LOCAL PERCEPTIONS FOR THE FUTURE OF THE NORTHEAST ICELAND 'HOPE SPOT' AREA.

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Contents

Abstract

Iceland has signed the Kunming-Montreal treaty to protect 30% of its Oceans by 2030. However, only 2% of Iceland's oceans have some level of protection. The Ocean to the

Northeast of Iceland has been recognised as a 'Hope Spot', an area of conservation importance. Increasing evidence supports that creating successful protection measures, such as a marine protected area (MPA), requires local engagement throughout the creation process, stakeholder perceptions to be understood, and community members' knowledge of the local ocean to be incorporated. Using a digital questionnaire distributed to local communities in the Northeast Hope Spot area by Ocean Mission NGO, this study investigated local perceptions of the state of the local ocean, attitude towards future marine protection in the area, views for the future of the area and perceptions of current marine governance. This study found that Northeast 'Hope Spot' residents thought the local ocean was in a good state. Overall, respondents supported the creation of a legal figure for marine protection, although Icelandic locals showed varying support compared to foreign residents, who overwhelmingly supported the initiative. Respondents felt excluded from the creation of new marine policies in the area. If protected, this area could help Iceland meet its international marine protection commitments. A successful protection figure such as an MPA will require locals to be engaged from its creation to enforcement stages.

1. Introduction

Globally, marine ecosystems are threatened by human activities (Georgian *et al.*, 2022). We are degrading marine ecosystems, extracting ocean resources and altering ecosystems by human-induced climate change (Bindoff *et al.*, 2019). We are undergoing a global extinction crisis, with marine species populations decreasing, on average, 56% over the last 50 years (WWF, 2024). There is a need for urgent transformation in how

humans use and view marine ecosystems (Georgian *et al.*, 2022). The current scientific consensus is to protect 30% of land and oceans to stop global extinctions (Jones *et al.*, 2020). The Kunming-Montreal biodiversity framework sets the global goal of protecting 30% of land and oceans by 2030 (CBD, 2022). This global goal can be met by establishing legally binding measures and creating figures of marine protection (FMP), such as a Marine Protected Area (MPA) or Other Effective Conservation Measures (OECMs).

OECMs are '*Geographically defined areas distinct from traditional protected Areas but managed in ways that yield positive, sustained, and long-term outcomes for biodiversity conservation, including associated ecosystem functions, services, and when applicable, cultural, spiritual, socio-economic and other locally significant values'* (IUCN Wcpa, 2019). OECMs are increasingly recognised as an alternative to MPAs to meet global biodiversity goals (Shabtay *et al.*, 2019). However, the idea has been slow to be adopted, especially in the ocean, with less than 0.1% of oceans under this designation (Gurney *et al.*, 2021) and there is less recognition by policy experts of OECMs compared to MPAs (Maini *et al.*, 2023). Updating fishing policy has been seen as a key opportunity to increase countries' OECM figures. However, countries must ensure the governance of fishing areas is in line with OECM guidelines and fishing areas have a long-term commitment to conservation outcomes (Garcia *et al.*, 2022). Despite experts recognising OECMs as an effective tool to increase marine conservation (Maini *et al.*, 2023), there is a significant gap between the OECM concept and how it works in practice (Laffoley *et al.*, 2017) and significant challenges in ensuring OECMs are effective (Maini *et al.*, 2023).

MPAs have traditionally been used to manage marine areas (Jennings, 2009). MPAs are defined by the IUCN (2008) as '*A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*'. MPAs with strong management have preserved ocean biodiversity successfully (Harker et al., 2022). For example, Gormley (2012) found that MPAs can increase survival for cetacean species. They help increase food security (Sala *et al.*, 2021) due to fish populations recovering inside the MPA and moving to surrounding areas (Halpern et al., 2009; Sala *et al.*, 2021). MPAs help mitigate climate change by preventing disturbance of sea beds

that results in carbon being released from sea bed carbon stores back into the ocean (Pusceddu *et al.*, 2014) and help ensure the well-being of coastal communities (Harker *et al.*, 2022).

MPAs have been created slower than land-protected areas (Devillers *et al.*, 2015). Currently, 8.3% of oceans have been designated as MPAs (mpaatlas, 2024). However, most of these MPAs can be described as *'paper parks'*. Paper parks are protected areas where legal protection is not enforced and thus have no conservation benefit (Rife *et al.*, 2013). Currently, only 2.9% of MPAs are being effectively managed and achieving conservation outcomes (mpaatlas, 2024). Globally, MPAs are failing due to not excluding extractive activities within their boundaries (Dureuil *et al.*, 2018), lack of enforcement (Rife *et al.*, 2013), insufficient management (Pike *et al.*, 2024), failures to engage stakeholders (Stewart *et al.*, 2020), excluding social dimensions from planning (Catalano *et al.*, 2019), and the disconnect between society, marine science and policy (Kelly *et al.*, 2022).

1.1 Public perceptions

The effective creation and management of MPAs require the attitudes and behaviours of affected communities to be considered (Mascia, 1999). Public perception research is growing, especially in the marine conservation field (Bennett, 2016). Bennet (2016) defines perceptions as '*the way an individual observes, understands, interprets and evaluates a referent object, action, experience, individual policy outcome.*' Research can look at perceptions of social and ecological impacts of conservation, the legitimacy of conservation governance and the acceptability of government. Local communities are not homogenous groups. Thus, they have diverse interests and values (Voyer *et al.*, 2015). Local communities can have different perceptions due to social, economic and cultural factors (Martín-López *et al.*, 2012; Paulus, Fauzi and Adar, 2023) Understanding competing perceptions of priorities in an area can help increase the acceptance of an MPA by local communities (Bennett, 2016), make conservation outcomes more equitable (Queiroz *et al.*, 2017) and solve conflicts between stakeholders (Voyer *et al.*, 2015).

Additionally, people's perceptions can affect their behaviour (Lotze *et al.*, 2018). Locals engaging in positive environmental behaviour is vital for a successful MPA. Thus, understanding people's perceptions of an MPA is the first step to designing successful conservation strategies to change negative perceptions of marine conservation to increase pro-environmental behaviours (McKinley and Fletcher, 2012a).

1.2 Stakeholder engagement

The creation of MPAs can create conflicts within local communities (Elliott, 2001). MPAs that do not successfully engage local communities will fail to achieve positive conservation and community outcomes (Pomeroy and Douvere, 2008; Arias-Arévalo, Martín-López and Gómez-Baggethun, 2017; Giakoumi *et al.*, 2018). For example, failures to regulate whale watching in MPAs can be due to limited collaboration between local stakeholders, scientists and NGOs (Finkler and Higham, 2020). Successful coastal management occurs when fishers, scientists, and NGOs work together (Schemmel *et al.*, 2016). Effective participation of local communities in the planning process can help local communities feel empowered (Pomeroy and Douvere, 2008). This can inspire local communities to take marine conservation into their own hands, increasing the chance of successful MPAs (Stewart *et al.*, 2020). When locals come together, they can discuss different strategies for the area, helping marine planning become more democratic and legitimate (Wilke, 2023). Successful MPA management must be an adaptive and iterative process, locals can provide vital knowledge to constantly improve marine plans (Weeks and Jupiter, 2013). However, locals can lack knowledge, making it difficult for them to engage (Kelly *et al.*, 2022). Stakeholder engagement can offer opportunities for environmental education, helping increase locals' awareness of environmental issues and environmentally responsible behaviours thus enhancing the chance of MPAs achieving positive conservation outcomes (McKinley and Fletcher, 2012a).

1.3 Governance

Bennet (2016) describes governance for MPAs as the *'structures, institutions and processes that determine who manages an MPA'*. Getting politicians on board with creating an MPA is vital, as a successful MPA will need a legal basis and long-term political commitment (Laffoley *et al.*, 2008). Good governance of MPAs must be

effective, equitable, responsive, robust (Bennett and Satterfield, 2018), and adaptive to changing circumstances, especially in a world of rapid environmental change (Weeks and Jupiter, 2013). There are two forms of governance to manage MPA: top-down and bottom-up approaches. Traditionally, in developed countries, top-down governance approaches for creating and managing MPAs have dominated (Jones, 2012). Top-down governance involves national or regional targets enforced by a centralised government based on scientific knowledge and little public participation (Gaymer et al., 2014). However, when top-down governance does not achieve the desired outcomes, bottom-up approaches have been used to create environmental action (Don, 2002). The bottom-up approach involves local stakeholders and community-based management over a long time-frame managed at the local scale (Gaymer et al., 2014). Bottom-up approaches can be more successful than top-down approaches as they are collaborative, reducing the risks of management actions being seen as imposed by bureaucrats with no lived experience of coastal communities' needs (Abdurrahim *et al.*, 2022) thus helping to reduce the risks of conflicts in MPAs (Gilman, 2002).

A successful MPA requires good governance from the creation to the long-term management stage. MPAs fail to provide conservation benefits if not enforced (Giakoumi *et al.*, 2018). MPAs must be well-staffed to ensure compliance with rules (Gill *et al.*, 2017) and legislation must be consistent to increase the chance of successful compliance (Jennings, 2009). Including local communities in enforcement mechanisms can help increase MPA law compliance (Schemmel *et al.*, 2016) and reduce enforcement costs (Giakoumi *et al.*, 2018). The roles of local communities should be written into legislation to ensure their role in marine management is respected and recognised (Jiang *et al.*, 2024) .

1.4 Icelandic case study

Currently, Iceland is failing to meet the Kunming-Montreal treaty to protect 30% of oceans by 2030. 2% of Icelandic waters are under some level of protection (Statistics Iceland, 2023). However, according to Bünter (2023), these MPAs fail to meet conservation objectives due to a lack of clear conservation goals, insufficient regulation and small

sizes of the MPAs. Additionally, information on MPAs in Iceland is scattered, and there is a lack of monitoring of the effectiveness of MPAs, making it challenging to evaluate the conservation benefits of current Icelandic MPAs. Due to the low numbers of MPAs in Iceland, the Icelandic non-governmental organisation (NGO) Ocean Missions nominated a coastal area of 176 nautical miles (see figure 1) to Mission Blue (a USA marine charity) to become a 'Hope Spot'. Mission Blue defines a Hope Spot as a '*special place that is scientifically identified as critical to the health of the ocean'* (Mission Blue, no date). This bottom-up scheme allows communities to nominate critical conservation areas, gain global recognition, and increase pressure on the government to protect these vital marine areas (Mission blue, 2017). The area nominated contains marine coastal habitats, including the islands of Grímsey, which reaches the Arctic Circle, Lundey, Flatey, Hrísey, and Mánárey. The bays of Skjálfandi and Eyjafjörður home to Icelandic coastal communities, economic activity and biodiversity are also encompassed by the Hope Spot. In June 2023, Northeast Iceland gained official recognition as a Hope Spot (Carlson, 2023). However, this does not offer legal protection to the area.

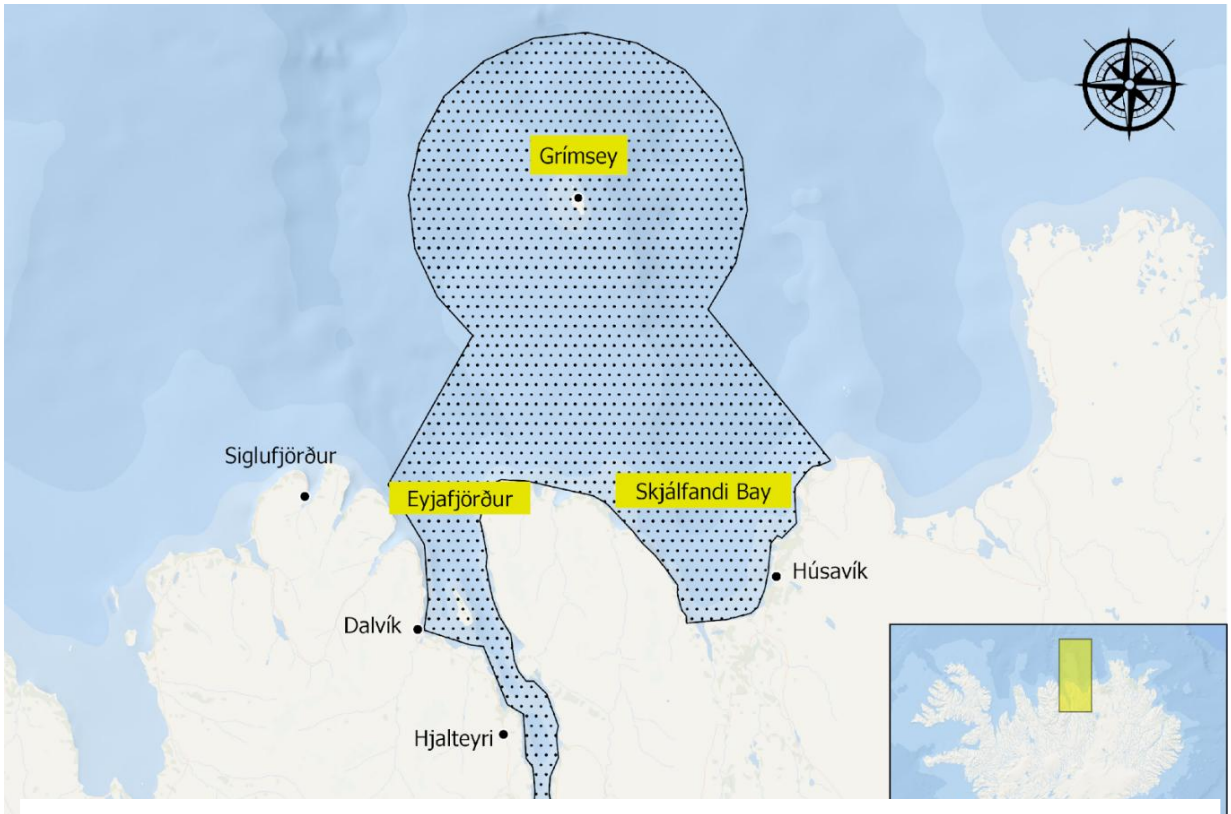


Fig.1 The Northeast Iceland Hope Spot region. Source: Ocean missions, Hope Spot proposal

1.5 The areas importance

The Northeast Iceland Hope spot area is of vital ecological, cultural and economic importance to Iceland. Ecologically, the waters of Northeast Iceland are nutrient-rich (Vallejo, 2013), providing habitat for endangered species, for example, the blue whale (*Balaenoptera musculus)*, Atlantic puffins (*Fratercula artica*), and sei whale (*Balaenoptera borealis)* (*Náttúrufræðistofnun Íslands*, 2018). Protecting cetacean species is vital for preserving healthy marine ecosystems and ocean carbon sequestration (Durfort *et al.*, 2022). The many islands in the Hope Spot provide marine coastal habitats for some of the largest seabird populations in Europe (BirdLife Iceland, 2022) and feeding grounds for aquatic and coastal wildlife (Rögnvaldsdóttir and Kaldbak, 2022). Historically, fishing was vital for the area's economy. However, since 1990, fishing has declined due to the introduction of a quota system, leading small fishermen to sell their quotas to large companies. Culturally, there has been a shift from locals working in fishing to tourism industries (Einarsson, 2009). The Northeast Iceland Hope Spot is a key whale-watching destination, especially Húsavík, where more than 100,000 tourists visit for whale watching per year (Nicosia and Perini, 2016). Currently, whales provide social-ecological resilience to Húsavík; however, in a rapidly changing climate, this resilience could be lost (Kendall, 2021). This area is rising in popularity as a destination for cruise ships visiting Iceland. For example, in Akureyri, cruise ships have increased by 92% between 2015 and 2019 (Fridriksson et al., 2020).

1.6 Threats

The Northeast Iceland Hope Spot is facing numerous threats. Climate change is threatening the area's resilience, with sea surface temperatures in Skjálfandi predicted to increase by 2 degrees by 2050 (Malinauskaite *et al.*, 2022). This could affect the whales entering the bay, the prey species, and the extent of sea ice in the Arctic. Plastic is a source of marine pollution in the area. In 2024, 3471 kg of marine litter was collected on Northeast Iceland's beaches (Ocean Missions, 2024). This is also affecting marine life, with 84% of northern fulmars (*Fulmarus glacialis)* found to have plastic in their stomachs (Trevail *et.*, 2015). The area also faces development threats. There is a silicon factory-

PCC Bakki Silicon- on the Húsavík coastline, with cargo ships bringing supplies to this factory (Velioglu, no date). Marine traffic can increase noise pollution (Tougaard *et al.*, 2012), which can cause stress to cetacean species (Christiansen et al., 2014). Salmon farming is increasing in Icelandic coastal waters (Govenment of Iceland, no date). Salmon farming can increase eutrophication in waters (Quiñones *et al.*, 2019) and be a source of increasing microplastics in the ocean (Jorquera *et al.*, 2022). Icelandic kelp harvesting company Íslandsaþri Ehf plans to open a seaweed drying factory in Húsavík. (Hafstað, 2021). This could risk exploiting Icelandic kelp forests, which are a critical carbon sink (Wernberg *et al.*, 2019).

Despite the ecological, social and cultural importance of the Hope Spot, this area has no formal marine protection. Currently, Skjálfandi Bay is a whale sanctuary area (Malinauskaite *et al.*, 2020). This means whales cannot be hunted; however, whale sanctuaries do not protect the bay from other anthropogenic threats (Cook *et al.*, 2019). The lack of regulation protecting marine life in the bay threatens the future sustainability of Iceland's coastal waters (Bünter, 2023).

1.7 Current MPA governance

MPA designation in Iceland is predominantly a top-down process (Wilke, 2023). *The Icelandic Act of Nature Conservation* (60/2913) legislates the protection of marine and land areas in Iceland. Under the act, the Icelandic Ministry for the Environment and Natural Recourses is in control of nature conservation, with the Environment and Food Agency of Iceland supervising the implementation of the act, granting permits and creating management plans for nature conservation (FAO, 2023). The act has focused on land-based conservation, with only 0.3% of Iceland's oceans protected under this act (Ólafsdóttir *et al.*, 2024). However, there are fisheries restrictions in Icelandic waters that have been created to reverse the decline in demersal fish stocks (Schopka, 2007). These areas could be working as OECMs to protect Iceland's marine wildlife (Ólafsdóttir *et al.*, 2024). The *188/2023 Regulation on Protective Measures for Vulnerable Marine Areas and Benthic Ecosystems* was passed in 2023. This is the first Icelandic legislation to state marine conservation as a key objective in fisheries management. However, these

laws only conserve fish stocks and do not protect marine life from other anthropogenic threats.

Iceland is part of the European Economic Area and, thus, subject to following European Union (EU) Law. The Directive 2014/89/EU of the European Parliament and Council (2014) states countries must create marine spatial plans to support the sustainable development of seas. In 2018, Iceland started developing marine spatial plans that work with local stakeholders to ensure the sustainability of their oceans (88/2018, 2018).

1.8 Study justification

Iceland must start protecting its coastlines to meet the Kunming-Montreal protocol target of protecting 30% of its oceans by 2030 (Bünter, 2023). If protected, the Northeast Hope Spot area could provide a case study for successful marine protection in Iceland. A perception study of locals' views on the future of the Hope Spot area will provide critical information to establish baselines, imagine future scenarios, gauge the acceptability of new policies and determine characteristics of good governance (Bennett, 2016) for a MPA. There is currently a lack of public perception studies for marine protection in Iceland, as most studies have focused on North America and Oceania (Jiang *et al.*, 2024) and in mangroves and coral reef ecosystems (Jefferson *et al.*, 2021). Thus, there is a vital need to increase perception studies in cold-water ecosystems (Fenberg *et al.*, 2012).

This study's objectives are to contribute to marine protection perception research in a cold-water Arctic ecosystem by exploring:

- What are local residents' perceptions of the current state of the local ocean?
- What are local perceptions of creating a marine protection figure, such as an MPA?
- What are local views on the future of the area?
- What are local perceptions of current marine governance?

This study comes at a critical time: urgent transformative action is needed to ensure the health of the oceans for wildlife and humanity (Georgian *et al.*, 2022). This is particularly pertinent in Iceland, a society that relies on the ocean for its economic and social wellbeing (Bünter, 2023). This study into local perceptions of the Northeast Hope Spot area hopes to provide critical information to help create a successful figure of marine protection in Northeast Iceland. This would help Iceland meet its international biodiversity targets and protect the health of its oceans for present and future needs.

2. Methods

2.1 Data collection

Data was collected between November 2023 and July 2024 by the Icelandic NGO Ocean Missions. The study deployed an online questionnaire containing 23 questions. The survey was created in line with the University of Iceland's ethics guidelines: before starting the questionnaire, participants were asked if they consented to be included in the study. All answers were anonymised and given a number ID code. The survey was distributed on the questionnaire platform Survey Monkey to residents in towns across the Hope Spot area in both English and Icelandic. In-person data collection was carried out in Húsavík, Akureyri and Dalvík. In these areas, QR codes for the survey were given to participants, and members of the Ocean Missions team were present to answer any questions.

Húsavík is in the Norðurþing municipality and has a population of 2449 (Statistics Iceland, 2024). Akureyri is in the municipality of Akureyrarbær the 5th largest municipality, with a population of around 20,000 (Statistics Iceland, 2024). Dalvik has a population of 1,360 and is located in the Dalvíkurbyggð municipality (Statistics Iceland, 2024).

The questions were composed of Likert scales to gain opinions on the state of the ocean, activities for future management and satisfaction with the government, as Likert scales can be used to rate perceptions of ocean management and governance (Gurney *et al.*, 2014). The term 'figure of Marine protection' such as an MPA was used due to previous experience from the ocean missions team that the term 'MPA' would be met with resistance among Icelandic residents (Ocean Missions, Personal communication, 2025). It is unlikely that people's perceptions within an area will have heterogenous views. Thus, it is essential to include socio-demographic factors when looking at perceptions (Jefferson *et al.*, 2021). This survey contained socio-demographic questions on age, nationality, gender, and job to compare respondents' perceptions of the area's future management. Long-answer questions were included so that participants could express their views on the area's importance for future generations and raise critical issues and thoughts on further marine protection in their own words.

2.2 Data analysis

Microsoft Excel was used to store and manage data. IMB Spss statistics (Version 28.0.0.0) was used to analyse the data. Multiple regressions were used to test for contributing factors in respondents' attitudes towards further marine protection, as all assumptions of multiple regressions were met as the data were normal and met the assumption of homoscedasticity and multicollinearity. As the survey used Likert scales, the data was ordinal and non-parametric tests were chosen to test for significant differences in values of creating a figure of marine protection and satisfaction with governance between different groups based on nationality, age, gender, and economic sectors (Newing *et al.*, 2011, chap. 15,16). The Kruskal-Wallis test, with post hoc analysis and a Bonferroni adjustment, was used to test for differences in attitude towards creating a figure of marine protection and satisfaction with governance between different groups based on age, economic sector, and dependence on the ocean. Mann-Whitney tests were used to test for differences in attitude towards creating an FMP and satisfaction with governance between different groups based on nationality and gender.

3. Results

A total of 106 surveys were completed. 54 surveys were completed in English, and 52 in Icelandic. One response was incomplete and excluded from the analysis (n=105). Two surveys were removed from the analysis comparing demographic factors due to the lack of answers for demographic data. Respondents were aged between 16-67. 18-39 was the most common age range (33%). Most respondents surveyed lived in the area for more than ten years (42%). 63% of respondents were female, 35% male, 2% non-binary. 14% of people surveyed live in the area seasonally. Most survey respondents (95%) lived in the same area they worked. The most common sector of work was tourism and hospitality (26%), and health care had the lowest number of respondents (1%). No answers were obtained from the fishing sector (see fig.2). Holding a master's degree was the most common form of education level (21%). 64% of respondents came from Skjálfandi Bay area, compared to 26% from Eyjafjörður area, 10% of respondents came from other areas in the North of Iceland.

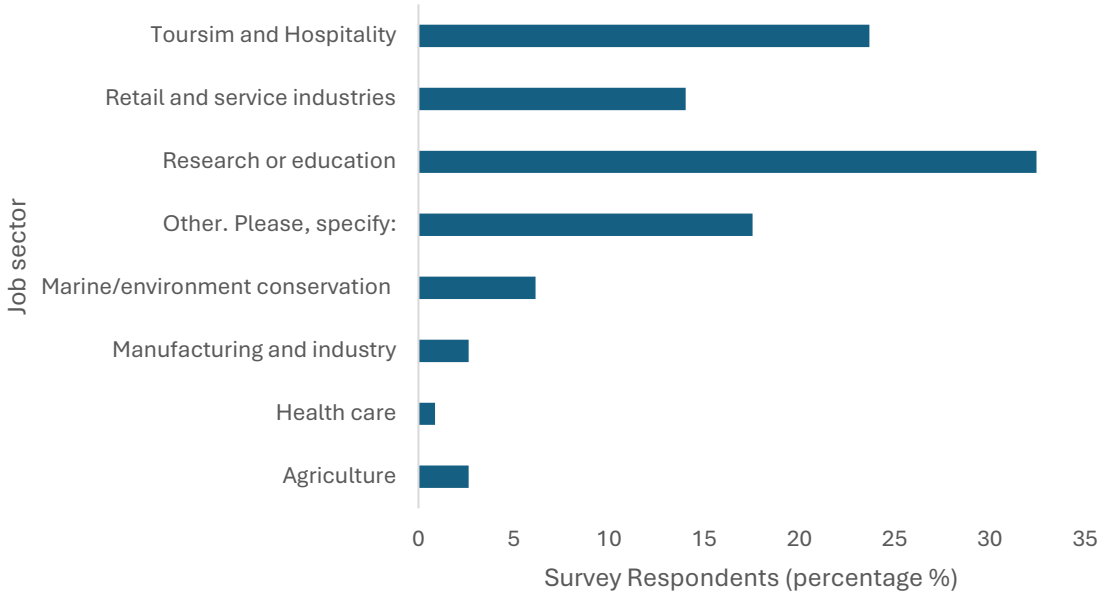
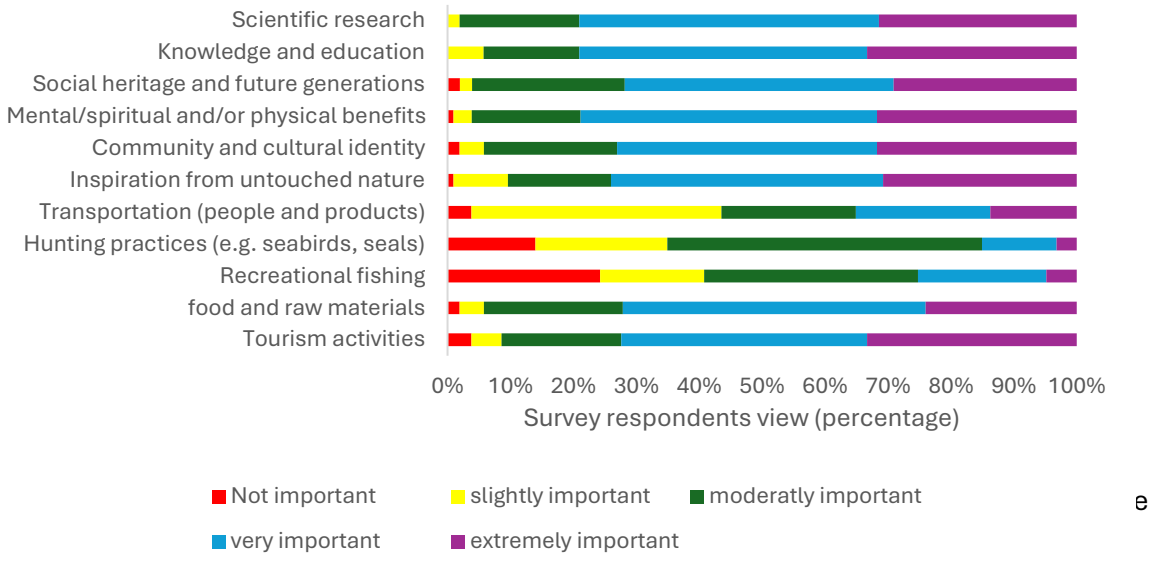


Fig.2. Job sectors of survey respondents.

3.1 Ecosystem services important to the area

Participants were asked what activities they thought were vital to the area on a scale of 'not important' to 'extremely important' (figure 3). Cultural and provision services were grouped for analysis (see figure 4). Cultural services were seen as the most important activity in the area (moderately important to extremely important=47%). Respondents



also saw provisioning services as vital (moderately important to extremely important= 36%).

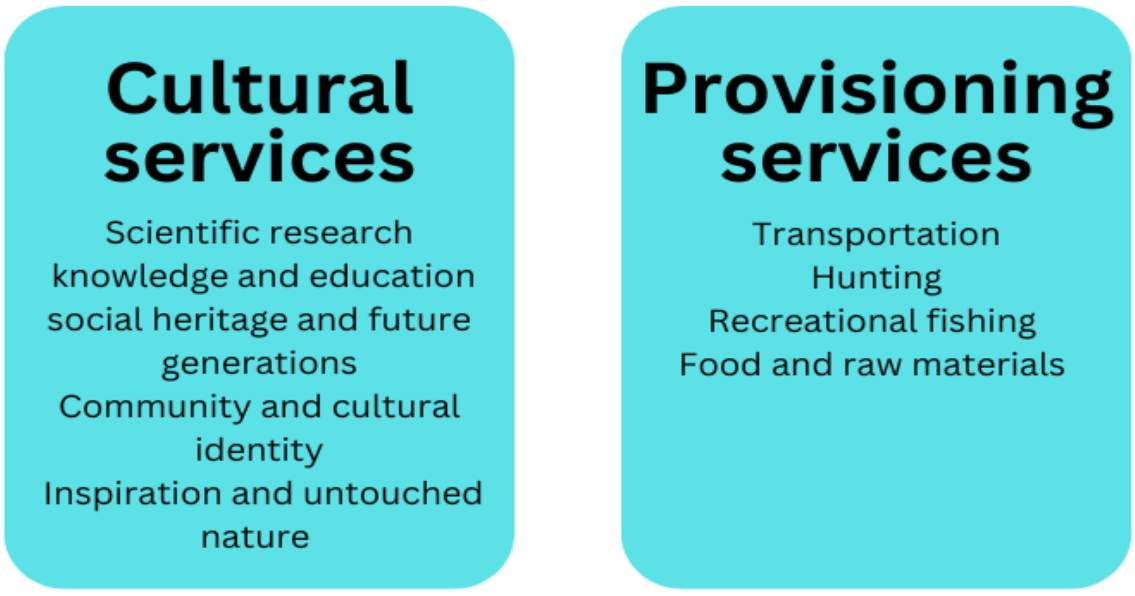


Fig.4 cultural and provisioning services in the Hope Spot area

3.2 Local respondents' perceptions of local ocean state

A question regarding the state of the local ocean was asked on a scale that ranged from 'very poor' to 'very good' (Figure 5). On average, 40% of respondents thought local ocean health indicators were in a 'good' state. Underwater noise (31%), and plastic pollution

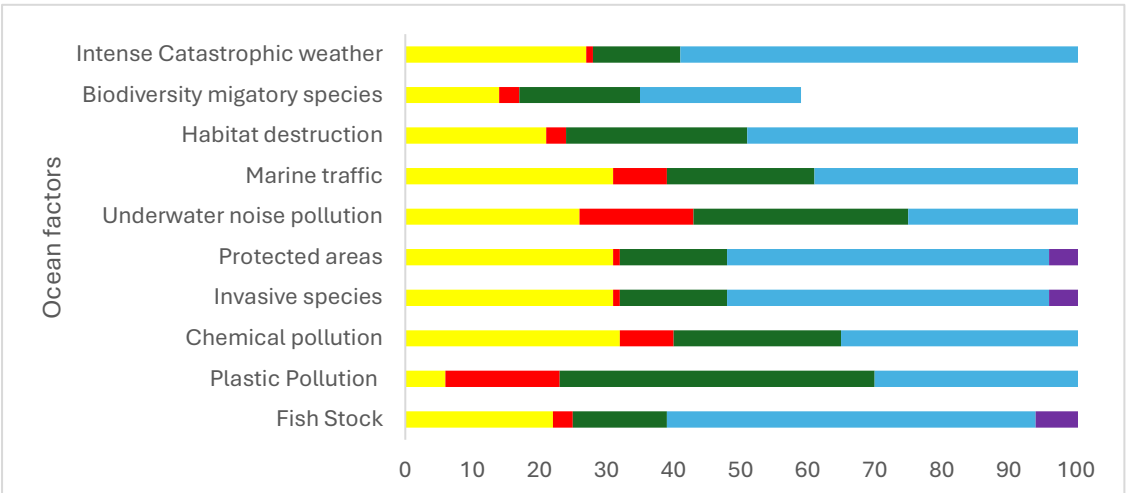


Fig 5. State of the local ocean. Local participants were asked to rate the state of the local marine environment on scale 'very poor' to 'very good' in terms of specific indicators.

(45%) where the only indicators respondents thought were in a 'poor' state. However, on average, 25% of respondents did not know the local ocean's state.

3.3 Attitudes towards creating a figure of marine protection

Most respondents (83%) were ‘in favour’ or ‘extremely in favour’ of marine protection in the Hope Spot area. Only 2% of respondents strongly opposed further protection in the area.

In the long answer questions, there were 5 mentions of support for the project, for example, *'Good luck with your project'*.

Gender, age, job, and ocean livelihood did not predict attitudes towards marine protection in the Hope Spot area (Table 1). There was only a significant negative association between nationality and attitude towards marine protection (p=0.015). (y= -0.608x+5.941). More foreign residents were ‘extremely in favour’ (75%) than Icelandic residents (42%).

Table.1 Multiple regression output. Only nationality significantly contributed to people’s views on further marine protection in the Northeast Iceland Hope spot.

Variable name	Coefficient β	p
Gender	-0.147	0.143
age	-0.115	0.276
Job	-0.096	0.399
Ocean livelihood	0.117	0.331
Nationality	-0.275	0.015
	$R^2 = 0.091$	

There was no significant difference between gender and attitude towards further protection in the marine area (U65,36= 964. P=0.099). However, there was a significant difference in nationality and attitude towards further protection of the Hope Spot (U62,42 =862, p<0.001) (see Figure 6). This was highlighted in the long answer questions, with

some Icelandic answers supporting further protection and management of pollution and boat traffic. Other respondents reported, '*I do not* feel the *need to protect further areas apart from what is already in place'*.

Others suggested that rather than protecting areas, they would prefer laws to manage specific activities, such as banning trawling and regulating the number of ships in the bay. There was a significant difference between age and attitude towards further protection in the Hope Spot (Kruskal-Wallis H = 11.82 , df = 5, p = 0.037) due to the difference between the 18-30 and 62-67 age groups (p = 0.033). The 18-30 age group supported the creation of a FMP more than the 62-67 age group. There was no significant difference between livelihood dependence on the ocean and attitude towards further protection in the Hope Spot area (Kruskal-Wallis H = 3.164, df = 3, p = 0.367). There was a significant difference between people's jobs and attitudes toward further marine protection (Kruskal-Wallis H = 102, df = 7, p=0.021). However, the post-hoc results did not bring up any significant difference between any of the individual jobs and attitudes, possibly due to sample size.

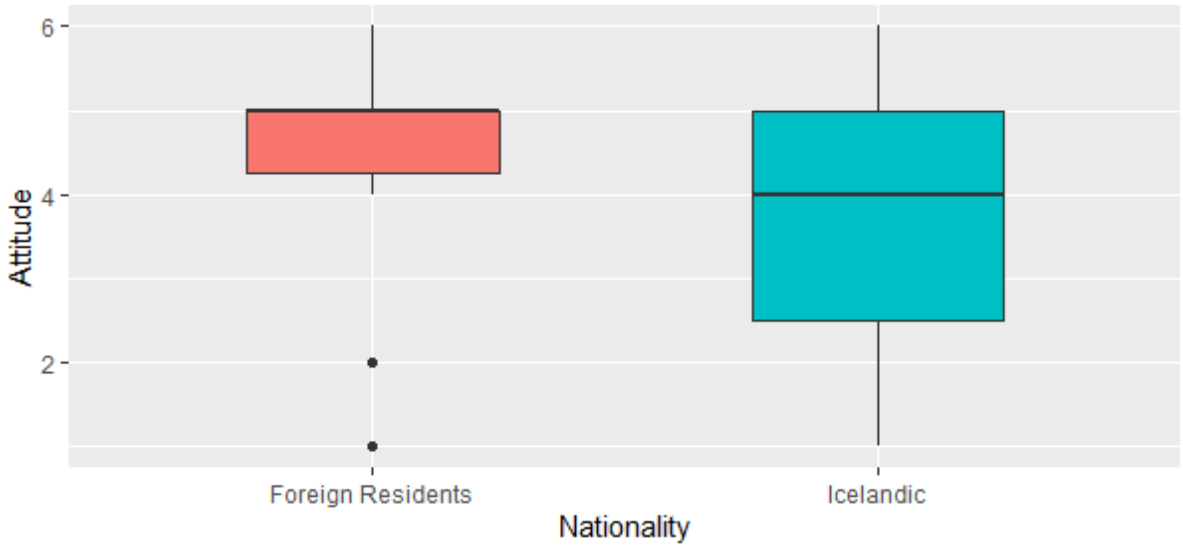


Fig.6 A box and whisker plot showing the difference between Foreign and Icelandic Residents and their attitude towards creating a figure of protection. On the Y axis, 1= 'not in favour' , and 6 = 'Extremely in favour'. Thick horizontal lines show the median, the box shows the interquartile range, and the whiskers depict the maximum and minimum values.

3.4 What marine actions should be included in future marine plans

A question was asked regarding what policies the government should include in marine planning; locals were asked to rank key policies on a scale of 'not important' to 'very important' (see Figure 7). Decreasing pollution and waste management was the activity with the most support to be included in plans ('very important' = 65%). This was supported by the long-answer question responses referencing the lack of a filtration system for water entering the ocean and efforts to reduce toxins entering from the shipyard in Húsavík.

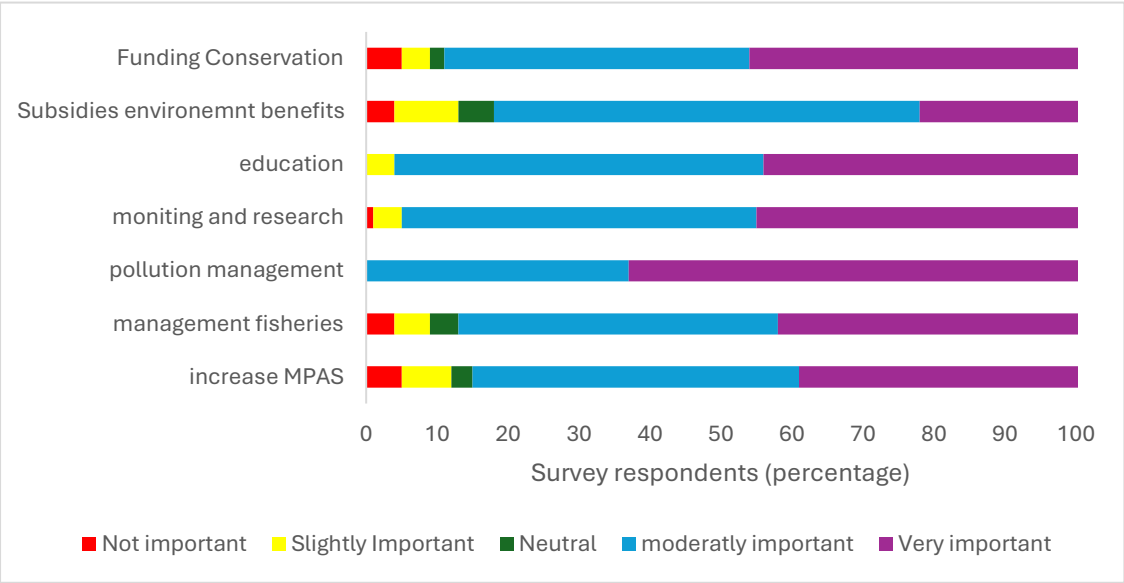


Fig 7. Key marine policy in the future of the Hope Spot area. Locals were asked what actions they thought would be important for the future protection of the Hope Spot area

3.5 What activities should be prioritised

A question was asked about what activities should be developed in the future within the Hope Spot area on a scale of 'strongly against' to 'strongly in favour' (see figure 8). The future activity with the strongest support was scientific research (64%). On the other hand, the activity that respondents were most 'strongly against' was whale hunting (75%).

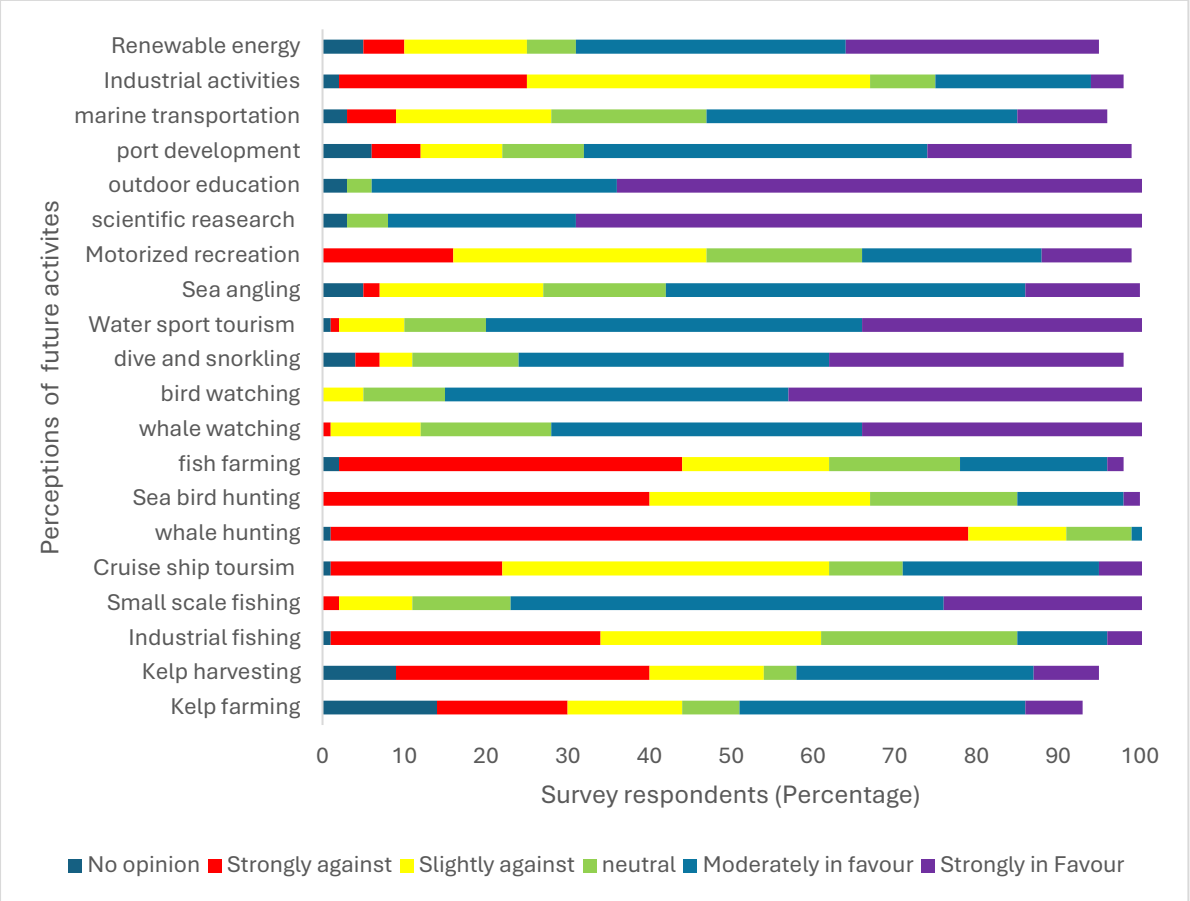


Fig.8. Local respondents' perceptions for what industries should be developed in the future within the Hope Spot area. Industries were ranked on a scale of 'Strongly Against' to 'Strongly in Favour'

When participants were asked to list their key priorities for the area and asked 'what should be preserved for future generations', biodiversity was most frequently mentioned (n=35). For example, there were comments, *'the more biodiverse the better for us'*, *'biodiversity of species on shore and in sea'*, *'keeping the biodiversity-rich and thriving'* highlighting the importance of maintaining healthy species and ecosystems within the Hope Spot area. *'whales'* were mentioned 14 times often when listing essential animals for the area. *'whales',* were often mentioned in the context of further management of

whale watching: *'whale watching, but regulated numbers of tours, ships and companies'*, one respondent mentioned stopping whale hunting while another supported if it was managed at sustainable levels. The next key issue mentioned 21 times was the need to manage pollution, *'no plastic in the ocean'*, *'the shipyard needs to stop putting toxic materials and antifouling in the water'*, and *'noise pollution'*. The next most reported issue was the management of fisheries (17 times), with mentions of *'fish stocks'*, *'fish populations'*, and *'preservation of fishing'*. There were four mentions regarding access to nature. There was a split between mentions of nature being left in a pristine state with no human access and being able to use areas for recreation and having safe access to the ocean and rivers.

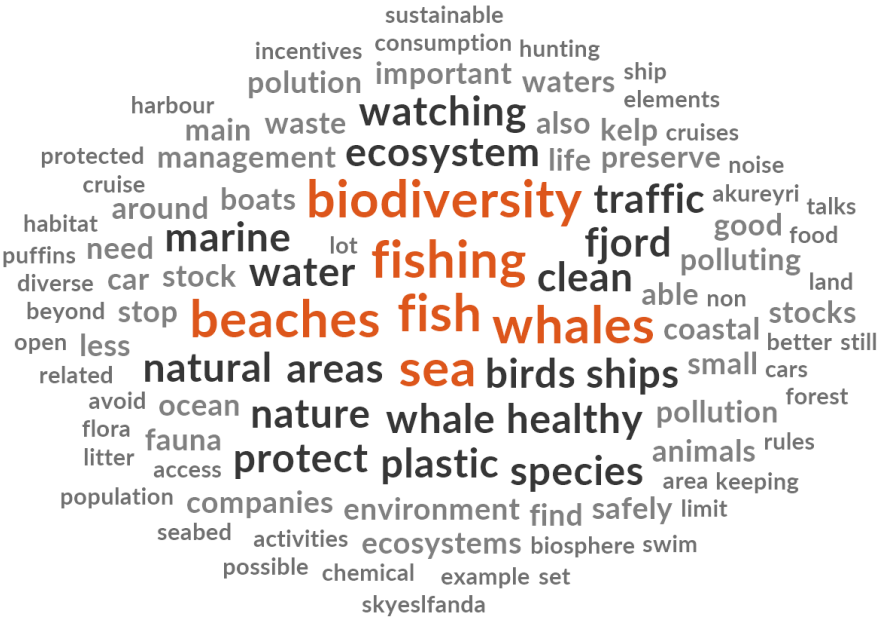


Fig 9. Word cloud made from the answers to: *what parts of the environment should be preserved for future generations?* Orange words were the top 6 most common words in answers. The larger the text size, the more times the word was mentioned in the response.

3.6 Government consideration of local opinions in policy planning

A question was asked regarding how often local respondents thought the government included their views in marine planning, on a scale of 'not considered' to 'always considered'. On average, most people thought their views were rarely considered (mean= 25%). Locals felt most ignored when the government developed new regulations ('not considered' and 'rarely considered' = 41%) (see figure 10).

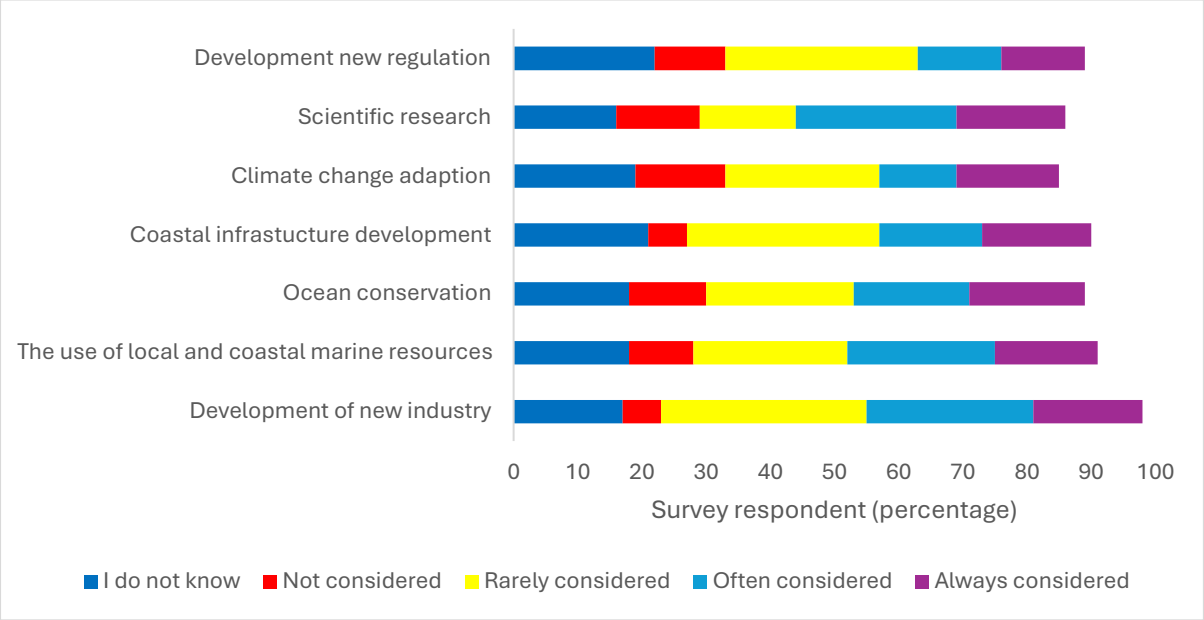


Fig 10. Local respondents' perceptions of how often the government included local views in marine policy. Participants were asked how well they thought the government included their opinions for key marine policy areas.

3.7 Key action government should take

Respondents were asked what key marine management actions were most important (see figure 11). The most common action local respondents indicated was important was conducting an ecosystem assessment (72%). The least common answers were regional government commitments (36%) and cooperation between Hope Spots municipalities (36%).

In the long answer question, it was highlighted that protection should come from government funding. However, respondents also highlighted the need to get locals on

board with protection measures. For example, *'Getting the support of Icelanders will be key'*.

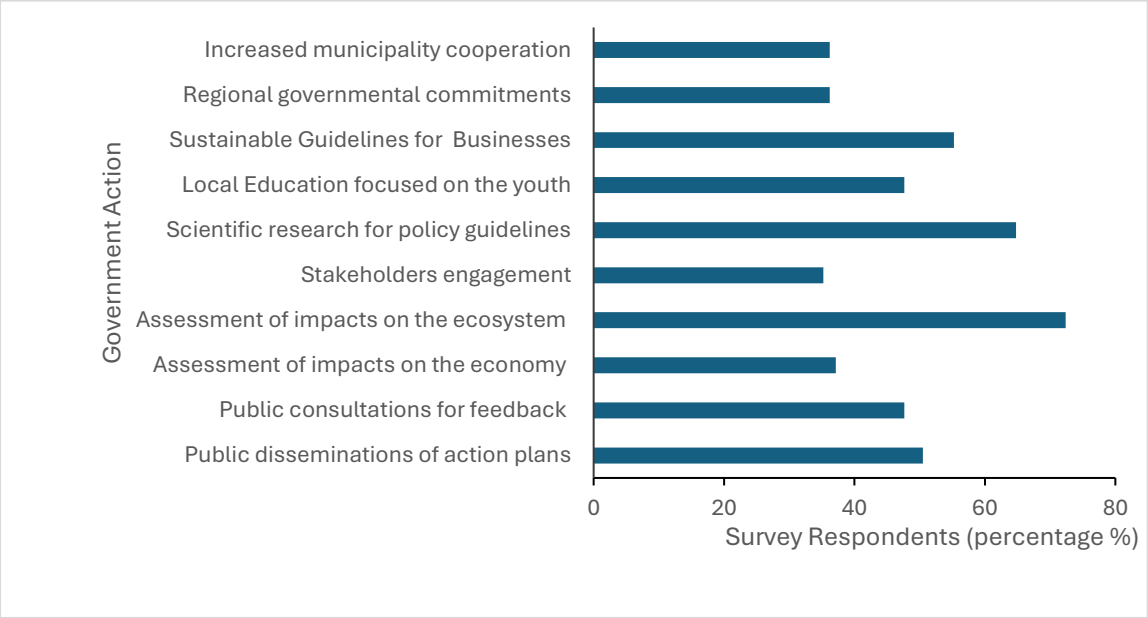


Fig 11 Local respondents' perceptions of key government action for further protection of the Hope Spot area

3.8 Satisfaction with government

A question was asked regarding how satisfied locals were with government action on marine protection. Most respondents were dissatisfied with government action (dissatisfied and very dissatisfied= 40%). However, there was only a 5% difference in the amount of satisfied people ('satisfied' and 'very satisfied' = 35%).

There was a significant difference between nationality and satisfaction with the government (U=61,62 = 963, p=0.027) with Icelandic locals being more satisfied than foreign residents. There was a significant difference between age and satisfaction with the government (Kruskal-Wallis H = 11.7, df=5, p=0.039) (see Figure 12). However, in the post-hoc tests, there was no significant difference between any of the age classes, possibly due to the small sample size. There was no significant difference between satisfaction with the government: and gender (U=64,36= 966.5, p=0.167), job dependence on the ocean (Kruskal-Wallis H=1.2, df=3, p=0.75) and economic sector job (Kruskal-Wallis H =9.2, df=7, p=0.235).

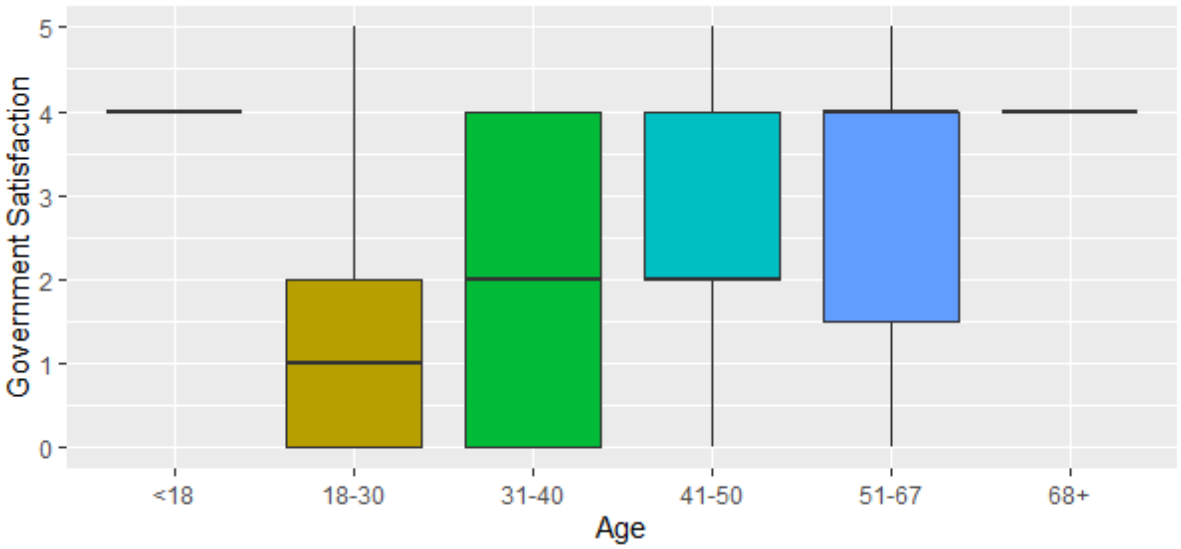


Fig 12. A box and whisker plot comparing the difference between age and satisfaction of government action on marine policy. 0= strongly dissatisfied and 6= strongly satisfied. Thick horizontal lines show the median, the box shows the interquartile range, and the whiskers depict the maximum and minimum values

4. Discussion

Overall, most respondents thought the local ocean was in a good state, except for noise pollution and plastics, which were seen as being in a 'poor' state. Respondents favoured creating a FMP, such as an MPA, in the Hope Spot area. However, Icelandic residents' support varied more than foreign residents. Respondents showed a value action gap with wanting marine protection but still wanting high levels of development in the area. However, most agreed ecotourism activities should be prioritised. Icelandic locals and older age groups felt more satisfied with government action than foreign residents. However, both groups agreed locals should be included more in planning new legislation for the area.

4.1 Demographic factors

There are likely biases in this data due to the demographic characteristics of the survey respondents. The largest group of respondents worked in research, followed by tourism. Respondents from tourism are likely to be whale-watching guides because whale-watching is the key industry in Húsavík. These respondents are more likely to have a vested interest in protecting the oceans, come from foreign countries, work daily on the sea, and have master's degrees and resulting in different viewpoints on marine protection than other residents. However, there were no respondents from fishing and shipping and only one respondent from health care, meaning these views are unlikely to be represented in the survey. Most respondents came from Húsavík. It is important to consider the demographic characteristics of survey respondents as it is unlikely the results represent all views of locals. Thus, these industries and areas should be targeted in future research to ensure these locals' views are included in future decision-making.

4.2 Knowledge state of the ocean

Most respondents thought the ocean was in a good state. This result is different from those of Lotze et al., (2018) global meta-analysis, found that the general public perceived the ocean as under threat. Respondents reported that pollution was seen as the biggest

threat to the area. Pollution is seen as the most significant ocean threat by local communities across Europe (Potts *et al.*, 2016) and globally (Lotze *et al.*, 2018). This may be because pollution is a highly visible issue that local communities experience daily (Potts *et al.*, 2016). Noise pollution was also seen as a significant threat. Although this is unlikely to be an issue directly experienced by locals, there could be recognition that the large number of ships in the bay is causing underwater noise that can negatively affect marine life. Noise pollution and plastic pollution are the issues that have been studied the most in the area. Thus, there may be more accurate knowledge of these factors' state. Invasive species, chemical pollution and diversity of migratory species had the highest number of respondents stating they did not know what levels these factors were in. This may be due to a lack of data on these issues in the Hope Spot. Another potential explanation is that in an increasingly modernised society, locals have become disengaged with the ocean and thus not aware of its state (Kelly *et al.*, 2022).

4.3 Important ecosystem services

The most important ecosystem services for locals were provisioning services. Healthy fish stocks were seen as vital provisioning services. The importance of fish stocks in the areas could be linked to the historic importance of fishing for Icelandic coastal communities, which have fishing practices dating back to the medieval period (Amundsen et al., 2005). Whale species provide job opportunities through ecotourism. For example, in 2019, 104,000 visitors to Húsavík took part in whale-watching tours (Icelandic Tourist Board, 2020). However, there was still some support for the limited use of whales for their provisioning services of food from their meat, with one comment from a local Icelandic resident suggesting that whaling should continue at low sustainable levels.

Similar to Kendall (2021) this survey also demonstrated that biodiversity provided provisioning and social and cultural services. For example, through the awe-inspiring qualities of seeing whales in wild nature and the pride the whales brought to the local community. Nature was used in the area for recreation and relaxation, likely providing well-being benefits to residents.

Respondents did not mention the regulating services the biodiversity provided to the area. For example the ocean role as a carbon store (Aldama-Campino et al., 2020).

4.4 Perceptions of further protection for the area

Overall, there was strong support for creating a FMP in the Hope Spot. However, respondents were divided between those wanting to use the area for recreation and connection to the natural world and those wanting an area of pristine nature untouched by human activities. In creating a successful FMP, there will need to be a balance between protecting the Hope Spot area for recreational use and preserving its aesthetic and spiritual value.

On the other hand, one Icelandic comment reflected that they did not want the protection of specific areas but supported increased regulation on environmentally harmful activities like trawling and pollution. This may reflect that there is a preference for regulating specific industries, for example, quota systems on fish stocks (Gunnlaugsson and Valtysson, 2022). Thus, locals may prefer the regulation of specific industries rather than broad protection measures.

Despite positive views for increasing protection in the area, there was still support for high development activities. This suggests a value-action gap. Although people may have 'conservation ideal' values in reality, they put economic values first (Voyer et al., 2015). This is similar to Wilke (2023), who found that locals in Iceland put economic priorities first in marine spatial planning. Clashing values between development and marine protection could create conflict over the area's future marine planning.

4.5 Social-demographic characteristics and attitude towards marine protection

The only socio-demographic characteristics with different levels of support for creating an FMP were age and nationality. This goes against much of the literature where social-demographic characteristics like gender, education, and job affected perceptions of MPAs (Bennett, 2016; Malinauskaite et al., 2020; Manson et al., 2021). Gender

differences may not have been shown because more females answered the survey than males, so there may not have been sufficient data from males to show a difference. Whether someone's job directly relied on the ocean may have made no difference since everyone's life in a coastal community has the backdrop of the ocean. The ocean will likely play a role in everyone's lives, whether for food, recreation or income. Floris et al. (2020) found that more educated people were more likely to agree with the MPA. However, our study showed no link between education and support for marine protection.

Younger people supported creating a FMP more than the oldest age group. Past studies have also found younger people to support marine protection measures. For example, Kendell (2021) found that young people were less in favour of whaling than older respondents. This is different to Potts (2016), who found that the older generation in Europe favoured marine protection because they had witnessed ocean degradation in their lifetimes.

Foreign residents had more substantial support for marine protection compared to Icelandic residents. This may be because foreign residents are more likely to work in marine tourism, which depends on a healthy ocean. Additionally, these residents may come from countries with stronger ocean connections, thus having stronger values for further protection compared to Icelanders, who have historically viewed the ocean as something that takes life (Bünter, 2023). There was a sense of general disconnect between Icelandic people and ocean conservation. This disconnect could prevent positive ocean values and the want for further marine protection (Fletcher and Potts, 2007; Jefferson et al., 2014). Despite differences in nationality, many Icelandic locals still supported further marine protection, with many wanting to stop pollution, protect whales, limit extractive activities (e.g., kelp farming) and sustainably manage cruise ship industries.

4.6 Governance

There was a strong feeling that the government did not take on local opinions when deciding on marine policy. Locals have been excluded from the marine planning

process because marine spatial planning in Iceland has been top-down and led by government agencies (Wilke, 2023). Bünter (2023) suggests that the Icelandic government is not taking on local views because civil society is not pressuring the government to include local opinions. Thus, there is a lack of political implications and accountability for not acting on marine conservation issues.

General frustration with the government is in line with Wilke (2023) who found locals were frustrated with marine planning processes in Iceland and highlighted reasons for this frustration as government corruption and the slowness of achieving goals. The study also highlighted a lack of accessible information about the planning process, leaving locals unsure of what is happening in their area. Without accessible information, there cannot be a public discourse about decisions. Public discourse helps to show the planning's strengths and weaknesses and allows the public to voice their opinions on decisions.

Frustration was expressed with the lack of governance enforcing sustainable policies in the Hope Spot area. For example, although whale-watching boats have voluntarily agreed to IceWhale's code of conduct for sustainable operation, these guidelines are not enforced and are often broken (Nicosia and Perini, 2016). MPA rules must be applied evenly to everyone; otherwise, locals feel unsatisfied with governance and rebel against enforced decisions (Giakoumi et al., 2018).

Marine spatial planning has been a top-down process (Wilke, 2023). This means that historically, there is a lack of community-level actions that locals can get involved in and share their voices to impact planning marine protection. In Iceland, there is a lack of resources for public and NGO action for marine protection compared to terrestrial counterparts (Bünter, 2023). An effective MPA in Iceland will likely be based on top-down governance. However, top-down legislation should be complemented by bottom-up approaches.

4.7 Social-demographic factors and governance

There were differences in nationality and satisfaction with the government. Icelandic citizens can vote and have more opportunities to engage in local politics, thus feeling that their views are considered in policy decisions. Local municipalities have directly elected councils, which means locals have a strong influence on who represents them (Hlynsdottir, 2016). Although more satisfied, there was still a sense that the government could do more to protect the natural environment. Many Icelandic residents expressed a desire to increase regulation around harmful environmental activities to preserve nature.

Less satisfaction by foreign residents may be explained by the fact that although they contribute to Iceland's economies and coastal communities, they have less voice than Icelandic residents in government decisions. Additionally, these residents may have grown up with different environmental values, increasing their ocean citizenship (Fletcher and Potts, 2007; McKinley and Burdon, 2020), thus feeling more frustrated with the lack of action to protect the marine environment in Iceland. However, foreign seasonal workers do not participate in elections and have fewer opportunities to engage with local politics. They are less likely to have first-hand experience with the Icelandic political system and have less experience in how receptive the government is to incorporating local views into decisions.

The younger age group was less satisfied with government action than the oldest. Intonti et al (2024) found that the younger generation relied more on European governance to look after the marine environment. There may be an expectation from the younger generation that it is part of the government's responsibility to look after the environment, and they feel frustrated it is not being achieved.

5. Recommendations

5.1 Increase Opportunities for stakeholder engagement

Throughout the process of creating a FMP, there needs to be better communication between the policymakers and local communities to ensure local opinions are listened to and ideas put into policy practice (Kelly et al., 2022). Creating mechanisms to allow constant stakeholder engagement will help aid the creation of a FMP such as an MPA (Pomeroy and Douvere, 2008; Bennett et al., 2019; Catalano et al., 2019).

5.2 Complete an ecosystem assessment

Respondents indicated that conducting an ecosystem assessment was important for successful marine management. An ecosystem assessment would provide baseline biodiversity data for the area and provide data to understand if the local ocean is degraded or healthy. BioProtect, a Horizon EU mission ocean and water project, has chosen Skjálfandi Bay, within the Northeast Hope Spot as a demonstration site. This project aims to map, monitor and forecast biodiversity in the bay to help create a decision tool, with local stakeholder participation to increase marine protection (BioProtect, 2024). Understanding baselines is critical to designing effective biodiversity management strategies (Bull et al., 2014) to help build resilience to changing conditions in the area

5.3 Use the creations of FMP as an opportunity to increase locals' ocean literacy

Locals supported the idea of increasing environmental education in the area. Currently, there is a disconnect between people's lives and their actions in the marine environment (Kelly et al., 2022; Paulus et al., 2023). Creating an FMP such as an MPA can provide a focus point for improving local communities' knowledge about the local marine environment (Laffoley et al., 2008). Environmental awareness could increase local communities' ocean citizenship (Fletcher and Potts, 2007). Potentially increasing positive conservation behaviour among local communities and chances of MPA success (McKinley and Fletcher, 2012b; McKinley and Burdon, 2020).

5.4 Ensure development and biodiversity coexist

Maintaining biodiversity was seen as critical to local respondents, so actions to preserve biodiversity must be a key focus for future marine policy in the area. Respondents were against the development of fish farming in the area, potentially due to hearing of the adverse effects farms in the West Fjords had on wild salmon (Skúladottír, 2022). However, there was support for increasing other high-impact activities, such as port development. New regulations must be created to ensure these industries follow sustainable practices, and enforcement mechanisms must be put in place to hold companies accountable if regulation is broken.

Increasing ecotourism activities within the Hope Spot area was seen as important to respondents. If whale watching is to continue to expand, regulation and enforcement practices must be developed to ensure cetacean species are not harmed by increased tourism in the area (Nicosia and Perini, 2016).

5.5 Manage biodiversity

Respondents saw sustainable fishing as important. In a marine management plan, it will be vital to have controls around fishing to ensure its sustainability. Possibly, a no-take area could be introduced, which would allow fish stock levels to recover and increase in surrounding areas (Belharet et al., 2020).

Many respondents highlighted the desire to increase the protection of cetacean species in the Hope Spot. With climate change, noise pollution and shipping traffic providing significant threats in the area (Tougaard et al., 2012; Nicosia and Perini, 2016; Malinauskaite et al., 2022) marine management must tackle these threats to ensure the survival of cetacean species.

Most respondents did not want whaling to continue in Iceland. Although no whaling is allowed in Skjálfandi Bay or Eyjafjörður (Directorate of Fisheries is, 2017) whaling is allowed outside of these areas. The study suggests most locals would support expanding the whale sanctuary to include the whole Hope Spot area. In the Azores,

where whaling was banned 1984, locals now think the banning of whaling was the most positive marine policy introduced to the area (Ressurreição et al., 2012).

5.6 Create enforceable, sustainable policy

To help protect cetaceans, Icewhales code of conduct should be enforced. If all whale-watching companies followed the same guidelines, it would not create a competitive disadvantage for companies that follow the rules (Finkler and Higham, 2020). Creating a procedure to enforce marine rules presents a key challenge. Parsons (2012) suggest that tourists can take on an enforcing role by using phone cameras to catch unsustainable whale-watching practices.

Other issues requiring greater policy in the area include the cruise ship industry, which lacks policy to ensure its sustainability (Fridriksson et al., 2020) and the lack of water filtering for wastewater entering the bay. For an FMP to be successful, protection must be enforced (Perez de Oliveira, 2013).

5.7 Explore alternative protection mechanisms: OECMs

Due to the lack of precedent for MPAs in Iceland, other protection mechanisms could be looked at to ensure the protection of the area. OECMs can ensure marine biodiversity and ecosystem processes (Shabtay et al., 2019). They have a benefit over an MPA, as to be classified as an OECM, there needs to be clear conservation benefits, whereas an MPA only needs to be managed for conservation. The Hope Spot area could be managed for goals other than biodiversity (Gurney et al., 2014), such as whale watching or eco-tourism. If the area has conservation benefits, the Hope Spot area could contribute to Iceland's goal of protecting 30% of the ocean by 2030. An OECM could be more socially acceptable in a country traditionally wary of MPAs.

An OECM should protect an area's local, cultural and traditional values. Ensuring the culture of Icelandic coastal communities is respected could help increase the acceptance of marine protection by locals. However, there would need to be a

significant policy effort before the Hope Spot area could be classed as an OECM. Currently, the Hope Spot area does not meet all the criteria to become an OECM as it is not managed in a way that achieves biodiversity protection, and there is a lack of long-term protection for the area(IUCN-WCPA, 2019). OECMs are an emerging concept, and there is a lack of clear guidelines on how they would work in practice, especially in the marine realm (Gurney et al., 2021). An MPA may be a better option as it is an easily recognisable term. For example, Maini et al. (2023) found that Ocean conservation experts were less aware of the concept of OECMs compared to MPAs. However, improving the area's management to meet the criteria of an OECM should be considered, as an OECM requires positive conservation outcomes and the protection of local rights and values. An OECM could be more socially acceptable in an area historically wary of MPAs and wanting to continue economic development.

6. Conclusion

Overall, the future of the Hope Spot area will require a balance between biodiversity protection and sustainable economic development. To create a successful FMP, there must be clear mechanisms for local engagement with the creation process alongside education opportunities to increase awareness of threats facing the local marine environments and solutions to aid its protection. An effective FMP, such as an MPA in Iceland, will likely be based on top-down governance; however, top-down legislation should be complemented with bottom-up approaches. The plan must be created with the needs of locals throughout its design, implementation and long-term management. Legislation is needed to protect the cultural and ecosystem services of the Northeast Hope Spot area. This legislation must be backed up with effective enforcement. With 5 years left to meet the 30 by 30 protection targets, we are at a critical point in time to use ocean science to further the protection of the marine world. Iceland is failing to meet the Kunming-Montreal target. Formalising the protection in the Northeast Hope Spot area could set a precedent for the future of marine protection and MPA creation in Iceland.

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