An aerial photograph of ocean waves, showing a color gradient from a warm orange-brown at the top to a cool teal at the bottom. The white foam of the waves is visible throughout.

The future of UK marine geospatial data

A summary of the UK Marine
Geospatial Community's Evidence
Base and Recommendations

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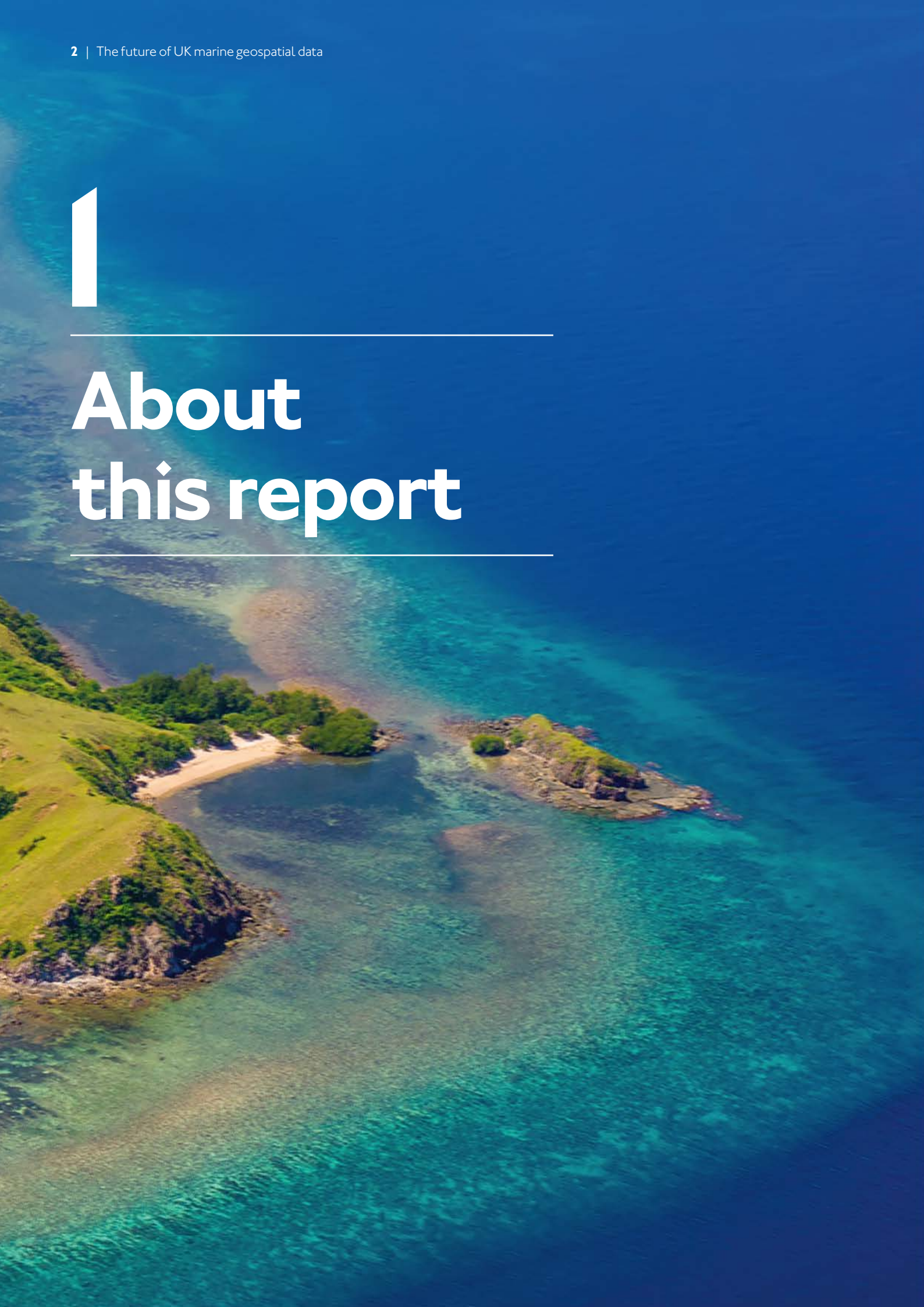


Geospatial data, is the record of what we do, and where we do it. It tells us where people and objects are in relation to a particular geographic location, whether in the air, on the ground, at sea or under our feet.

Source: Geospatial Strategy, Geospatial Commission 2020

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About this report



Preface

As an island nation the sea is critical to the UK's past, present and future. The marine geospatial sector enables nearly all activity in the ocean, and is essential to offshore energy, conservation, security, tourism and trade.

There are a vast number of marine geospatial stakeholders covering Government, Industry and Academia in the UK. These organisations play a supporting role in sectors such as offshore energy, transport, conservation and security; but operate more independently than a collective marine geospatial sector.

This report represents the first time that the UK's marine geospatial sector has worked together to collectively record shared challenges and opportunities. Increased collaboration and integration within the sector will further all other activity, and will position many national benefits and exportable opportunities for leadership in poverty reduction, environmental protection, national security and sustainable economic growth. We must work together to succeed.

The challenges, opportunities and recommendations in this report are the product of the commitment and expertise of the many representatives of the marine geospatial sector who took part. We are grateful to all those who have given their time and insight to this journey, and would like to thank them all for their contribution.

The UK Government's Geospatial Commission was established in 2018 to promote the use of geospatial data domestically and to set out the UK's geospatial strategy.

The Geospatial Commission has 6 partner bodies, often referred to as the 'Geo6' – Ordnance Survey, UK Hydrographic Office (UKHO), HM Land Registry, British Geological Survey, Coal Authority and the Valuation Office Agency.

As part of a wider call for evidence on the role that geospatial data can play within the UK economy, the Geospatial Commission requested that UKHO and Department for Business, Energy and Industrial Strategy (BEIS) worked together on building an evidence base for the potential uses of marine geospatial data.

To achieve this, in Summer 2019 the UKHO and BEIS hosted workshops that brought together organisations and key stakeholders from across the UK's marine and ocean industries. The workshops were created to explore how the UK's marine geospatial community can better collaborate to improve data collection, access, and standards.

These workshops were focused on 'discovery' and identifying key industry challenges. After these workshops, a solutions-oriented workshop was managed by the UK Government's policy incubator Policy Lab.

How this report was developed



Almost all activity in the marine environment is at least partly supported by seabed mapping.

Source: Future of the Sea, Foresight and GO Science, 2018



Our ambition is to establish the UK as a global services, digital and data hub.

Source: Global Britain in a Competitive Age, the Integrated Review of Security, Defence, Development and Foreign Policy, 2021

In 2018 the Geospatial Commission sent out a call for evidence to hear how the use of geospatial data can support economic growth and productivity across the United Kingdom, while transforming how public services are delivered. To support the call for evidence the Geospatial Commission requested BEIS and UKHO to work together on a Marine Geospatial Evidence Base.

BEIS and UKHO in collaboration with Policy Lab established a departmental level steering group to oversee the development and governance in creation of the evidence base. Following a Policy Lab defined process and best practice UKHO reached out to industry, academia and government across the maritime and geospatial sectors through a mixture of existing networks, social media and industry bodies. Interested parties then took part in workshops held in London over the summer of 2019.

UKHO and BEIS's discovery workshops were designed to get participants to identify marine geospatial opportunities, barriers, future users and best practices. The outputs from these sessions then drove the subsequent solutions-oriented workshops.

During this process four major themes emerged as top priorities across the UK's marine geospatial sector: **collaboration, data standards, data accessibility, and data collection.**

During the discovery workshop participants centred on key questions for each theme that they collectively wanted to address:

Collaboration: How and why do we collaborate and coordinate, and to solve what problems? What does good look like? To what end?

Data standards: How do we use standards to enable or prevent them from inhibiting our marine geospatial goals?

Data accessibility: How do we get the right balance between access, intellectual property rights, national security, and governance models?

Data collection: How do we collect the data we need and "collect once, use many times"?

The initial 'discovery' workshops were hosted by UKHO and the 'solution' focused workshop and subsequent report were managed by Policy Lab.

The final independent Policy Lab report provides detail on the processes used to form the Evidence Base and should be read in conjunction with the high-level executive summary found in this report.

Developed in partnership with:



Department for Business, Energy & Industrial Strategy



UK Hydrographic Office



Department for Environment Food & Rural Affairs



Department for Transport



Ministry of Defence



Geospatial Commission



Acknowledgements

UKHO would like to thank those who gave their time and experience to contribute to this report. A full list can be found in the contributors section of this report. Particular thanks are due to the steering group and Policy Lab as well:

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Executive summary



In the UK alone, the ocean provides jobs for over 500,000 people and contributes more than £47 billion to the economy.

Source: Geospatial Commission, Geospatial Strategy 2020



While 70% of the world's surface is covered by water, only 5% has been mapped to modern standards. We know more about the surface of the moon than the ocean.

Source: Geospatial Commission, Geospatial Strategy 2020

The marine geospatial sector is crucial to the success of the UK, but how can we harness the opportunities and mitigate the challenges faced by the sector? This report aims to address this and provides recommendations.

Millions of homes and livelihoods are dependent on marine activity for energy, transport, goods and services. Initiatives such as the UK government's 10-point plan for a green industrial revolution can only succeed with the support of the marine geospatial sector. The UK is the largest producer of offshore wind energy in the world (Source: COP26 Explained), and further investment in clean energy, transport and innovative technology such as autonomous navigation will require extensive use of quality marine geospatial data.

This report is aligned to the 4 key priorities that were common across the whole marine geospatial sector. The findings of the evidence base activity were reflected in the Geospatial Commission's Geospatial Strategy 2020, which states that "we must work internationally to realise common interests to improve interoperability of data, and tackle challenges around data collection, access, collaboration and consistency of standards".

The first priority explored in this report is of collaboration and coordination. There are many stakeholders operating in the marine space, with complex relationships and inter-dependencies. Contributors to this report identified the lack of coordination and strategic direction in the marine geospatial sector as a significant challenge. There is an opportunity for government direction and future policy to support collaboration across the sector. Collaboration would reduce duplication of effort and maximise value and re-use of data.

The second priority identified is the requirement for common data standards. Stakeholders operating within the marine space are creating and storing data and metadata to their own standards, resulting in variations in quality. There is no unified policy or specification, however the UK can be a leader in setting global standards for data.

Thirdly, data accessibility is essential. The most significant challenge facing those in the sector is understanding what data exists. Some collaborators and stakeholders provide information via portals, however these are not joined up. There is no central catalogue or central repository for a user to identify and obtain information, and no legislation to compel data collectors and holders to share data centrally with government for it to be made available.

The final priority identified by the marine geospatial sector is data collection. Coordination of effort across data collection would benefit every sector requiring marine geospatial data. At present collectors identify where they need to collect and meet only their own requirements. Our collaboration identified an opportunity in understanding who is collecting in an area, when, what kind of data and how the effort is funded.

The challenges, opportunities and recommendations in this report are the product of the commitment and expertise of the many representatives of the marine geospatial sector who took part. The conclusions from these workshops were presented to the Geospatial Commission as part of the UKHO and BEIS's marine geospatial evidence base, which will directly inform future UK Government policy in both the marine geospatial sector and the UK's marine environment.

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The findings

Recommendations from the
UK Marine Geospatial Community





Collaboration

The UK should commit to collaboration, cooperation, and integration across the marine geospatial sector. Improved collaboration will contribute to all the recommendations in this report.

“Improving our understanding of the sea through UK contributions to systematic, globally coordinated and sustained global ocean observations and seabed mapping.”

Source: Foresight: Future of the Sea



Data Standards

The UK should work to develop common data standards. This should include investment in skills and knowledge, simplification of existing standards and introduction of mandatory data standards.

“Data should be collected to a common standard”

Source: Eonomia CEFAS UK National Seabed Mapping Programme Scoping Study



Data Accessibility

The UK should create a central repository for marine geospatial data. This should include joining of services, providing access to catalogues and a single access portal.

“Ensuring all existing marine data can be obtained and assimilated...”

Source: Geospatial Commission – Call for Evidence – Submitted responses



Data Collection

The UK should commit to the coordination of data collection by an appropriate agency. This should include sharing plans for collection activity and funding. The UK should also consider funding and incentivising or legislating open data initiatives between private and public sectors.

“Realising the UK’s national geospatial vision will require collective effort, connecting policy, data, people and systems.”

Source: Geospatial Commission, Geospatial Strategy 2020

Full details of the development of the recommendations can be found in the Marine Geospatial Community’s Evidence Base and Recommendations report and Evidence Card Annex by Policy Lab, to be read in conjunction with this report.



We have identified challenges that have resulted in a complex and fractured geospatial policy landscape.

Source: Geospatial Commission Annual Plan 2021-22

Collaboration



**For users,
there is no way
to establish
whether data
exists or how
to obtain it.**

During the workshop it was agreed that collaboration between the UK's marine geospatial sector would enable stakeholders to collectively maximise the value from data, innovate and bring new solutions to market, and further our understanding of the oceans.

Today the UK's marine geospatial sector has at least 30 different public sector data-collecting organisations. In many cases these organisations work independently, and there is currently no central agency providing oversight or direction.

Participants agreed that collaboration would make a fundamental difference for the UK's marine geospatial sector. Unnecessary duplication of efforts – either data collection or processing – was particularly highlighted as a challenge worth overcoming.

As part of this, effort should be placed specifically on increasing the recognition of the role that the marine geospatial sector plays holistically within UK government and industry.

At the workshop it was widely agreed that collaboration would be a vital underpinning factor for all of the other improvements and solutions recommended as part of the marine geospatial evidence submitted to the Geospatial Commission.

Key finding

The UK should commit to collaboration, cooperation and integration across the marine geospatial sector. Improved collaboration will contribute to all the recommendations made as part of the workshop process.

Challenges and opportunities identified by the community

- We need to collaborate more. There are more than 30 public sector organisations collecting marine geospatial data in the UK, often in isolation from each other. This leads to duplication of effort in data collection, processing and storage. Working together, we can build a better picture of the marine geospatial environment. We need to build relationships across the sector.
- Marine geospatial needs to be recognised as a sector. Marine geospatial data is an enabler but is not regarded as a sector in its own right.
- The benefits of closer collaboration were identified by the Government Office for Science in the Foresight: Future of the Sea report. Recommendation 20 states that. Closer collaboration will help us understand the sea. We can improve our understanding of the sea through UK contributions to systematic, globally coordinated and sustained global ocean observations and seabed mapping.
- Coordination and planning of data collection will bring benefits. We can avoid unnecessary duplication of effort and reduce costs by working together with partners on areas or surveys of mutual value.



The marine geospatial community's strategic recommendation:

The UK should commit to collaboration, cooperation and integration across the marine geospatial sector. Improved collaboration will contribute to all the recommendations made as part of the workshop process.



Picture of people collaborating around a table.

Data Standards



There are no common standards for the collection, storage or retrieval of data and metadata.

The second theme of discussion was on the types of data standards currently being used within the marine geospatial sector and their effectiveness. It was agreed that data standards – if used effectively and adopted widely – provide much needed consistency and interoperability across the marine geospatial ecosystem.

Participants discussed how today there are no common standards for the collection, storage and retrieval of marine geospatial data and metadata. Indeed, information can vary widely between different organisations with nothing to relate or join them up.

It was agreed that a huge opportunity for good data use lies in promoting the value of metadata and standards, to enable common systems and easier project collaboration. Looking forward, an agreed UK and international standard for marine data will be an important pillar in developing the marine geospatial ecosystem.

Participants agreed that training on good data use and re-use would be a critical element of this, as building knowledge would help to ensure that all users have a good understanding of the benefits of standards and are able to adhere to them in their work.

However, it was also noted that intellectual property rights (IPR) must be maintained as part of this pursuit of common data standards, protecting and incentivising a wide range of users to contribute to the UK's marine geospatial sector.

Key finding

The UK should work to develop common data standards. This should include investment in skills and knowledge, simplification of existing standards and introduction of mandatory data standards.

Challenges and opportunities identified by the community

- We need to promote the value of metadata and standards. Organisations with a role in collecting, storing and retrieving need to work together to agree common standards and approaches.
- We need to establish or adopt an agreed UK and International standards for marine data. The UK's marine geospatial community can lead the way in developing and promoting common standards which can be adopted across the UK and internationally.
- Organisations within the sector need to improve existing infrastructure, to allow for common data standards to be met and data to be ingested in line with those standards.
- We need to ensure Intellectual Property Rights (IPR) management is built in to the standards. IPR is essential to protect the information, ideas and efforts of the community and to ensure organisations continue to benefit from their work and are able to continue focusing on research and development.



The marine geospatial community's strategic recommendation:

The UK should work to develop common data standards. This should include investment in skills and knowledge, simplification of existing standards and introduction of mandatory data standards.

Image of the seabed next to a charted landmass.

Data Accessibility



There is no open data exchange, no central repository, and no catalogue.

The third key theme from the workshop sessions was on data accessibility. Participants sought to answer how the UK's marine geospatial sector could get the balance right between enabling direct access whilst also honouring intellectual property rights (IPR), national security and good data governance.

It was widely agreed that data only has value if it can be clearly identified, accessed and used. Currently, there is a lot of data held within UK marine geospatial organisations that could have far greater value if shared more widely, but there is no central data exchange or repository to enable direct data sharing.

Currently organisations collect, store and use their own data – and manage data from partners if they have it. Participants agreed that a central catalogue of open data sources would allow any current marine geospatial user or, crucially, new entrants, to quickly and easily identify data that they can use.

In addition, it would give the whole sector a shared picture of who owns or holds what data and what it can be used for. Searchability was also highlighted as a key factor.

This would enable companies and organisations to balance their intellectual property rights – because they would be fairly compensated for the data they hold – whilst also transparently showing the sector where gaps exist in our current understanding of the UK's ocean environment.

Participants agreed that data sharing should become routine, and that in time other nations should be involved in data sharing, to enable and underpin the UK marine geospatial sector's growth.

Key finding

The UK should create a central repository for marine geospatial data, whilst also respecting intellectual property rights. This should include joining-up of services, providing access to catalogues and single access.

Challenges and opportunities identified by the community

- We need a central catalogue and repository for existing data. The sector should work to develop this in partnership, with lead agencies agreeing an approach and leading the way by including their data in the repository, and establishing processes to allow other organisations to contribute.
- We need data sharing to become routine. The marine geospatial sector needs to prioritise and put effort into creating a catalogue and repository, ensuring that they share data and survey plans as part of their routine business. Without this, we will never achieve the accessibility we need to truly maximise the re-use value of our data.
- We need to work with other nations to access and share data internationally. The UK should promote the sharing of data and information with other nations to unlock the true power and value of data. Greater access to data will improve our understanding of and ability to respond to environmental challenges.



The marine geospatial community's strategic recommendation:

The UK should create a central repository for marine geospatial data, whilst also respecting intellectual property rights and national security.

This should include joining-up of services, providing single access to catalogues and available data.

Picture of two people looking at data on a large interactive screen

Data Collection



There is no coordination of data collection activity, or of data collection planning.

The fourth key theme of discussion during the workshops were the opportunities and challenges posed by data collection. Participants wanted to answer questions on how good data collection could be managed in a way that ensures minimal duplication of surveys, but maximum data use from the same resource.

Currently there is little-to-no coordination of data collection activity and planning, with individual agencies and organisations collecting data as required. In addition, there are no incentives for the sector to collect data beyond their direct requirements.

Participants agreed that a lead agency working within the UK's marine geospatial sector to coordinate data collection and act as a central repository for information would pave the way for smoother assessment of planned surveying. It would also enable more frequent data gathering, and support the marine geospatial market to understand the value of good data.

It was widely agreed that the UK marine environment needs more widespread study to understand its characteristics and economic potential. It was also suggested that the sector should work to fill the gaps in industry-collected data where the required incentives for data collect have been lacking.

Furthermore, participants shared their belief that a central agency would reduce duplication whilst also creating reciprocal opportunities to share and effectively co-fund surveys of common interest, because they would have a transparent view of ongoing and planned surveying activity.

Key finding

The UK should commit to the coordination of data collection by an appropriate agency. This should include sharing plans for collection activity and funding. The UK should also consider funding and incentivising or legislating open data initiatives between private and public sectors.

Challenges and opportunities identified by the community

- We need coordination of data collection efforts. The marine geospatial sector needs to identify a lead agency to begin working on coordination and ingest of data into an accessible portal.
- We need clarity around who is responsible for what data once it is collected and where data is stored. This should be included in the cataloguing and repository requirements, to ensure that users can see this information at point of access.
- We need governance on data collection and datasets. The UK should define a strategy to ensure the protection of datasets containing considered important to national security, to control access and use of that data.



The marine geospatial community's strategic recommendation:

The UK should commit to the coordination of data collection by an appropriate agency. This should include sharing plans for collection activity and funding. The UK should also consider funding and incentivising or legislating open data initiatives between private and public sectors.

Picture of two small survey vessels underway.

3

Further information



Links to all can be found on the Gov.uk website or the digital library on the UKHO website.

Reports

Publication name	Lead Department
Foresight: Future of the Sea	GOScience
Eunomia CEFAS UK National Seabed Mapping Programme Scoping Study; March 2016.	Cefas
The UK Marine Geospatial Communities Evidence Base – Workshop report	BEIS/UKHO

UK Policy documents

Publication name	Lead Department
Promoting the UK's world-class maritime offer: Trade & Investment 5-year plan 2019	Department for International Trade
Overseas Territories Strategy	Foreign, Commonwealth and Development Office
Maritime 2050: Navigating the Future	Department for Transport
The UK's Geospatial Strategy	Cabinet Office
The Integrated Review 2021	Cabinet Office

International Policy documents

Publication name	Lead Department
Charlesvoix Blueprint for Health Oceans, Seas and Resilient Coastal Communities	G7

Contributors

Governance: High-level Marine Geospatial Steering Group



Department for
Business, Energy
& Industrial Strategy



UK Hydrographic
Office



Ministry
of Defence



Department
for Transport



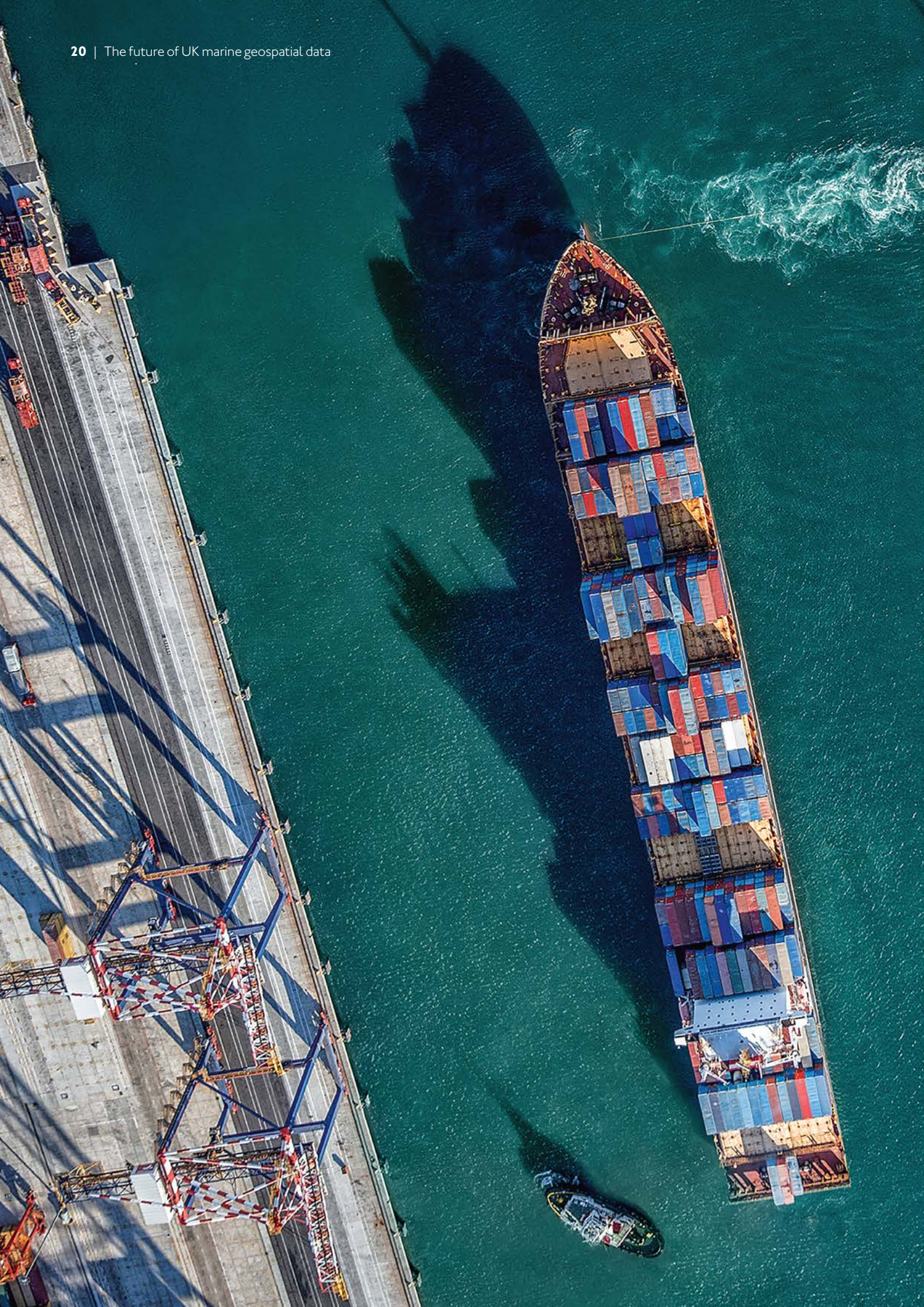
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Department
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Environment Agency	Natural Resource Wales	UK Defence Solutions
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		Willis Towers Watson





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The UK is well placed to take advantage of the opportunities brought by a growing global ocean economy if it creates the right environment, builds on its research and development strengths, and has a long-term strategy.

Source: Foresight: Future of the Sea



Department for
Business, Energy
& Industrial Strategy



UK Hydrographic
Office



Ministry
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Department
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Geospatial
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Department
for Environment
Food & Rural Affairs