeholder (first column), not on the example from the second column.

| Category | Examples | Human-water connectedness dimension | Interest & influence; risk of conflict |
|--|--|--|---|
| NATURE UTILIZATION | | | |
| Blue Economy | | | |
| <i>Extractive industries: fishing, mining, offshore oil, aquaculture</i> | <p><i>Fishing:</i> Arctic Fisheries Ltd., US</p> <p><i>Mining:</i> Mawson Gold, Canada</p> <p><i>Offshore oil extraction:</i> Equinor, Norway</p> <p><i>Aquaculture:</i> SalMar Aker Ocean, Norway</p> | <ul style="list-style-type: none"> • Material: Depend heavily on water and land for extraction processes, leading to significant material consumption. • Experiential: Directly involved in resource extraction from water and land bodies. • Cognitive: Engage in research to optimize extraction methods, while addressing environmental concerns. • Emotional: Positive feelings related to profit generation, negative feelings due to environmental regulations and the disapproval of the general public. • Philosophical: Focuses on economic gains, but increasingly incorporating sustainable practices due to changing philosophies and regulations. | <p><i>Interest:</i> High interest in material, experiential, and cognitive connectedness (e.g., access to new fishing grounds, opening of new extraction fields, economic opportunities).</p> <p><i>Influence:</i> High influence in material, experiential, and cognitive connectedness.</p> <p><i>Risk of conflict:</i> High -> Indigenous communities, environmental NGOs and activists</p> |
| <i>Tourism industry</i> | Spitzbergen Reisen, AS, Norway | <ul style="list-style-type: none"> • Material: Relies on water and land activities, leading to material consumption for infrastructure and tourism services. • Experiential: Provides tourists with direct experiences like cruises, fishing tours, and wildlife encounters (e.g., whale watching). • Cognitive: Educates tourists about local ecosystems and the importance of conservation. • Emotional: Positive feelings from promoting environmental awareness, negative feelings related to ecosystem disturbance. • Philosophical: Balances profit-making with eco-friendly practices, adapting philosophies based on evolving environmental consciousness. | <p><i>Interest:</i> High interest in material, experiential, cognitive connectedness, and emotional (e.g., access to new touristic sites).</p> <p><i>Influence:</i> High influence in material, experiential, cognitive, and emotional connectedness.</p> <p><i>Risk of conflict:</i> High -> Indigenous communities; environmental NGOs and activists</p> |
| Space to live | | | |

| | | | |
|--|--|--|---|
| Arctic Indigenous Peoples | Saami in circumpolar areas of Finland, Sweden, Norway and Northwest Russia Inuit (Kalaallit) in Greenland | <ul style="list-style-type: none"> • Material: Rely on water for sustenance, fishing, and hunting. Traditional practices involve material use from nature. • Experiential: Direct interaction with water bodies for livelihood and cultural practices. • Cognitive: Deep knowledge about local water sources, ecosystems, and sustainable practices. • Emotional: Strong emotional connection to water, central to cultural and spiritual beliefs. • Philosophical: Often possess a holistic philosophy of living in harmony with nature, emphasizing sustainable practices. | <p><i>Interest:</i> High interest in all dimensions (e.g., traditional way of life, cultural preservation, sustainable resource management).</p> <p><i>Influence:</i> Low to moderate influence.</p> <p><i>Risk of conflict:</i> High -> Industrial actors</p> |
| NATURE CONSERVATION | | | |
| Governmental agencies (national and international) | The Arctic Council | <ul style="list-style-type: none"> • Material: Manage water resources, regulate industrial use, and ensures water access for citizens. • Experiential: Implement policies for water management, monitor water quality, and respond to natural disasters. • Cognitive: Invest in research, collects data on water ecosystems, and develop policies based on scientific knowledge. • Emotional: Concerned about the impact of water-related issues on communities, seeks to mitigate negative emotions. • Philosophical: Balances economic development with environmental conservation, emphasizing sustainable policies. | <p><i>Interest:</i> High interest in all dimensions (e.g., material interests in governing fisheries, oil and gas exploration, shipping routes, and political influence in international waters).</p> <p><i>Influence:</i> High influence.</p> <p><i>Risk of conflict:</i> High -> Industrial actors; Indigenous communities</p> |
| Scientific research institutions | The University Centre in Svalbard | <ul style="list-style-type: none"> • Material: Utilize water samples and conduct experiments, contributing to material consumption for research equipment. • Experiential: Researchers engage in fieldwork, collecting data from Arctic waters; collaborating with indigenous communities for traditional knowledge. • Cognitive: Generate knowledge about Arctic ecosystems, climate change impact on water bodies etc. • Emotional: Positive feelings related to discoveries, negative feelings about environmental degradation. • Philosophical: Driven by the pursuit of knowledge, often advocates for policies based on scientific findings; participatory approaches. | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> Moderate to high in all dimensions.</p> <p><i>Risk of conflict:</i> High -> Industrial actors; Indigenous communities; Moderate to high -> More than human actors (e.g., quotas for extraction of natural resources is established based on scientific advice)</p> |
| Environmental NGOs and activists | WWF Arctic Programme | <ul style="list-style-type: none"> • Material: Advocate for sustainable use of natural resources, oppose overexploitation of water-based resources. | <p><i>Interests:</i> High interest in all dimensions.</p> |

| | | | |
|---------------------------|--|---|---|
| | | <ul style="list-style-type: none"> • Experiential: Engage in direct actions like clean-up drives, awareness campaigns near water bodies. • Cognitive: Expertise in environmental issues, educate various target audiences about water conservation. • Emotional: Driven by passion for nature conservation, positive feelings about preserving water bodies. • Philosophical: Advocate for ethical and moral responsibility toward nature, promotes eco-centric values; advocates for the intrinsic value of nature, aiming to influence policies based on a deep ethical stance. | <p><i>Influence:</i> Moderate to high in all dimensions.</p> <p><i>Risk of conflict:</i> High -> Industrial actors; Governmental agencies. Moderate -> Scientific research institutions</p> |
| MORE-THAN-HUMANS | | | |
| <i>Individual species</i> | <p>Polar bear (<i>Ursus maritimus</i>)</p> <p>Arctic cod (<i>Gadus morhua</i>)</p> <p>Arctic tern (<i>Sterna paradisaea</i>)</p> | <ul style="list-style-type: none"> • Material: Rely on water for survival. Arctic sea ice preservation is essential for hunting and breeding • Experiential: Direct interaction with water bodies for survival. • Cognitive: Innate knowledge about ice patterns, local water sources, migration routes etc. • Emotional: Strong connection to water in the sense of their welfare preservation. Some are central to Indigenous people mythology; can induce negative emotions in humans due to climate change-induced habitat loss. • Philosophical: For example, Polar bears, represent the intrinsic value of charismatic megafauna, inspiring philosophical discussions about human responsibility for their survival. | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> None to moderate in the case of charismatic species (e.g., Polar bear).</p> <p><i>Risk of conflict:</i> High -> Industrial actors</p> |
| YOUTH ENGAGEMENT | | | |
| Future generations | N/A | <ul style="list-style-type: none"> • Material: Future generations in the Arctic inherit the region's unique water resources (oceans, rivers, and freshwater lakes), which are essential for their livelihoods. They inherit advancements in Arctic-specific technologies (e.g., icebreakers, offshore natural resource extraction, telecommunications), enhancing their ability to utilize Arctic waters. • Experiential: Future Arctic inhabitants will experience the consequences of current climate change, including alterations in sea ice patterns and shifts in aquatic ecosystems. Their experiences will be shaped by the changing dynamics of Arctic waters, influencing their cultural practices and economic activities. They will gain experiential knowledge in managing environmental crises specific to the Arctic, such as oil spills in icy waters and the impact of thawing permafrost on water quality, developing adaptive strategies and crisis response capabilities. | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> None to low.</p> <p><i>Risk of conflict:</i> High -> Industrial actors.</p> |

| | | | |
|--|--|--|--|
| | | <ul style="list-style-type: none"> • Cognitive: Future generations will inherit scientific knowledge about Arctic ecosystems, a knowledge base will be crucial for making informed decisions about resource management and conservation. They will possess cognitive understanding of the delicate Arctic environment, including the importance of preserving Arctic water bodies and unique aquatic species. Education initiatives will influence their awareness of conservation practices specific to the Arctic region. • Emotional: Positive emotions arise in current generations from a sense of stewardship and pride in the unique Arctic environment, which enhance efforts to protect and conserve these pristine water bodies for future generations. Negative emotions arise from concerns about the rapid changes in Arctic waters (e.g., rising temperatures, loss of sea ice; loss of biodiversity; ocean acidification). These concerns fuels their determination to address climate change and other environmental matters that have a high impact on the Arctic. • Philosophical: Future generations in the Arctic can be understood as representing the philosophical concept of intergenerational ethics, emphasizing the responsibility of the current generation to protect Arctic waters and ensure their availability for future inhabitants of the region. They inherit a sustainability philosophy specific to the Arctic, emphasizing the need for sustainable fishing practices, eco-friendly tourism, and international cooperation to preserve the Arctic ecosystem. Continuing the nowadays approach, future Arctic inhabitants adopt a philosophical perspective focused on preserving the indigenous cultures. | |
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Further reading for Arctic region:

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- Arctic Council: <https://arctic-council.org/>
- European Union Atlantic and Arctic Basin: <https://bluemissionaa.eu/wps/>
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- Icelandic Arctic Cooperation Network: <https://www.arcticiceland.is/>
- Interactive Arctic Stakeholder Map built for the H2020 KEPLER project: <https://map.kepler-polar.eu/>
- Jóhannesson, Gunnar Thór, Johannes Welling, Dieter K. Müller, Linda Lundmark, Robert O. Nilsson, Suzanne de la Barre, Brynhild Granås, Trine Kvidal-Røvik, Outi Rantala, Kaarina Tervo-Kankare



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- Hovelsrud, Grete K., Julia Olsen, Annika E. Nilsson, Bjørn Kaltenborn, and Julien Lebel. "Managing Svalbard Tourism." *Arctic Review on Law and Politics* 14 (2023): 86-106.
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- WWF Arctic Programme: <https://www.arcticwwf.org/>

Baltic Sea region

Table 2 Interest and influence of stakeholders in changing (young) human-water relations in the Baltic Sea region.

| Stakeholder domain | Influence (on human-water relations) | Interest (in human-water relations) |
|---------------------------------|---|---|
| Blue Economy | | |
| Maritime research organizations | <p><i>Influence level: Low influence on actual cognitive connectedness.</i></p> <p>Oceans literacy materials and education (formal and informal)</p> <p>Knowledge production</p> <p>Science-policy interface</p> <p>Small employment sector</p> | <p><i>Interest level: Medium interest in shaping human-water relations through cognitive connectedness.</i></p> <p>Providing knowledge or techno-scientific solutions</p> <p>Be attractive for future employees</p> <p>Positioning of field</p> |
| Coastal tourism | <p><i>Influence level: Medium influence on material, experiential and emotional connectedness.</i></p> <p>Connections through sports and leisure activities</p> <p>Direct exposure to Baltic Sea life</p> | <p><i>Interest level: High interest in fostering experiential and emotional connectedness with Baltic Sea.</i></p> <p>Increase market share by capitalizing on increased connectedness</p> <p>Little to no interest in enlarged conservation activities</p> |



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| | Large employment sector (about 300.000 persons employed in tourism in the Baltic Sea) ⁴ | |
| Maritime transport and ports activities, shipbuilding and repair | <i>Influence level: High in material connectedness using the Baltic Sea as an infrastructure.</i> Large employment sector (about 400.000 persons employed in tourism in the Baltic Sea) | <i>Interest level: Low interest in shaping human-water relations through emotional connectedness.</i> Be attractive for future employees Little to no interest in enlarged conservation activities |
| Living resources | <i>Influence level: High in material connectedness using life in the Baltic Sea as a resource.</i> Lobbying groups and marketing Mid-sized employment sector (about 100.000 persons employed in tourism in the Baltic Sea) | <i>Interest level: High interest in shaping human-water relations through material connectedness, e.g. promoting the idea of sustainable resource use.</i> Opposition to interspecies solidarity, e.g. animal welfare debates and consumer awareness Be attractive for future employees and consumers |
| Ocean energy | <i>Influence level: Low in all connectedness dimensions.</i> Small, but fast growing employment sector (about 10.000 persons) | <i>Interest level: Low in all connectedness dimensions.</i> Little to no interest in enlarged conservation activities |
| Policy and regulation | | |
| EU organizations | <i>Influence level: High, but mainly restricted to experiential and material connectedness.</i> | <i>Interest level: Low in all connectedness dimensions.</i> |
| National organizations | <i>Influence level: High, but mainly restricted to experiential and material connectedness.</i> | <i>Interest level: Low in all connectedness dimensions.</i> |
| Local organizations | <i>Influence level: High, but mainly restricted to experiential and material connectedness.</i> | <i>Interest level: Low in all connectedness dimensions.</i> |
| Nature conservation | | |
| Conservation foundations | <i>Influence level: Low to medium influence on actual cognitive and emotional connectedness.</i> Large number of members | <i>Interest level: High in all connectedness dimensions, especially cognitive and emotional.</i> |

⁴ https://blue-economy-observatory.ec.europa.eu/depth-analytical-tool_en

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| | Policy advocacy | Interest in shaping stewardship and care-oriented human-water relations through cognitive and emotional connectedness |
| More-than human | | |
| Macroalgae | <i>Influence level: Low, little visibility</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Jellyfish | <i>Influence level: Low, little visibility</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Mussels | <i>Influence level: Low, little visibility</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Seal | <i>Influence level: Medium, popular figure</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Herring | <i>Influence level: Low, little visibility</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Youth engagement | | |
| Science Centers and Museums | <i>Influence level: Medium influence on cognitive connectedness.</i> High visitor numbers Oceans literacy materials and education (formal and informal), especially directed towards young people | <i>Interest level: High in all connectedness dimensions, especially cognitive and emotional.</i> Increase oceans literacy and connect people to the sea |
| Volunteering groups | <i>Influence level: Medium influence on experiential and cognitive connectedness.</i> | <i>Interest level: High in all connectedness dimensions, especially cognitive and emotional.</i> |



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| | Direct actions like clean-ups, especially directed towards young people | Increase oceans literacy, awareness around plastic pollution and connect people to the sea |
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Inland region

Table 3 Interest and influence of stakeholders in changing (young) human-water relations in the Inland region.

| Stakeholder domain | Influence (on human-water relations) | Interest (in human-water relations) |
|---|---|---|
| Blue Economy | | |
| River tourism | <p><i>Influence level: Medium influence on material, experiential and emotional connectedness.</i></p> <p>Connections through sports and leisure activities</p> <p>Direct exposure to rivers</p> <p>Large employment sector</p> | <p><i>Interest level: High interest in fostering experiential and emotional connectedness with Baltic Sea.</i></p> <p>Increase market share by capitalizing on increased connectedness</p> <p>Little to no interest in enlarged conservation activities</p> |
| Waterways transport and ports activities, shipbuilding and repair | <p><i>Influence level: High in material connectedness using rivers as an infrastructure.</i></p> <p>Large employment sector</p> | <p><i>Interest level: Low interest in shaping human-water relations through emotional connectedness.</i></p> <p>Be attractive for future employees</p> <p>Little to no interest in enlarged conservation activities</p> |
| Water resources | <p><i>Influence level: High in material connectedness using freshwater, but also life in river basins as a resource.</i></p> <p>Lobbying groups and marketing</p> <p>Large employment sector</p> | <p><i>Interest level: High interest in shaping human-water relations through material connectedness, e.g. promoting the idea of sustainable resource use.</i></p> <p>Be attractive for future employees and consumers</p> |
| Policy and regulation | | |
| EU organizations | <i>Influence level: High, but mainly restricted to experiential and material connectedness.</i> | <i>Interest level: Low in all connectedness dimensions.</i> |
| National organizations | <i>Influence level: High, but mainly restricted to experiential and material connectedness.</i> | <i>Interest level: Low in all connectedness dimensions.</i> |
| Local organizations | <i>Influence level: High, but mainly restricted to experiential and material connectedness.</i> | <i>Interest level: Low in all connectedness dimensions.</i> |



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| Nature conservation | | |
| Conservation foundations | <i>Influence level: Low to medium influence on actual cognitive and emotional connectedness.</i> Large number of members Policy advocacy | <i>Interest level: High in all connectedness dimensions, especially cognitive and emotional.</i> Interest in shaping stewardship and care-oriented human-water relations through cognitive and emotional connectedness |
| Activists | <i>Influence level: Low to medium influence on material, cognitive, philosophical and emotional connectedness.</i> Direct action with high visibility Promotion of rights of nature | <i>Interest level: High in all connectedness dimensions.</i> Interest in awareness raising concerning water security |
| More-than-human | | |
| Birds, like grey heron | <i>Influence level: Low, little visibility</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Semiaquatic rodents, like beaver | <i>Influence level: Medium, popular figure</i> | <i>Interest level: High</i> Interest in human-water relations that support them in maximizing their capabilities and follow their life projects |
| Youth engagement | | |
| Science Centres and Museums | <i>Influence level: Medium influence on cognitive connectedness.</i> High visitor numbers Oceans literacy materials and education (formal and informal), especially directed towards young people | <i>Interest level: High in all connectedness dimensions, especially cognitive and emotional.</i> Increase oceans literacy and connect people to the sea |
| Volunteering groups | <i>Influence level: Medium influence on experiential and cognitive connectedness.</i> Direct actions like clean-ups, especially directed towards young people | <i>Interest level: High in all connectedness dimensions, especially cognitive and emotional.</i> Increase oceans literacy, awareness around plastic pollution and connect people to the sea |



Mediterranean Sea region

Table 4 Examples of various categories of stakeholders of the FLOW Mediterranean Sea biogeographical region, their mapping into human-water connectedness dimensions (following the dimensions described in Ives et al., 2018), and their influence and interest in this domain (including the risk of conflict with the interests of other stakeholders categories). The analysis in the third column is made based on the category of stakeholder (first column), not on the example from the second column.

| Category | Examples | Human-water connectedness dimension | Interest & influence; risk of conflict |
|---|---------------------------------|---|--|
| NATURE UTILIZATION | | | |
| Culture | | | |
| <i>Food and culinary arts professionals</i> | Artisan Culinary School, France | <ul style="list-style-type: none"> • Material: Direct material connection with the sea. They rely on a wide array of seafood, olives, fruits, and vegetables sourced from the region's waters and fertile coastal lands. The ingredients they use are not just materials; they are the essence of the Mediterranean culinary tradition, creating a tangible link between humans and the sea. • Experiential: Immerse themselves in the experiential world of the Mediterranean Sea. They visit fish markets, witness fishermen hauling in their catches, and participate in olive and grape harvests. These direct interactions provide them with firsthand knowledge of the sea's richness (or lack of!) and the seasonal rhythms of nature, enhancing their culinary creativity. • Cognitive: Possess a profound cognitive understanding of the intricate relationship between humans and water. They comprehend the nuances of seafood varieties, understanding the impact of water salinity and temperature on the flavor profiles. Their expertise extends to the sustainable sourcing of ingredients, ensuring the delicate balance between human consumption and the preservation of marine ecosystems. • Emotional: Emotion permeates the culinary world's connection with the sea. There is joy in the preparation of dishes celebrating the sea's richness, but there is also concern driven by environmental challenges. Such professionals experience a deep sense of responsibility to promote sustainable practices, translating their emotional connection into ethical culinary choices. • Philosophical: Engage in contemplation about their role as mediators between nature and human society. They reflect on the ethical implications of | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> Moderate to high.</p> <p><i>Risk of conflict:</i> Moderate to high -> Other industrial actors (e.g., shipping, shipbuilding). Low -> Government bodies.</p> |



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| | | their ingredient choices, considering the long-term impact on the environment. | |
| NATURE CONSERVATION | | | |
| <i>Weather services</i> | Instituto Português do Mar e da Atmosfera, Portugal | <ul style="list-style-type: none"> • Material: Rely on natural elements such as air pressure, temperature, and humidity to predict weather patterns. They utilize weather instruments made from natural materials like metals and polymers. Weather data collection often involves natural resources like water for studying precipitation patterns. • Experiential: Engage in direct interactions with nature, observing atmospheric conditions, cloud formations, and oceanic patterns. They experience the immediacy of weather phenomena, especially during field research or while monitoring extreme events. • Cognitive: Demonstrate a deep cognitive understanding of natural processes. Meteorologists analyze data from satellites, radar systems, and buoys, applying their knowledge to interpret weather patterns, predict storms, and provide early warnings, enhancing public safety. • Emotional: Meteorologists often feel a responsibility toward public safety. Positive feelings arise when accurate forecasts help communities prepare for natural events, while negative emotions emerge during severe weather events due to the potential impact on lives and properties. • Philosophical: Topics of concern are responsibility to communicate risks effectively, broader implications of climate change. | <p><i>Interests:</i> High interest in material, experiential, and cognitive dimensions. Moderate in emotional. Low in philosophical.</p> <p><i>Influence:</i> Moderate</p> <p><i>Risk of conflict:</i> Low -> Industrial actors (e.g., tourism, fisheries); Local communities.</p> |
| MORE-THAN-HUMAN | | | |
| <i>Specific ecosystems</i> | Mediterranean Marine Ecosystem | <ul style="list-style-type: none"> • Material: Rely on water for existence. Rely on a delicate balance of species interactions. • Experiential: Various marine species, including dolphins, sea turtles, and diverse fish species, engage in direct interactions with the Mediterranean waters. Their behaviors, such as hunting, mating, and migration, contribute to the experiential richness of the marine ecosystem. • Cognitive: Mediterranean marine life demonstrates cognitive adaptations, understanding migration routes, hiding techniques, and predator evasion strategies. This cognitive understanding is essential for their survival and reproductive success. • Emotional: None of their own. The emotional significance of marine life is evident in cultural and local mythologies across Mediterranean societies. Additionally, human communities often | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> None.</p> <p><i>Risk of conflict:</i> High -> Industrial actors (e.g., tourism, shipping, fisheries).</p> |

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| | | <p>experience emotional responses, including awe, admiration, and concern, when observing or interacting with marine life.</p> <ul style="list-style-type: none"> • Philosophical: Represent the intrinsic value of biodiversity and the interconnectedness of all living beings. Philosophical discussions surrounding marine conservation often revolve around ethical responsibilities and the philosophical value of preserving the diversity of life forms. | |
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Further reading on Mediterranean Sea Region:

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Golf of Biscay, Iberian Coast, and Macaronesia region

Table 5 Examples of various categories of stakeholders of the FLOW Golf of Biscay, Iberian Coast, and Macaronesia bio-geographical region, their mapping into human-water connectedness dimensions (following the dimensions described in Ives et al., 2018), and their influence and interest in this domain (including the risk of conflict with the interests of other stakeholders categories). The analysis in the third column is made based on the category of stakeholder (first column), not on the example from the second column.

| Category | Examples | Human-water connectedness dimension | Interest & influence; risk of conflict |
|---------------------------|----------|-------------------------------------|--|
| NATURE UTILIZATION | | | |
| Blue Economy | | | |



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|---|--|--|--|
| <i>Tourism and hospitality sector</i> | The Wyndham Grand Algarve, Quinta do Lago, Portugal | <ul style="list-style-type: none"> • Material: Relies heavily on natural coastal landscapes and resources for tourism, impacting local ecosystems through infrastructure and resource consumption (including consumption of large amounts of water). • Experiential: Tourists engage directly with nature through activities such as beach walks and whale watching. • Cognitive: Tour guides possess knowledge about local flora, fauna, and aquatic ecosystems. • Emotional: Operators experience positive feelings related to profit generation, negative feelings due to environmental regulations and the disapproval of the general public. Tourists experience awe and relaxation in natural surroundings, but negative emotions can arise due to environmental degradation. • Philosophical: Reflection on eco-tourism ethics, promoting responsible tourism that educates visitors and supports local conservation efforts. | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> Moderate to high in all dimensions.</p> <p><i>Risk of conflict:</i> Moderate to high -> Other industry actors; Government bodies; Local coastal communities and indigenous peoples</p> |
| Space to live | | | |
| <i>Local coastal communities and indigenous peoples</i> | Garifuna indigenous community in the Canary Islands Basque people | <ul style="list-style-type: none"> • Material: Rely on traditional fishing and agriculture, respecting natural rhythms and resources. • Experiential: Communities engage in cultural practices like traditional fishing/hunting, passing down experiential knowledge through generations (e.g., Basque whaling). • Cognitive: Hold deep knowledge of local aquatic ecosystems, seasonal changes, and sustainable resource management practices. • Emotional: Strong emotional connection to ancestral lands and marine life, resulting in both positive feelings of cultural identity and negative emotions due to environmental threats. • Philosophical: Reflect on their roles as custodians of nature, emphasizing respect for all living beings and the interdependence of humans and the environment. | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> Low to moderate in material dimension.</p> <p><i>Risk of conflict:</i> High -> Industry actors; Moderate -> Government bodies</p> |
| NATURE CONSERVATION | | | |
| <i>First responders to extreme weather events</i> | Bomberos de Tenerife (Fire department, Tenerife, Canary Islands) | <ul style="list-style-type: none"> • Material: Heavily rely on natural resources for their equipment and materials during emergencies. These resources include timber for building shelters, water for firefighting, and natural fibres for protective gear. Their material dependence on nature is direct and immediate during crises. • Experiential: Frequently engage in direct interactions with nature during emergency | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> Moderate to high in all dimensions.</p> <p><i>Risk of conflict:</i> None.</p> |

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| | | <p>operations. In the case of extreme weather events, this interaction can have dramatic consequences.</p> <ul style="list-style-type: none"> • Cognitive: Rely on extensive knowledge about natural phenomena, local geography, and weather patterns to effectively manage emergencies. Their cognitive understanding of nature is crucial in predicting disaster outcomes, planning evacuation routes, and ensuring the safety of both responders and affected communities. • Emotional: Experience a wide range of emotions when dealing with extreme weather events. Positive feelings might include a sense of accomplishment when saving lives, while negative emotions can arise from witnessing destruction and loss. • Philosophical: Often engage in philosophical reflections about their role in protecting communities during extreme weather events. They contemplate the inherent value of human life, the importance of solidarity, and the ethical responsibility to preserve nature and prevent further environmental degradation to mitigate the impact of future disasters. | |
| MORE-THAN-HUMAN | | | |
| <i>Specific ecosystems</i> | Macaronesian Seagrass Meadows | <ul style="list-style-type: none"> • Material: Rely on water for existence. Serve as critical nurseries for various fish species, supporting local fisheries. • Experiential: Rely on water for existence. Offer unique experiences for marine enthusiasts, especially snorkelers and researchers, allowing them to witness diverse marine life. These experiences enhance understanding of the marine ecosystem and foster a sense of awe and appreciation. • Cognitive: None of their own. However, scientists study seagrass meadows to understand their ecological importance, including carbon sequestration and their role in supporting marine biodiversity. This knowledge informs conservation policies and practices. • Emotional: None of their own. However, evoke emotional responses, from fascination due to their intricate structure to concern and sadness over habitat destruction and pollution. These emotions drive conservation efforts and public awareness campaigns • Philosophical: Hold philosophical significance as symbols of resilience, regeneration, and the interconnectedness of life. Philosophers reflect on these habitats to contemplate humanity's | <p><i>Interests:</i> High interest in all dimensions.</p> <p><i>Influence:</i> None.</p> <p><i>Risk of conflict:</i> High -> Industrial actors (e.g., tourism, shipping).</p> |

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| | | responsibility in preserving delicate aquatic ecosystems. | |
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Further reading on Golf of Biscay, Iberian Coast, and Macaronesia region:

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