The Future and Changing Context of the Irish Sea in the 2020s

Full Report

Results from the 2020 Irish Sea Stakeholder Survey carried out by the Irish Sea Maritime Forum

Irish Sea Maritime Forum, June 2021

IRISH SEA
MARITIME FORUM

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Executive Summary

Over the summer of 2020 the Irish Sea Maritime Forum[1], supported by the University of Liverpool, conducted an online survey to develop a comprehensive picture of the future for the Irish Sea and its communities on a whole Irish Sea scale.

The **aim of the survey** was to discover and extend our understanding of what makes the Irish Sea special for those who use it or live around it, identifying both challenges and opportunities, now and looking forward, for the Irish Sea's businesses, communities and environment. To explore these questions a thematic approach was taken, but with the understanding that many issues are cross-cutting, particularly themes such as climate change.

The survey results are summarised in a report **'The Future and Changing Context of the Irish Sea in the 2020s'** of which this report is an executive summary, and the findings will be further explored at a future Irish Sea Maritime Forum event in order to validate and finalise the research.

Responses came from all six Irish Sea nations – England, Republic of Ireland, Isle of Man, Northern Ireland, Scotland and Wales, as well as further afield. Several responses were not identifiable by country. Respondents were people from national government departments and agencies, research institutions, local and national businesses, local authorities, a range of NGOs representing between them environment, recreation and heritage, and local residents. In total over 1000 individual comments were received across the full range of themes explored, some addressing multiple points and cross-cutting issues and opportunities.

Number of Comments per Theme
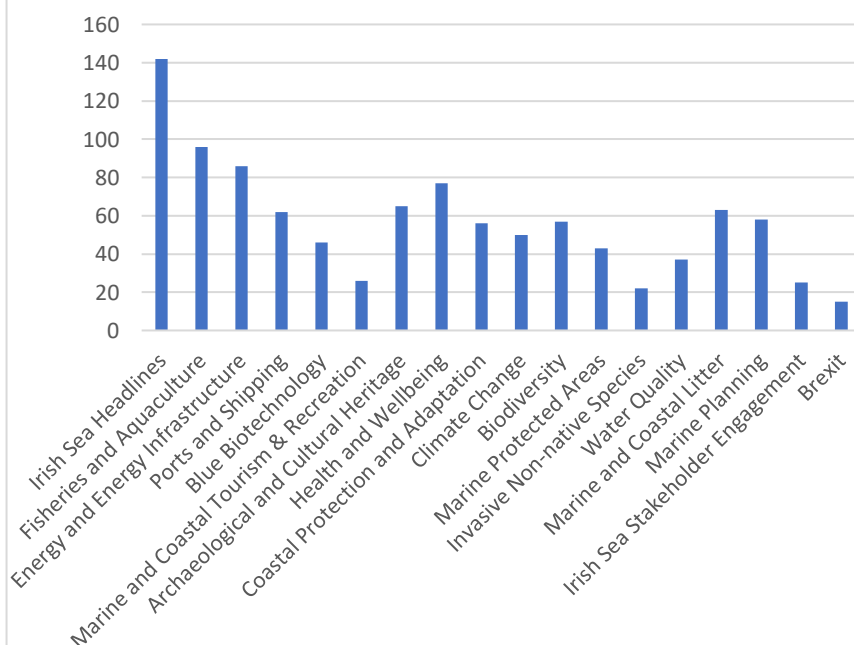
Irish Sea Headline Quotes

"There are lots of opportunities in the Irish Sea, for energy, environmental protection, shipping etc. It is also unique in the UK with an overlap of jurisdictions, devolutions, and differences in governance."

"The area for which I am responsible in my work, it's where I live and I feel passionate about protecting its health for future generations."

"I also value it for its potential for climate change mitigation, e.g., through renewable energy generation."

"The Irish Sea has its own unique biodiversity."

"Its ecological services support the health and well-being of millions of people (residents and visitors) in its six coastal jurisdictions."

"Rich array of geological and geomorphological features and site along the coast and on the sea-bed. These are important for research, teaching and geo-tourism."

"The area has potential for carbon capture and storage in geological media or for energy storage as part of the transition to a low carbon economy."

"It's a precious marine habitat that is on the receiving end of a lot of plastic pollution that has a devastating impact on the wildlife in the sea."

"There is value too, perhaps more intangible, in its health and wellbeing benefits: the enjoyment people get from being by the sea, the 'sea air' and the views."

Draft Irish Sea Headlines

Different stakeholders have different perspectives on the Irish Sea and its value to them. This survey captured a wide range of views on the reasons why the Irish Sea is an important and special place. From these a draft set of **Irish Sea Headlines** have been developed. These will be tested and refined at the next Irish Sea Maritime Forum conference with a view to the headlines being a valuable tool for use by organisations developing policy or projects in the Irish Sea area.

- The **diversity of wildlife and habitats of the Irish Sea are highly important and valued** for their contribution to marine and coastal biodiversity and the network of Marine Protected Areas for internationally important species and habitats. As well as being important in its own right **the natural environment of the Irish Sea offers benefits for climate change mitigation, amenity** (e.g., recreational fishing, landscape value) **and the health and wellbeing** of both coastal communities and visitors to the Irish Sea and its surrounding regions. **Threats to the Irish Sea include invasive non-native species, climate change and pollution**, including plastics.

- **Socio-economic benefits derived from working on and living in close proximity** to the Irish Sea are important for Irish Sea communities.

  - **Economic benefits:** A **wide range of coastal and maritime industries** – in particular tourism, ports and shipping, fisheries and energy generation - **support local jobs**.

  - **Social benefits:** People **enjoy the amenity value** the Irish Sea and its coastline provide to them, including **opportunities for recreation and exercise** and the **more intangible benefits for health and wellbeing** provided by enjoying **open spaces and attractive views**.

- **Cross-border governance** is a key feature of the Irish Sea, with six national administrations, and good governance and management of activities to provide **long term environmental sustainability** for the Irish Sea area are important to Irish Sea stakeholders.

What make the Irish Sea special?
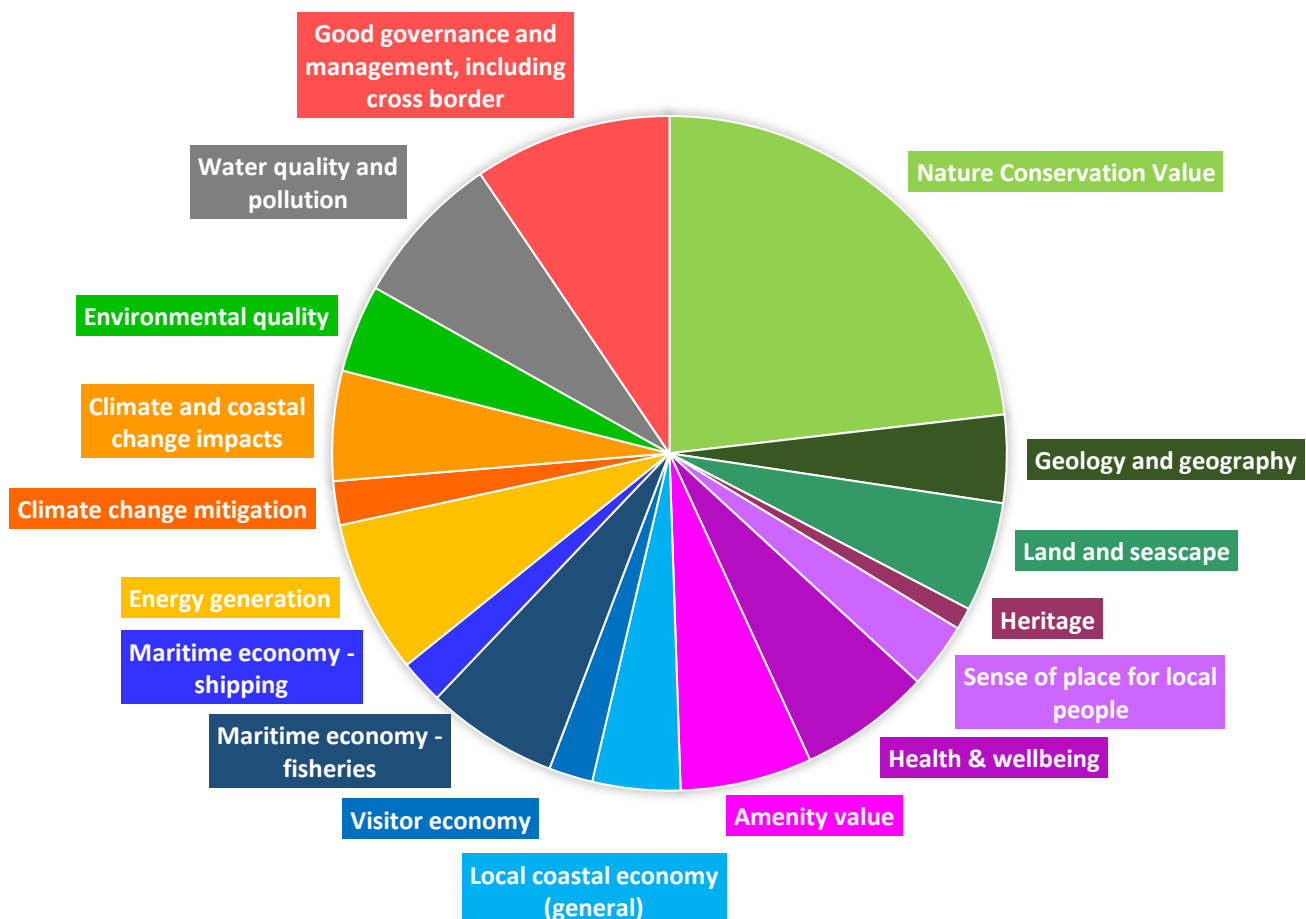
Key Future Issues and Opportunities

As part of the research respondents were asked to identify up to three top issues and opportunities for a range of thematic areas. The following table gives a 'snapshot' of the top issue and opportunity identified for each theme. Occasionally the results were found to be tied, hence two points are given. Again, the research findings will be tested and refined at the next Irish Sea Maritime Forum conference with a view to the research being a valuable tool for use by organisations developing policy or projects in the Irish Sea area.

Theme	Key issue	Key Opportunity
Fisheries and aquaculture	Brexit[2]	Fishers' involvement in research & data. Irish Sea-wide cooperation on a range of issues.
Energy and energy infrastructure	Financial issues (energy price, lack of investment)	Promotion and use of 'greener' energy
Ports and shipping	Brexit[2]. Pollution from shipping.	Environmental improvements to ports and shipping. Expansion and diversification of activity.
Blue biotechnology	Environmental issues	Products for people and the planet
Marine and coastal tourism & recreation	Access and facilities	Development of geo and eco-tourism
Archaeological and cultural heritage	Lack of funding. Coastal change and flooding.	Public education and engagement
Health and wellbeing	Accessibility of the coast	Health benefits from exercise and connecting with nature
Coastal protection and adaptation	Governance, policy and planning. Litter and pollution.	Coast protection solutions that deliver multiple benefits
Climate change	Domestic and international policy. Risks to communities.	Renewable energy. Future proofing coastal assets.
Biodiversity	Habitat and species loss	Data and evidence
Marine Protected Areas	Lack of awareness and understanding of MPAs	Improving the evidence base and management
Invasive non-native species	Managing INNS transport mechanisms	Monitoring
Water quality	Farming practices	Research (studies and surveys)
Marine and coastal litter	Clean up and enforcement	Cleaning up litter
Marine planning	Awareness and engagement in marine planning	Benefits of collaborating at an Irish Sea scale. Environmental benefits.
Stakeholder engagement	*Not applicable – question not asked*	Knowledge exchange and advancement
The future for the Irish Sea after Brexit[2]	Socio-economic impacts	None* *'none' was the top response in this section however some opportunities are given by respondents in this and other sections of the report*

For more details, please refer to the full report **'The Future and Changing Context of the Irish Sea in the 2020s'** which is available to download from the Irish Sea Maritime Forum website: www.irishseamaritimeforum.org.uk

[1] *For more information about the ISMF and its work see www.irishseamaritimeforum.org.uk*
[2] *the withdrawal of the UK from the European Union*

Introduction

This report provides an analysis of results from a survey undertaken during summer 2020 by the Irish Sea Maritime Forum. The survey and preparation of this report have been funded and are supported by the University of Liverpool.

In 2013, following a workshop at the 2012 Irish Sea Maritime Forum inaugural conference and later consultation, the Irish Sea Maritime Forum published the **Irish Sea Issues and Opportunities Report** summarising stakeholder views on the main issues and opportunities for the Irish Sea region at that time. The report is available to download from the Irish Sea Maritime Forum website: http://www.irishseamaritimeforum.org

Results from the 2020 survey have been used to update issues and opportunities for the 2020s, bringing in themes that were explored during the 2014 ISMF conference on Blue Growth and issues headlining during 2020, to provide a comprehensive forward-looking view. For example:

- Improvements to the marine protected area network across the Irish Sea
- The implementation of marine planning by jurisdictions around the Irish Sea
- The UK's withdrawal from the European Union
- A renewed focus on global challenges such as climate change, invasive species and plastics in the marine environment

To develop a comprehensive picture of the future for the Irish Sea and its communities on a whole Irish Sea scale the survey asked questions to determine:

- What are the current and future issues and challenges?
- What are the current and future opportunities?
- What new legislation/policy, etc., is in place or due to be enacted?
- Which issues have gained new prominence?
- What key projects are taking place around the Irish Sea?
- What recovering from the COVID-19 pandemic might mean for the Irish Sea and its communities both in terms of challenges and opportunities?

The survey used a thematic approach, but with the understanding that many issues are cross-cutting, particularly themes such as climate change.

The information collected during the survey will be used by the Forum and its partners to:

- Extend understanding of what makes the Irish Sea special for those who use it or live around it.
- Produce a report (this report) looking to the future and responding to the changing context of the Irish Sea in the 2020s; this will be freely available.
- Showcase current project work and future project opportunities around the Irish Sea via inclusion of projects on the ISMF website
- Provide evidence of the benefits of trans-national multi-sector stakeholder partnership work
- Supply evidence for a University of Liverpool Impact Case Study[1] on the value of the Irish Sea Maritime Forum

Over 1000 individual comments were received across the full range of themes explored. Some of the comments included multiple points and many had relevance for more than one theme, so where appropriate, this is reflected in the analysis given in the thematic sections of this report.

It is important to note that the report attempts to provide as faithful an account possible of the comments made; comments made by respondents have not been checked for accuracy.

Number of Comments per Theme
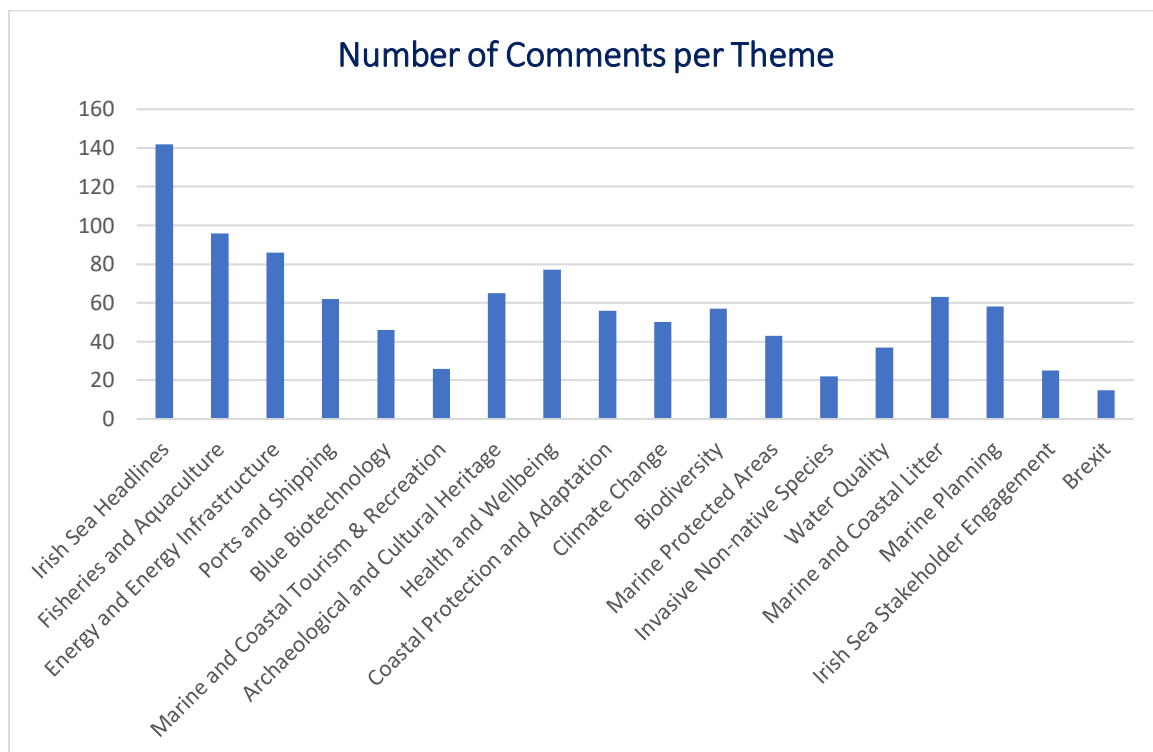
The results presented in this report provide a preliminary picture of what the future and changing context of the Irish Sea in the 2020s might be and further work will be done to explore and validate the conclusions.

The findings from the survey will be presented and further discussed at the next Irish Sea Maritime Forum conference.

[1]The University of Liverpool is developing an Impact Case Study which includes work on the Irish Sea Maritime Forum and projects which have benefited in some way from the Forum's existence, e.g., by bringing partners together, networking, or funding or other workshops. Impact Case Studies show how the research work of higher education establishments has had an effect on, changed or provided benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia.

The Irish Sea Maritime Forum

The Irish Sea Maritime Forum, established in 2012, aims to:

- provide a broad-based forum for all Irish Sea users and provide an opportunity for voices to be heard
- facilitate marine planning knowledge exchange and capacity building across all administrative areas and sectors
- facilitate sharing of data and information
- encourage and maintain political support for transnational partnership working in support of marine planning, with the aim of promoting sustainable development in the Irish Sea region
- facilitate a more coordinated, efficient planning process for transnational issues/projects and good working relationships among Irish Sea partners

It is managed by a voluntary Steering Group with representatives from all six Irish Sea administrations, including Government agencies, universities, NGOs and industry representatives. The current Chair is Irish Senator Gerry Horkan. A small voluntary secretariat is provided jointly by Liverpool University and the North West Coastal Forum.

For more information about the ISMF and its work see www.irishseamaritimeforum.org.uk

Image: Irish Sea Maritime Forum Conference January 2019, Cardiff, Wales
Left to right: Joe Smithyman – MMO, Roger Pullin - Irish Sea Centre, Kirsty Lindenbaum - Natural Resources Wales,
Rhona Fairgrieve, Scottish Coastal Forum, Senator Gerry Horkan, Seanad Éireann

Image credit: Caroline Salthouse

Section 1: Irish Sea Headlines

Why is the Irish Sea important to people? What makes it special to them?

Different stakeholders have different perspectives on the Irish Sea and its value to them and the survey aimed to capture a wide range of different views on the reasons why the Irish Sea is an important and special place in order to develop a set of key **Irish Sea Headlines** which can be used by organisations developing policy or projects in the Irish Sea area.

These headlines – developed on a whole-Irish Sea basis – will help organisations have a better understanding of the context within which their proposed policy or project sits and could provide opportunities for more joined-up thinking and working across the administrative and other boundaries of the Irish Sea.

Respondents were asked to describe what makes the Irish Sea special to them or their sector and to list the top three most important items from this description. The results for the top three most important items are summarised in the graphic below.

What make the Irish Sea special?
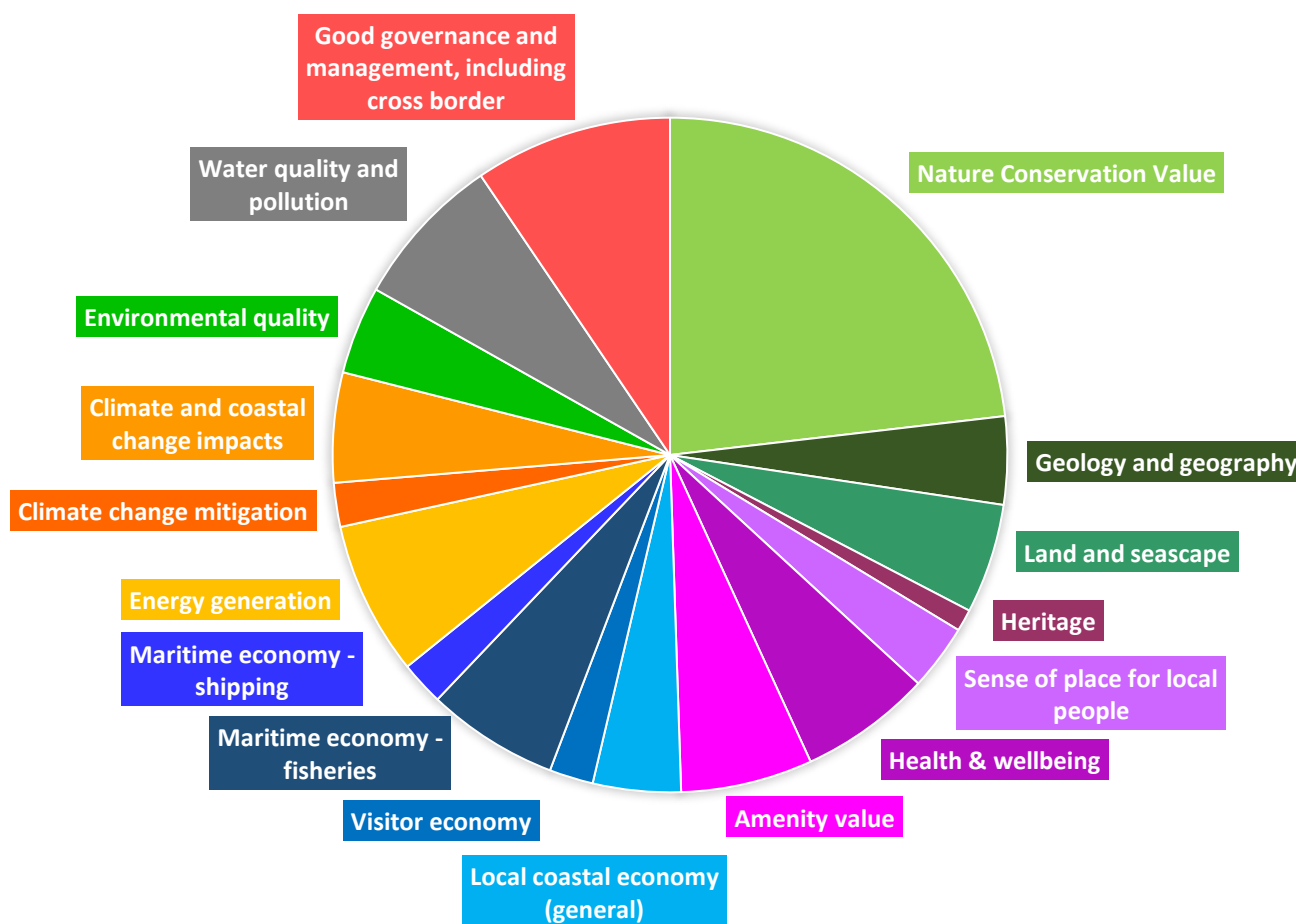
Summary and Draft Headlines

What makes the Irish Sea special? Overwhelmingly the responses indicate that the Irish Sea's environmental qualities are a key factor, with responses citing environmental aspects of the Irish Sea totalling 46% of all the comments received.

The nature conservation value of the species and habitats of the Irish Sea was the most noted feature, accounting for 23% of the responses, with other factors such as water quality (7.5%), climate change impacts and mitigation (7.5%), geology and geography (4%) and general environmental quality (4%) also being cited as important.

Economy and society each made up 22% of the comments. Economy included the general coastal economy and the visitor economy (totalling 6.5%), shipping (2%), fisheries (6%) and energy generation (7.5%).

Societal aspects that were noted as important included health and wellbeing (6%) and amenity value (6%). Land and seascape (5%) are also included here; they could have been included in environmental quality above but as they are aesthetic concepts they have been included in society, along with sense of place (3%) and heritage (1%).

Good governance and management – including cross border governance, made up the remaining 10% of responses.

For a full account of all the comments received see Annex 1: The headlines in more detail.

Draft headlines:

- The **diversity of wildlife and habitats of the Irish Sea are highly important and valued** for their contribution to marine and coastal biodiversity and the network of Marine Protected Areas for internationally important species and habitats. As well as being important in its own right **the natural environment of the Irish Sea offers benefits for climate change mitigation, amenity** (e.g., recreational fishing, landscape value) **and the health and wellbeing** of both coastal communities and visitors to the Irish Sea and its surrounding regions. **Threats to the Irish Sea include invasive non-native species, climate change and pollution**, including plastics.

- **Socio-economic benefits derived from working on and living in close proximity** to the Irish Sea are important for Irish Sea communities:

    - **Economic benefits:** A **wide range of coastal and maritime industries** – in particular tourism, ports and shipping, fisheries and energy generation - **support local jobs**.

    - **Social benefits:** People **enjoy the amenity value** the Irish Sea and its coastline provide to them, including **opportunities for recreation and exercise** and the **more intangible benefits for health and wellbeing** provided by enjoying **open spaces and attractive views**.

- **Cross-border governance** is a key feature of the Irish Sea, with 6 national administrations, and good governance and management of activities to provide **long term environmental sustainability** for the Irish Sea area are important to Irish Sea stakeholders.

Section 2: Irish Sea Economy

The Irish Sea has a strong and vibrant maritime economy encompassing many sectors and many different uses of the Irish Sea and its surrounding coastlines. These range from traditional industries such as fisheries, ports and shipping, to new opportunities arising from developments in blue biotechnology and renewable energy which are providing skilled employment for the communities around the Irish Sea. This section covers:

2.1 Fisheries and Aquaculture

2.2 Energy and Energy Infrastructure

2.3 Ports and Shipping

2.4 Blue Biotechnology

2.5 Marine and Coastal Tourism & Recreation

Respondents could also add any themes they felt were missing.

As part of the research respondents were asked to identify up to 3 top issues and opportunities for each thematic area. The following table gives a summary 'snapshot' of the top issue and top opportunity identified for each theme. However, these are indicative and should not be taken in isolation; the result here is based on groupings of similar comments which is a subjective process and respondents were not asked to weight their points. Occasionally the results are tied hence 2 or more points are given.

Theme	Top issue	Top Opportunity
Fisheries and aquaculture	Brexit*	Fishers' involvement in research & data. Irish Sea-wide cooperation on a range of issues.
Energy and energy infrastructure	Financial issues (energy price, lack of investment)	Promotion and use of 'greener' energy
Ports and shipping	Brexit*. Pollution from shipping.	Environmental improvements to ports and shipping. Expansion and diversification of activity.
Blue biotechnology	Environmental issues	Products for people and the planet
Marine and coastal tourism & recreation	Access and facilities	Development of geo and eco-tourism

*The withdrawal of the UK from the European Union

Fishing image credit: Colin Tennant

Other image credits: Caroline Salthouse

2.1 Fisheries and Aquaculture

Fishing in the Irish Sea has a long history and remains fundamental to the economic and social well-being of many rural coastal areas across the Irish Sea region.

In the past, the Irish Sea supported a large and varied fleet, which landed a diverse range of species. Nowadays the majority of larger vessels focus on Nephrops, otherwise known as Dublin Bay Prawns. Other vessels target scallops and crabs. The majority of fishing effort is focused in the North West quarter of the Irish Sea, between Northern Ireland and the Isle of Man. There is also a significant amount of shellfish aquaculture in the western and northern areas of the Irish Sea and economically significant wild shellfish beds, particularly on the eastern side of the Irish Sea.

Fisheries management in the Irish Sea involves 6 national administrations and differing management and enforcement arrangements for inshore and offshore fisheries within national waters.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for fisheries and aquaculture.

"Public awareness and support is key to growing the fisheries industry. "

Sectors / interests represented in responses to Fisheries and Aquaculture *(17 respondents; some had more than one interest)*
Not given (4)
Local residents (3)
Governance, law and planning (2)
Ecology /marine ecosystem (2)
Environment (1)
Inshore fisheries (1)
All sectors (1)
Recreational fishing (1)
Marine science and research (1)
Agriculture (1)
Offshore renewable energy (1)
Coastal management (1)

Lobster fishing, Solway Firth, Scotland

Image credit: Colin Tennant

Current Issues and Challenges

Sustainability of fisheries was a key current issue, mentioned directly by 4 of the respondents and indirectly by many more. Challenges around **environmental sustainability** of fisheries include **over-fishing**, the **need to protect fish stocks** within national waters, and the need to work together to **match fishing effort and quotas to changing stocks**, together with **a lack of knowledge of species and stocks**. Agricultural run-off was also mentioned as an issue due to its impact on **water quality** and hence fish stocks. **Electrofishing** was raised as an issue due to its impact on fish embryos and plankton. Challenges to **economic sustainability** include **the increasing development of sea space** for example with offshore renewables.

Governance issues were also flagged; with **'opaque/confusing multi-layered regulation'** and **'fragmented administration'** being cited, along with government industrial support and aid.
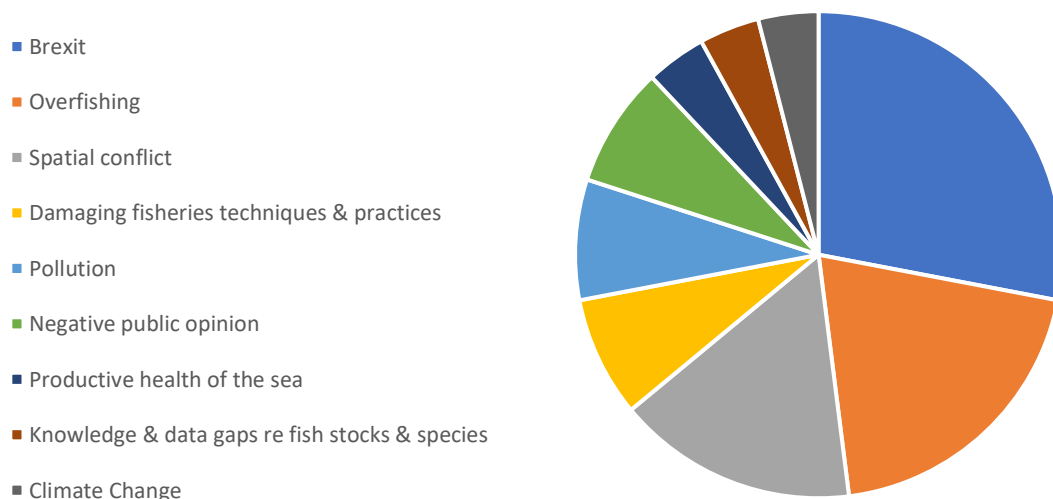
Future Issues and Challenges

Many of the issues which currently exist were also seen as future issues, particularly those around **overfishing** and the **need to avoid overexploitation of fish stocks**, and **spatial conflicts**, for example with renewable energy projects and Marine Protected Areas. There were, however, some interesting additions including the mention of **'growing public opposition'** to fishing and **'countering unfounded negativity concerning aquaculture'**. **Marine litter and pollution** and their impact on fishing were mentioned, along with **warming seas**. One respondent was particularly concerned with the negative **impacts of allowing electrofishing** on other fisheries and the marine ecosystem.

Brexit (the withdrawal of the UK from the European Union) was flagged as a key future issue with a lot of comments relating to the impact of Brexit on fishing rights and the **ability to export and trade** after the exit from the EU, with potential loss of trade agreements or routes to market, for example it was noted that **'routes to market are key and most of the shellfish from the Irish Sea goes to the EU'**. The fear of overfishing by other nations within national waters despite Brexit was also mentioned.

The likely **impacts of COVID-19** were seen as potentially severe for communities and the fishing industry around the Irish sea due **to problems of social distancing on fishing vessels**, **the collapse of local fishing industries** in part due to **issues with the trade and export market for fish** and **diversification of those losing jobs and income into other areas of the economy** (although it was noted that this is also an opportunity). The **cost of local fish for consumers** was also raised as a possible issue.

'Top 3' Future Fisheries and Aquaculture Issues

- Brexit
- Overfishing
- Spatial conflict
- Damaging fisheries techniques & practices
- Pollution
- Negative public opinion
- Productive health of the sea
- Knowledge & data gaps re fish stocks & species
- Climate Change

Opportunities

Current Opportunities

A range of **environmental** opportunities were listed including **improved fishing gear** to reduce impacts and improve selectability, and **taking a greener approach** – it was noted that Irish aquaculture has a very good standard and therefore image. Nature protection is seen as important with one respondent suggesting **using management that improves fisheries and conservation objectives**. There are also opportunities for **collaborating with marine energy providers**. **Involvement in science and data collection** was also noted as an opportunity.

Economic opportunities include catching more with reduced effort, the **promotion of local seafood**, equitable sharing of catches and market, and further **development of fish farming including shellfisheries**; one respondent suggested that rebranding responsible aquaculture as 'aquatic farming' would lead to greater acceptance alongside agriculture. Diversification was also mentioned, for example by **diversifying to catch species not normally targeted** such as squid, or by moving into **seaweed farming or the offshore energy supply chain**. It was also noted that there may be a **revitalisation of the domestic market** depending on future trading arrangements. The opportunity for **aquaculture opportunities linked with marine energy infrastructure** such as tidal lagoon power schemes was mentioned as a missing economic theme but fits well here so is noted here and also in 2.2 Energy and Energy Infrastructure.

Future Opportunities

As with issues above many of the future opportunities listed by respondents are the same as the current opportunities mentioned, however there were some important additions. These include **Irish Sea-wide cooperation on**:

- stock assessment,
- fishing rights,
- market access,
- environmental monitoring,
- pollution prevention, and
- development of responsible aquaculture, and its rebranding.

Other **economic** opportunities include more **promotion of local seafood** and **selling fish locally**, e.g. at the local harbour. It was also noted there may be **greater unity of the fishing industry post-Brexit**. The **potential to increase marine tourism related to fishing** such as yacht charter, and **fish farm development** in the more sheltered waters around the Irish Sea, together with the opportunity for **seaweed farms to provide biomass for energy production** were also mentioned, along with collaboration with the marine energy sector with the possibility of **multi-use areas** and the opportunities for **sector diversification** as a result of offshore energy developments.

Environmental opportunities, in addition to those listed in Irish Sea-wide cooperation above and in current opportunities above include **greater sustainability**, **collaboration with research institutions** including the opportunity to **engage fishers to carry out marine research** and get them involved with **marine litter reduction work**. The **introduction of more Marine Protected Areas** was seen as an opportunity, and there was a call for the reintroduction of the 3-mile limit in order to **develop sustainable fisheries which are ecologically viable**.

Opportunities for fisheries & aquaculture arising from **adapting to and recovering from the COVID-19** pandemic included **more local sales** and shopping and **increased emphasis on local produce and markets** with one respondent stating: **"There has been some diversification of retail opportunities by direct selling of catch locally."** Another respondent stated: **"With new post EU status there is the opportunity for a government-led potentially incentivised Buy British initiative/campaign to encourage local/national support for the fishing industry."** **Diversification into other areas of the economy** was also raised as an opportunity (and an issue).

'Top 3' Future Fisheries and Aquaculture Opportunities

- Irish Sea-wide cooperation on a range of issues
- Fishers' involvement in research & data
- Fishing gear and technique improvements to reduce impacts
- Local sale of locally-sourced fish / seafood
- Co-location of activity
- Sector diversification - renewable energy
- Managing for both fish and conservation
- New Marine Protected Areas
- Aquaculture expansion
- Fishers' involvement in marine litter reduction
- More unified fishing industry post BREXIT
- Greater sustainability
- Sector diversification - fisheries-related tourism
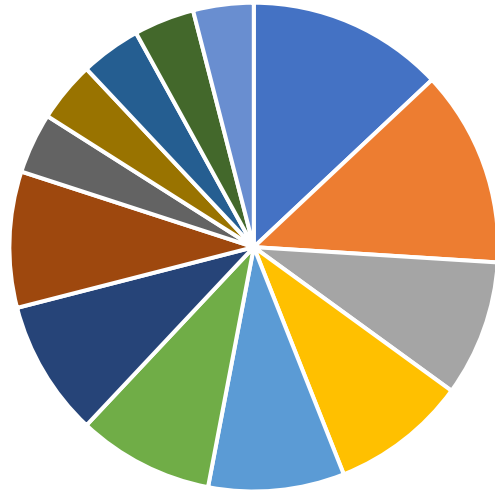
Fisheries and Aquaculture

Legislation and Policy

New legislation, policy, etc., recently put in place or due to be enacted that might impact fisheries & aquaculture

- A new **Northern Ireland Energy Strategy** is being developed
- The Irish Government is pursuing offshore wind as part of its **Climate Action Plan**
- **Brexit* and its aftermath** – one respondent noted that **"The Brexit issues hardest to resolve are fisheries-related."**
- **Common Fisheries Policy Fisheries Bill (UK)**
- potential **Highly Protected Marine Areas (UK)**
- **National Marine Planning Framework (Ireland)**
- Allowing **electrofishing**
- Welsh National Marine Plan (and other nations' marine plans)
- Environment (Wales) Act 2016
- Marine Area Statement (Wales)
- Well-being of Future Generations (Wales) Act 2015

The withdrawal of the UK from the European Union

Mussels (Mytilus edulis), Anglesey, Wales

Image credit: Caroline Salthouse

2.2 Energy and Energy Infrastructure

Renewable Energy: The Irish Sea is an important area for offshore wind development, with over 2937 MW of production capacity already installed and further wind farms planned. The largest pre-commercial floating windfarm in the world is currently planned as a Crown Estate test and demonstration project off the Pembrokeshire coast. The high tidal range of areas of the Irish Sea such as the Mersey estuary make tidal energy – tidal stream, barrages and lagoons – an active area of investigation and new technology may make other forms of renewable energy such as wave and algae farming viable.

> *"Releasing areas of the seabed from Crown Estate and Crown Estate Scotland may lead to new offshore wind opportunities."*

Nuclear: Currently there is only 1 nuclear power station on the Irish Sea coast – Heysham (comprising Heysham 1 and 2). However, sites at Wylfa on Anglesey and Moorside in Cumbria have been put forward as suitable for new nuclear build to replace the UK's ageing nuclear power stations. The Scottish and Irish Governments have both stated that no nuclear power stations will be built within their jurisdictions.

Sectors / interests represented in responses to Energy and Energy Infrastructure *(13 respondents; some had more than one interest)*
Energy (1)
Offshore renewable energy (1)
Governance, law & planning (1)
Ecology / marine ecosystem (2)
All sectors (1)
Marine science & research (2)
Agriculture (1)
Coastal management (1)
Coastal tourism (1)
Local residents (3)
Not given (3)

Oil and gas: The eastern Irish Sea contains several oil and gas fields, for example the Morecambe gas fields and the Lennox oil field. Some are nearing the end of their operational life but some are yet to be exploited.

Energy Infrastructure: All energy installations require sub-sea cabling and / or pipelines with landfall – for example oil gas pipelines come ashore at Barrow (England) and Point of Ayr (Wales). Access to port facilities is needed during build, routine operation and maintenance along with decommissioning. All require in-sea structures such as turbines and rigs, some potentially mobile but most static. Energy interconnectors should also be considered here – for example the new Greenlink interconnector between Ireland and Wales, or the Moyle which connects Great Britain with Northern Ireland.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for energy and energy infrastructure.

Walney Offshore Wind Farm, England

Image credit: Caroline Salthouse

Issues and Challenges

Current Issues and Challenges

Governance issues were of major concern to respondents, including a **lack of legislation, policy**, for example on the decarbonisation of the energy sector, and **a lack of government financial support** leading to greater **uncertainty for developers.** Other issues raised included **friction between administrations** (central and devolved) and the **reluctance to support long-term infrastructure projects** where the project time frames are longer than the election cycle as well as the need for **co-ordination between onshore and offshore planning** regimes. In addition to the more political issues raised above several respondents cited issues with the consenting process, one noting there is **"multi-layered marine regulation and licensing confusion."** The need to **accelerate the transition from hydrocarbon-based generation to alternative sources** was noted.

A range of **financial issues** were also flagged up as important. One respondent stated **"The greatest problem with the marine energy industry is the failure to actually support it through consenting and financially. These projects are much longer-term than the election cycle and whilst outwardly there is significant verbal support there is little appetite of ability to openly support the industry with financially or legislatively. These projects have potentially a 100+ year lifespan and require support on a national level, fully backed by the government, political parties and immune from election related timescales. However, it is also essential that there is the funded coastal and marine research to support the industry and a national marine energy plan."** Other respondents mentioned, as well as a **lack of government financial support** mentioned above, a general **lack of investment**, **issues with the accounting conventions for the cost / benefit analysis of renewables,** the problem of trying to provide **competitively priced energy compared with existing traditional sources** and a **lack of funding for national marine research**.

Infrastructure and connectivity issues raised included not only the **competition for coastal space** and the **"need to reconciling energy infrastructure with environmental stewardship and other users"** but also **access to suitable offshore sites**, and **grid infrastructure** – with one respondent noting that the current grid infrastructure in southern Scotland is already at maximum capacity so new renewables would need new grid capacity to connect into. The **distance from the source of energy generated to areas of demand/market** was also raised, as well as associated infrastructure needs such as **better road provision to ports**.

Public acceptability of energy generation methods and renewables infrastructure was also raised as a challenge, with two respondents expressing concerns about wind farms: with **" 'Fencing in' of Liverpool Bay by wind turbines"** and **"Too many wind turbines destroy the scenery and sealife"** and another suggesting that **nuclear power should stop being used**.

Future Issues and Challenges

Financial issues and **visual impact** were the two themes receiving the most comments, with 21% and 17% of comments respectively. A general **lack of investment** coupled with **issues around route to market**, assessment of **end-to-end costs and time discounting** and, critically **"How much extra are consumers willing to pay for 'green energy'?"** were all mentioned.

Socio-economic issues included the visual impact of offshore development on both tourism and the attitude of the general public, with one respondent asking **"How to accommodate sudden (in the public eye) large scale offshore development."** and another stating that there could be a **"Feeling of wild open space lost with resulting negative impact on tourism industry."**

Economic issues included operational issues such as **grid capacity**, how **quickly the change from hydrocarbons to alternative sources can happen**, with one respondent asking **" Should additional exploitation of natural gas fields be allowed in the interim?".** The **impact on other industries** was also mentioned, for example the loss of fishing grounds (e.g. when space is given over exclusively to renewables) and other spatial conflicts with traditional users of sea space.

Environmental issues raised included the **impact on protected areas** and **pollution in general**, but 2 respondents also mentioned the **disposal of nuclear waste**. Gaps in knowledge, for example geological and geophysical baseline data, were flagged, together with a lack of funding for research.

Future Issues and Challenges (cont.)

Governance issues including **"Consenting confusion"** and **"A need for recognition of the role of geosciences in coastal zone planning".** Another noted that there was a **lack of international co-ordination with regard to carbon capture and storage** in the Irish Sea (energy infrastructure has the potential to be used for carbon capture and storage).

The **impacts of COVID-19** were thought likely to be **budget constraints** on both public and private sector budgets, **more interventionist governments** and **"legislative lethargy"** post COVID-19.

'Top 3' Future Issues for Energy and Energy Infrastructure

- ■ Financial issues (energy price, lack of investment)
- ■ Visual impact
- ■ Pollution and nuclear waste
- ■ Spatial conflicts with other users and uses
- ■ Science and data gaps
- ■ Planning, consenting and cross-border cooperation issues
- ■ Operational issues and timeframe for the switch to renewables
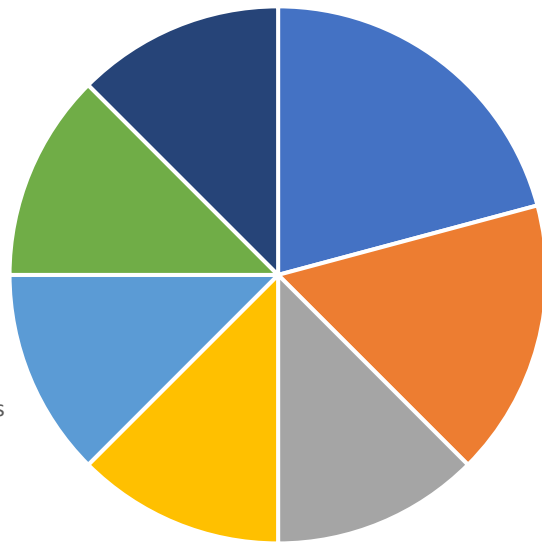
Energy and Energy Infrastructure

Opportunities

Current Opportunities

The majority of comments related to the opportunities for **increasing renewable energy production**, from wind, wave, tidal – including tidal barrages - and small-scale hydro-electric systems. There was also the suggestion of use of **"Constrained renewables* to produce clean gases".** One respondent mentioned that there are still **opportunities around a non-renewable source – gas**, another mentioned rising energy consumption and the **"reluctance to use nuclear and fossil fuels"** could help renewables development.

Social and **environmental** benefits include opportunities for **citizen community energy**, **marine conservation enhancement in wind farms** and **carbon capture and storage** in depleted gas fields or saline aquifers.

Economic benefits include the **opportunity of combining marine energy infrastructure with coastal protection, tourism and aquaculture**, for example through tidal lagoon power schemes - this was mentioned as a missing economic theme but fits well here so is noted here and also in 2.1 Fisheries and Aquaculture, 2.5 Marine and Coastal Tourism and Recreation and 3.3 Coastal Protection and Adaptation.

Governance opportunities include one respondent commenting that **"Clearer legal and policy framework will push development in the Irish part"** and another suggesting **"Post EU exit optimism for large scale infrastructure projects leading to job creation and green energy production."**

Future Opportunities

As with current opportunities **expansion of offshore renewables**, particularly wind and tidal, were seen as key future opportunities supported by the **promotion of and encouragement to use 'greener' energy sources**, with one respondent suggesting there may be a **"Post EU exit national green energy boost". Greater electrification of transport and heat**, together with **subsidies to promote supply and use of 'green' energy**, and the **contribution renewables make to climate action**, were cited. The **production of clean gases** such as hydrogen and other green gasses could offer other opportunities.

Expansion of renewables could bring **socio-economic benefits to local communities**, and **co-location of activities**, for example in offshore wind farms, was mentioned by several respondents, with one stating **"Multi-industry collaboration, i.e. marine energy - tourism – aquaculture"**, and another mentioning the potential **ecological benefits** arising from **new habitat development** such as artificial reef on structures.

The importance of **government funded coastal and marine research**, and opportunities for **new geological and geophysical data collection** were mentioned, along **with pilot projects, for example for tidal energy**, and **studies to enhance planning and modelling for infrastructure development** or **feasibility studies for example for carbon capture and storage** using energy infrastructure.

Opportunities arising from **adapting to and recovering from the COVID-19** pandemic included the possibility of **changes to funding opportunities as governments want to build the economy**, which may include renewable energy development. One respondent said there are **"More opportunities than challenges. Big emphasis in the coalition* programme."** Another thought there would be a **"Post COVID-19 environmental gains-wave and public support for green energy".**

Irish Government coalition programme – see Programme for Government: Our Shared Future

'Top 3' Future Opportunities for Energy and Energy Infrastructure

- Promotion and use of 'greener' energy

- Research, data and pilot studies

- Co-location / use of space for shared benefits

- Expansion of offshore renewables

- Coastal community benefits from offshore renewables
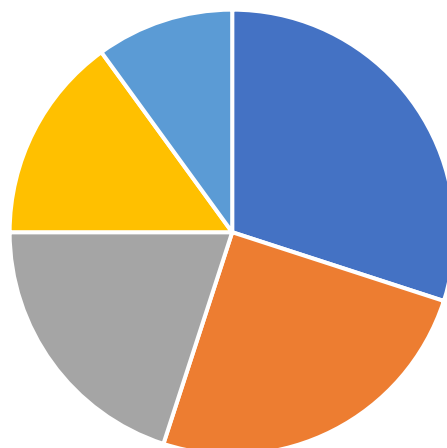
New legislation, policy, etc., recently put in place or due to be enacted that might impact energy and energy infrastructure:

- New Northern Ireland Energy Strategy being developed
- New Climate Change legislation in process on the Isle of Man
- Policy and legislation around Marine Protected Areas
- The release of areas of the seabed from Crown Estate and Crown Estate Scotland may lead to new offshore wind opportunities
- Irish National Marine Planning Framework and Marine Planning and Development Management Bill*
- Welsh National Marine Plan (and other nations' marine plans)
- Welsh Offshore Renewables Energy Programme
- Environment (Wales) Act 2016 sets decarbonisation targets, etc.

Post-survey note: now renamed as Maritime Area (Planning) Bill

Heysham 1 and 2 Nuclear Power Stations, England

Image credit: Caroline Salthouse

2.3 Ports & Shipping

Approximately 95% of the UK's and 99% of Ireland's total volume of import and export trade arrives by sea, making ports and shipping essential to economic wellbeing.

The Irish Sea has historically been an important area for ports, shipping and shipbuilding activities and continues to be in the present day, with several major ports, including Liverpool, Glasgow, Belfast and Dublin, with Cardiff just to the south and Douglas on the Isle of Man, providing vital links for both passengers and goods between the UK, Ireland, Isle of Man and to mainland Europe and beyond. There are many smaller ports around the Irish Sea, providing important links for short sea shipping, landing fishing catch, smaller passenger ferries and servicing of offshore infrastructure.

Sectors / interests represented in responses to Ports & Shipping *(13 respondents; some had more than one interest)*
Renewable Energy (1)
Governance, law & planning (2)
Ecology / marine ecosystem (2)
All sectors (1)
Marine science & research (1)
Environment (1)
Coastal tourism (1)
Local residents (3)
Not given (4)

The sector also has an important role in some cases as a port authority – whether this is a privately or state-owned company - managing ports for a wide range of activities including freight, passenger transport and fisheries, as a land developer, dredging areas for port expansion and maintaining navigable waterways that can reach far inland, and in providing support vessels for offshore energy producers.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for ports & shipping.

Heading out to the Irish Sea from Port of Manchester Ship Canal, Mersey Estuary, England

Current Issues and Challenges

A range of **economic** issues were raised, including the **increases in ship size** and the problems this creates for smaller ports which may not be able to accommodate them, and the constraints on ship size caused by **water depth on port approaches**. One respondent commented on the **cost of upgrading port facilities** and others mentioned the need for **dredging**, with one stating **"In the Inner Solway the main challenge is the moving sands and need for regular dredging which is very expensive. This makes is difficult to develop / maintain small ports."** **Connectivity of ports inland** was also raised as an issue, for example road links to/from the motorway network for the port of Cairnryan. Other challenges include the **increasing cost of fuel for shipping** and **costs associated with compliance with IMO fuel regulations** along with **increasing competition for space in the marine and coastal zones**. The **decline in cruise liners and loss of traditional industries** and **historic ferry routes** also impact on ports in the Irish Sea.

Environmental concerns include the **impacts of climate change** and the risks associated with the resulting **more extreme weather conditions**.

The **impact of the UK's exit from Europe** and the challenges posed by **the COVID-19 pandemic** were also noted.

Future Issues and Challenges

Brexit – the withdrawal of the UK from the European Union - was seen as the biggest future challenge; at the time of the survey the Brexit negotiations were still underway creating **uncertainty**. One respondent noted that **"Stranraer possibly to end up as huge lorry park. There is no room at Cairnryan for stacking lorries in case of extra checks."**

Another challenge was the **effect of the pandemic on cruise traffic** and the resultant **loss of cruise tourism**, with uncertainty in terms of how long this downturn could last. The **loss of traditional industries** and the **need to adapt** going forward were also mentioned.

Port connectivity was again raised as an issue, with several respondents mentioning challenges around **road access to ports** – in particular the A75 and A77 in Scotland which link the motorway network to Cairnryan and the infrastructure for overland access to the Port of Liverpool. One respondent noted **"The road access in Northern Ireland is far superior to that in Scotland."**

A range of **environmental** issues were raised including the **need to comply with IMO regulations for a cleaner environment**, **pollution in general**, and **shipping-related litter**. Another issue raised was the potential for **transfer of marine invasive non-native species between ports.**

Challenges relating to **adaptation to and recovery from COVID-19** included a **drop in passenger numbers**, which could later be made worse by the impacts of Brexit, and **social distancing requirements on ferries reducing capacity**, potentially resulting in **not enough ferry crossings to meet tourism demand**, and the **general movement of people and goods being limited at certain ports**. One respondent mentioned **"The difficulty in managing long term land needs, due to massive shrinkage of the economy, skews demands/needs."**

'Top 3' Future Issues for Ports & Shipping

- Brexit
- Pollution from shipping
- Road access to ports
- Reduction in cruise tourism/traffic due to COVID-19
- Invasive Non-native Species transfer
- Adapting to new needs
- Loss of traditional industries
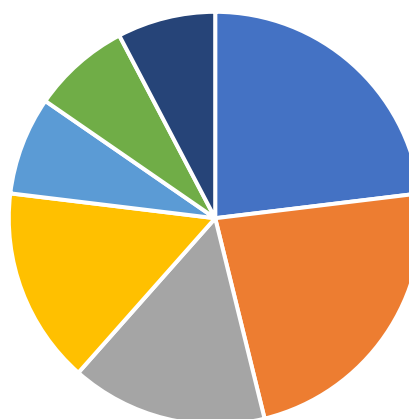
Opportunities

Current Opportunities

A range of **economic** opportunities were put forward, including **enhanced port facilities**, for example at Liverpool, and **trade outside the EU**, particularly after Brexit. **Improved facilities for fish sales to the public** at ports was noted as a missing economic theme but fits within ports and shipping so is mentioned here.

Expansion of marine aggregates extraction and the **growth of offshore renewables** were mentioned as both would require port facilities and offer opportunities for boat-based business, and several respondents commented on opportunities for **diversification of port activity at the smaller ports** around the Irish Sea, for example **servicing of offshore wind** or **provision of marine leisure facilities,** with one respondent stating there are **"Opportunities for diversifying small ports to allow for a wider range of activities such as recreational: skiff rowing, sailing, paddle boarding, etc."** One respondent mentioned the possibility of reinstating a passenger ferry at Mostyn.

One respondent noted the environmental opportunity of the **"Transition to greener systems, including electric-powered vessels."**

Future Opportunities

More than a third of respondents listed **environmental improvements** to ports and shipping operations in their 'top 3' opportunities. These included the **drive for low carbon fuels**, **'greener' ports** (as defined by the EU), working with ports and shipping to **promote Fishing for Litter** or other similar initiatives, **research and development for electric-powered vessels** and **installation of vertipools on port infrastructure** (vertipools are artificial rock pools that provide new wildlife habitat).

The same number suggested opportunities around **expansion and diversification of activity** including **new port users**, ports acting as **renewables hubs**, and the possibility of **creating new ferry routes**. One respondent suggested that as part of the **recovery from COVID-19** there may be opportunities for **"Diversification into the low carbon energy production/supply chain."**

Opportunities around **better community integration and shared benefits** included **community energy built around ports and harbours**, better **integration with urban areas** and **benefits for rural areas** and the possibility of the private sector – for example large shipping companies – **funding environmental coastal work**.

Improved port access was a direct plea from one respondent for the dualling of the A roads connecting Cairnryan to the motorway network to make **access to and from the port easier**.

One respondent considered that **adapting to or recovering from COVID-19** might provide an **opportunity to ports to become more locally focused**.

'Top 3' Future Opportunities for Ports & Shipping

- Environmental improvements to ports and shipping
- Expansion and diversification of activity
- Better community integration and shared benefits
- Improved port access

Legislation and Policy
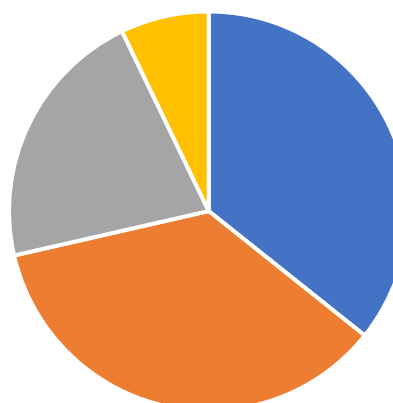
New legislation, policy, etc. , recently put in place or due to be enacted that might impact ports & shipping:

- Brexit* Agreement
- Indirect impact of the policies allowing development of offshore wind onto ports and shipping
- It is an industry sector in the Welsh National Marine Plan
- Other nations' marine plans

*The withdrawal of the UK from the European Union

Belfast Harbour, Northern Ireland

Image credit: Caroline Salthouse
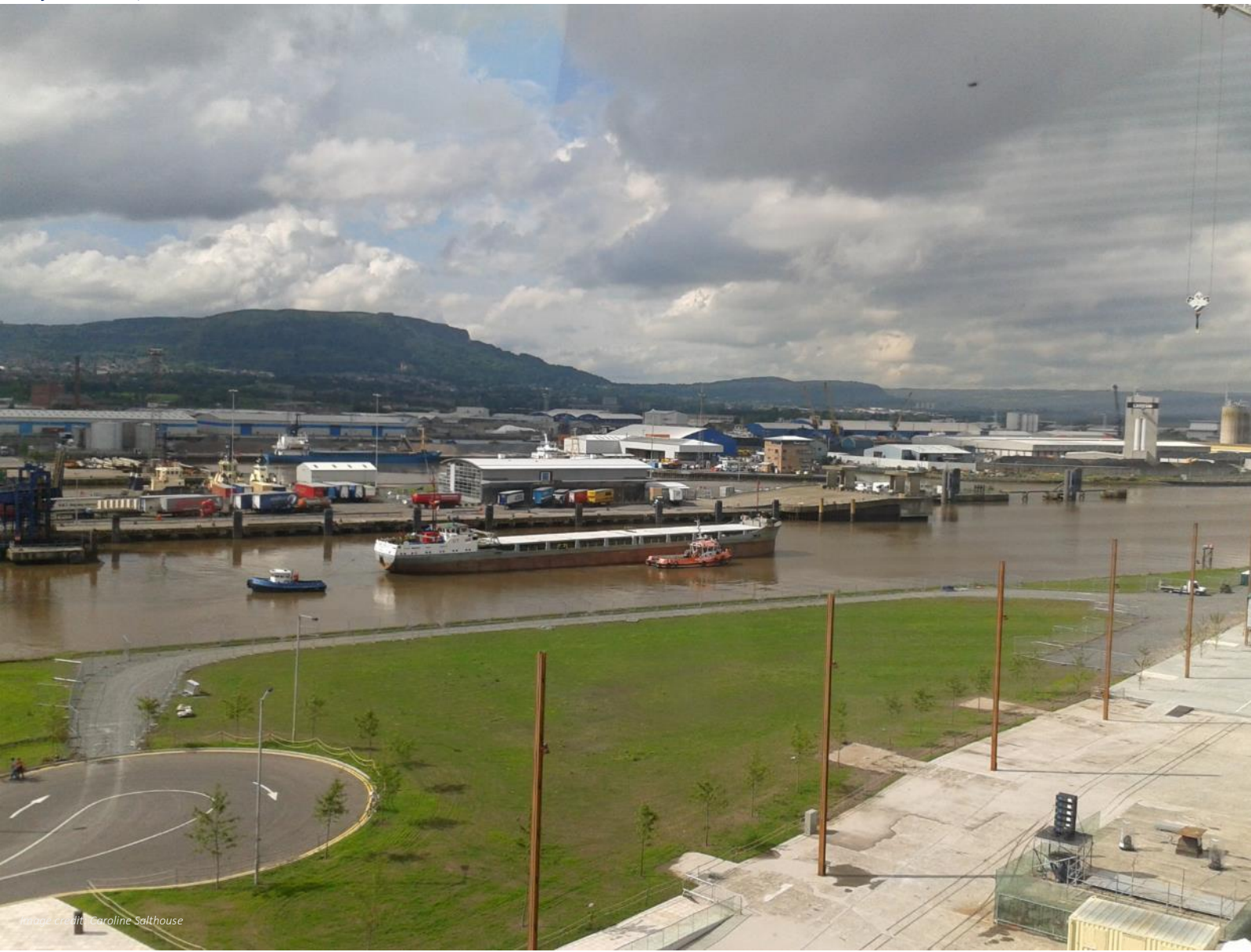
2.4 Blue Biotechnology

The OECD defines blue biotechnology as 'The application of science and technology to living organisms from marine resources, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services'. It is a relatively new field of technology that makes use of aspects of marine biological resources (plants and animals) to develop new products or processes for 'smart' food, animal feed, biofuels, biomaterials, health care and pharmaceutical products, cosmetics, bioremediation, industrial enzymes, etc. Marine life has adapted to thrive in extreme conditions and this diversity can lead to the development of innovative new products with high economic or social value. One example is the use of proteins derived from luminescent marine animals to mark human cancer cells.

As technology improves, enabling greater exploration of the sea and industrial techniques improve this sector has the potential of contributing strongly to economic growth and to provide skilled new jobs, whilst supporting sustainable development, public health, and environmental protection.

Sectors / interests represented in responses to Blue Biotechnology *(9 respondents; some had more than one interest)*
Offshore Renewable Energy (1)
Ecology / marine ecosystem (2)
All sectors (1)
Marine science & research (1)
Local residents (3)
Not given (3)

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for blue biotechnology.

Seaweeds – Fucus serracus and Polysiphonia lanosa

Image credit: Caroline Salthouse

Issues and Challenges

Current Issues and Challenges

Challenges include a **lack of knowledge of the marine environment**, with one respondent stating **"The greatest issue surrounding the marine environment is the lack of data and especially marine systems scale data at a spatial level. This transcends all industries in the marine environment."** Others also picked up on the lack of knowledge and the **difficulties accessing resources,** including research and funding.

Regulatory issues, potential **conflict with other economic activities** and **issues around invasive species** were also raised by respondents.

Blue biotechnology was considered to be an **undeveloped economic activity** in the Irish Sea; **"Working together Irish Sea-wide and with global partners to develop new products and processes, with increased funding."** was seen as a challenge, with a possible **lack of general interest** and other respondents considered that **public awareness and perception** of blue biotechnology was an issue.

Future Issues and Challenges

The key environmental issues for blue biotechnology were seen as climate change, pollution and over exploitation of natural marine resources.

Development and operational issues included blue biotechnology being considered **"very niche still"**, along with **inadequate funding for research and development** and **potential conflict with other marine users**, for example fishing or recreation.

Regulation was seen as a future challenge, along with **reduced international cooperation** after the UK's exit for the EU.

Issues arising from recovering from COVID-19 include a possible **lack of investment** and **lack of funding for research.**

'Top 3' Future Issues for Blue Biotechnology

- Environmental issues
- Development and operational issues
- Regulation and international cooperation
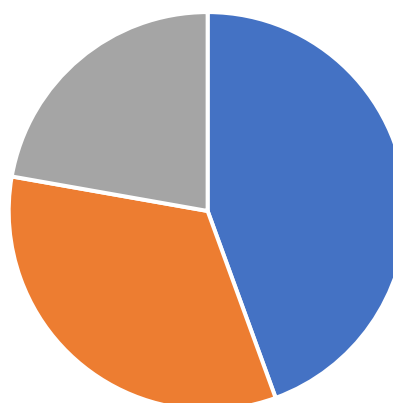
Opportunities

Current Opportunities

Respondents considered that there are **great opportunities for development of blue biotechnology sector**, with one describing them as **"Immense"** another stating **"These are huge, from microorganisms and algae to invertebrates and fish"** and another saying **"Enormous opportunities for seaweed, cosmetics, pharmaceutical, animal feed, etc."**

Improving amounts of **research into and knowledge of the marine environment** is currently taking place, one respondent noted **research into harvesting seaweed to make natural gelling agent agar**. Another highlighted the **use of seaweed farms for biomass** which can be **co-located** with fish farm activity. Such research could be assisted by the focus provided by the **UN Decade of Ocean Science for Sustainable Development*.**

Another respondent voiced concerns about WW2 ordnance on the seabed and proposed that **ensuring seabed safety** by removing this would provide opportunities for blue biotechnology.

* https://www.oceandecade.org/

Future Opportunities

44% of respondents considered that blue biotechnology can provide **products that benefit both people and the planet**, for example **seaweed farming for food production**, or **for biomass as a source of renewable energy** to help with climate action along with other types of blue biotechnology that provide **products that benefit environmental and human health**.

New techniques such as **molecular and DNA sequencing**, **and using natural marine products sustainably** provide future opportunities.

Respondents also commented on the opportunities for **cooperation for development**, for example **international cooperation in research and development** despite political barriers, and **more public-private partnerships** being used to develop blue biotechnology products.

Another area of opportunity is the **potential for inward investment**, i.e., investment into the local area for development of marine resources, which can benefit coastal communities in terms of jobs and wealth creation.

One opportunity put forward with regard to the recovery from COVID-19 is **"Government's public appreciation of science."**

'Top 3' Future Opportunities for Blue Biotechnology

- Products for people and the planet

- New techniques

- Cooperation in research and development

- Inward investment

Legislation and Policy
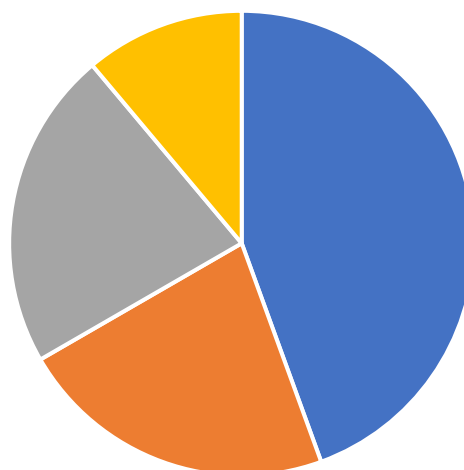
New legislation, policy, etc., recently put in place or due to be enacted that might impact blue biotechnology

- New Northern Ireland Energy Strategy being developed
- New Northern Ireland Green Growth Strategy being developed
- Brexit* Agreement could reduce cooperation in and funding for cooperative Research & Development
- Action plans for jobs

The withdrawal of the UK from the European Union

2.5 Marine and Coastal Tourism & Recreation

With around 6 million people living within 10km of the Irish Sea coastline and the region recognised as an established tourism destination, it is not surprising that the leisure and tourism sector contributes significantly to the Irish Sea region's economy. There is also increasing recognition of the value of the coast and marine environment to both the physical and mental health and wellbeing of coastal communities and visitors to coastal areas.

"Opportunities for more sustainable tourism activities such as walking including long distance coastal walks, cycling, sailing."

The region has many established coastal attractions, including major resorts, drawing visitors to the coast for day trips or longer stays. The region's resorts have been the traditional focus of the sector but the changing nature of the recreation and tourism market includes a growth in leisure and tourism associated with the Irish Sea's unique natural and cultural maritime heritage for example coastal walks, coasteering, rock climbing, eco-tourism and a wide range of water sports. Cruise tourism is increasingly associated with the Irish Sea's major city destinations of Dublin, Belfast, and Liverpool and the region boasts several world-class golf courses on the coast which act as a major draw for tourism through the hosting of major competitions such as the Open. In addition, a network of marinas and launch points or anchorages for smaller boats mean that recreational fishing and sailing are popular activities all around the Irish Sea and serve to link Irish Sea communities.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for marine and coastal tourism.

Sectors / interests represented in responses to Marine and Coastal Tourism & Recreation *(20 respondents; some had more than one interest)*
Coastal tourism (1)
Recreation (1)
Marine litter (1)
Energy (1)
Environment (1)
Offshore Renewable Energy (1)
Governance, law and planning (2)
Ecology / marine ecosystem (3)
All sectors (1)
Marine science & research (2)
Agriculture (1)
Coastal management (1)
Local residents (4)
Not given (5)

Dhoon beach, Dumfries & Galloway, Scotland

Image credit: Solway Firth Partnership

Issues and Challenges

Current Issues and Challenges

Access and connectivity to and along the coast were key issues raised, including:

- Provision of, or **access to, public transport** (incl. because of COVID-19)
- **Provision and maintenance of access to waterfront for both pedestrians and cyclists**
- **Accessibility of smaller towns**, including unsuitable road access
- **Remoteness of much of the coastline**, for example in Dumfries and Galloway, with attendant access issues and **fewer facilities**
- **Lack of port access for cruise ships**
- **Limited airline routes**, for example into Prestwick airport

Other issues related to **attracting people to the coast** including **improving the appeal of historic resorts**, and the **lack of awareness of other coastal locations away from major tourism hubs** such as Blackpool, Liverpool and the Lake District. **Mixed use** of coastal zone was also considered an issue.

Environmental concerns included **the impact of tourism on vulnerable habitats**, particularly re the **intensity of tourism**. One respondent mentioned **"Matching the development, scale and conduct of tourism and recreation to the carrying capacity of host ecosystems"** and another stated there should be **"Adequate conservation infrastructure to protect the environment while promoting tourism"**. **Pollution and litter**, were mentioned, with one respondent stating that **"Managing litter on the coast from beach users is a challenge."** Potential **negative impacts of climate change on marine and coastal tourism** were also noted.

Both **Brexit** – the withdrawal of the UK from the European Union - and the recovery from COVID were raised as issues although no detail was given.

Future Issues and Challenges

As with current issues and challenges above **access and connectivity to and along the coast** were again the key area of concern to respondents with many of the same issues raised again including **limited air routes and cruise ports**, and **poor road** links, however an additional and important point raised was the **geohazards associated with coastal locations**, such as rockfalls and landslips. Several respondents also mentioned **a lack of facilities**, for example **accommodation** and **facilities for water-based activities** and the **"Dereliction of smaller amenity ports"**. Other **economic** issues included the difficulties in **attracting visitors**, including the **lack of public engagement with the sea and coasts** of the Irish Sea, **insufficient advertising** and a plea to **"Make Ireland more attractive to Irish tourists"**. **Sustainable development** was also raised as an issue; with the need to **manage development on the coast** and a repeat of the **how it is operated to the carrying capacity of the local ecosystem**. **Brexit** was also raised as a future issue.

Environmental issues for use of the coast for tourism and recreation include the **impacts of seasonality and weather on** the coast and marine area, and the impact of **extreme climatic events** and more **incremental climate change**, for example sea level rises over time affecting coastal infrastructure and access to the coast. Several respondents mentioned **litter** as a key issue, in particular **plastic pollution**, with one using litter as an example of the **environmental impact of increased visitor numbers**.

It was also noted there is a **need for Improved public education about leisure safety**.

The **impacts of COVID-19** were mentioned by many of the respondents with one raising as an issue the **"Potential collapse of the cruise industry."**; other issues raised included:

- Reduction in international travel, cruises and an attendant loss of foreign tourists
- Having to upgrade facilities to accommodate social distancing measures (cost issues, but also an opportunity)
- More people using the coast, putting pressure on some sensitive ecosystems
- Job losses in declining activities
- Increase in use of single-use plastic, with attendant littering and disposal problems
- The need to encourage visitors again when restrictions are lifted
- The need for government support for the hospitality sector

'Top 3' Future Issues for Marine and Coastal Tourism & Recreation

- Access and facilities
- Attracting visitors
- Marine and coastal litter
- COVID-19 recovery
- Climate change and weather
- Sustainable development
- Brexit
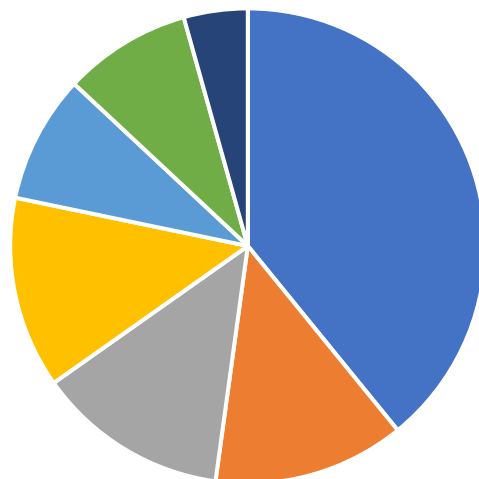
Marine and Coastal Tourism & Recreation

Opportunities

Current Opportunities

The **marine and coastal offer** of the Irish Sea featured strongly in responses to current opportunities for marine and coastal tourism and recreation. Many of the respondents noted that there are really good opportunities around **increasing domestic tourism** or 'staycations', with one respondent commenting there are **"Sights to see and golf courses to play"** and another that the Irish Sea has **"wonderful facilities, beaches and harbours for recreation"** although **provision of more/better outdoor recreation and facilities**, e.g. picnic tables, serviced public toilets was flagged up as an opportunity to increase use, along with **education of the maritime leisure public**. Others mentioned **further development opportunities** with one commenting, **"Stranraer has an opportunity to develop coastal tourism. It held world skiffie* championship and is looking to develop the old Stena quay"** and **diversification of offer** including **green tourism** and **exploiting niche markets such as eco-tourism** associated with estuaries, **wildlife viewing trips** and opportunities for **more sustainable tourism and recreational activities** such as walking, including long distance coastal walks, cycling and sailing were noted. One respondent stated **"These** (opportunities) **are huge, if more emphasis is placed on how tourism and recreation can contribute to keeping the sea healthy".** **Marine management plans**, for example in the Firth of Clyde, could help to develop sustainable and ecologically viable fisheries which would help the sea angling recreation sector. The opportunity for **tourism opportunities linked with tidal lagoon power schemes** was mentioned as a missing economic theme but fits well here so is noted here and also in 2.2 Energy and Energy Infrastructure.

Working together on marketing at an appropriate scale was noted as an opportunity, with the work done some years ago by Mersey Waterfront Regional Park cited as an example of this kind of collaboration. One respondent noted the **on-going clean-up of the coast**, making it more attractive for visitors and recreational users.

It was also noted that during the COVID-19 pandemic **"Coasts could provide socially distanced activities in abundance".**

**The World Skiffie Championship is* a *championship competition for the St Ayles Class of coastal rowing boat*

Future Opportunities

Development of eco and geo-based tourism markets was seen as a major future opportunity; with suggestions that **tourism providers and customers should be well informed about local ecology,** and development of **online and physical publications on coastal geology.** The need **to integrate geotourism into the wider tourism sector** was noted, for example through the use of Geoparks, and that **making coastal geology more accessible** is key, for example the Gobbins walkway in Northern Ireland.

Several respondents commented on the opportunity for **improving domestic markets** through the promotion of '**Staycations**', and by **raising public appreciation of the coast and open spaces**. It was suggested that **fresh approaches to marketing** were needed, including more use of newspaper advertising and **"Partnership working across borders to promote the whole area".** **Improved access and facilities** would help both the tourism and recreation sectors, suggestions included **improvements to roads**, **more cafes and accommodation**, and **coastal footpath development**. The **repair of facilities such as jetties and piers** which have fallen into disrepair could help encourage the uptake of the sport of sea angling by providing comfortable fishing locations especially for less mobile anglers. It was noted that other **improvements to destinations** such as **redeveloping coastal locations as tourism destinations**, for example Stranraer, old port areas, etc., would also bring benefits.

Several respondents commented on **opportunities to clean up the environment** as part of this section, this demonstrates, at least in part, **a perceived link between the need for a visually clean coast and marine environment and tourism and recreational use**. It was noted that there are **opportunities for clean-up operations for plastic already in the marine environment** and opportunities to ensure **"More Irish sea users educated on plastic - removal of single use plastic from rivers and the sea".**

Finally, the **public health and wellbeing benefits** of the coast and marine environment for visitors and recreational users, including those from coastal communities, were noted as a future opportunity, for example through **green social prescribing**. Green social prescribing is a healthcare solution which links people to nature-based interventions and activities such as walks and other outdoor activity and includes both green and blue environments.

Despite the issues being faced by the tourism and leisure industry some positive **opportunities arising from the COVID-19 pandemic** were noted, with one respondent stating **"Tourism and recreation in general is significantly impacted and likely will be for some time to come. This can be positive - shift from high-pollution tourism (flights, cruises) to more environmentally-aware activity; a forward-looking approach can mitigate economic impacts (job losses in declining activities); marine and coastal tourism can lead the way"**. Other opportunities include:

- More people, including local people, appreciating the coast and using it.
- Upgrades to facilities as a result of social distancing measures (also noted as an issue due to cost)
- The possibility of future funding to support business recovery, which would help coastal and marine tourism and recreation businesses.

'Top 3' Future Opportunities for Marine and Coastal Tourism & Recreation

- Development of geo and eco-tourism
- Improving domestic markets
- Marketing
- Improved access and facilities
- Destination improvements
- Cleaning up plastic pollution
- Public health and wellbeing benefits
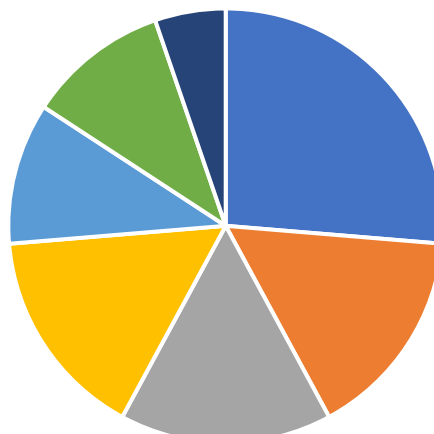
Marine and Coastal Tourism & Recreation

Legislation and Policy

New legislation, policy, etc., recently put in place or due to be enacted that might impact marine & coastal tourism:

- Planned relaxation of planning regulations
- Marine Protected Areas
- National Marine Planning Framework (Ireland)
- The Scottish National Marine Plan includes: "The Future; "Development of a strategy for Recreational Sea Angling that could assess the potential and capacity for increased participation."
- Scottish Creel Fishermen's Federation have called for the reintroduction of the 3 mile limit http://www.scottishcreelfishermensfederation.co.uk/threemilelimit.htm
- Welsh National Marine Plan

Cruise ship, Liverpool, England

Image credit: Caroline Salthouse

2.6 Missing Economic themes/activities

Respondents were asked if there were any other economic activities that should be considered.

Two areas flagged up for inclusion in further work on the Irish Sea Economy are the **"Knowledge" economy** and the **potential use of seabed/subsea mineral resources**. **Local employment** and **"More industrial input"** were also raised for further consideration. **Sustainable recovery** was also mentioned.

Demonstrating the economic importance of ecological goods and services, including healthy seas, by quantifying economic benefits or losses related to loss of those goods and services, and the economic benefits for human physical and mental health were noted as a missing theme. These points are also relevant to Section 3: Irish Sea Communities and Section 4: Irish Sea Environment and have been replicated there.

Several more of the items mentioned here were more relevant to other sections of this report, for example **climate change**, which is dealt with in Irish Sea Environment, and those points have been moved to the relevant sections.

Coastal Industry, Mersey Estuary, England

Section 3: Irish Sea Communities

The Irish Sea region has a diverse range of communities, from isolated rural settlements to major international cities. Over 6 million people live within 10km of the Irish Sea coast and there are areas of relative affluence and deprivation all around the Irish Sea. Although each major settlement has its own character there is a shared cultural and maritime history linking communities around the Irish Sea. This section covers:

3.1 Archaeological and Cultural Heritage

3.2 Health & Wellbeing

3.3 Coastal Protection and Adaptation

Respondents could also add any themes they felt were missing.

As part of the research respondents were asked to identify up to 3 top issues and opportunities for each thematic area. The following table gives a summary 'snapshot' of the top issue and top opportunity identified for each theme. However, these are indicative and should not be taken in isolation; the result here is based on groupings of similar comments which is a subjective process and respondents were not asked to weight their points. Occasionally the results are tied hence 2 or more points are given.

Theme	Top issue	Top Opportunity
Archaeological and cultural heritage	Lack of funding. Coastal change and flooding.	Public education and engagement
Health and wellbeing	Accessibility of the coast	Health benefits from exercise and connecting with nature
Coastal protection and adaptation	Governance, policy and planning. Litter and pollution.	Coast protection solutions that deliver multiple benefits

Image credit: Dave McAleavy Images *Image credit: © Dave Willis mountainsportphoto.com* Image credit other images: Caroline Salthouse

3.1 Archaeological and Cultural Heritage

Marine & Coastal Archaeology: The Irish Sea and its coasts contain a wealth of maritime and coastal archaeology, from ancient stone circles to World War 2 artefacts. As a busy shipping area there are many wrecks, many of these unprotected and unexplored and so vulnerable to seabed development. By the nature of the dynamic environment much coastal archaeology is transient – as sediments erode exposing the archaeology whatever is exposed becomes vulnerable to the next tide or the next big storm. An example of this is the prehistoric human and animal footprints in peat exposures on the shores at Formby point but, once exposed, are often only visible for one low tide as the next either recovers them or washes them away.

Cultural Heritage: The communities of the Irish Sea represent a wide mix of cultures but have some common threads such as a strong shared Viking heritage leading to a strong sense of place for communities. There are major museums and art galleries, vibrant music and other attractions, and iconic built heritage across the Irish Sea region. Port cities such as Liverpool, Glasgow, and Belfast have a strong maritime culture; this is reflected in Belfast's Titanic museum and the World Heritage status of Liverpool's waterfront, and capital cities in and adjacent to the Irish Sea include Dublin, Cardiff and Douglas, but other areas also have a strong sense of history, for example Maryport with its Roman museum and mile fort (part of Hadrian's Wall World Heritage Site), Caernarfon with its famous castle, and Whitehaven with its rum museum and Georgian town centre. Our coastal resort towns also have a strong sense of place both in history and the present day; Blackpool still attracts millions of visitors a year to enjoy its piers and illuminations. Across the region coastal art installations provide an attraction and a talking point for residents and visitors. These include Anthony Gormley's 'Another Place' at Crosby, the Great Promenade Show at Blackpool, the Tern Project at Morecambe, the Big Fish at Belfast, the Famine Memorial in Dublin and Rise in Glasgow.

Sectors / interests represented in responses to Archaeological and Cultural Heritage *(13 respondents; some had more than one interest)*
Coastal communities (1)
Local residents (4)
Ecology / marine ecosystem (2)
Governance, law and planning (1)
Environment (1)
All sectors (1)
Marine science & research (1)
Coastal tourism (1)
Not given (4)

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for archaeological and cultural heritage.

Flint Castle, Flintshire, Wales

Image credit: Caroline Salthouse

Current Issues and Challenges

Funding issues were flagged up by several respondents as being key issues, this includes a **lack of funding for archaeology** and **lack of funding for protection of coastal cultural assets**, as well as a **lack of funding to research past environmental change**, which could help to understand how to better protect archaeological and cultural heritage sites as well as contributing to climate change knowledge.

Issues around **limited public awareness,** including **a lack of advertising,** were also noted, together with a **lack of interest from landowners with heritage assets/sites** on their land, and **a lack of ability to hold organisations responsible for preserving and maintaining heritage assets and sites to account**.

The impact of **demographic changes on awareness of cultural heritage** was noted, with one respondent stating **"Aging population - many assets in Whitehaven are around coal mining in the last 100 years and the people who remember them are aging - a huge opportunity to tap into their knowledge and listen to their stories will inevitably be lost soon - recording of cultural heritage and how the younger generations currently see the potential return of mining to the Whitehaven area is a real opportunity."**

The **risk of loss of culturally significant artefacts or sites** was noted. This could be because of **dereliction** as noted above but can also be caused by **natural processes such as coastal erosion**, including **increased levels of erosion from storm surges** and **rising sea levels inundating sites**; both the latter being **impacts of climate change.** One respondent noted that **"Coastal retreat can't be stopped but recording of archaeological/heritage assets before they are lost or as they are exposed should be maximised. "**

Brexit – the withdrawal of the UK from the European Union - was flagged as a potential issue if it affects cooperation between nations.

One respondent typified the **conflict that can arise between the need to protect cultural heritage and the desire for 'progress'** with this statement: **"Cultural heritage and archaeology are the history of the region and can teach us a lot about the development of our people and nation, however they should not prevent the continued progression of national interests. There is a balance. "**

Future Issues and Challenges

As with current issues above a **lack of funding** was considered one of the key challenges, impacting on site investigation as well as protection. **Coastal change**, including coastal retreat, erosion, flooding, and **climate change impacts on the coast** exacerbating these with sea level rise and increased storminess were raised by several respondents.

Limited public awareness and involvement was another key issue, along with the need to support cultural and heritage sites with good facilities, including retail.

Management in general and the lack of management plans for some sites was raised, along with the lack of data available for some sites (linked to the funding issues raised above).

Issues arising from the **COVID-19 pandemic** include the **loss of income to heritage bodies** and **the loss of foreign tourists**.

'Top 3' Future Issues for Archaeology and Cultural Heritage

- Lack of funding
- Coastal change and flooding
- Public engagement
- Local facilities
- Lack of management
- Brexit
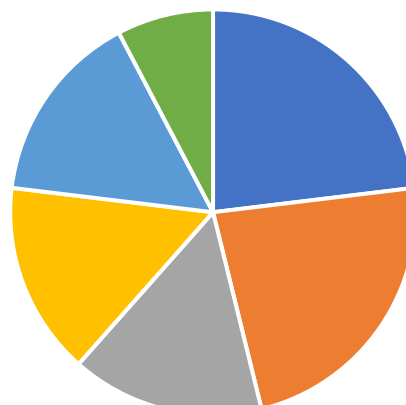
Opportunities

Current Opportunities

Current opportunities were described by one respondent as **"Immense."** A lot of comments related to **increasing public appreciation and awareness**, making it **more accessible** and **involving people and communities in their heritage**. It was noted that local knowledge is often missing, engagement would help to solve that, and there's a **need to recognise and represent the experience of different communities**. One respondent noted **"Digital technology allows for new research / mapping and bringing the public into contact with sites they might otherwise not be able to access"**. Another noted the value of **"Utilising shared cultural heritage and cultural links to the sea to engage people in maritime spatial planning"**. Another respondent noted that **"Copeland Borough Council should create a Heritage Coast management plan which could incorporate these in the St Bees/Whitehaven locale."**

The opportunities for **increased tourism based around archaeology and cultural heritage** were noted, with examples such as the World Heritage Site at Liverpool and the coastal path cited as examples that could bring benefits to local areas. One respondent also noted the opportunity for **collaborative projects** between museums, galleries and other cultural institutions around the Irish Sea.

Future Opportunities

Half of the respondents considered that aspects of **public engagement** provide key opportunities for archaeological and cultural heritage, with additional benefits for health and wellbeing, engagement in governance and economic activities such as tourism. These include **raising public awareness and interest** through **education** at all levels, promotion of sites through **use of new digital technologies**, **using culture to help people to engage in governance issues**, and **linking coastal volunteering opportunities with health and wellbeing** benefits.

Improved management and facilities, for example by **improving museums** and **providing more retail opportunities** were proposed, along with opportunities to **manage cultural and heritage sites and assets through public-private partnerships**.

Several respondents proposed initiatives to **link or extend heritage assets**, these included the development of the **North Rhins coastal path, St Bees Head Heritage Coast extension** plans and **partnership working to link sites all around the Irish Sea** with heritage trails.

Opportunities arising around **adapting to and recovering from COVID-19** included **"More awareness of local and national treasures"**, **using cultural and heritage assets to support health and wellbeing** objectives, and **government support for cultural activities**.

'Top 3' Future Opportunities for Archaeology and Cultural Heritage

- Public education and engagement
- Improved management and facilities
- Development and linkage of heritage assets

Legislation and Policy
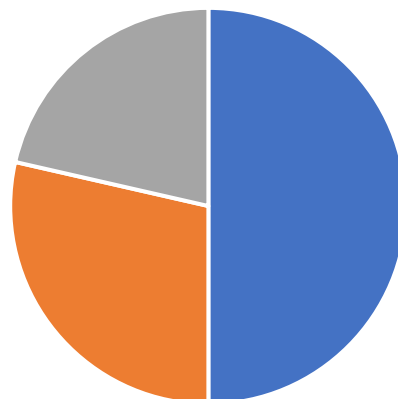
New legislation, policy, etc., recently put in place or due to be enacted that might impact archaeology and cultural heritage:

- St Bees Head Heritage Coast extension (England)
- National Marine Planning Framework (Ireland)

Wreck of Monreith, Solway, Scotland

Image credit: Solway Firth Partnership
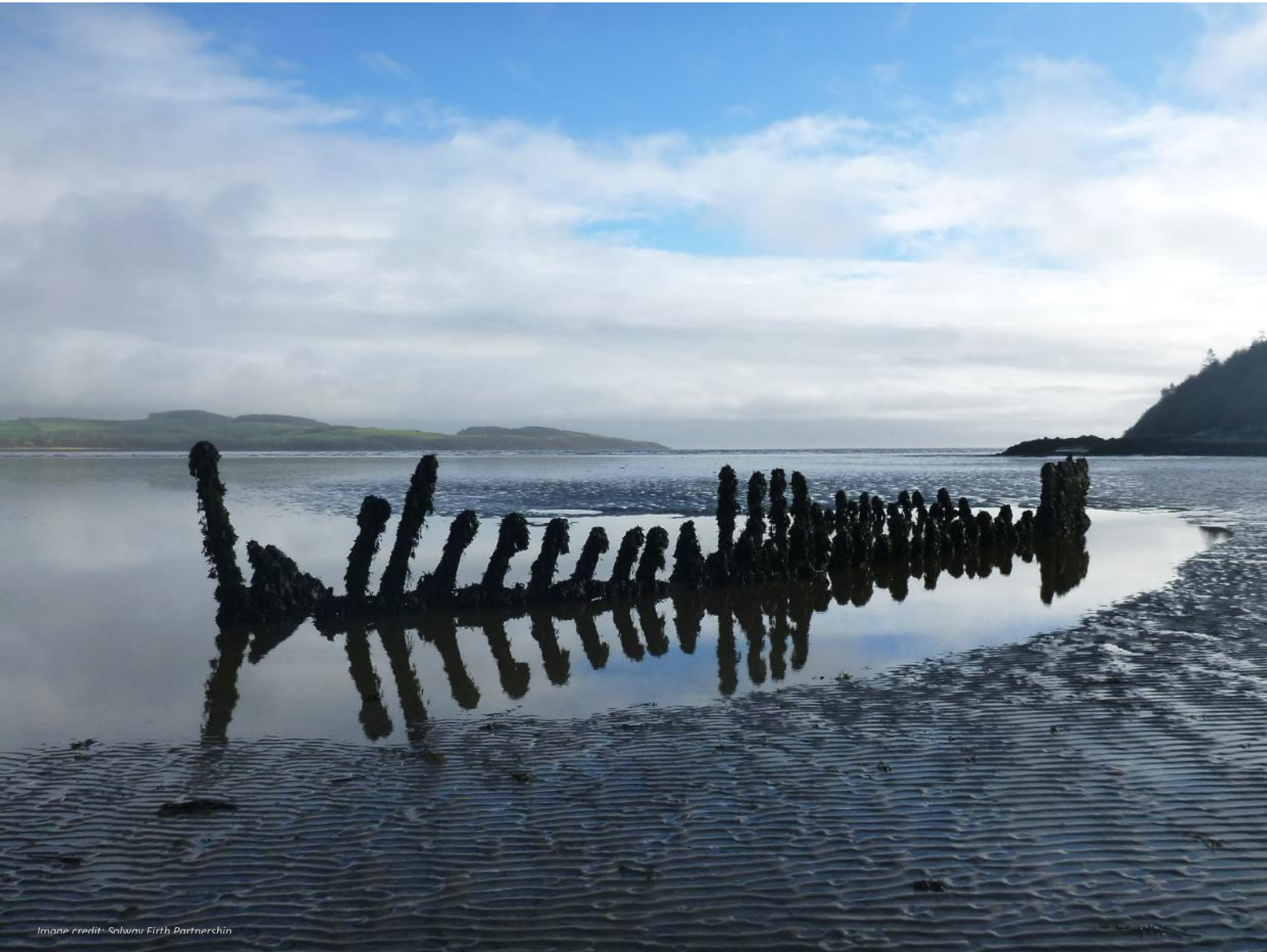
3.2 Health & Wellbeing

Over 6 million people live close to the Irish Sea, in communities ranging from small, isolated rural settlements to major cities such as Dublin, Belfast, Glasgow and Liverpool, smaller but important coastal towns such as Douglas and Holyhead, coastal resorts such as Southport and Blackpool and manufacturing towns such as Barrow. There are large areas of deprivation – both urban and rural - often sitting cheek by jowl with more affluent areas, and many smaller coastal towns which act as commuter settlements for the larger urban or industrialised areas.

Urban and rural deprivation brings many challenges for people's health and wellbeing and in remote rural areas access to healthcare can be difficult, but many people move to the coast precisely because of its perceived health benefits, for example mental health wellbeing and opportunities for physical exercise on the shore and in the sea.

The Irish Sea coast also acts as a draw for visitors, many of whom will come to the coast for exercise and enjoyment, so has an impact on health and wellbeing far beyond just those communities situated on the coast.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for health & wellbeing.

"Lots of use of local sites, perhaps not identified as 'wellbeing', support linking the opportunities these sites provide to GPs or health professionals so they can signpost people to the opportunities that are provided."

Sectors / interests represented in responses to Health & Wellbeing *(16 respondents; some had more than one interest)*
Local residents (4)
Coastal communities (1)
Environment (1)
Energy (1)
Ecology / marine ecosystem (2)
All sectors (1)
Fisheries (1)
Marine science & research (1)
Coastal tourism (1)
Governance, law and planning (2)
Not given (4)

Taking exercise, Dee Estuary, England

Image credit: © Dave Willis mountainsportphoto.com

Current Issues and Challenges

A **range of accessibility and connectivity issues** were raised which impact on health and wellbeing. **Access to facilities such as shops** – one respondent indicated there were **limited local food shops so limited food choices,** with another indicating it was a 2 hour drive to get to the nearest town. **Lack of bus or rail services** was also flagged as an issue, adding to travel restrictions and time pressure. Other issues included **poor internet connectivity**, **poverty** and **unemployment**. One respondent stated there was a **"Problem attracting health professionals to a remote area"** where the main hospital is 75 miles away. It was noted that **"The coast needs to be seen as accessible to everyone for health and well being"** and that there are **issues with encouraging more active recreation;** although there was lots of use of local sites this is **not necessarily formally recognised as contributing to wellbeing**.

Environmental concerns include **water quality**, **littering and pollution of the coast and sea** as well as overall **sustainability**.

COVID-19-related issues include the **disposal of PPE,** some of which is being discarded by coastal users and the direct and indirect impacts of the pandemic regarding **people's short and long-term health**, and the **economic downturn** potentially leading to **increased deprivation and health inequalities.**

Future Issues and Challenges

Coastal accessibility was again the key issue raised, with 32% of respondents describing a range of issues including the need for **better road connectivity and better rail and bus services** to and along the coast, **including cross border**, and highlighting the **cost of getting to the coast** when household incomes may be affected by health issues. One respondent commented that there is **"Limited awareness of local and affordable opportunities to connect with nature".**

A range of **environmental** issues were mentioned, including **the loss of and damage to ecosystems impacting on the ability to connect with nature** for health and wellbeing, the **impacts of climate change**, **water quality** and **litter and pollution on the coast** either dropped by beach visitors or washed up from other marine or riverine sources.

Access to a range of **services for communities** was raised including **internet access**, **limited food choices**, **lack of community facilities** and, importantly a lack of access to health provision including **lack of health facilities and professionals**, exacerbated by policies to centralise health services which can mean needing to travel up to 75 miles to access them.

Challenges around **adapting to and recovering from COVID-19** include the economic impacts including **economic hardship**, **unemployment** and **loss of housing**, a more **limited range of goods in supermarkets**, **more single use plastic and litter**, including PPE and **restrictions to accessing the coast due to lockdowns** as well as the **long-term health impacts** of COVID-19.

'Top 3' Future Issues for Health & Wellbeing

- Accessibility of the coast
- Environmental issues
- Access to services for day to day living
- Access to health provision
- COVID-19
- Lack of awareness of opportunities to connect with nature
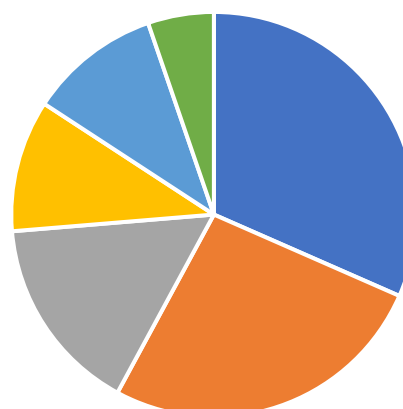
Opportunities

Current Opportunities

Many of the respondents felt that there were opportunities around **improving people's connection with nature** and helping them to **appreciate the health benefits of the coast** through a range of **outdoor and nature-based leisure and recreation**, including the opportunities for **increased coastal access** by expanding and improving coastal paths and cycleways and **watching wildlife**, for example marine wildlife boat trips. One respondent commented that **"Recreational fishing provides enormous health and wellbeing benefits to those who participate".**

One respondent stated the need to **"Highlight the role of the ocean in public health (including climate change mitigation) and the consequent need for protection (of the ocean)"** Another mentioned the importance of **raising awareness about leading greener lives**.

Improvements to **connectivity of coastal communities** and **service provision** such as **internet access** were mentioned, as well as the benefits of **improving transport links to more remote areas** which could attract health care professionals to those areas.

Future Opportunities

50% of respondents mentioned opportunities around the **health benefits from exercise and connecting with nature**, including **NHS linked-projects** and **social prescribing**, **education** about the **"positive physical and mental benefits of connecting with nature"**, **promoting outdoor exercise** such as walking and cycling – one of the respondents suggested this could replace gyms - and **local campaigns for sustainable use and conservation of places enabling connection with nature**.

Other key areas of opportunity for improving health and wellbeing are **connectivity and facilities improvements**, the suggestions have been mentioned in other sections so have **cross-cutting benefits** and **include road improvements** to Stranraer, **improvements to bus and rail services,** including both reinstatement of former services and creation of new ones – this point was raised particularly re the Scotland/England border but may well have relevance elsewhere. Other suggestions included **improving public facilities** at the coast and **improving internet connectivity** in coastal communities.

Climate change mitigation and **more sustainable living** were both seen as opportunities for better health and wellbeing, and one respondent noted that **"COVID-19 might have made people cook more from scratch"** – this doesn't necessarily mean healthier eating but could reduce reliance on processed food, which tends to be higher in sugar, salt, fats and chemical additives.

Respondents also considered that taking positive **action to clean up plastics** could improve people's health and wellbeing, for example **campaigns on single use plastics** and the **clean up of plastic litter** on the coast.

Opportunities arising from **adapting to and recovering from COVID-19** include **more people taking up outdoor exercise and using the coast** which can provide space for **free or low-cost, safe, outdoor exercise and enjoyment** through walking, cycling, etc., and **wide appreciation of the significance of mental health** and, as one respondent noted, **"Hopefully, greater awareness of the benefits of connecting with Nature".** Other opportunities include **encouraging more locally based food shopping and food shops** such as local butchers and greengrocers.

'Top 3' Future Opportunities for Health & Wellbeing

- Health benefits from exercise and connecting with nature
- Connectivity and facilities improvements
- Healthier and more sustainable living
- Action on plastics

Legislation and Policy
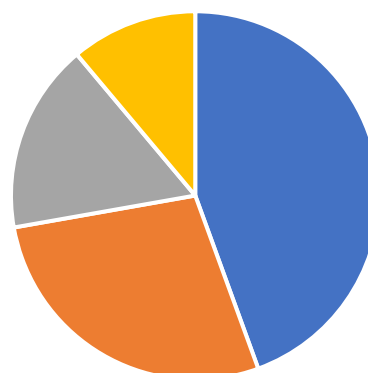
New legislation, policy, etc., recently put in place or due to be enacted that might impact health & wellbeing

- Potential further lockdowns restricting access to coast
- Policy/legislation affecting provision of housing in coastal communities
- Highly Protected Marine Areas (UK) will prohibit all fishing including recreational activities. The Natural Capital approach to valuing the environment will allow the health and wellbeing aspects of recreational fishing to be evaluated.
- Well-being of Future Generations (Wales) Act 2015
- Welsh Well-being Plans

North West Air Ambulance, Sefton coast, England

Image credit: Caroline Salthouse

3.3 Coastal Protection and Adaptation

The Irish Sea coastline is very varied, from hard rocky cliffs to extensive low-lying mud flats and beaches backed by salt marsh or dunes. Rocky areas are less at risk from coastal erosion but may still succumb to sea level rise.

The eastern coast of the Irish Sea is mainly low-lying and is particularly vulnerable to both natural coastal change due to tide and current movements and storms, and the impacts of climate change such as increased storminess and sea-level rise (see also the section on climate change). Salt marshes and sand dune systems can provide both a sea defence function and a valuable habitat for wildlife and a large-scale managed realignment scheme in the Ribble estuary is providing sea defence benefits to a community and recreating valuable salt marsh habitat. The eastern Irish Sea also has extensive areas of sand dunes – at Newborough Warren on Anglesey, the Sefton coast and around Barrow (Sandscale Haws and Walney Island). As well as these natural defences many of the coastal communities around the Irish Sea are protected by engineered coastal defences, some over 100 years old, some very new. In England and Wales Shoreline Management Plans provide a policy framework for coast defence.

As well as vulnerability to erosion and flooding from storms many of the Irish Sea's coastal communities are situated at river mouths so as they are also exposed to riverine flooding, particularly when high tides and storms coincide. As well as provision of defences or other measures to prevent or slow down flooding, adaptation to flooding can include building flood-resilient buildings which can help flooded homes and businesses get back to normal far faster, causing less economic and social impact.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for coastal protection and adaptation.

Sectors / interests represented in responses to Coastal Protection and Adaptation *(16 respondents; some had more than one interest)*
Local residents (4)
Environment (1)
Energy (1)
Ecology / marine ecosystem (2)
Marine science & research (1)
Coastal tourism (1)
Governance, law and planning (2)
Not given (3)

Blackpool sea defences, England

Current Issues and Challenges

The majority of the issues and challenges raised related to the **environment**, in particular **the impacts of climate change**, with one respondent stating there is an issue with **"Accurate prediction of the effects of climate change on sea level, tidal range and storm surges",** and others raising issues such as **higher rainfall, increasing number of storms**, **flood risk** and a related management issue re **"The cost / benefit analysis of protecting coast and infrastructure from the storm surges that are occurring more regularly"** Other environmental issues include **sand and sediment transport**, and **erosion rates**, with several respondents commenting on the speed and amount of erosion. Issues around **litter**, in particular plastics, were raised by several respondents – these fit better in Section 4.6 Marine and Coastal Litter section of this report but can accumulate around coastal defence structures.

Governance and related **management** issues raised include **allowing home building too close to the water's edge**, **protection of communities** and the **nature and maintenance of coast protection.** One respondent suggested an issue with the "Public (and government) taking future erosion and flooding issues seriously".

Future Issues and Challenges

Aspects of **governance, policy and planning** were mentioned by 32% of respondents as key future challenges. Issues raised included **government policy and budget constraints**. Several respondents commented on **government planning policy**, with one respondent stating **"The current planning system may not fully take into account future coastal vulnerability"** and another describing planning regulations as **"Lax"**, **government environmental policy** was also raised as an issue with one respondent stating there is a **"General lack of urgency in addressing climate change".**

Climate change impacts raised included **rising sea levels**, **flooding**, and **coastal erosion**, with one responding stating that there is a **"Possibility that communities and settlement will have to withdraw from the coast".**

Other issues raised included the **need to educate local communities** and **data gaps** such as gaps in the geological mapping of the coastal zone.

Around a third of the respondents also commented in this section on **litter** – in particular plastics – from beach visitors and dogwalkers, illegally dumped **shipping waste** and **water quality**. These are all discussed further in sections 4.5 Water Quality and 4.6 Marine and Coastal Litter.

'Top 3' Future Issues for Coastal Protection and Adaptation

- Governance, policy and planning
- Litter and pollution
- Climate change impacts
- Data gaps
- Community awareness
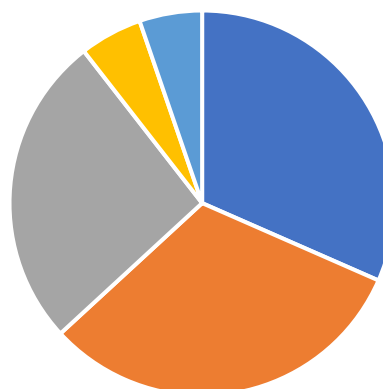
Opportunities

Current Opportunities

Management opportunities include the **Shoreline Management Plan refresh process** currently underway in England and Wales, **management methods** in general, and **ever-developing knowledge and understanding** of the coastline. One respondent commented on the **"Scope for integrated coastal zone planning and management".**

The use of **natural coastal defences** was mentioned, including **sand dune projects** and **increasing the area of salt marsh** to "absorb" tidal surge and rising sea levels. In addition the opportunity to incorporate **eco-engineering** into coast protection was noted, for example one respondent stated there is an **"Opportunity of co-location of activities and provision of new habitats through engineering solutions to create artificial rockpools etc.".**

The potential for **multiple uses and benefits from coastal protection measures** was also noted, e.g. for aquaculture, tourism and education.

The opportunity for **coast protection opportunities linked with marine energy infrastructure** such as tidal lagoon power schemes was mentioned as a missing economic theme but fits well here so is noted here and also in 2.2 Energy and Energy Infrastructure.

One respondent considered there is also an opportunity to **improve pollution levels** but does not go into further detail.

Future Opportunities

60% of the respondents considered that **coast protection solutions that deliver multiple benefits** are a major future opportunity. These included coastal protection schemes that provide **benefits for leisure and recreation** such as walking routes, and **alignment of conservation and flood resilience benefits**, for example through **development of saltmarsh** or **habitat creation on hard engineering structures**.

Public education was seen as important, along with **data and modelling feeding into the design of coastal protection measures**, with one responding stating: **"Integrated coastal zone mapping would assist modelling and design of mitigation/protection measures".**

As with current opportunities above the issue of **coastal litter** was mentioned, with the need to clean beaches and reduce illegal refuse; these points will be picked up in section 4.6 Marine and Coastal Litter.

In terms of recovering from and adapting to COVID-19 respondents felt that there would be **"Increased appreciation of coastal amenity"** and more **people visiting the coast**. One respondent stated **"The large-scale, far-reaching public health impacts of COVID-19 could be viewed as a taster of climate change public health impacts; it's frightening but has to be faced and it's an opportunity to make a case for investment".**

'Top 3' Future Opportunities for Coastal Protection and Adaptation

- Coast protection solutions that deliver multiple benefits
- Marine and Coastal Litter
- Data, modelling and design
- Community awareness

Coastal Protection and Adaptation

Legislation and Policy
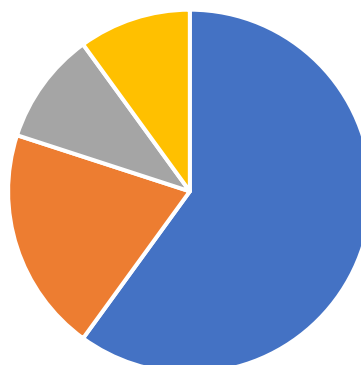
New legislation, policy, etc., recently put in place or due to be enacted that might impact coastal protection and adaptation:

- Relaxation of planning and environmental regulations being discussed; the respondent who put this point forward also asked **"Will this lead to building on flood plains, cutting corners on flood-resilience etc.?"**
- Plan for restricting town planning from permitting coastal development
- Developments should enhance some habitats
- Shoreline Management Plans (and SMP2 refresh for England and Wales)

Salt marsh, Dee Estuary, England

Image credit: Caroline Salthouse

3.4 Missing Irish Sea Communities Themes?

Respondents were asked if there were any other Irish Sea Communities activities that should be considered.

Some important areas flagged up for inclusion in further work on the Irish Sea Communities are ensuring **community preservation and survival**, the **creative arts** as both products of and sustainers of communities**, employment** and **economic development,** the **impact of new development** including **housing demand** and **industry** (people's desire to move away from built-up urban areas after the pandemic and West Cumbria mining and Moorside were given as examples)**, poverty, equality and diversity,** and **transport and connectivity,** across the sea and between countries. **Wildlife awareness** of communities was also raised as an area for future consideration and fostering **a sense of life-long connections with the sea** for people living beside the sea but who don't earn a living from it for example through local schools programmes.

Demonstrating the economic importance of healthy seas by quantifying economic benefits for human physical and mental health were noted as a missing theme. This point was made in Section 2: Irish Sea Economy and is replicated here.

Port Logan beach, Scotland

Section 4: Irish Sea Environment

The Irish Sea has diverse marine and coastal habitats supporting a wide range of ecologically and commercially important species. It is a relatively enclosed sea basin fed by estuaries, some rural but some with high density urban populations and industry along their banks. The marine environment is very heavily used for shipping and other forms of maritime industry, as well as recreation. This section covers:

4.1 Climate Change

4.2 Biodiversity

4.3 Marine Protected Areas

4.4 Invasive Non-native Species

4.5 Water Quality

4.6 Marine & Coastal Litter

Respondents could also add any themes they felt were missing.

As part of the research respondents were asked to identify up to 3 top issues and opportunities for each thematic area. The following table gives a summary 'snapshot' of the top issue and top opportunity identified for each theme. However, these are indicative and should not be taken in isolation; the result here is based on groupings of similar comments which is a subjective process and respondents were not asked to weight their points. Occasionally the results are tied hence 2 or more points are given.

Theme	Top issue	Top Opportunity
Climate change	Domestic and international policy. Risks to communities.	Renewable energy. Future proofing coastal assets.
Biodiversity	Habitat and species loss	Data and evidence
Marine Protected Areas	Lack of awareness and understanding of MPAs	Improving the evidence base and management
Invasive non-native species	Managing INNS transport mechanisms	Monitoring
Water quality	Farming practices	Research (studies and surveys)
Marine and coastal litter	Clean up and enforcement	Cleaning up litter

Image credits: outer images Caroline Salthouse, centre images - Solway Firth Partnership

4.1 Climate Change

The Marine Climate Change Impacts Partnership report card 2020 sums up the key headlines for climate change in the marine environment around the UK – whilst done from a UK perspective it is equally applicable to the shared Irish Sea. The headlines are:

- Warming seas, reduced oxygen, ocean acidification and sea-level rise are already affecting UK coasts and seas. Increasingly, these changes are having an impact on food webs, with effects seen in seabed-dwelling species, as well as plankton, fish, birds and mammals.
- The upper range for the latest UK sea-level rise projections is higher than previous estimates, implying increased coastal-flood risk. The likelihood of compound effects from tidal flooding and extreme rainfall is increasing, which can greatly exacerbate flood impacts.
- Oxygen concentrations in UK seas are projected to decline more than the global average.
- Fisheries productivity in some UK waters has been negatively impacted by ocean warming and historical overexploitation.
- Impacts of climate change have already been observed at a range of heritage sites. Coastal assets will be subjected to enhanced rates of erosion, inundation and weathering or decay.

Sectors / interests represented in responses to Climate Change *(23 respondents; some had more than one interest)*
Energy (1)
Offshore Renewable Energy (1)
Governance, law and planning (1)
Ecology / marine ecosystem (6)
All sectors (1)
Environment (2)
Marine litter (1)
Recreation (2)
Fisheries (2)
Water quality (1)
Coastal communities (2)
Marine science & research (2)
Agriculture (1)
Coastal management (2)
Coastal tourism (1)
Local residents (4)
Not given (1)

Warming seas mean that mobile species, or species carried on, for example ship hulls or in ballast water, can exist further north than their natural range. In some cases, this may provide new economic opportunities e.g. new fisheries, new eco-tourism opportunities, but in others some may become 'invasive' - causing problems for existing species or causing economic harm

Changes in weather patterns to hotter, drier summers may mean increased opportunities for coastal tourism, but increased storminess can mean more flooding and damage to coastal businesses and properties.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for climate change.

Storm damage to frontal dunes, Formby Point, England

Image credit: Caroline Salthouse

Issues and Challenges

Current Issues and Challenges

Governance issues relating to climate change include the **need for global action**, the challenge of **encouraging governments and people to make beneficial changes** to reduce, mitigate or adapt to climate change, ensuring **policy is based on scientific evidence and accurate modelling of the impacts of climate change** on coastal environment. One respondent noted it is **"Difficult for the UK to lead by example and be an influencer in this important area".**

The impacts of climate change on the **coastal and marine environment** are many and affect not only nature but also people's livelihoods and communities. Many respondents commented on the impact of **rising sea levels increasing the risk and frequency of flooding**, **greater levels of coastal erosion**, including a decline in salt marsh habitats, and **coastal 'squeeze'** – the impacts of erosion and sea level rise on the shoreline and its habitats, particularly when areas have hard coastal defences in place so that the coast cannot naturally roll back.

Many other issues were raised, with one respondent reporting **"There are so many it's hard to pick just a few".** These include **ocean acidification** and **increasing water temperatures** both of which can impact on marine species, a **lack of space for species adaptation** and **loss of species diversity**, **depletion and displacement or changes in range** of marine and coastal species, including important commercial fisheries stocks such as cod. One respondent stated **"Changes in species / habitats can affect the way people depend on the marine environment for their livelihood."**

Economic issues were noted, with one respondent stating the need to assess **"Climate change and the impact to the coastal economy and national infrastructure."**

Future Issues and Challenges

One respondent summed future issues and challenges for climate change as **"Again, too many to list"**, however the importance of both **domestic and international policy**, including **the need for international commitment and cooperation**, and **impacts of Brexit** – the withdrawal of the UK from the European Union - were mentioned, with one responding noting the need for **"Changing Westminster Government policy to embrace climate change".** The need to **reduce carbon emissions** was also mentioned.

The future **risks to communities** included **rising sea levels** and impacts of that and other climate events on **erosion and flooding**, as well as **increased risks form coastal geohazards**, and the possibilities of **reduced access to the coast**. The **potential public health impacts** due to issues like rising temperatures, spread of disease, water contamination, food shortages, etc., were mentioned, and the role of the ocean in helping to combat these.

Risks to habitats and geological features include **sea level rise forcing long-term adaptation** (this applies equally to habitats, species and people living on the coast), **the loss of important coastal habitats** and **risks to coastal geological features** such as Giant's Causeway and Carrick-a-rede (both in Northern Ireland), which are important in their own right but also have **potential knock on effects on coastal access and tourism**.

'Top 3' Future Issues for Climate Change

- Policy
- Risks to communities
- Risks to habitats and geological features
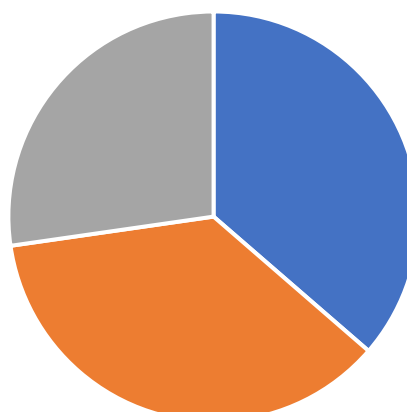
Opportunities

Current Opportunities

Respondents considered that there is an opportunity to capitalise upon the **increased awareness of climate change**, evidenced by **declarations of climate emergency**, with one respondent stating there is **"Definite political momentum right now as part of the coalition* programme."** Another noted that **"COVID-19 appears to have shown that people are willing to change their lifestyles and mindsets are changing."**

The current and potential **role of the ocean in preventing and mitigating climate change** was noted. The impacts of climate change may not all be negative, so **enhanced tourism**, changes in the range of fish species providing **diversification of fisheries opportunities and markets** and potential **higher yields of some fisheries** were all listed as potential benefits of climate change.

The need to **plan for a sustainable future for the coastal zone** and the **role of accurate modelling as a basis for planning** were also mentioned.

*Irish Government coalition programme – see Programme for Government: Our Shared Future

Future Opportunities

As noted above there is **political momentum** and **heightened public interest in the coast and sea** which can be used to **educate for change.**

Increases in use and development of **renewable energy** were seen as important for reducing climate change and include opportunities for **other benefits such as colocation of activities** with offshore developments such as wind farms. Other **ocean-related technological innovations** were mentioned, although no detail was provided.

There is an opportunity to **use protection measures now that can future-proof coastal assets** such as infrastructure (coastal roads, rail etc.,) and tourism destinations. There is also an opportunity to **create new habitat now to mitigate for future loss**. One respondent mentioned the need for **"Detailed geological characterisation and monitoring for risk assessment, mitigation and protection."**

Recovering from and adapting to COVID-19 also gives rise to some new opportunities, including **learning lessons from emergency planning** that has taken place. One respondent noted **"So many opportunities are emerging"** and another commented on the **recovery of fish populations** **"due to lockdown inactivity"**.

'Top 3' Future Opportunities for Climate Change

- Renewable energy
- Future proofing coastal assets
- Political and community interest
- Other ocean technology
- COVID-19

Legislation and Policy
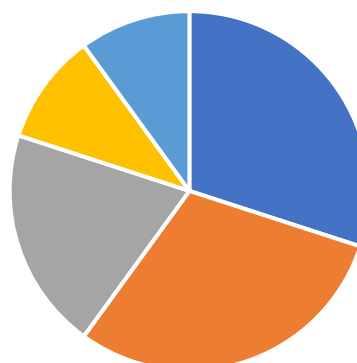
New legislation, policy, etc., recently put in place or due to be enacted that might impact climate change:

- Scottish Government legislation on climate change
- Change to renewables should help
- Paris Agreement failing
- National Marine Plan Framework (Republic of Ireland)
- Welsh National Marine Plan
- Natural Resources Policy (Wales)

Post-survey note: Northern Ireland Assembly Climate Change Bill developed

Coastal monitoring, Gronant dunes, North Wales

Image credit: Caroline Salthouse

4.2 Biodiversity

The Irish Sea is a wonderfully biodiverse area, partly due to the position of the Irish Sea at a junction between cold northern waters and warm southern waters. Some species exist at the northern edge of their ranges and some at the southern edge of theirs. In some cases, species hybridisation is taking place where the two co-exist, for example some saltmarsh plant species on the Sefton coast. The complex geology of the region also increases the diversity of life, through the range of habitats and substrate. Many of these habitats and the species they support are subjects of international action to conserve them and Marine Protected Areas, which help with this, are considered separately in this survey.

From the giant basking shark down to the smallest diatom the variety of life in and around the Irish Sea supports intricate food webs, including those of commercially exploited species. All are vulnerable to the impacts of climate change, pollution and human activity.

The Irish Sea is also home to several UNESCO biosphere reserves, including the Isle of Man and Galloway and Southern Ayrshire, Dublin Bay and, slightly further down towards St George's Channel, Biossfer Dyfi. UNESCO states that 'biospheres reserves promote solutions reconciling the conservation of biodiversity with its sustainable use. They are learning areas for sustainable development under diverse ecological, social and economic contexts.'

Sectors / interests represented in responses to Biodiversity
(16 respondents; some had more than one interest)
Energy (1)
Environment (2)
Governance, law and planning (1)
Ecology / marine ecosystem (4)
All sectors (1)
Marine science & research (2)
Agriculture (1)
Coastal management (1)
Coastal tourism (1)
Local residents (4)
Not given (3)

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for biodiversity.

Young Lion's Mane Jellyfish (Cyanea capillata), North Wales

Current Issues and Challenges

The majority of issues raised focussed on aspects of **environmental degradation** and these are noted below, however a **lack of awareness of biodiversity**, and the **need to ensure it is protected** were raised. One respondent noted it **"Will struggle for funding unless policymakers are shown the linkages with other areas of environmental concern"** and another stated **"Many people are not connected to the 'blue planet' of the Irish Sea".**

Climate change was raised as a significant issue, with effects such as warming water influencing **shifts in biodiversity**, including the **distribution of non-native species, including invasive non-natives**, and **displaced fish stocks**.

Invasive species were also noted as an issue on coastal land, together with **loss of habitat**, **"inadequate conservation management"** and the **pressures from coastal development** and **access from tourism**.

Other **environmental** issues raised included **water quality and pollution**, with **marine litter and plastics pollution** both on land and in water being noted as issues by many of the respondents.

Over exploitation of natural assets was also considered an impact on biodiversity, examples include **overgrazing of salt marsh** and **depleted fish stocks due to overfishing**.

Future Issues and Challenges

Nearly half of the respondents listed aspects of **habitat and species loss** in their top 3. Issues raised included the need to **protect saltmarsh species** and to **prevent the loss of seagrass habitat**, as well as the **impacts of extreme climatic events** on habitats and species, along with the **impacts of coastal flooding and erosion** and the need to manage these. **Invasive non-native species** were also noted as an issue and the **need to monitor and manage the impact of non-natives**.

More general **environmental degradation** included the need to **limit eutrophication**, and the impacts of **pollution including plastics**, along with more **general climate change** impacts.

Other issues raised included **gaps in baseline geological mapping** along with **funding** for biodiversity work.

Issues arising from adapting to and recovering from COVID-19 **include greater use of single use plastics**, and **less data collection**, for example mapping, due to the postponement of survey activities due to the pandemic restrictions.

'Top 3' Future Issues for Biodiversity

- Habitat and species loss
- Environmental degradation
- Data and evidence
- Invasive non-native species
- Funding
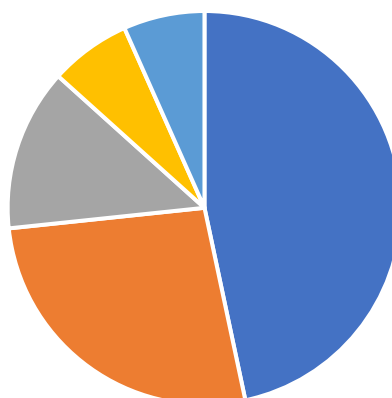
Opportunities

Current Opportunities

"Improving public education" was seen as a current opportunity, with attendant opportunities for **increased eco-tourism** mentioned by several respondents, with the potential for greater protection resulting from this. **Plastic campaigns**, both for education and getting people involved in active clean up activity, were also seen as opportunities. **New Marine Protected Areas** such as Marine Conservation Zones (a UK designation) are also seen as an opportunity for protecting/improving biodiversity.

The **"unique array of species"** in the Irish Sea is seen as special, and the possibility of **partnership working across boundaries** to develop biodiversity projects was mooted.

Climate change impacts can also be opportunities, with respondents noting that **warm-water species could arrive or be introduced**.

One respondent noted that (as a result of Brexit – the withdrawal of the UK from the European Union) **"Perhaps the collapse of the international export market will help stocks."**

Future Opportunities

Almost half of the opportunities put forward by respondents related to **data and evidence** including **site-specific geological studies**, with one respondent noting there is **"Scope for systematic regional geological and geophysical mapping"**, **mapping habitat such as saltmarsh and seagrass beds** and **monitoring annual change**, **monitoring to assess impacts of non-native species** at marinas and shorelines (NB this comment is also noted in Section 4.4 Invasive Non-native Species) and **use of recording schemes such as BioBlitz** for data gathering (a BioBlitz is where wildlife experts and the public work together at a specific location for a specific period of time to record all the species present).

The opportunities to **achieve and maintain Good Environmental Status** (as defined in the EU Marine Strategy Framework Directive) include **managing nutrient loading** and **educating, campaigning and cleaning up plastic pollution**. One respondent noted they **"Expect the UK to continue to align closely with EU Marine Strategy Framework Directive."** The opportunity to **designate more Marine Protected Areas**, for example the UK's Marine Conservation Zones, was also noted.

More **eco-tourism** and **coastal accessibility**, for example via coastal footpaths, were considered opportunities to **raise awareness of and show the economic benefits from** the Irish Sea's biodiversity, and **other socio-economic benefits** arising from biodiversity such as **restoring natural habitats to act as buffers to flooding** were also put forward.

With regard to **adapting to and recovering from COVID-19** one respondent noted **"I think COVID-19 likely had positive impacts on biodiversity"**.

'Top 3' Future Opportunities for Biodiversity

- Data and evidence
- Achieving/maintaining Good Ecological Status
- New Marine Protected Area designations
- Awareness-raising through tourism and recreation
- Habitat restoration for multiple benefits

Legislation and Policy
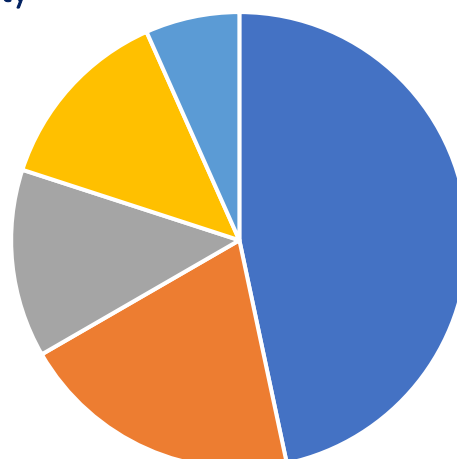
New legislation, policy, etc., recently put in place or due to be enacted that might impact biodiversity:

- Current discussion of relaxation of planning and environmental legislation could have negative impact on biodiversity, e.g., by reducing habitat protection
- Designation of Marine Protected Areas, e.g., Lamlash Bay Isle of Arran
- Environment (Wales) Act 2016
- Marine Strategy Framework Directive
- EU Biodiversity Strategy for 2030

Puffin (Fratercula arctica), Scotland

4.3 Marine Protected Areas

Marine Protected Areas (MPAs) take a variety of forms but all contribute to an international network of areas designated to provide protection for a wide range of species and habitats. They range from relatively small coastal sites to large scale offshore sites. MPAs include Special Protection Areas (Birds Directive) & Special Areas of Conservation (Habitats Directive), Ramsar Sites (Ramsar Convention). Countries can also have their other designations that also contribute to the Marine Protected Area network, for example:

"The biggest issue is adequate management, as a good number of Irish Sea MPAs could be considered paper parks."

- Scotland: Nature Conservation MPAs
- England, Wales and Northern Ireland: Marine Conservation Zones; Sites of Special Scientific Interest (sites with marine components)
- Isle of Man: Marine Nature Reserves

The Irish Sea has a wide and diverse coastal and marine environment including many priority habitats including *Sabellaria alveolata* reefs, saltmarshes, seagrass beds, subtidal rocky habitats and maërl beds and priority species such as basking sharks and bottlenose dolphins. Many birds listed in Annex 1 of the Birds Directive use the Irish Sea, either as residents or seasonal visitors; these include species such as the red-throated diver, Leach's storm-petrel, sandwich tern and bar-tailed godwit.

Sectors / interests represented in responses to Marine Protected Areas *(10 respondents; some had more than one interest)*
Energy (1)
Environment (2)
Governance, law and planning (1)
Ecology / marine ecosystem (3)
All sectors (1)
Marine science & research (2)
Local residents (2)
Not given (1)

There are well over 90 Marine Protected Areas (marine and coastal with marine components) across all administrations in the Irish Sea (depending on where the boundary of the Irish Sea is drawn). Some sites have more than one designation, with slightly differing boundaries, affording a greater level of protection to those areas.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for Marine Protected Areas.

Honeycomb worm (Sabellaria alveolata) reef, Solway Firth

Current Issues and Challenges

Governance and management issues raised include: lack of effective management and monitoring, with one respondent stating **"The biggest issue is adequate management, as a good number of Irish Sea MPAs could be considered paper parks. Management and monitoring in some countries can be found wanting."** Another challenge was **ensuring compliance with existing protection measures** and that **work carried out in MPAs is done sensitively**.

Socio-economic concerns included **pressures from users** of the Irish Sea **including threats from increased access and tourism**, which can be compounded by **a lack of awareness of MPAs and what they are for**; one respondent stated **"People generally don't know about them and what they mean."**

Environmental issues and challenges raised included **climate change** – including the **need for species adaptation** and the potential that **MPA designations may need to change** but this may not happen quickly enough, the impact of **coastal erosion**, and **pollution issues** such as **microplastics** and **water quality** issues such as **eutrophication** through nutrient enrichment. Several respondents also commented on the challenges raised by **the limited size, scale and distribution of MPAs** and how these impact on their effectiveness.

Future Issues and Challenges

Lack of awareness and understanding of MPAs was noted by 30% of respondents, with one respondent stating that **"Many people do not know or care about them"** and another noting that inland areas can impact marine ecosystems so there needs to be **"Recognition that inland aquatic protected areas are also needed for healthy marine ecosystems".** Future **Funding** was also raised as an issue.

Effective protection and monitoring is needed, with the need to protect and monitor changes to saltmarsh, seagrass, *Sabellaria* and maërl habitats given as examples.

Environmental impacts again included the impacts of **pollution** such as **plastics**, and **climate change**, along with the **need to limit the impact of non-native species**. The need to **increase the size and distribution of protected areas** was also flagged as a future issue.

With regard to **adapting to and recovering from COVID-19** it was noted that there has been **limited monitoring & fieldwork during lockdown** and that **more plastics a**re likely to be entering the ocean as a result of increases in beach litter during the epidemic.

'Top 3' Future Issues for Marine Protected Areas

- Lack of awareness and understanding of MPAs
- Effective protection and monitoring
- Size and distribution of MPAs
- Pollution impacts
- Climate change impacts
- Non-native species impacts
- Funding
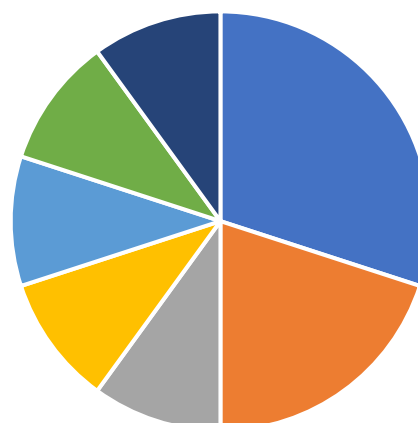
Opportunities

Current Opportunities

Governance and management opportunities include **changing the way MPAs are managed**, with one respondent describing this as **"Crucial"** and another **noting "The UK needs to deal with the MPAs it currently has and ensure they're fully protected before designating more new sites."** Another put forward opportunities arising from a **"Favourable political climate"** The opportunity to create a new designation - **Highly Protected Marine Areas** (UK) was noted, along with the creation of a **"Resilient network of MPAs."**

Raising awareness of and celebrating the benefits of MPAs were seen as opportunities to raise the profile of MPAs and help people understand why they are important. This includes **quantification of their economic and social benefits**, the benefits they bring to **species recovery**, **sustainable fisheries** and **tourism**.

Opportunities for **more scientific research**, including **studies of biodiversity changes and warmer water species** were also noted.

Future Opportunities

Improving the evidence base and management was seen as a major future opportunity by 38% of respondents, including **increasing national and local support and involvement in monitoring and management**, and ensuring policy makers such as the UK's Government department DEFRA and the Marine Management Organisation make **evidence-based policy**.

Future opportunities to **reduce harm to MPAs** include a **plastics campaign** and collaborating with other sectors **to mitigate climate change impacts.**

Showcasing the benefits of MPAs through projects that **promote them as examples of best Irish Sea habitats** and enable people to **explore what they mean to people**, perhaps by **enabling visits to less accessible MPAs** were also noted.

Creation of Highly Protected Marine Areas was also seen as a future opportunity – these would be areas in which no activity is allowed; the UK Government is currently exploring whether these are desirable/feasible.

'Top 3' Future Opportunities for Marine Protected Areas

- Improving the evidence base and management
- Reducing harm to MPAs
- Showcase the benefits of MPAs
- Creation of Highly Protected Marine Areas
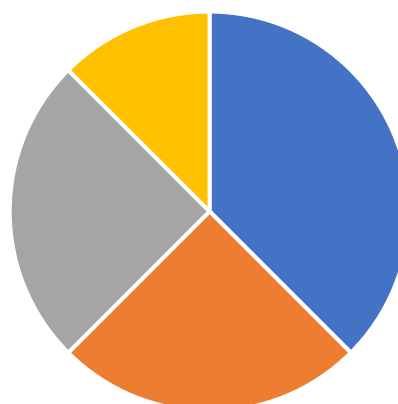
Legislation and Policy

New legislation, policy, etc., recently put in place or due to be enacted that might impact Marine Protected Areas:

- Marine Strategy Framework Directive

- Highly Protected Marine Areas (UK)

- Fisheries Bill (UK)

- Irish Government work on extending Ireland's network of Marine Protected Areas*

*Post-survey note: Resulting in the Marine Protected Area Advisory Group report - Expanding Ireland's Marine Protected Area Network, October *2020 for DHLGH, Ireland and subsequent consultation on the report by the Irish Government in 2021*

Oystercatchers (Haematopus ostralegus) Morecambe Bay and Duddon Estuary SPA, England

Image credit: © Dave Willis mountainsportphoto.com

4.4 Invasive Non-native Species

The Irish Sea has increasing numbers of non-native species, some of which are invasive or potentially so. Non-native species can arrive in the Irish Sea through natural spread as climate and ecosystems change, or be brought in on mobile structures, or ship's ballast water. They can also escape from captive populations kept for aquaculture, aquaria and research.

Invasive non-native species (INNS) can threaten biodiversity by competing with, killing or spreading disease to species, including economically important species such as those used in aquaculture, and cause other problems for industry such as fouling structures.

Some examples of marine INNS are:

Sectors / interests represented in responses to Invasive Non-native Species *(N respondents; some had more than one interest)*
Environment (2)
Governance, law and planning (1)
Ecology / marine ecosystem (2)
Marine science & research (1)
Agriculture (1)
Coastal management (1)
Fisheries (1)
Local residents (2)

- wireweed (*Sargassum muticum*)
- green sea-fingers (*Codium fragile subsp. tomentosoides*)
- common cordgrass (*Spartina anglica*)
- red alga (*Heterosiphonia japonica*)
- acorn barnacle (*Austrominius modestus*)
- Japanese skeleton shrimp (*Caprella mutica*)
- carpet sea-squirt (*Didemnum vexillum*)
- Pacific oyster (*Crassostrea gigas*)
- Chinese mitten crab (*Eriocheir sinensis*)
- slipper limpet (*Crepidula fornicata*)

Not all non-native species will become problematic and some may provide economic opportunities such as eco-tourism and new fisheries. In this section we are just considering those that do already, or may, become a problem.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for invasive non-native species.

Pacific oyster (Magallana gigas), Solway Firth, Scotland

Image credit: Solway Firth Partnership

Current Issues and Challenges

It was noted there is a current **increase in invasive species present** and this needs to be reduced as they can **outcompete native species** and **alter species diversity;** this can **impact economically on fisheries** for example restrictions on exports for areas where certain types of INNS have been identified.

Respondents noted several **mechanisms for transport of INNS**, including **oil & gas structures**, **presence on marine litter**, all types of **shipping,** both local and international, **recreational sailing craft** which can move INNS between ports and harbours or through **movement of other species such as shellfish for aquaculture**. **Global transport** and **climate change resulting in warmer waters** capable of sustaining different species were both noted to contribute to the spread of INNS. Because of the **wide-ranging nature of how INNS arrive and thrive** in the Irish Sea one respondent noted that, in terms of **governance**, **"There needs to be a cross sector/cross departmental response to the whole invasives issue."**

Several respondents noted the **difficulties in monitoring INNS in the marine environment** compared to monitoring terrestrial INNS and **issues with maintaining monitoring effort**. It was also noted that some **monitoring has been prevented due to social distancing restrictions** because of the COVID-19 pandemic.

Future Issues and Challenges

Future issues included the need to **manage potential transport mechanisms/vectors for INNs**, including **shellfish industry stock movements** and the incidence of non-native species in **marinas**.

The need to **monitor and manage the spread & impact** is linked to this, but one respondent noted the **"Difficulty of identifying species in marine environment"** and **funding** was also raised as an issue.

As noted above, with regard to **adapting to and recovering from COVID-19** it was noted that monitoring can be impacted due to social distancing restrictions.

'Top 3' Future Issues for Marine Invasive Non-native Species

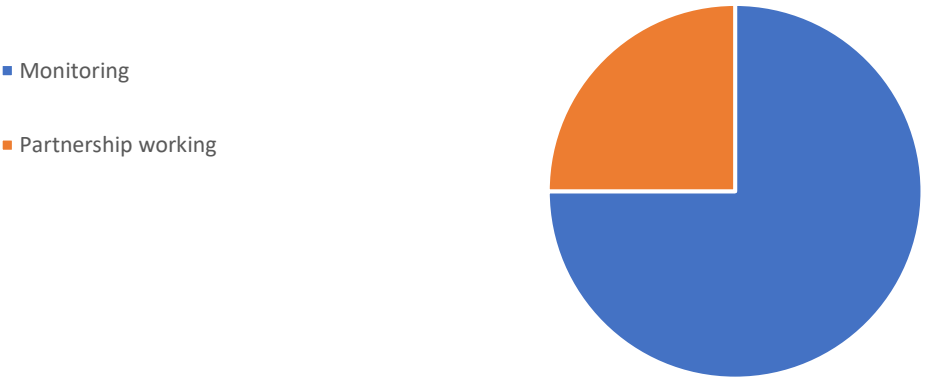- ■ Managing INNS transport mechanisms

- ■ Data and evidence

- ■ Funding

Opportunities

Current Opportunities

Governance and management opportunities were noted here, with one respondent stating INNS are an **"Explicit topic in Defra assessment of the state of UK seas". Biosecurity measures** can also help, along with **national monitoring schemes**, however one respondent noted that monitoring **"Appears to be quite low key at present."** Another noted that **"Encouraging commercial exploitation of invasive crustaceans would help greatly"** as this would help to remove invasive species, although it may also encourage their production/retention. Working **to increase species diversity** and **create shifts in habitat** could help to mitigate the issues caused by INNS or reduce their prevalence.

The opportunities arising from **more public education** were noted, particularly the maritime leisure public, and one respondent noted that **"Working with networks such as Coastal Partnership Network is helpful to identify examples of best practice."**

Future Opportunities

Monitoring was seen as the main future opportunity for controlling INNS, including **new technology** such as eDNA testing, **using other warm water species to monitor the progression of climate change** and **monitoring marinas and shorelines to assess the impacts of non-native species** (this last point is also mentioned in Section 4.2 Biodiversity)

The opportunities for **partnership working around the Irish Sea** to address INNS issues was also noted.

'Top 3' Future Opportunities for Marine Invasive Non-native Species

- Monitoring
- Partnership working

Legislation and Policy

New legislation, policy, etc., recently put in place or due to be enacted that might impact invasive non-native species:

- Marine Strategy Framework Directive
- Regulation (EU) 1143/2014 on invasive alien species (the IAS Regulation)
- the Irish National Biodiversity Data Centre (NBDC) has an online invasive species database that allows for sightings of invasive species to be reported, providing a critically important monitoring and control function.

4.5 Water quality

Water quality has long been an issue in the Irish Sea, with eutrophication being an issue in some areas in the eastern Irish Sea. Bathing water quality is also variable although significant improvements have been made in bathing water quality in recent years.

Some of the more common marine pollutants include:

- Human sewage
- Nutrients such as nitrates and phosphates, often originating from agriculture
- Oil, heavy metals and organic chemicals from industrial activity and discharges
- Microplastics from a range of sources which can leach chemicals such as plasticisers and carry other contaminants such as PCBs and metals

Poor water quality can harm wildlife and commercially important species and have impacts for human health, either directly (e.g. through swimming in contaminated water) or indirectly (e.g. through eating contaminated fish).

With River Basin Management Plans in place all around the Irish Sea and the monitoring requirements of the Water Framework Directive, the Bathing Water Directive and the Marine Strategy Framework Directive Irish Sea water quality should continue to improve. However there are longstanding intractable issues such as historic unsealed landfill sites and munitions dumps which are difficult, if not impossible, to remediate, and a lot of investment in new or replaced water treatment infrastructure, together with education re changes of practice, for example in agriculture, will be needed to solve some water quality issues.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for water quality.

> *"Poor water quality can impact on fishing, there has been an increase in prohibited shellfish beds due to poor water quality. "*

Sectors / interests represented in responses to Water Quality
15 respondents; some had more than one interest)
Energy (1)
Environment (1)
Governance, law and (1)
Ecology / marine ecosystem (4)
All sectors (1)
Marine science & research (2)
Agriculture (1)
Fisheries (1)
Coastal management (1)
Coastal tourism (1)
Local residents (3)
Not given (3)

Wind surfers, West Kirby, England

Image credit: Caroline Salthouse

Current Issues and Challenges

Water quality issues raised included **general pollution**, respondents noted this can be exacerbated by an **increasing number of high rainfall events** and **poor infrastructure** causing **more run off**, for example from **sewer overflows in urban areas** such as Liverpool or more rural areas with **run off from agriculture**. Issues with agricultural run-off were noted by several respondents, with one stating there is **"No support from the government to switch to more eco-friendly methods of fertiliser"** and others noting there is a particular issue with agricultural run-off in the Solway catchment and that **"The geology of the Solway area can make it difficult to disperse pollutants."** Pollutant 'drift' was also mentioned – with one respondent again citing the Solway and noting it is disproportionately polluted from elsewhere and that the **pollutant sources should be sharing the cost of the resources needed to clean it up**. It was also noted that there is an issue with the **build-up of hormones** in the water environment.

Pollution from other sources, such as **marine freight** and **illegal dumping** were mentioned, and several respondents mentioned the issues posed by litter, **in particular plastics and microplastics.**

It was noted that some areas have **"Prolonged eutrophication"** as a result of poor water quality, and that the **poor ecological quality impacts on protected habitats and fisheries**, with an increase in the number of shellfish beds closed due to poor water quality.

Future Issues and Challenges

40% of respondents placed issues to do with **farming practices** impacting on agricultural run-off in their 'top 3' issues and challenges, with one respondent noting the need to **"Alter nutrient loading by altering farm practices".**

The need to **manage pollution** issues and **reduce eutrophication** was noted, along with the need for **infrastructure upgrades** to wastewater treatment and the sewage system.

With regard to **adapting to and recovering from COVID-19** it was noted that monitoring can be impacted due to social distancing restrictions.

'Top 3' Future Issues for Water Quality

- Farming practices
- Governance
- Infrastructure
- Marine litter
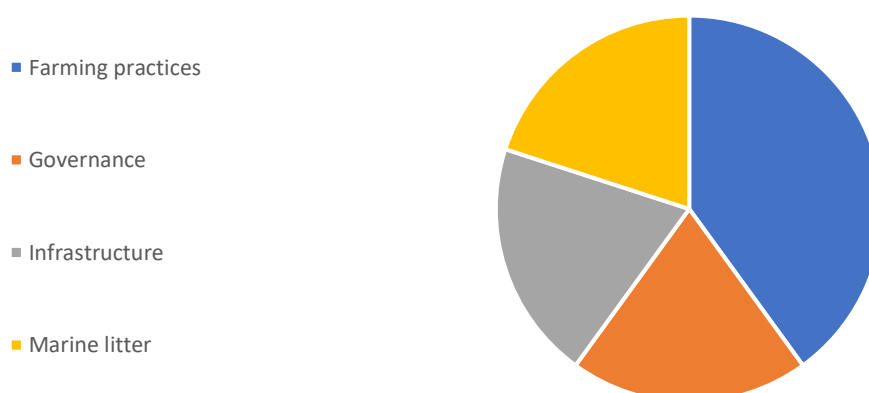
Opportunities

Current Opportunities

Water quality regulation and enforcement around the Irish Sea tend to be the **explicit remit of specific agencies or government departments** which is considered an opportunity, for example in England it is the explicit remit of Defra (government department responsibly for policy and regulation) and the Environment Agency (statutory agency responsible for monitoring and enforcement). One respondent noted that **"Better enforcement of a stricter regulatory system"** would bring benefits.

It was also noted that there are opportunities for **cross-border cooperation** and **partnership working to raise awareness** to help tackle water quality issues.

It was noted that **improvements in river water quality** would lead to lower pollution levels in the Irish Sea and mechanisms suggested to help this included **improved sewage processing**, and the **beneficial use of seagrass and bivalve molluscs** to remove nitrogen & hazardous chemicals from the water column. It was also noted there is an opportunity to **monitor climate change impacts on water quality**, for example by using automated analyser buoys.

Improved public education about marine pollution was mentioned as a missing economic theme but fits within both 4.6 Marine and Coastal Litter and 4.5 Water Quality so is noted in both these sections.

Future Opportunities

Several opportunities for **research** were suggested, including using **geophysical surveys to identify potential pollution sources** such as pollution plumes from buried landfill sites. using hydrogeologists to work on **integrated onshore/offshore water studies** and undertaking **studies of groundwater and seawater mixing zones.**

The opportunities for greater stakeholder involvement noted included a **citizen science water quality monitoring project** and **river catchment management groups** which are usually made up of a range of stakeholder organisations who have an interest in water quality or whose activities can influence it in some way.

With regard to **adapting to and recovering from COVID-19** it was noted that there is **"More public/political appreciation of quality of life."**

'Top 3' Future Opportunities for Water Quality

- Research
- Citizen Science
- Catchment management
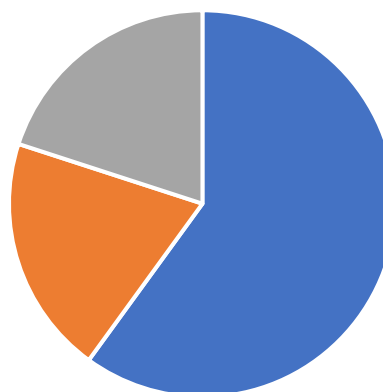
	Water Quality
Legislation and Policy	New legislation, policy, etc., recently put in place or due to be enacted that might impact water quality: • Divergence from EU regulations (applies to UK only). • Water Framework Directive • Marine Strategy Framework Directive • Bathing Water Directive • There is an ongoing public consultation on inland and coastal water quality by the Isle of Man Government.

Beach information sign, Morecambe, England

Image credit: Caroline Salthouse

4.6 Marine and Coastal Litter

All around the Irish Sea marine and coastal litter causes a problem, in particular plastics, which tend to linger in the marine environment, being broken down into smaller and smaller pieces which are now forming part of marine and coastal sediments and can be ingested by marine life and pass up the food chain – potentially into humans. Litter is unsightly, adversely affecting tourism destinations and larger items can cause entanglement of wildlife or be mistakenly ingested, clogging up stomachs and causing starvation. Plastics in various forms have been found in seabird and turtle stomachs. Sources of litter include litter dropped by coastal users, spillage from ships, including loss of containers which may break open, fishing waste and, particularly on the north west coast of England, litter from many miles inland washed down to its extensive estuaries. There are many industry, local authority, NGO and citizen-led initiatives to tackle marine litter issues such as Scotland's Fishing for Litter and community action groups such as Friends of the Estuary Coastal Care Group (Lytham).

> "It feels like this is an area where individuals can make a big difference, so public engagement is both an issue and an opportunity. "

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for marine and coastal litter.

Sectors / interests represented in responses to Marine and Coastal Litter
(N respondents; some had more than one interest)
Energy (1)
Environment (1)
Governance, law and planning (1)
Ecology / marine ecosystem (2)
Marine science & research (2)
Coastal management (1)
Coastal tourism (1)
Local residents (3)
Not given (3)

Beach litter, Sefton coast, England

Image Credit: Caroline Salthouse

Current Issues and Challenges

A range of **social** issues were noted to **directly cause marine and coastal litter**, in particular the behaviour of individuals, for example **visitors leaving rubbish on the beach** and **dog walkers bagging and discarding** dog excrement. One respondent commented on the **"Lazy people dumping litter"** and another stated **"People are still leaving far too much litter"; increased public access to the coast** was seen to be likely to exacerbate these problems. Others noted people's general **lack of care for the environment** and the **need to get people engaged** with solving the issue. A **lack of understanding and awareness** was also flagged up here, for example **people not connecting their plastic use with marine pollution**.

Other sources of litter arising directly from people's actions included **abandoned, lost or otherwise discarded fishing gear** and **illegally dumped shipping waste**. **Nurdles** (small pieces of plastic arising from the plastics recycling industry) are an increasing problem – these may have been **stored inadequately near a watercourse** or **lost during industrial or shipping accidents**. A range of other sources of marine and coastal litter were noted, for example the **risk of litter being increased by storms** due to **storm water run off from roads** and sewers, **with sewage-related debris** being noted as a particular issue.

It was noted that there are **coastal 'hot spots'** where **litter accumulates in specific areas** along the coast such as coastal bays due to currents and prevailing wind direction, or around coastal defence structures.

Governance issues included the **difficulty of identifying and penalising offenders,** with one respondent from South West Scotland noting **"A lot of plastic appears to be blown / washed across from Northern Ireland."**

Problems caused by litter include the **build-up of microplastics in the foodweb**, and **economic issues** such as **damage to vessels** and the **costs of cleaning up** marine and coastal litter. There is also the **impact on coastal visitors' experience of the coast**, with one respondent noting **"Walking on the west coast of the North Rhins there are plastic bottles crunching underfoot as they are hidden in the grass."** and another stating that there is **"Impact on other issues and opportunities, not only environmental but on health and wellbeing, tourism and recreation".**

Litter, in particular **plastic litter**, was mentioned the responses to other themes in the survey, such as Water Quality and Coastal Protection – relevant comments have been extracted and incorporated here.

Future Issues and Challenges

Clean up and enforcement issues raised include **who is responsible for clean ups**; it was noted, for example, that the landowner is often not the litterer but is responsible for clearing it up. This has **cost implications** and funding was also noted as a future issue. It was also noted (as above) that litter **can accumulate in hard to reach places making it difficult to remove**. One respondent noted the need to **"Report fly tipping and dumping on and offshore."**

Several respondents mentioned the issues of **visitor behaviour**, equating **more future visitors to more litter** and noting that **crowd behaviour can be a big influence**, with one respondent noting **" People seem to act more irresponsibly and drop more litter in crowd situations"**. The need to **discourage litter dropped by both tourists and locals** was noted, along with the issue of **inappropriate disposal of PPE** by visitors.

Concerns were raised about **plastics** in particular, with the need to **reduce plastic use**, and **discourage and reduce the use and build-up of microplastics** noted. Other concerns include **litter arising from industry** and the **lack of recycling of domestic waste**.

The **need for public engagement** on all of these issues was noted.

With regard to **adapting to and recovering from COVID-19** a lot of concerns raised focused around the **increase in visitors**, including 'different' visitors who have not visited the Irish Sea coast before, to coastal areas and the **corresponding increase in coastal litter**, with **PPE such as face masks** being noted as being a major new issue, and **a rise in the use of single use plastic items**, in addition to more usual items of litter. It was also noted that **mass shore clean ups have been discouraged during lockdown** and may continue to be impacted by pandemic restrictions and the need for social distancing, etc.

'Top 3' Future Issues for Marine and Coastal Litter

- Clean up and enforcement
- Litter from coastal visitors
- Plastics
- Litter from other sources
- Public engagement
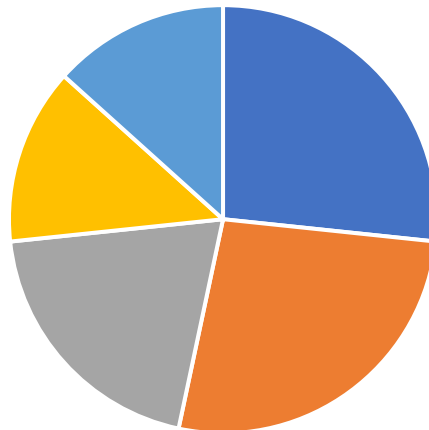
Opportunities

Current Opportunities

Many of the respondents noted the opportunity to **raise public awareness** of the issues of marine and coastal litter, through **increased media coverage** and **public education**. Public awareness of the problem and public opinion, for example with **increased plastic pollution awareness**, was mentioned as an opportunity as there is **"More enthusiasm from public to protect the coast".** It was also noted that **"Linkages between sectors and litter pollution should be highlighted"**

The possibility for **community campaigns**, and **consumers pressurising corporations to change what they do/produce** and the opportunities arising from **public reaction to coast and marine litter** were noted. One respondent suggested **"Make littering unacceptable by education of children, making them keep school grounds litter free also their routes home."** and another noted the opportunity for **"Working with community groups / local business to clean and send plastics to circular economy";** it was also noted there are already **many volunteer groups cleaning beaches**. **Improved public education about marine pollution** was mentioned as a missing economic theme but fits within both 4.6 Marine and Coastal Litter and 4.5 Water Quality so is noted in both these sections.

The need for **better legislation and enforcement** to **reduce illegal refuse**, **increased penalties for littering** and the opportunity for **improvements to recycling facilities** and to **make recycling easier and more easily understandable** and so encourage greater use/wider recycling was noted.

Opportunities for **future research** were noted too, with the Natural Course project's **'Understanding and taking action on plastics pollution: Identifying macro plastic pathways into rivers and seas'** being cited as an example of an English study.

Litter, in particular plastic litter, was mentioned the responses to other themes in the survey, such as **4.5 Water Quality** and **3.3 Coastal Protection** – relevant comments have been extracted and incorporated here.

Future Opportunities

Cleaning up litter was seen as a key opportunity by 36% of respondents, with **more local beach clean activity** being suggested, **linkage to tourism and business opportunities**, wider **public support for projects** and the possibilities of **partnership working** all being noted. One respondent commented that "People could assume more individual responsibility for removing litter."

Raising awareness and **getting people and businesses more engaged with litter prevention** were noted as future opportunities, with suggestions for **education** to prevent litter around, for example, geotourism and the importance of children being **educated on litter issues at school** and **improving the "take your litter home" message awareness and compliance**.

Future Opportunities (cont.)

Encouraging the **reduction of single use plastics** and **reducing the use of plastics by the food industry and supermarkets** were seen as opportunities for reducing general plastics use; one suggestion was to **increase the cost of plastic carrier bags** to at least 50p per bag.

The opportunity for reducing litter by introduction of **heavier fines for dumping on and offshore**, and the possibilities for **research into the impact of plastics and other litter**, for example the Natural Course project cited above, were noted.

With regard to **adapting to and recovering from COVID-19** it was noted that there is **now more public and political appreciation of environment quality** which might help reduce the issue, and that **funding may become available under business recovery schemes** which would include the tourism industry and might help deal with some of the litter issues.

'Top 3' Future Opportunities for Marine and Coastal Litter

- Cleaning up litter
- Raising awareness and engagement
- Reduce plastics use
- Research
- Financial penalties
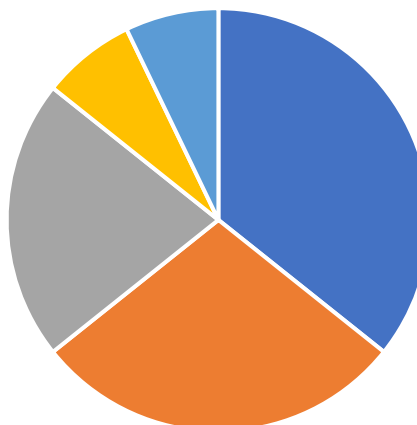
Marine and Coastal Litter

Legislation and Policy

New legislation, policy, etc., recently put in place or due to be enacted that might impact marine and coastal litter:

- Enforcement of existing litter legislation might act as a deterrent

- Marine Strategy Framework Directive

- Possible plastic bottle deposit scheme (UK)

Beach litter, Alt Estuary, England

4.7 Missing Environment Themes?

Respondents were asked if there were any other Irish Sea Environment activities that should be considered.

Both the themes suggested here relate more to the Communities section so have been incorporated in section 3.4 Missing Communities Themes.

Demonstrating the economic importance of ecological goods and services by quantifying economic benefits or losses related to loss of those goods and services was noted as a missing theme in Section 2: Irish Sea Economy but has been replicated here as it fits with the Environment theme.

Wildlife interpretation board, Wirral coast, England

Image credit: Caroline Salthouse

Section 5: Irish Sea Governance

Governance of the Irish Sea is complex, with six different governing administrations involved in making policy and legislation for the Irish Sea and its communities, and administering licensing and enforcement activity. Borders requiring a degree of trans-boundary co-operation range from the international border between Ireland and the UK as a whole, through the devolved UK administrations and on down to adjacent local authority areas.

The 1998 Good Friday, or Belfast, Agreement created two international bodies to foster co-operation between Irish Sea jurisdictions on a range of issues. The British-Irish Council draws together representatives from the Irish Government, the UK Government, the Scottish Government, the Northern Ireland Executive, the Welsh Government, the Isle of Man Government, the Government of Jersey and the Government of Guernsey. The North South Ministerial Council brings together ministers from the Northern Ireland Executive and the Irish Government to develop consultation, co-operation and action within the island of Ireland and has a range of implementation bodies.

Brexit – the withdrawal of the UK from the European Union – is likely to make the governance situation even more complex with a change to international border management and the potential for future divergence of legislation on a range of issues.

This section covers:

5.1 Marine Planning

5.2 Irish Sea Stakeholder Engagement

5.3 Irish Sea Projects

5.4 The Future for the Irish Sea after Brexit

Respondents could also add any themes they felt were missing.

As part of the research respondents were asked to identify up to 3 top issues and opportunities for each thematic area. The following table gives a summary 'snapshot' of the top issue and top opportunity identified for each theme. However, these are indicative and should not be taken in isolation; the result here is based on groupings of similar comments which is a subjective process and respondents were not asked to weight their points. Occasionally the results are tied hence 2 or more points are given.

Theme	Top issue	Top Opportunity
Marine planning	Awareness and engagement in marine planning	Benefits of collaborating at an Irish Sea scale. Environmental benefits.
Stakeholder engagement	*Not applicable – question not asked*	Knowledge exchange and advancement
The future for the Irish Sea after Brexit* *The withdrawal of the UK from the European Union*	Socio-economic impacts	None* *'none' was the top response in this section however some opportunities are given in this and other sections of the report*

5.1 Marine Planning

Marine planning is the process for planning where and when human activities take place at sea. This is needed due to increasing competition for marine space; activities need to be coordinated in the best possible way to reduce conflict and help meet environmental, economic and social objectives. Marine planning is a relatively new concept, with some nations having made more progress in preparing marine plans than others. The European Union Directive establishing a Framework for Maritime Spatial Planning states that marine plans must be in place for each member state by March 2021. The UK's Marine and Coastal Access Act has the same deadline. The Isle of Man is a Crown Dependency with responsibility for its own territorial waters and is not subject to either the UK's Marine and Coastal Access Act or the EU Directive.

"Consultation processes are usually quite detailed and require a lot of input"

Each of the administrations has collected data and evidence and undergone stakeholder engagement to inform development of the marine plans.

Ireland - the draft Marine Policy Statement was published in 2019 and a consultation on the first draft National Marine Planning Framework ran until 30th April 2020. It is expected to be adopted in 2020 together with new primary legislation in the form of the Maritime Area (Planning) Bill (formerly called the Marine Planning and Development Management Bill). The resulting plan is due to be submitted to the European Commission by March 2021.

UK - the Marine Policy Statement covering all UK administrations was published in 2011, but marine plans themselves are devolved to the 5 different UK administrations:

Sectors / interests represented in responses to Marine Planning *(N respondents; some had more than one interest)*
Energy (1)
Environment (1)
Governance, law and planning (2)
Ecology / marine ecosystem (2)
Fisheries (1)
Recreation (1)
Coastal tourism (1)
Marine science & research (1)
Local residents (3)
Not given (2)

- Northern Ireland - a consultation on the Draft Marine Plan for Northern Ireland took place in 2018.
- Scotland – the Scottish National Marine Plan was published in 2015.
- Wales - the Welsh National Marine Plan was published in 2019 and supporting guidance is being produced for some policies
- England - North West Inshore and Offshore Marine Plans have recently been consulted on and are expected to be finalised and adopted in spring 2021 (ditto the South West Inshore and Offshore Marine Plans) *(post-survey note: the North West and South West Marine Plans were published in June 2021)*

Isle of Man – although the Isle of Man is exempt from the legislation mentioned above the Manx government has similar issues in managing a complex space so has a marine plan project, and as part of this has published the Manx Marine Environmental Assessment. In addition, new legislation for marine infrastructure was enacted in 2016.

In order to provide potentially useful information to the relevant marine planning authorities for each region additional questions were asked and, for these additional questions, it was considered useful to retain the full verbatim responses rather than summarising them. However, the standard questions are dealt with in the same way as for the rest of this report, with a summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for marine planning.

Engaging with Plan Development

How easy did you find it to engage with the marine plan development process?

For the benefit of the marine planning authorities in each region **the comments received in relation to ease of engagement** have not been summarised and instead are **given verbatim** below.

Generic comments:

- Consultation processes are usually quite detailed and require a lot of input

- Although it was not my role to engage with the Marine Planning process I am aware of the difficulties colleagues faced with the process.

- Too many cooks spoil the broth. Marine planning becomes complicated when too many different departments have a say in it.

- I was not involved due to lack of awareness of it at the time.

NB The term 'generic' has been used for comments where it was not possible to determine which marine plan area or areas the respondent was commenting on; they could relate to one, some or all of the Irish Sea jurisdictions.

**Ireland's National Marine Planning Framework:**

- Department of Housing, Planning and Local Government (DHPLG*) * have done a fantastic job at engaging and raising awareness.

England's North West Marine Plan:

- The 'plan' turned out to be a simplistic document, whereas most info, etc., was in a technical annex, which was too detailed to respond to. A single, compromise document would have been more helpful in terms of providing a consultation response.

- Regarding the on-line survey a large number of our members do not have easy access to internet or find it problematic to do online surveys. As club it would be helpful if the surveys were downloadable so the questions could be more easily discussed with our members to get the best response. These are experienced members who have years of experience and knowledge of the Irish Sea areas where they fish, so it would be in the interest for any future surveys to have their input and knowledge about the Irish Sea Area.

*Post-survey note: now renamed as the Department of Housing, Local Government and Heritage – DHLGH

How easy did you find it to engage with the marine plan development process?

Implementation of Marine Plans
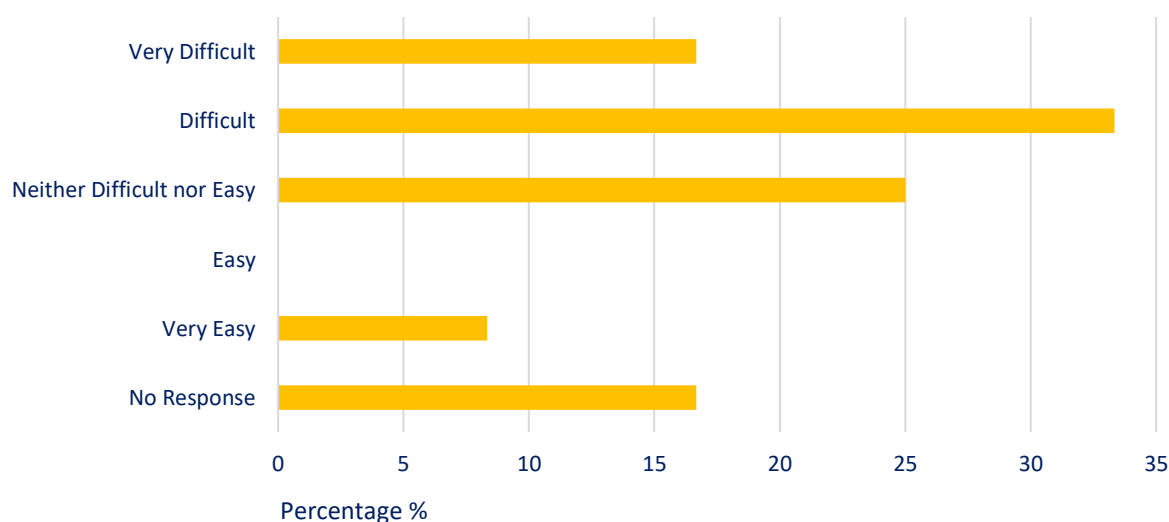
As marine plans move forward into implementation and review is there anything you would like to see done differently in terms of:

For the benefit of the marine planning authorities in each region **the comments received in relation to implementation** have not been summarised and instead are **given verbatim** below

Gathering data and evidence?

- Better communication to people who can't access the internet

- The numbering in the online was not helpful if you skipped a section and subsequently decided to go back and answer a question in a section you skipped. The question numbers change this was confusing for me taking notes and rechecking that my answers were put in properly also the boxes showed so little text this made it difficult as well.

Stakeholder engagement?

- Local people need to be consulted.

- Explore ways of involving general public not just through interest groups, e.g., by better engagement with local politicians and integration with land use planning as well as through media, etc.

- Stakeholders need to be made aware of projects so advertising to make them aware.

- Continue to use local coastal partnerships for this.

Issues and Challenges

Current Issues and Challenges

Issues raised included **governance**, in terms of skills, knowledge and preparedness in the planning authorities for **effective implementation** of marine planning with one respondent commenting **"The new legislative regime will be a massive change"**. Other implementation issues are the challenge of **getting all sectors to work together**, and the challenge of **integrating the planning policies of different Irish Sea administrations.**

Balanced representation was also raised as an issue, with one respondent noting **"The level of complexity in the marine environment and balancing the representation of the often competing sectors"** and another stating **"Too many economic aspects".**

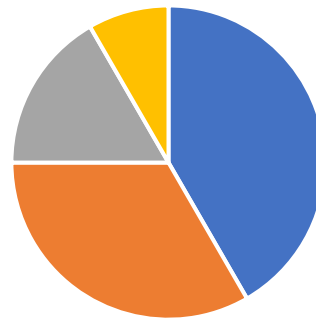## Future Issues and Challenges

Awareness and engagement in marine planning was raised as a future issue by 42% of respondents. Issues included the need to **demonstrate relevance to stakeholders** including local communities and the wider general public, with one respondent citing **"Public ignorance"** as an issue, and the importance of **meaningful engagement**. The difficulty of engagement with **so many different sectors** was acknowledged.

Another area of concern was **resource issues**, including **funding** but also **a lack of skills and training** in the planning profession and one respondent noted the **"Lack of continuity in personnel in relevant organisations"** as a challenge.

Other issues noted included **environmental** concerns such as **water quality** and **plastic pollution**, along with potential future issues arising from **Brexit** – the withdrawal of the UK from the European Union.

'Top 3' Future Issues for Marine Planning

- ■ Awareness and engagement in marine planning
- ■ Resource constraints
- ■ Environmental concerns
- ■ Brexit

Marine Planning

Opportunities

Current Opportunities

It was noted that marine planning offers opportunities for **improvement of the marine environment** and **promotion of blue growth**, with one respondent commenting they are **"A mechanism for sustainable development"**

It was noted that there is an opportunity to **select the key issues that will be the target of effort over the next 5 years** and that there's an opportunity for an **"Integrated approach from all Irish Sea partners."**

Future Opportunities

When considering future opportunities around marine planning in the Irish Sea 27% of respondents considered there were potential benefits from **collaboration at an Irish Sea scale**, with **"Working across whole Irish Sea"** and **"Networking internationally"** being given as examples, along with opportunities for **centralisation of objectives and targets** of marine plans and **rationalisation of the use of space** in the Irish Sea.

Environmental opportunities include **improved fish stocks**, **less pollutants** such as sewage and industrial waste being discharged into the Irish Sea, the **opportunities for carbon capture and storage** and the opportunity for plans to provide **"Environmental leadership".**

The future role of marine plan policies in **local and regional economic development** and in **promoting blue growth** were noted, and the benefit of having **regional marine planning** and the opportunities this scale of plan might provide were noted.

Respondents noted there are opportunities for **improving engagement in and awareness of marine planning** and its benefits, using **more creative ways to increase engagement** and through **public education**. One respondent noted **"The opportunities are engagement and education of community using road shows, media, etc."**

With regard to **recovering from and adapting to COVID-19** it was noted that marine planning has a potential **role in public health management and emergency preparedness.**

'Top 3' Future Opportunities for Marine Planning

- ■ Benefits of collaborating at an Irish Sea scale
- ■ Environmental benefits
- ■ Improved awareness and engagement in marine planning
- ■ Regional benefits
- ■ Economic benefits

	Marine Planning
Legislation and Policy	**New legislation, policy, etc., recently put in place or due to be enacted that might impact marine planning:** • National Marine Planning Framework and Marine Planning and Development Management Bill* (Ireland) **Post-survey note: now renamed as the Maritime Area (Planning) Bill*

Felix Leinemann, DG MARE, European Commission, addressing delegates at the SIMCelt project conference, Liverpool, England, 2017


Image credit: Caroline Salthouse

5.2: Irish Sea stakeholder engagement

As well as government initiatives to involve stakeholders in initiatives like marine planning and development of proposals for marine conservation zones there have been a range of projects such as Celtic Seas Partnership, SIMCelt and SIMAtlantic that have worked with stakeholders, including those from the Irish Sea region, as well as networks supporting stakeholder engagement and collaboration such as the Irish Sea Maritime Forum (ISMF).

Respondents were asked **whether or not they considered it useful to have a stakeholder engagement mechanism that worked at Irish Sea scale**. Overwhelmingly, the response was yes with 95% responding yes and only 5% being unsure.

"Having a wide range of stakeholders engaged allows for better outcomes."

Is it important to have an Irish Sea-wide mechanism for multi-sector stakeholder engagement?

Irish Sea Maritime Forum workshop, Liverpool

Image credit: Caroline Salthouse
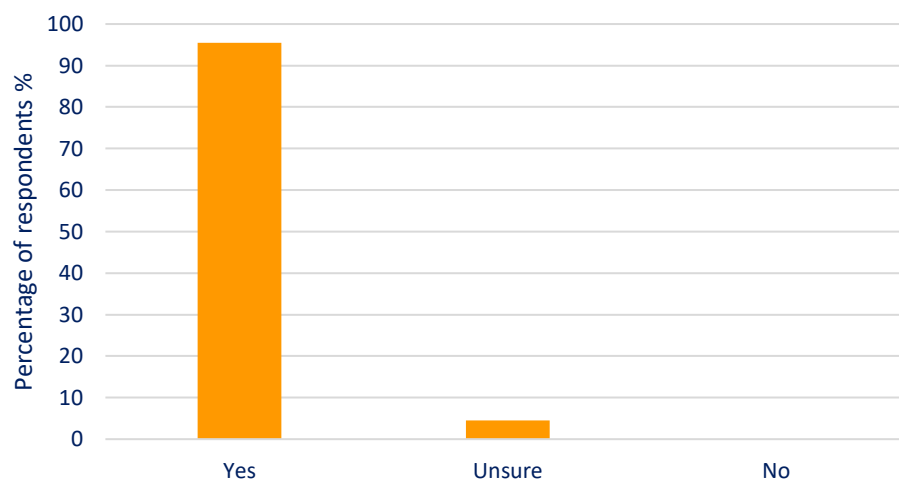
Sectors / interests represented in responses to Irish Sea Stakeholder Engagement *(21 respondents; some had more than one interest)*
Energy (1)
Environment (2)
Governance, law and planning (2)
Ecology / marine ecosystem (4)
All sectors (1)
Marine science & research (2)
Agriculture (1)
Fisheries (1)
Coastal management (1)
Coastal tourism (1)
Recreation (1)
Coastal communities (1)
Local residents (3)
Marine litter (1)
Not given (4)

Engagement Mechanisms

Current benefits experienced from working with existing Irish Sea-wide stakeholder initiatives (single or multi-sector):

Cross-border cooperation is the key benefit listed by respondents. The SIMCelt project (now finished) was cited as an example of working across the Irish Sea.

Future benefits from participation in Irish Sea-wide stakeholder engagement mechanisms

The majority (50%) of the comments regarding benefits from Irish Sea-wide stakeholder engagement mechanisms related to **opportunities for knowledge exchange and advancement**. These included:

- **Wider and greater access to 'quality' information**
- **Better knowledge of wider issues and opportunities**
- Seeing the bigger picture – **'Irish Sea scale' context** and implications
- **Keeping in touch** - learning about and **keeping up to date** with new developments and initiatives and, for example through **valuable networking opportunities**, **knowing who to contact**
- **Learning from others** and **building capacity** – a 2-way exchange of knowledge and expertise leading **to increased awareness** and, as one respondent noted **"Ideas and motivation for research; promulgation of its findings"**.
- Opportunities for obtaining **"Good all round advice, from thinking outside the box"**
- To **provide a space where issues and opportunities can be shared** - for example a forum such as the Irish Sea Maritime Forum

30% of respondents listed **benefits from co-operation and collaborative working opportunities**. These included:

- **Shared or common objectives** and the resulting opportunities for **close working relationships** for mutual benefit
- Opportunities to **build capacity and knowledge by partnership working**
- To be able **"To coherently respond to transnational issues that impact the Irish Sea"**.
- **Continued co-operation leading to enhanced understating of organisations**, their structures and the issues and opportunities that they are interested in.
- Opportunities for Irish Sea wide partnership working **to facilitate partnership working at a more local or sub-regional level** in areas across the Irish Sea. Examples given include Liverpool Bay scale, Merseyside coast scale or North West coast scale.
- The **desire to work with others on relevant projects** and for that **collaboration to be able to continue** in some way after a project ends – one respondent commented **"I think a forum like this is really important. I think the Celtic Seas Partnership did a lot of good work in a broader area and I feel that we lost a lot when the project finished."**

Other benefits noted include **policy benefits**, with respondents noting that having a **wide range of stakeholders engaged enables better outcomes** and that **enabling the 'sectoral voice' to be heard by the public sector** can reduce areas of **"unnecessary duplication"**. Environmental benefits were noted, with one respondent stating **"We need international cooperation and stakeholder engagement to ensure effective conservation"**; another noted that there can also be local community benefits arising from stakeholder engagement.

Only one respondent felt there was **"No tangible benefit"** to having an Irish Sea-wide stakeholder engagement mechanism.

Benefits of Irish Sea-wide Stakeholder Engagement Mechanisms

- Knowledge exchange and advancement
- Benefits from collaborative working opportunities
- Policy benefits
- Environment benefits
- Community benefit
- No benefit
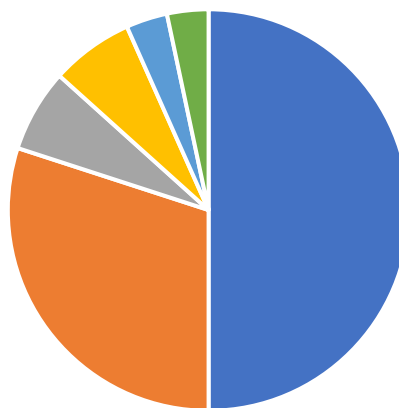
Celtic Sea Partnership (EC LIFE+ project) workshop, 2016

Image credit: Caroline Salthouse

5.4 The Future for the Irish Sea after Brexit

As the UK finalises its withdrawal from the European Union (Brexit), we asked respondents to give their thoughts on how this might impact the Irish Sea for their particular sector or area of interest.

A key area of uncertainty is the effect of Brexit on the land border between Northern Ireland and the Irish Republic and the sea border between the Irish Republic and the other administrations around the Irish Sea. The 'Northern Ireland Protocol' which will address some of these key issues will be finalised as part of the Brexit negotiations.

A summary analysis of the responses drawing out the key points is given in the tables and figures below illustrating respondents' 'top 3' issues and opportunities for the future of the Irish Sea after Brexit.

It should be noted that the responses given in this section are not the only ones relating to Brexit; issues and opportunities relating to Brexit were also mentioned by respondents against specific themes and are not duplicated here.

Sectors / interests represented in responses to the Future for the Irish Sea after Brexit *(11 respondents; some had more than one interest)*
Energy (1)
Environment (1)
Governance, law and planning (2)
Ecology / marine ecosystem (2)
Marine science & research (1)
Fisheries (1)
Marine litter (1)
Coastal tourism (1)
Local residents (2)
Not given (2)

Looking out over the Irish Sea, Formby, England

Issues and Challenges

Issues and challenges following the UK's withdrawal from the European Union:

A wide range of potential **socio-economic impacts** were noted including the **impact on continuity of trade**, with one respondent noting this could **especially impact the export of live shellfish**. The **impact of increased border controls on tourism and transport** and the disruption this might cause, e.g. traffic stacking, were also noted, along with more a more general concern that there would be "Negative economic impact exacerbating inequalities and exclusion from benefits (e.g. health and wellbeing, employment) from the Irish Sea"

Potential future **governance** issues raised included **a weakening or lack of co-operation and reduced policy integration** between states, particularly with regard to **marine planning**, and a "general loss of goodwill" between nations. **Future UK policy** was also noted as a potential challenge for the Irish Sea with another respondent citing "Westminster government policy".

Potential future **environmental impacts** include a **reduction in environmental standards and protection**, with one respondent noting that "Experts warn that the UK's approach to environmental conservation may be found wanting post-Brexit".

Respondents also noted that there may be a **reduction in funding for regional projects**, and that there is likely to be increased **competition over resources**.

Future Issues Following the UK's Withdrawal from the EU

- Socio-economic impacts
- Lack of co-operation between states
- Environmental impacts
- UK policy impacts
- Funding impacts
- Increased competition for resources
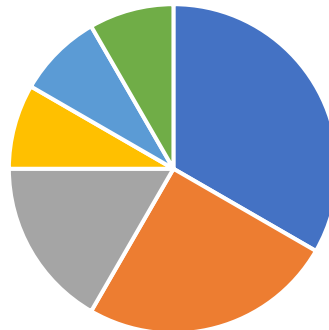
Opportunities

Opportunities following the UK's withdrawal from the European Union:

The majority of respondents considered there were **no opportunities arising from Brexit**, with one respondent commenting there are "No new opportunities whatsoever" and another stating "There are no benefits to leaving the EU, let's be honest."

The only potential benefits noted were **wider conservation powers** (for the UK), which may result in **better species and fisheries protection**.

Future Opportunities Following the UK's Withdrawal from the EU

- None
- Species and fisheries protection (UK)
- Unsure
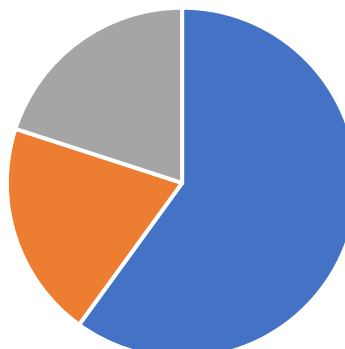
5.5 Missing Governance Activities/Themes

Respondents were asked if there were any other Irish Sea Governance activities that should be considered.

Some important areas flagged up for inclusion in further work on the Irish Sea Governance are the **importance of communication**, particularly in light of the UK's exit from the European Union, and the **role of international treaties and agreements over marine and coastal protection**.

Constraints on resources and the impacts on governance were noted as a missing theme, with one respondent noting a **"Lack of government funding to support councils in maintaining the coastal fringe."**

Scallop fishing, Solway Firth, Scotland

5.6 Irish Sea Projects

As part of the survey respondents were asked if there were particular current or future projects with Irish Sea relevance that they would like to publicise.

A list of the projects submitted, with weblinks where appropriate, is given in the table below.

Current or Future Projects with Irish Sea Relevance
SIMAtlantic - Supporting implementation of maritime spatial planning in the European Atlantic - www.simatlantic.eu
Long distance electricity cable from Firth of Clyde to Wales
A **PhD on an assessment of Irish Sea MPAs**: 'The role of governance in how effectively Marine Protected Areas in the Irish Sea reach their biological conservation objectives while maintaining sustainable use.' (Research being undertaken by a researcher at King's College London).
Bridge across the Irish Sea from Portpatrick, Scotland to Larne, Northern Ireland
Tunnel across the Irish Sea from Scotland to Northern Ireland (under the north channel)
Solway Marine Information Learning and Environment Project (SMILE) https://www.solwayfirthpartnership.co.uk/planning/smile-project/
The Socio-Economic Analysis of the Scottish & English Solway https://www.solwayfirthpartnership.co.uk/planning/seass-and-seaes

CHERISH project workshop (Ireland-Wales INTERREG), North Wales

Image credit: Caroline Salthouse

Annex 1: The Headlines in more detail

The following analysis considers the results summarised in section 1 Irish Sea Headlines above and includes the fuller descriptions given by respondents on what makes the Irish Sea special to them.

The 'top 3 words or phrases' are given on coloured background by theme and other comments provided are shown in quotation marks.

Some of the comments are repeated as they covered more than one section, or are broken down into their thematic parts where it was possible to do so. Some one word comments are repeated when more than one respondent made them.

ENVIRONMENTAL FACTORS

In this survey by far the most comments received related to the natural environment so arguably **the key headline for the Irish Sea is its value for nature conservation**.

The Irish Sea is important to people for a wide range of nature conservation value reasons including ecosystem quality, its ecological services and its contribution to North Atlantic habitats and species and the Natura 2000 network of international Marine Protected Areas.

The key words or phrases included not only the things that people consider important in themselves, for example marine biodiversity and natural habitat which were flagged up by many, but also the need to conserve and protect the Irish Sea's species and habitats, to maintain species diversity and to prevent harm by limiting the impact of invasive species and by carrying out any work in the Irish Sea's Marine Protected Areas sensitively.

Only a few comments were received which directly related to geology and geography, however the need to know baseline geological conditions, the wide variety of physical processes, the geological features and more general geography of the Irish Sea were all flagged up as being important. One respondent expounded on the value of the geology of the Irish Sea and how this cross-cuts with education, tourism and climate change mitigation:

"Rich array of geological and geomorphological features and site along the coast and on the sea-bed. These are important for research, teaching and geo-tourism. The area has potential for carbon capture and storage in geological media or for energy storage as part of the transition to a low carbon economy."

Nature Conservation Value:		
	Looking after marine life	Its ecology
	Marine biodiversity	Ecological services
	Good ecosystem quality	Nature protection
	Biological conservation	Natura 2000 areas
	Limit alien species impact	Wildlife
	North Atlantic habitats and species	Biodiversity
	Maintain Irish Sea species diversity	Habitat
	Protecting marine environments	Wildlife habitats
	Natural habitat	Biology
	Marine Protected Areas	Wildlife*
	Works in these areas carried out sensitively	
	mentioned by different respondents	

"I also value it for the habitats it supports, such as the dunes on the Sefton coast."

"The Irish Sea has its own unique biodiversity."

"North Atlantic marine biodiversity and Marine Protected Areas."

"It's a precious marine habitat that is on the receiving end of a lot of plastic pollution that has a devastating impact on the wildlife in the sea."

"The wildlife and habitats that it supports/affects."

"Beautiful, clean shorelines & species biodiversity within."

"I am a PhD candidate studying MPA effectiveness in the Irish Sea."

"Research interest. "

Geology and Geography	Wide variety of physical processes	Geography
	Need to know baseline geological conditions	
	Geological features	

"Rich array of geological and geomorphological features and site along the coast and on the sea-bed. These are important for research, teaching and geo-tourism. The area has potential for carbon capture and storage in geological media or for energy storage as part of the transition to a low carbon economy."

"Many physical processes"

Climate Change Mitigation	Carbon capture and storage
	Energy storage

"I also value it for its potential for climate change mitigation, e.g., through renewable energy generation."

"The area has potential for carbon capture and storage in geological media or for energy storage as part of the transition to a low carbon economy."*

*This comment is repeated in the geology section

Climate and Coastal Change Impacts	Vulnerability of coastal zone	Tides
	Vulnerability to climate change	Weather
	Coastal defence against flood risk	

"Weather affects Firth of Clyde which borders & affects my garden."

Environmental Quality:	Good health of our seas	Environmental quality
	Sustainable future for our seas	Diversity of environments

"The area for which I am responsible in my work, it's where I live and I feel passionate about protecting its health for future generations."

"Its good health and productivity."

"Diversity of environments."

Water Quality and Pollution:	Water quality	Cleanliness
	Pollution	Plastic pollution
	Flotsam	Pollution*
	Maintain clean healthy shores	

There were no quotes relating directly to water quality.

SOCIETAL FACTORS

Respondents reported the importance of the Irish Sea's open views, the views across the Irish Sea to Ireland and, more generally, the landscape of the Irish Sea. The suggested headline from this is that views of and across the Irish Sea are valued.

One respondent considered that "*What you can see on the surface*" is important and then went on to include an additional comment that "*What you can't see beneath the surface*" is also important; it may seem odd including this in a seascape section as it can't be easily seen however undersea landscapes are important not just for their habitat value and their value should be acknowledged.

Land and Seascape:	Views across to Ireland	Landscape
	What you can see on the surface	Open views
	What you can't see beneath the surface	

"Beautiful coastline."

"The illusion of space."

"Space"

"The scenery is superb."

"Scenery"

"What you can see on the surface."

"What you can't see beneath the surface."

Sense of Place for Local People:	Sense of place	Locality
	Proximity	

"I live five miles from an Irish Sea coastline."

"Diverse range of activities, and cultural importance to local communities"

"Nothing except it is local."

"It's where I live and work."

"Resident within about 3 km."

Health and Wellbeing:	Health and wellbeing	People
	Mental and physical health	Wellbeing
	Wellbeing and enjoyment	
	Public health including climate change mitigation	

"There is value too, perhaps more intangible, in its health and wellbeing benefits: the enjoyment people get from being by the sea, the 'sea air' and the views."

"Its ecological services support the health and well-being of millions of people (residents and visitors) in its six coastal jurisdictions."

"Going to the Irish Sea area is good for your mental and physical health."

Amenity Value:	Solitude	Space to walk
	Coastal amenity	Pleasure/amenity
	Accessible coast	Recreational fishing

"The Irish Sea area is a good area for recreational sea angling where you can go to participate in your sport. You can do this on the shore or out in a boat. It is a place where the Sea Angling Club organise outings to meet to take part in our sport."

"Live on Loch Ryan, walk the North Rhins."

Heritage:	History

"Environmental archaeology and climate change history."

"The Irish Sea is special for its historical role in Liverpool's development and resulting cultural impact".

ECONOMIC FACTORS

There were a range of responses indicating that issues to do with energy production and climate change, including climate change mitigation, are key issues for the Irish Sea.

It's also important to note the one negative comment relating to wind farms – the reason behind this is not given but it may relate to issues such as impact on seascape or reduced access to areas for fishing or recreational boating activities.

Local Coastal Economy (general):	Dependence on it	Coastal economy
	Support local community businesses	Income/trade

Importance to coastal communities."

"It's close to where I live and a lot of people depend on it."

"Dumfries & Galloway has a significant coastline - an opportunity for income, food and pleasure for my family and forbears in particular."

"The distinctive character, heritage and natural features of our marine and coastal area which supports a vibrant and sustainable local economy."

"I live within 1.2km from the coast and my work considers the sea."

Visitor Economy	Tourism	Tourism

"By visiting the area we can support the local area businesses. It is a place you can go away to for a day a weekend or longer where you can relax and get away from the everyday routine."

"It's on my doorstep and is Important to tourism. And my restaurant serves local fish/shellfish."

Maritime Economy – Fisheries	Restrictions on fishing	Fishing
	Fisheries	Seafood
	Scope for primary production	Fresh fish

"Economic and social wellbeing opportunities offered by the diverse fisheries opportunities present in the Irish Sea."

"Supply of fish."

Maritime Economy – Shipping	Port of Liverpool	Ferries

"The Irish Sea is special for its current economic contribution through, for example, port and tourism activities"

	Scope for green energy	No more windfarms
	Capacity for wave development	
	Capacity for tidal development	
	Capacity for offshore wind development	

"Potential for low carbon energy development."

"The potential for electricity generation."

"Scope for green energy production and primary production."

*"I also value it for its potential for climate change mitigation, e.g., through renewable energy generation."**

*This comment is repeated in the climate change mitigation section.

GOVERNANCE

Respondents noted the unique nature of the Irish Sea with the range of different jurisdictions, many different sectors using the Irish Sea space and the need for good governance and management for sustainability.

Good Governance and Management:	Good governance of our seas	Planning
	Effective management	Sustainability
	Sustainable development	Law
	Cross-border relationships	
	Sustainable exploitation	
	Cross sectoral involvement and governance	
"There are lots of opportunities in the Irish Sea, for energy, environmental protection, shipping etc. It is also unique in the UK with an overlap of jurisdictions, devolutions, and differences in governance."		