

Marine Data Exchange Impact report

September 2023

Marine 
Data Exchange

Inspiring everyone to shape the future of our seas, through open and accessible data and evidence.



Welcome to our **Marine Data Exchange**

Impact Report 2023

Developed in 2013 as the first of its kind, the Marine Data Exchange is a world-leading database of marine industry survey data, research and evidence.

By working with our customers and stakeholders to make data and evidence publicly available, we aim to drive the sustainable development of the seabed, whilst protecting the UK's marine environment for future generations.

Today, the Marine Data Exchange contains over 260 terabytes of survey data collected throughout the lifecycle of UK offshore projects, as well as new research that addresses evidence gaps.

Over the last ten years, we have been working with offshore industries to get thousands of their surveys uploaded to the Marine Data Exchange and made publicly available for others to freely access as soon as it is reasonable to do so.

The data hosted on the Marine Data Exchange plays a major role in the sustainable development of the seabed and growth of the offshore sector, by enabling industries and successive offshore projects to make increasingly informed decisions, sharing lessons learned for the wider benefit of industry and nature.

The Marine Data Exchange Impact report was created by The Crown Estate, with collaboration from our customers and stakeholders, to showcase the role of the platform in supporting the UK's net zero and biodiversity targets. The report celebrates our partners who continue to deliver data and explores the history, impact and value of the Marine Data Exchange, whilst shining a light on organisations and individuals that have used the data hosted on the Marine Data Exchange to inform their work.

We thank all our customers and stakeholders for their continued support of the Marine Data Exchange and thank them for their contributions to the Marine Data Exchange Impact Report (2023).

Should you wish to contact the authors of this report, please contact:

mde@the-crownestate.co.uk





Contents

| | |
|--------------------------------------|----|
| The Marine Data Exchange | 01 |
| Introduction | 02 |
| The Marine Data Exchange | 03 |
| Offshore Industry Survey Data | 04 |
| Data Quality and Publication | 05 |
| Marine Data Exchange Timeline | 06 |
| Marine Data Exchange Impacts | 07 |
| Impact and Value | 07 |
| Value of the MDE Data Holding | 09 |
| Conversations with Industry | 10 |
| User Case Studies | 14 |
| Plymouth Marine Lab | 15 |
| Flotation Energy | 16 |
| OneBenthic | 17 |
| British Geological Survey | 18 |
| ECOWind-ACCELERATE (CGG) | 20 |
| The Next Generation of Ocean Experts | 21 |

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Should you wish to contact the authors of this report, please contact: mde@thecrownestate.co.uk

Image credit: Lundy kelp forest,
Keith Hiscock

Marine Data Exchange

The Marine Data Exchange is the UK's trusted source of marine industry survey data, research and evidence.

Through the Marine Data Exchange, we aim to empower the nation to make evidence-based decisions and to inspire everyone to shape the future of our seas through open and accessible data and evidence.

We have been working with our customers for over 20 years to promote the importance of data sharing, by building trust and working with offshore industries to develop consistent processes and data management standards. The introduction of the Marine Data Exchange ten years ago leveraged the strong relationships that we have with our customers and our ability to bring together a range of stakeholders, to provide a platform for industry to not only share survey data, but to make it freely available to benefit the marine community.

Offshore industries in the UK, such as the offshore renewables sector, have set a strong precedent for data sharing through the Marine Data Exchange, which is an inspiration to other nations around the world who are also seeking an evidence-based approach towards achieving net zero.

Since its creation in 2013, we have been continually investing in the Marine Data Exchange to remove barriers to data sharing, to make it easier for others to find and access data, and to develop accessible content that can inspire everyone – technical or not – to learn more about offshore industries and the marine environment. As the industries evolve, requirements shift and technology advances, we are committed to moving the Marine Data Exchange along at pace.

The Marine Data Exchange is both a tool and a platform for sharing data, evidence and insights, but it also represents a community that are invested in making data and evidence available to deliver the best outcomes for the seabed to achieve net zero, energy security and biodiversity growth. It is this community that drives the vision for the Marine Data Exchange.

Introduction

The Crown Estate is a significant national landowner creating financial, environmental and social value for the nation, both for now and for the long term.

A company for the country, all of our net revenue profit goes to the Treasury for the benefit of the nation's finances. This has totalled more than £3.2 billion over the last ten years.

Our focus is on delivering three strategic objectives – climate resilience and energy security, thriving communities, and nature recovery. Through these we aim to address national needs where we are best placed to draw on our unique combination of strengths and support economic growth and equality of outcomes.

We manage the seabed and much of the coastline around England, Wales and Northern Ireland, playing a major role in the UK's world-leading offshore wind sector.

The UK has been a global leader in offshore wind for over two decades. From the very beginning of the UK's growth in the offshore wind sector, The Crown Estate has invested in data and evidence, partnering with our customers and stakeholders to unlock the power of big data to inform the growth of a sustainable, world-class offshore industry.

We have a unique position as the manager of the seabed to take a long-term view across many sectors, interests and industries.

As trusted experts, we recognise the importance of bringing together a wide range of marine stakeholders - from Government and developers to academics and environmental groups - to make efficient use of data, address evidence gaps and drive positive change in the sustainable development of the seabed. Through our unique ability to convene others, we are immensely proud to be driving forward such a vibrant and driven marine data community.

Alongside our work with the Marine Data Exchange, we are pioneering several other initiatives to broaden our evidence base and support the development of the seabed in a way that allows many different priorities, including nature, to thrive. This includes our flagship Offshore Wind Evidence and Change Programme (OWEC), a unique £50m initiative that enables the gathering of data and evidence to support the sustainable development of offshore wind in the UK. In collaboration with a wide range of organisations that have a role to play offshore, we've also commenced pioneering work to digitally map the seabed. As demands on the seabed grow, our seabed mapping capability provides advanced analysis tools that utilise the most comprehensive database of seabed characteristics, uses and interests in the country, enabling the delivery of multiple priorities including net zero and nature recovery, as well as the enhanced co-ordination of future activities out to 2050.

Together with a range of experts, partners, government departments and devolved governments, we are shaping and delivering research projects across the UK to generate better insights and understanding that can support the long-term future of the marine environment and deliver better outcomes for all.



The Marine Data Exchange

Number of public surveys

1659

Terabytes of data

260+

Number of users

7800

Number of Countries Searching the MDE

78+

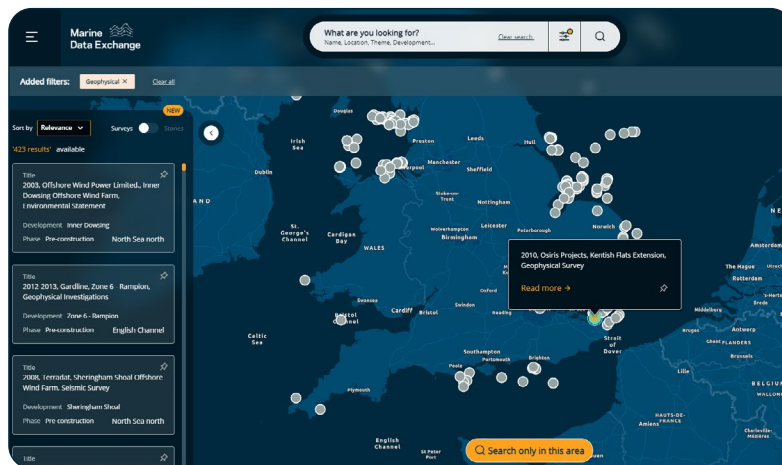
(MDE in Numbers, 2023)

The Marine Data Exchange collates survey data from offshore projects around the UK, giving an unparalleled big picture view of the survey data collected by industry.

It also hosts evidence and research that has been generated through evidence programmes such as The Crown Estate's Offshore Wind Evidence and Change (OWEC) programme, and by our partners and stakeholders.

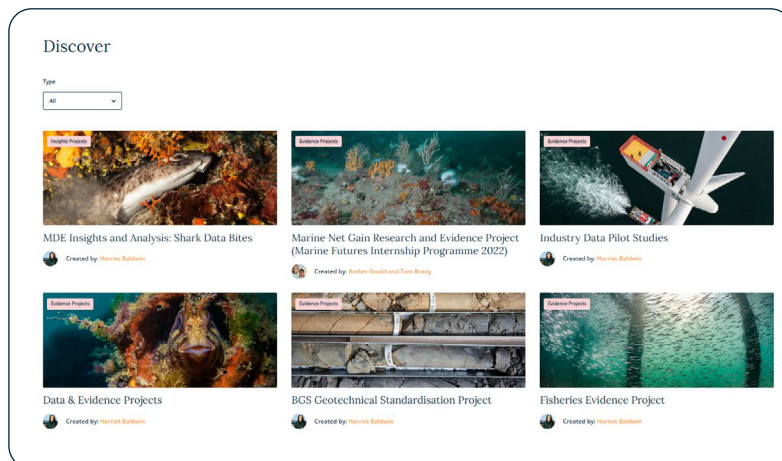
Data hosted on the Marine Data Exchange also feeds into other initiatives and tools that support in the sustainable development of the seabed. For example, data collected by the aggregates industry is hosted on the Marine Data Exchange and then fed into **OneBenthic** (Cefas), a collection of high-quality standardised datasets used to generate new science and collaborative ways of working.

Through the Marine Data Exchange, The Crown Estate can ensure that existing data and evidence drives positive impact, whilst identifying and addressing data and evidence gaps. Through this we will deliver the best outcomes for the seabed to achieve Net Zero, energy security and biodiversity growth.



The Marine Data Exchange: Spatial Search Interface Tool

The Marine Data Exchange utilises carbon neutral technology and data storage through Azure and low energy website designs.



The Marine Data Exchange: Discover Stories

The Marine Data Exchange

Offshore Industry Survey Data

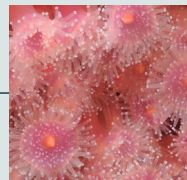
Before an offshore project can be built, the developer must secure a seabed agreement from The Crown Estate and consent for development from the relevant UK statutory bodies.

Within The Crown Estate's seabed agreements, there is a data sharing clause that requires all survey data collected throughout the lifetime of an offshore project or development to be shared with The Crown Estate and delivered to the Marine Data Exchange¹. This data sharing clause was first introduced into our offshore wind agreements in 2003 and we have been working with our customers ever since to promote the benefits of data sharing. The clause is now in all of our offshore agreements except for oil and gas pipelines.

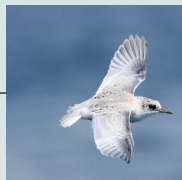
The types of survey data collected throughout a project or development are multi-disciplinary, covering environmental, social and physical data or research campaigns. These surveys inform all aspects of the development from feasibility and consenting, all the way through to decommissioning or post-dredge monitoring. These include:



Archeology



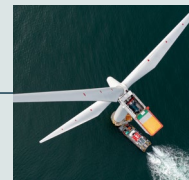
Benthic Ecology



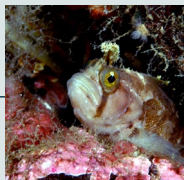
Birds



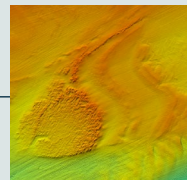
Coastal Processes



Engineering & Design



Fish & Epifauna



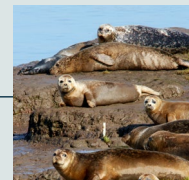
Geophysical



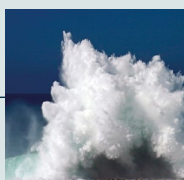
Geotechnical



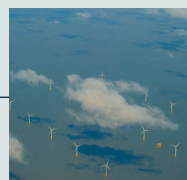
Intertidal Ecology



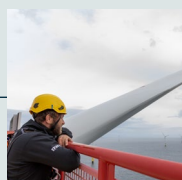
Marine Mammals



Metocean



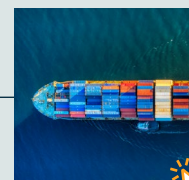
Meteorology



Noise



Sedimentology



Shipping & Navigation

To learn more, head to our [“Types of Data”](#) and [“MDE in Numbers”](#) page, on the Marine Data Exchange.

¹ See The Crown Estate's Requirements for [Delivering Survey Data document](#) for information on the data submission and publication process.

The Marine Data Exchange

Data Quality & Publication

To encourage industry to share data, it is critical that the expectations and standards for data delivered to the Marine Data Exchange are uniform across the sectors that we work with, and that the approach to publication is consistent.

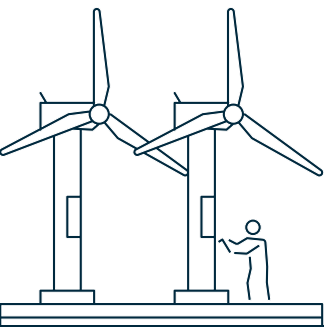
Once data has been delivered to the Marine Data Exchange, it undergoes a Quality Assurance (QA) process. Through our leading role in data sharing and as sponsors of the Marine Environmental Data and Information Network (MEDIN) all data delivered to the Marine Data Exchange must have MEDIN Discovery Standard metadata and adhere to the MEDIN Data Guidelines. This ensures that the data held on the Marine Data Exchange is discoverable and re-useable and showcases our commitment towards the Q-FAIR principles (Quality Findable, Accessible, Interoperable and Reusable). We work with our customers and partners to resolve any concerns that have been flagged in the QA process.

The Crown Estate uses a secure and traceable process for managing the confidentiality of data. It is our intention to publish all survey data held on the Marine Data Exchange within a reasonable timeframe, which is defined for each sector within the Requirements for Delivering Data document.



Image credit: "Eddystone west", Keith Hiscock





MDE Timeline

History of the Marine Data Exchange & The Crown Estate's role in the growth of offshore wind (UK)

2001 UK's first offshore turbines - Blyth, Northumberland

2001 Offshore Wind Leasing Round 1

2003 Data clause introduced

To support the growth of the offshore wind sector, The Crown Estate pioneered the inclusion of a data clause that would require projects to deliver their survey data to The Crown Estate throughout the lifetime of the project. This data clause has since been rolled out to all offshore Agreements.

2003 Offshore Wind Leasing round 2

2008 Offshore Wind Leasing round 3 (exponential growth)

2013 Marine Data Exchange established

In response to the large volumes of survey data being collected by our customers and then delivered to The Crown Estate (as per our data clause for all offshore agreements), we built a bespoke data management system - the Marine Data Exchange.

2015 Marine Data Exchange moved to "the cloud"

The Marine Data Exchange data holding surpassed 100TB and the Marine Data Exchange was moved to the cloud, championing the way for other platforms.

2019 Offshore Wind Leasing Round 4

2021 New-look Marine Data Exchange launched

Following feedback from our customers, users and stakeholders, the Marine Data Exchange was re-platformed and a new-look website launched. This shift sees the Marine Data Exchange becoming user-driven and design-led.

2022 Spatial Search Interface launched

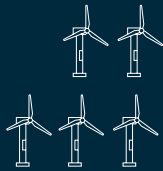
After taking the time to understand user requirements, the Spatial Search Interface tool was launched to allow users to search for industry data via an interactive map, making data more discoverable and accessible.

2023 The Marine Data Exchange's 10th Anniversary

Both the offshore industry and Marine Data Exchange have come a very long way in 10 years. To meet the needs of our users and the growing industry, we've invested in our digital capabilities and have improved the accessibility of the site. As the sector grows, as do we.

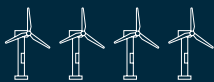


2003



2013

2015



2021

2022

2023

Impact & Value

To meet ambitious UK policy targets, such as decarbonising our energy system to achieve net zero by 2050 and ensuring fast and wide-ranging improvements to the state of nature, UK policy clearly states the need for the delivery of data at speed, including marine data and evidence, to support the sustainable development of the seabed.

However, data acquisition offshore is expensive and the volume of data difficult to manage - often organisations don't have the digital or resource capabilities to store or quality assure information.

That's why we created the Marine Data Exchange, which has been operating for over 10 years, supporting the needs of our customers and stakeholders in the sustainable development of the UK's seabed. We have learned so much on this journey and continue to evolve as we grow to support the needs of the UK marine industry. Here we take a look at the impact and value of the Marine Data Exchange to date:



● Environmental Value



● Financial Value



● Social Value

The Marine Data Exchange is the primary source for UK marine industry data

The Marine Data Exchange is one of the world's largest platforms of offshore industry data, research and evidence. By collecting UK data in one space, we make this information more discoverable and accessible, enabling the effective re-use of marine industry data. ● ● ●

The Marine Data Exchange facilitates the deployment of net zero infrastructure by accelerating and de-risking offshore development

The Marine Data Exchange is recognised as a key data platform to help accelerate offshore wind in the UK, but it will also facilitate the acceleration of emerging industries, through the provision of data to feed into decision making. By making this wealth of data available through the Marine Data Exchange, we allow our customers and stakeholders to learn lessons from past projects, to drive down costs and drive efficiencies for new projects; ultimately increasing the value and attractiveness of the UK seabed to the market and stimulating growth and innovation in the sector. ● ● ●

The Marine Data Exchange promotes transparency

The Marine Data Exchange promotes transparent decision-making and processes, by sharing methods, reporting and outputs for free. This includes outputs and insights from The Crown Estate's own decision making, including Habitat Regulation Assessments and spatial planning insights. The Marine Data Exchange makes this data, research and knowledge accessible for all audiences by removing barriers such as paywalls and data request forms. ● ● ●

The Marine Data Exchange promotes trust in industry

We use trusted data delivery processes and have close relationships with data providers. Our data providers know that their data will be managed with care and Marine Data Exchange users trust that the data will be delivered to MEDIN data standards. Through this system of trust, we support the continued delivery of data to the Marine Data Exchange, increasing the wealth of knowledge made available to support the sustainable development of the seabed.

The Marine Data Exchange also provides a platform to engage with local communities, dispelling myths around offshore wind and helping to support the growth of renewable energy in the UK and abroad.

● ●



The Marine Data Exchange enables a holistic view of offshore industries and research

The Marine Data Exchange enables The Crown Estate to take a project specific view, but also to look across the sector as a whole. Through taking this overview, industry are able to draw insights using data from a combination of projects, so that we can influence a more proactive and considered approach to the sustainable development of the seabed.



Collect once - use many times

The Marine Data Exchange promotes the concept of “Collect once - use many times”.

The data hosted on the Marine Data Exchange forms a library of knowledge, adding value beyond the original purpose of collection. The Marine Data Exchange prevents the duplication of survey effort by enabling the reuse of data already collected, avoids the loss of data in the event of project cancellation, and drives insights and a stronger evidence base from the data collected on the seabed over many years.



Identifying and addressing data and evidence gaps

Data hosted on the Marine Data Exchange can be used to address evidence gaps, supporting projects that will drive positive change, through the efficient re-use of industry data. It can also be used to identify and to prioritise data gaps across the UK. For example, the Marine Data Exchange supports the enhancement of biodiversity within existing habitats, as data and evidence hosted on the Marine Data Exchange can be used to deliver environmental net gain.



The Marine Data Exchange is a tool for global leadership

In 2022, the Marine Data Exchange was used by members from 78 different countries across the world. Demonstrating how industry data can be collected and shared for the benefit of all.

Over the last few years, members from The Crown Estate have engaged with governments from across the world, including India, Norway, America, Indonesia, Taiwan, the Philippines, Brazil, India and more.

By sharing our ways of working, the Marine Data Exchange supports international efforts towards the effective re-use of industry data to support sustainable development, helping communities world-wide in the fight against climate change and biodiversity loss.



The Marine Data Exchange promotes collaboration

The Marine Data Exchange is a tool that promotes collaboration. By breaking down barriers to information and acting as a convening platform for our customers and stakeholders, we help to unify our collective objective to address data and evidence gaps.



The Marine Data Exchange inspires

The Marine Data Exchange provides opportunity to learn about careers in the offshore marine industry and provides open and accessible data and evidence - driving innovation and educating and inspiring the next generation of industry experts.



The Marine Data Exchange aims to be carbon neutral and aspires to be carbon negative

We have committed to becoming a net zero carbon business by 2030 and our approach to data collection and sharing reflects this. By promoting data sharing, the Marine Data Exchange encourages the re-use of data, reducing the need for additional surveying effort and eliminating survey emissions where possible. The Marine Data Exchange also utilises carbon neutral technology and data storage, and prioritises website designs that reduce energy and carbon emissions.



MDE Impacts

Impact & Value

Value of the Marine Data Exchange Data Holding

Since its development in 2013, the Marine Data Exchange has added value to the marine industry and offshore sectors. A quantitative assessment conducted by our partners at ABPmer concluded that the total cost of re-collecting the survey data held on the Marine Data Exchange would be over **£1.5 billion** (Table 1, pictured right).

The assessment was carried out using [BVG's Guide to an offshore wind farm](#), which considers a surveys spatial extent, distance offshore and water depth. Using a Megawatt Multiplier, ABPmer were able to detail the procedures and associated costs. This assessment was only able to quantitatively value 55% of total data, research and evidence holding on the site at the time of this study and so the total cost and thereby value can be expected to be greater.

Geotechnical, Metocean, Geophysical and Ornithological surveys were the most expensive data themes to collect, which correlates with these types of surveys being the most common survey types carried out by offshore industries and therefore held on the Marine Data Exchange.

| Theme | Overall Cost (rounded to the nearest million £) | Percentage of overall value (%) |
|-------------------------|---|---------------------------------|
| Intertidal Ecology | 12,000,000 | 1 |
| Archaeology | 16,000,000 | 1 |
| Coastal Processes | 17,000,000 | 1 |
| Noise | 19,000,000 | 1 |
| Shipping and Navigation | 27,000,000 | 2 |
| Onshore | 31,000,000 | 2 |
| Sedimentology | 45,000,000 | 3 |
| Meteorology | 50,000,000 | 3 |
| Benthic | 51,000,000 | 3 |
| Epifauna and Fish | 54,000,000 | 4 |
| Marine Mammals | 83,000,000 | 5 |
| Birds | 211,000,000 | 14 |
| Geophysical | 257,000,000 | 17 |
| Metocean | 318,000,000 | 21 |
| Geotechnical | 351,000,000 | 23 |
| Total | £1,542,000,000 | 100 |

Table 1. Quantitative assessment of the value of the Marine Data Exchange data holding by Theme. Figures are approximate.



Photo credit: "Stoke Point," Keith Hiscock



Kate Smith

Environmental Manager at Nova Innovation Ltd

What role do you play in the Marine Data Exchange?

I represent Nova Innovation, a world-leading tidal stream energy technology and project developer. I lead licensing and environmental assessment for Nova’s tidal energy projects; a role that includes commissioning surveys and contracts to gather the data and evidence to support these processes. I regularly use the Marine Data Exchange to access existing evidence and data relevant to our pipeline of tidal energy developments, to de-risk project planning and consenting and to develop project evidence plans. Recently I have also uploaded all of the survey data, reports, and other key outputs from Nova’s proposed Enlli Tidal Project in north Wales to the Marine Data Exchange.

“The Marine Data Exchange has great value to tidal energy developers like Nova, who are working on every aspect of technology and project development to bring down the tidal Levelized Cost of Energy (LCOE).”

In this section of the report – **Conversations with industry**, we talk to colleagues across different offshore industries to learn about the role that they play in the Marine Data Exchange community, and the value of the Marine Data Exchange in supporting the sustainable development of offshore industries, to help reach the UK’s net zero targets.

What do you think the value of the Marine Data Exchange is?

Being able to easily access existing evidence and data relevant to our pipeline of tidal energy developments through the Marine Data Exchange means we can use this to de-risk project planning and consenting so that our own data gathering and surveys can build on this and be as cost-effective as possible. Access to information on the Marine Data Exchange also enables us to build on good practice and lessons learned from other offshore sectors. The Marine Data Exchange is also of huge value to relatively small developers like Nova as it provides a repository for us to share survey data and other key evidence and outputs from our tidal energy projects. We do not have the resources to effectively host these outputs on Nova’s own website, while doing so through the Marine Data Exchange also provides for much wider dissemination.

What do you see the role of the Marine Data Exchange as in the future of offshore development?

As the critical role of offshore energy in delivering net zero and UK energy security grows, access to and sharing of data and evidence will become even more important. Making effective use of existing evidence will enable better planning and decision-making for offshore development. It will also facilitate cross-fertilization and sharing of knowledge, learning and good practice within and between sectors help us all learn from each other and base our projects on best available evidence.



Image credit:
Tidal turbine, Nova



Mark Russell

Executive Director - Planning,
Mineral Resources & British Marine
Aggregate Producers Association
(BMAPA)

What role do you play in the Marine Data Exchange?

The British Marine Aggregate Producers Association (BMAPA) is the representative body for the marine aggregate sector. While it represents one of the lower profile marine development sectors, through the licence, application and option areas it holds the marine aggregate industry is responsible for managing a large area of seabed. Alongside this comes the need to obtain and manage marine environmental data to support resource management, to inform the licensing process and to demonstrate compliance. With the help of BMAPA, the marine aggregate sector has been at the forefront of adopting new and innovative ways to acquire and use marine environmental data. This has included the extensive research programme funded through the marine aggregate levy sustainability fund that ran between 2003-2012, and the regional environmental assessment and regional monitoring programmes the sector has developed.

MDE Impacts

Conversations with industry

“The Marine Data Exchange helps to provide a much-needed focus on how marine environmental data can be managed and made available to be accessed by others once it has been acquired, which in turn helps to deliver the principle of ‘collect once and use many times’. This improves environmental outcomes, by allowing evidence from otherwise disparate sources to be pooled.”

What do you like/dislike about being part of the Marine Data Exchange community?

The fact that it is a community – it provides an insight into the diversity and quality of marine environmental data that is being acquired by the marine development sector across the UK shelf area.

What impact do you believe the Marine Data Exchange has on the offshore marine industry?

It has helped to demonstrate the diversity, resolution and spatial scale of marine data that is routinely acquired by the marine development sector, to support the ability to access this information, and dispelled the myth that industry is not prepared to share the data it collects. Nothing could be further from the truth. The challenge is how to derive the maximum added value that can be derived from this to support sustainable management of the marine environment.

What do you see the role of the Marine Data Exchange as in the future of offshore development?

There is an almost unprecedented pace of change in how the marine environment is being used at present, and the attendant pressures that this brings will mean that marine data and how this is used will become increasingly important. No single development or sector for that matter will be able to answer the key questions around cumulative and in-combination impacts and how these relate to the carrying capacity of a region or the environmental headroom that is available. Just as holistic marine management is required, the holistic use of marine environmental data will become a key factor in how we deliver sustainable marine management.



Conversations with industry

What do you think the value of the Marine Data Exchange is?

The availability of open-access marine ecology data plays a vital role in preserving and enhancing the marine environment. By providing up to date information, it aids in the implementation of projects that enhance biodiversity and promotes offshore best practices that safeguard marine life.

What do you like/dislike about being part of the Marine Data Exchange community?

Being part of a collaborative community that promotes the sharing of offshore data brings me satisfaction because it results in a deeper understanding of the marine environment among all marine stakeholders. This increased understanding facilitates better protection, management, and sustainable development of our oceans. I appreciate the fact that by participating in this community, we contribute to a future where the ocean is managed responsibly and its resources are utilised sustainably.

How does it make you feel knowing that your data is being shared openly?

It feels like we are pioneering the future of marine developments and management. Knowing that our data is being utilised to drive innovation within the industry and improve decision making is a great feeling.

What impact do you believe the Marine Data Exchange has on the offshore marine industry?

The Marine Data Exchange enables stakeholders in the offshore marine industry to make more informed decisions that help to promote both prosperous and healthy oceans. Access to useful data supports the development and implementation of offshore projects that are environmentally sustainable, economically viable, and socially responsible.

What do you see the role of the Marine Data Exchange as in the future of offshore development?

The Marine Data Exchange holds the potential to supply invaluable marine data and information for guiding the initial site selection of offshore wind developments. By accessing data on wind resources, seabed conditions, bathymetry, ecological sensitivities, and other factors, developers could make informed decisions during this process.

The Marine Data Exchange could also play an expanded role in enhancing EIA process for offshore developments. Developers could potentially tap into ecological data, species distribution maps, and habitat information through the Marine Data Exchange. This would reduce the need for costly environmental surveys, as developers could assess potential impacts on marine ecosystems and wildlife by utilising existing data.



Harry Cale

Environment and Consents
Specialist at Ørsted

What role do you play in the Marine Data Exchange?

I represent Ørsted's UK Environment and Consents Team. I manage data uploads to the Marine Data Exchange which contain environmental survey data collected throughout our offshore portfolio.

“The Marine Data Exchange plays a crucial role in supporting research within the marine industry by providing convenient access to a wide range of current and relevant offshore data.

This accessibility enables researchers to delve into the data and drive new innovations that are rapidly transforming the offshore wind industry to meet the growing demand for renewable energy at a low cost of production.

Open access to industry data is pivotal in facilitating this transformative change.”

MDE Impacts

Conversations with industry

What do you think the value of the Marine Data Exchange is?

The Marine Data Exchange has enormous value in enabling a safe and accessible storage location for historic and current data – it has proved invaluable as a resource when organisational changes have occasionally meant that finding historic data has been difficult; this is not to downplay the obvious environmental and financial benefits to the wider Marine Data Exchange using community.

What do you like/dislike about being part of the MDE community?

There is really nothing to dislike, access to the Marine Data Exchange is only positive for us.

How does it make you feel knowing that your data is being shared openly?

I do feel that this aspect of membership of the Marine Data Exchange is under-rated, the value to the wider community is undoubtedly very large and it is satisfying to think that the data we provide may help others.

What impact do you believe the Marine Data Exchange has on the offshore marine industry?

From a wind energy perspective, it can only be a positive impact.

What do you see the role of the MDE as in the future of offshore development?

I would like to see all operators deliver all their data (pre and post marine license discharge) to enable a mandatory and comprehensive database for all to use.



Richard Sykes

Operations & Maintenance Engineer at Equinor.

What role do you play in the Marine Data Exchange?

I represent Equinor in delivering survey data to the Marine Data Exchange in my role as an Operations and Maintenance Engineer.

What do you think the value of the Marine Data Exchange is?

The Marine Data Exchange plays a crucial role in supporting research within the marine industry by providing convenient access to a wide range of current and relevant offshore data. This accessibility enables researchers to delve into the data and drive new innovations that are rapidly transforming the offshore wind industry to meet the growing demand for renewable energy at a low cost of production.

“Open access to industry data is pivotal in facilitating this transformative change.”



MDE User case studies



The impact of the Marine Data Exchange on the offshore industry

Michael Blair

Senior Technical Manager at The Crown Estate

“The Marine Data Exchange allows project developers to benefit from the efforts of those who have gone before.

Engineers and analysts can use data such as wind speed and wave height to improve the accuracy of simulations in the early stages of a projects, informing technical and economic feasibility studies. All of this helps to accelerate and de-risk projects, as well as saving on expenditure during the critical early stages of the project lifecycle.

The Marine Data Exchange also allows The Crown Estate to combine data to produce high-value insights. The Crown Estate’s investigations into UK wind resource (Met Office, 2015) and inter-annual variability (DNVGL, 2016), based on measured data from various locations across the country spanning multiple years, stand as excellent examples of the power of data to become more than the sum of its parts, delivering real value back into the sector.

This section of the report - **Marine Data Exchange User Case Studies**, will showcase the ways in which our customers and stakeholders have used the data hosted on the Marine Data Exchange to inform their own research and support growth towards meeting the UK’s biodiversity and net zero targets.

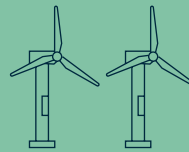


Visit the Marine Data Exchange to see how industry data is being used in our data and evidence projects and how our users are using the data to inform their project work.



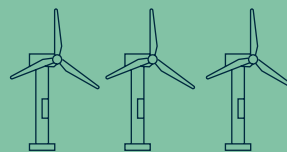
Round 1

Construction and operation of the UK’s first offshore wind farms.



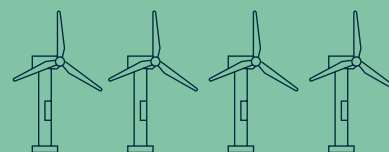
Round 2

1249 survey campaigns or “Series” collected and delivered to the Marine Data Exchange from Round 1 & 2.



Round 3

439 survey campaigns collected and delivered to the Marine Data Exchange.



Round 4

Ongoing data collection and delivery from Round 4 projects to the Marine Data Exchange.

PML

Plymouth Marine
Laboratory

Offshore wind farm impacts database - Plymouth Marine Laboratory (PML)



“I am a marine ecologist at Plymouth Marine Laboratory (PML) with a research focus on anthropogenic impacts on the seabed and marine environment, such as fisheries and offshore energy installations.”

Dr. Claire Szostek

I'm part of an interdisciplinary team working across marine ecology and social science to link human impacts on the marine environment with ecology and physical processes.

I apply specialist ecosystem service knowledge across many offshore energy projects (such as ECOWind PELAgIO), working towards increasing knowledge and evidence for improving environmental outcomes for our oceans, while maintaining and enhancing the services and benefits provided by a healthy marine environment.

At PML, we have developed the first comprehensive database of global primary and UK grey literature on the environmental impacts and ecosystem service outcomes of offshore wind farm developments on the marine environment.

This was done as part of the UK Energy Research Council's (UKERC) Energy, Environment and Landscapes project, which applies ecosystem service and natural capital approaches to understand the environmental implications of changes in UK energy systems.

This work also builds on the DREAMS: Decommissioning - Relative Effects of Alternative Management Strategies project which is led by PML, the University of Plymouth (UoP, UK) and the Centre for Environment, Fisheries and Aquaculture Science (Cefas, UK) including the work of Lemasson et al., 2022.

We searched the Marine Data Exchange for all relevant literature to add to the database and it has proved a valuable and comprehensive source for this piece of work.

We are planning to host our database on the Marine Data Exchange and will regularly update the database with new evidence as it is published on the Marine Data Exchange.

Visit the PML Offshore Wind Farm Impacts Database





Offshore Wind Project Development -Flotation Energy



"I am an Engineer working for Flotation Energy. I support the development of our major offshore wind projects in UK, Irish and international waters."

Matthew Barnott

My primary role is to prepare fundamental engineering documents, identify engineering work required to progress the project and then support the procurement and ongoing management of engineering work packages and surveys. To date, I have primarily worked in the Project Establishment phase of our projects, supporting the initial site characterisation and Concept Design work to support projects through consent.

I use the Marine Data Exchange to access information relevant to ongoing project demands.

Ahead of ground investigation surveys I will check the Marine Data Exchange for survey data and reports in the area to get an idea of expected conditions, which can then be used to inform programme, and any cross-over in data collection will reduce uncertainty and aid with interpretation of results.

Met mast/LiDAR data taken from the Marine Data Exchange are provided to the Wind Resource Assessment consultants and used as the basis for wind resource modelling as there are good quality data measurements that can be extrapolated to the relevant sites and then validated against long-term hindcast data. It is worth noting that having more data can lead to lower uncertainties – which increases the accuracy of the project's financial model and gives lenders more confidence, which can lead to reduced weighted average cost of capital and hence, lower levelized cost of electricity (LCoE).

Onshore works, landfall assessments, information on coastal processes etc. from the Marine Data Exchange were all used to inform the relevant onshore cable route optioneering studies, and a study assessing viability of an area for Horizontal-Directional Drilling contributed to a Project being able to rule out a specific landfall zone and focus effort on safer, more appropriate areas, saving time and cost.

Other information such as port studies, have helped inform understanding of facilities around the project area and enhance our own database – simplifying the RFI process and saving time.

Environmental data is used to inform the Environmental Impact Assessments, environmental models, etc as well as validating our own studies – this isn't my department but I make a point of sharing pertinent ecological surveys, reports, etc. with the relevant teams.

"These resources facilitate genuine savings in both time and cost to new offshore wind developments, which helps drive the energy transition."



Image credit: Floating offshore wind farm, Flotation Energy



OneBenthic - Cefas

OneBenthic brings together disparate benthic datasets (e.g. seabed macrofauna, sediment particle size) in one cloud-based platform. The resulting high-quality, standardised dataset is used to generate new science, and new innovative and collaborative ways of working. Outputs are shared via open-access publications and a suite of interactive web apps.

Every year thousands of benthic samples (grabs, cores, trawls) are collected globally by industry, government and researchers for purposes of characterisation, monitoring and research and development. Moreover, these data have value and utility beyond their original purpose. For instance, contributing to the understanding of species distribution or the relationship between fauna and habitat. Until now it hasn't been possible to fully realise this potential due to data access limitations and a lack of suitable IT infrastructure (hardware/software). However, progress has been made in both areas, with a host of on-line repositories where data can now be harvested, enhanced computing power, and open-access software for manipulation, analysis and presentation of data.

The Marine Data Exchange is one of the primary sources of data for OneBenthic.

This big data approach creates an opportunity to do things differently - realising the concept of 'collect once, use many times' by finding ways to add value to marine data. This is important given the increasing use of the marine environment and the challenges associated with delivering sustainable development.



"For researchers like me, the Marine Data Exchange provides a one-stop shop for benthic data associated with offshore renewables projects. This data has contributed to many of the products arising from OneBenthic, such as new biodiversity maps, which provide a common understanding for developers and regulators, leading to better decision making and improved sustainability."

Keith Cooper, Marine Ecologist and founder of OneBenthic Initiative (Cefas)

OneBenthic data have already been used to develop:

- A 'baseline' assessment of the UK macrofauna
- A new monitoring approach for the aggregates industry (better environmental protection, 50% lower costs, relevant to multiple sectors)
- A new biologically informed habitat classification
- A new machine learning approach to biotope classification
- Improved understanding of biodiversity hotspots

Visit the **OneBenthic portal**.

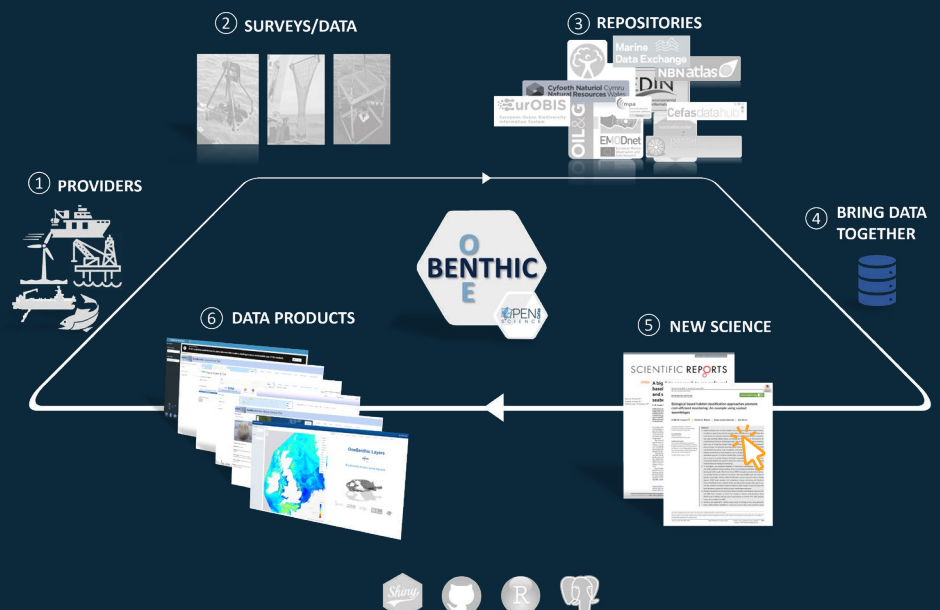


Image credit: OneBenthic processes diagram, Cefas



British Geological Survey

Research and evidence - British Geological Survey (BGS)



“The MDE provides access to highly useful information and data, that have wide applicability. Acquiring this information independently would be prohibitively expensive, so this is a fundamentally important resource. BGS scientists have, and will continue to make good use of the MDE.

Dayton Dove (Senior Marine Geoscientist) and **Mary Mowat** (Marine Data Manager)

Dayton and Mary work with the British Geological Survey (BGS), and are key contributors to BGS’s new Seabed Geology mapping programme.

As a survey, the BGS works to enable governments, industry and the public to make better decisions regarding geology and associated processes in managing the economy, the environment and society.

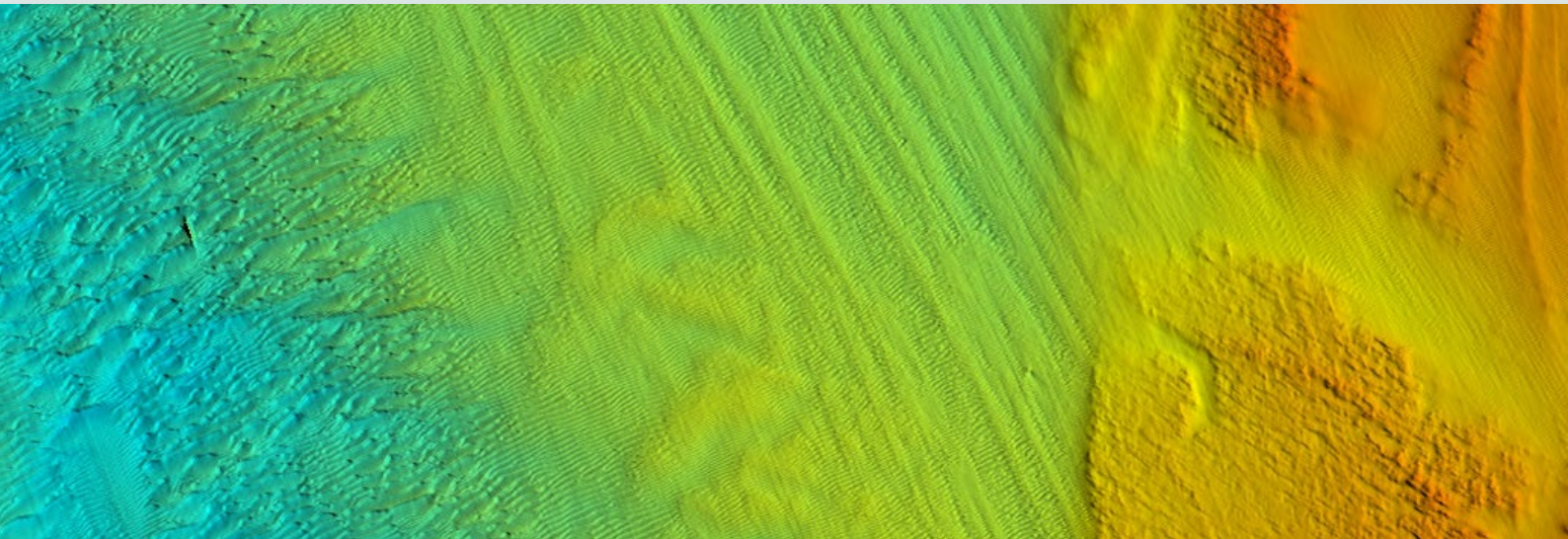
The recently initiated Seabed Geology mapping programme will provide a unique resource for multiple offshore users, and importantly relies on a variety of open-access data, including from the Marine Data Exchange.

The data acquired for offshore developments, such as for offshore wind farms, can be used for a multitude of projects.

For example, the detailed bathymetry data collected as part of routine geophysical surveys for offshore wind development can paint a more detailed picture of the UK’s seafloor and sub-surface characteristics, creating a greater evidence base for BGS to use in their marine geoscience focused projects.

Marine Data Exchange data, such as bathymetry and seismic imagery, as well as associated site reporting (e.g., subsurface interpretation, sedimentology assessments, and seabed videography) have been used to inform BGS’s research and applied work to better understanding seabed and shallow sub-seabed characteristics and architecture in a number of areas around the UK.

This in turn helps to more accurately characterise active, as well as former environmental processes.



MDE Impacts

MDE User case studies

Data from the Marine Data Exchange has supported the MOET project “Managing the Environmental Sustainability of the Offshore Energy Transition”, BGS’s Seabed Geology Mapping Programme, as well as nascent CCS research.

MOET will provide the UK’s first holistic study of the environmental and social impacts resulting from the rapid expansion of offshore infrastructure associated with windfarms and subsurface storage of carbon dioxide (CO₂) and hydrogen (H₂), driven by the UK’s energy transition to net zero emissions.

BGS have also used Marine Data Exchange data to better understand coastal erosion at Holderness, identifying information on ubiquitous offshore ridges, indicative of past coastlines and coastal retreat. The information provided in the reports available on the Marine Data Exchange provided evidence about the composition of the ridges, allowing for a better understanding of the feature origin, helping to inform BGS’s geological modelling.

Marine Data Exchange Geotechnical data – once standardised, can also be integrated into BGS’s National Geotechnical Properties Database, which is used predominantly for research that facilitates the planning, design and construction of infrastructure, and the mitigation of risk to these structures.

The application of these data is fundamental to several key BGS geology and engineering outputs and data products.

The geological information (data products, expertise, and scientific outputs) that BGS provide is crucial to fully understanding the nature of the seabed, informing on: siting offshore renewables, offshore resources, seabed vulnerability, ecosystem character and distribution, coastal processes, and hazard mitigation.



Image credit: MoMorad, drilled core samples

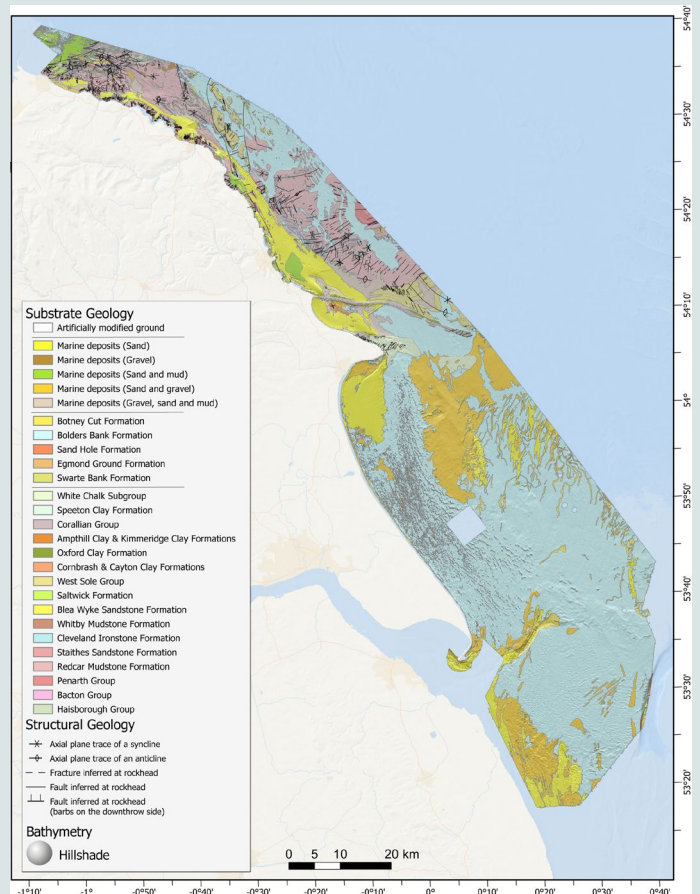


Image credit: Substrate geology map, BGS © UKRI



MDE Impacts

MDE **User case studies**



The Offshore Wind Evidence and Change Programme - ECOWind-ACCELERATE

The Crown Estate have convened government bodies, industry and key stakeholders from across the UK to work collectively on a shared mission – to balance the sustainable growth of the offshore wind sector with the protection and enhancement of the marine environment. Founded on the need to better understand and overcome the cumulative environmental impacts of offshore wind, and its effects on users of the sea and onshore communities, the Offshore Wind Evidence and Change programme brings together marine experts to gather and share evidence.

The Marine Data Exchange is a tool that supports projects funded by the Offshore Wind Evidence and Change Programme, such as Planning Offshore Wind Strategic Environmental Impact Decisions (POSEIDON) and Ecological Consequences of Offshore Wind (ECOWind).

The ECOWind Programme

ECOWind is bringing together experts from science, policy and industry to understand how offshore wind affects ecosystems, and the species and habitats that make them, in order to reduce negative impacts on marine life while tackling climate change. Three projects will explore the effects of offshore wind on different aspects of the marine environment, covering elements of the ecosystem such as fish, marine mammals, seabirds, and life on the seabed (ECOWind-ACCELERATE, ECOWINGS and PELAgIO).

ECOWind-ACCELERATE

ECOWind-ACCELERATE will deliver a range of outputs that speak to the three core aims of the ECOWind programme. In particular, the project will support the development of environmental simulations and prediction systems across a range of offshore windfarm sizes, use predictive modelling to map behavioural adjustments in key species, and develop a public-facing tool that allows stakeholders to understand the potential impacts of offshore wind developments on marine habitats in their region.



“As an MDE user I represent CGG alongside ECOWind-ACCELERATE project partners, National Oceanography Centre & Bangor University.

Sharon MacAllan, CGG

Most recently, I have used the resources available on the MDE as one of the main data sources. With the area filter, I was easily able to find data on the East Irish Sea to support the data mining process for the ECOWind-ACCELERATE project.

The extracted data was used to understand the research area’s benthic ecology at various stages of offshore energy projects.

This search was simplified using the theme filters which ensured that all data shown was potentially useful for the project. Additionally, the inclusion of file types in the summary was a time-saver as any files that required specialized software were not included in the data search.

“The collation of numerous data sources onto one platform with various filters to improve the user experience makes the Marine Data Exchange a valuable tool. If you are working on any UK marine-related project, I would highly recommend using the Marine Data Exchange as one of your primary sources of data.

MDE Impacts

MDE User case studies

The next generation of ocean experts

To support our ambitions of reaching Net Zero and a thriving marine environment, we will need a greater pool of marine experts to support and lead the way. The Marine Data Exchange is an invaluable tool that can be used to support the learning and development of young professionals, educating them and preparing them for life in industry.

Here we talk to researchers and university students about how they have used the Marine Data Exchange:

Emily Harlow, Bangor University

I am a recent graduate from Bangor University, where I studied a BSc Marine Vertebrate Zoology. I dedicated my dissertation to the impacts of offshore wind farm installations on benthic biodiversity in the North Sea.

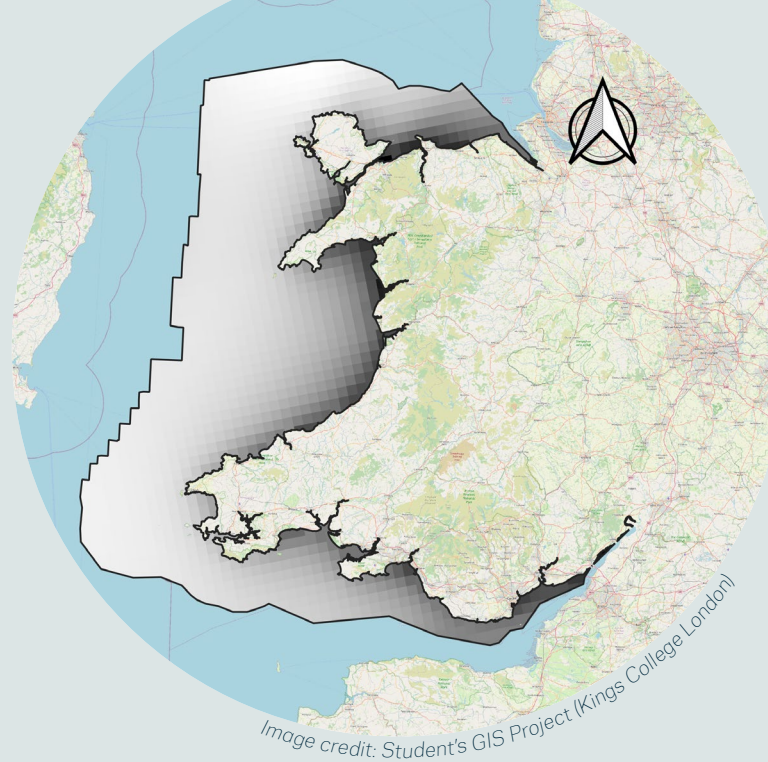
The Marine Data Exchange provided an invaluable database for me to successfully analyse the impacts of offshore wind farms on benthic biodiversity. Obtaining the data required was effortless and straightforward for my dissertation which I achieved a first class on!

I downloaded pre-construction and post-construction benthic survey reports dating from 1998-2021 from the Marine Data Exchange database. All survey reports were from 8 offshore windfarms within the North Sea. I researched 3 measurements of biodiversity: Species Richness (s), Shannon Wiener's Index (H') and Pielou's Evenness (J') between pre- and post-construction benthic surveys.

My study shows offshore wind farms have the potential to effectively enhance benthic biodiversity within areas where relative species tolerance and local environmental factors are considered.

Student, Kings College London

My educational background includes receiving a BSc in Earth and Ocean Science from Brighton University and MSc Environmental Science for Sustainability from Kings College London. My employment has varied from collecting data on marine mammal populations, to conducting Environmental Impact Assessments and recruitment consultancy.



I used the Marine Data Exchange for my dissertation project "The future of Offshore Wind in Wales: A multi-criteria decision analysis approach to site selection. Using QGIS and The Model for Environmental Assessment of Offshore Wind (LCA)."

During my project, I mapped out potential offshore wind farm sites around the coast of Wales using QGIS (MCDA + Weighted Summation). I used the wind speed data hosted on the Marine Data Exchange to map areas that experience wind speeds over 10m/s.

I also created a constraint map, which visualised areas of constraint where there were marine mammal sightings and marine protected areas. Furthermore, I also investigated benthic habitat data hosted on the Marine Data Exchange to understand the ecology of different sites.

Student, Bangor University

Student "H" is a post-graduate student who studied MSc Marine Environmental Protection at Bangor University. They are now working at one of the leading marine management organisations in the UK.

As part of our studies we learn about Environmental Impact Assessments (EIAs), so that we learn key skills that will make us more employable and prepared for life in industry. As part of our EIA module, we had to propose our own offshore or coastal project and then write a draft environmental statement describing the level of the impacts of the proposed development and outline any potential mitigation measures and monitoring plans.

MDE User case studies

Student, Bangor University

I chose to write about a co-location project - integrated multi-trophic aquaculture and an offshore wind farm. We had to try and understand the potential impacts of the project by analysing real data. I found a wealth of baseline data for the proposed Islay offshore wind farm in Scotland on the Marine Data Exchange. Using this information really helped me to understand the potential impacts of offshore development and how to write and present a report.

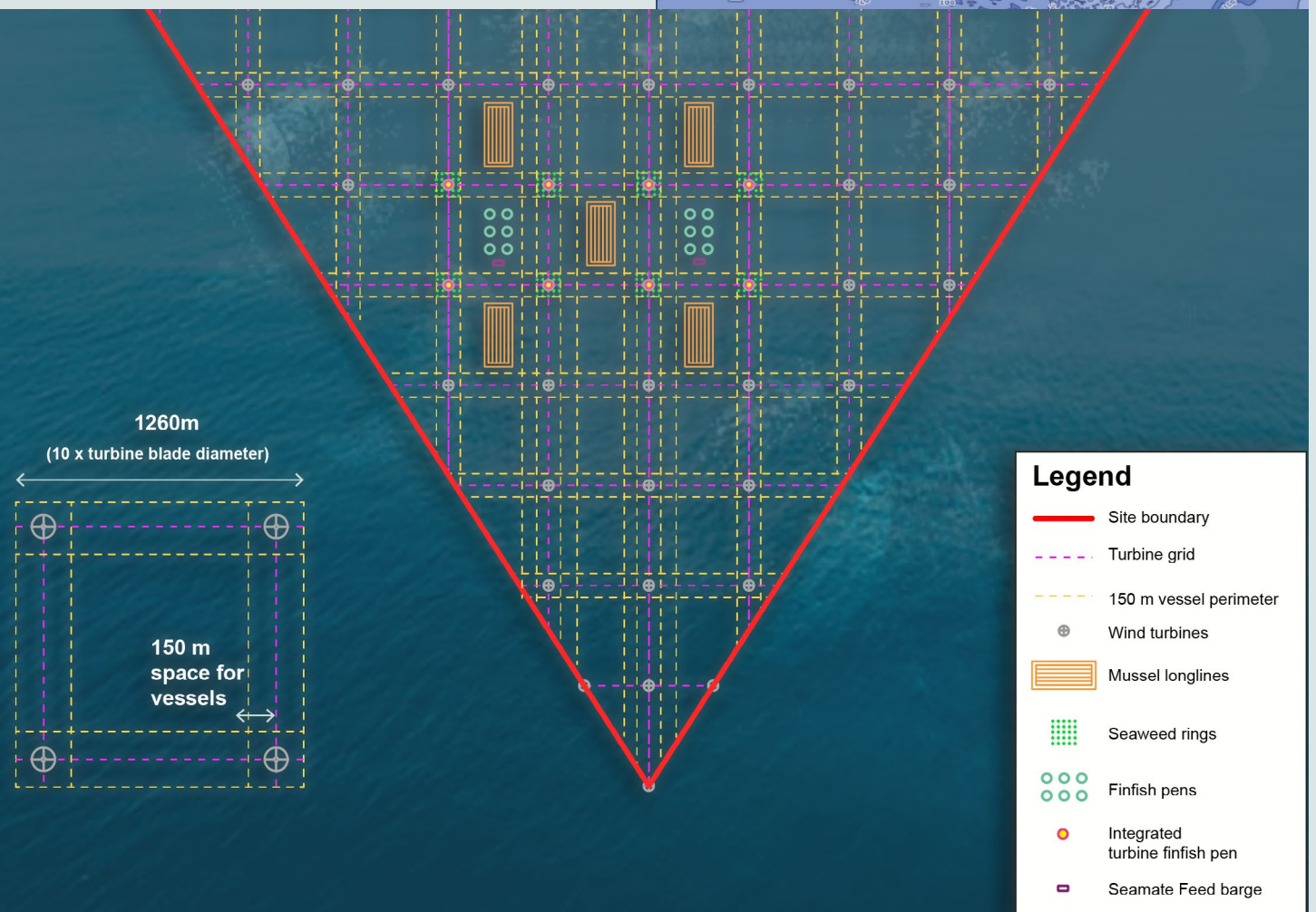


Image credits: Integrated multi-trophic aquaculture co-location project with an offshore wind farm, created by a student at Bangor University.

“The Marine Data Exchange is a brilliant tool that can be used to educate people, helping them to develop their skills and providing them with real life examples of marine industry projects that they can learn from, preparing them for their own industry projects later on in life. Without the Marine Data Exchange, I would have really struggled to write my own Environmental Impact Assessment. The wealth of data is amazing- it is one of my go to study resources” **Student, Bangor University**



Image credit: Henley Spiers, "Mussel Lines"
Underwater Photographer of the Year 2023,
British Waters Living Together category,
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London
The Crown Estate
1 St James's Market
London
SW1Y 4AH
T 020 7851 5000

Windsor
The Crown Estate
The Great Park
Windsor
SL4 2HT
T 01753 860 222

thecrownestate.co.uk
[@TheCrownEstate](https://www.instagram.com/TheCrownEstate)

 marinedataexchange.co.uk

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