



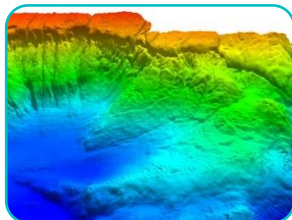
# Annual Report

## 2021-2022

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*'measure once, use many times'*

# Highlights of the year



## *Access to marine datasets*

We provide a single place to find UK marine environmental data. In March 2022, the MEDIN portal described and provided access to 14,944 marine datasets, owned or managed by over 600 public and private sector organisations. *Read more on page 16.*



## *Data managed by specialists*

We coordinate a network of specialist Data Archive Centres (DACs) that provide long-term, interoperable access to UK marine data. Our data centres are working towards an international accreditation called Core Trust Seal and this year received over 4.2 million requests for marine data, nearly 2.5 times last year's total. *Read more on page 11.*



## *Marine data standards*

We provide a standardised way for the UK marine community to describe the data they collect. This year we delivered a suite of online training to explain how to use our metadata standard and data guidelines to make your marine data findable, accessible, interoperable and reusable. *Read more on page 14.*



## *Marine policy*

We provide expert advice to government departments and agencies, supporting the UK Marine Monitoring and Assessment Strategy (UKMMAS) community. This year we developed a data strategy for the UKMMAS community to support transparent access to the data used in national and international reporting. *Read more on page 29.*



## *Value chains*

We provide access to a wide range of marine data. This year we published a report with the Organisation for Economic Co-operation and Development (OECD) and the Global Ocean Observing System (GOOS) exploring the value chains in marine data available from our Data Archive Centres. *Read more on page 28.*

# Performance

This year our services  
were acclaimed by  
international  
stakeholders

2021-22 was the third year of the Marine Environmental Data and Information Network's (MEDIN) ambitious five-year (2019-24) [Business Plan](#). MEDIN is strengthening and evolving as the leading authority on the management of marine environmental data, albeit with a reduced level of funding, down from £763K per year before 2011 to £509K in the last year. This year we continued to see disruption around the world associated with the ongoing global pandemic, necessitating changes to working practices and travel. Nevertheless, we successfully delivered the bulk of our planned work, through the commitment and hard work of our core team, our Data Archive Centres, our sponsors and all of our 58 partners.

Our Key Performance Indicators (KPIs) show some areas of significantly increased performance, as well as helping us identify some areas that may benefit from more focus in the future. In particular we saw an increase of around 25% in the number of individuals using our metadata standard and data guidelines compared to the previous year. Learning from our experiences in 2020-21, we continued to embrace virtual meetings and conferences. A particular success this year was the series of interactive virtual training workshops we ran in conjunction with our partner OceanWise. Making use of a range of digital solutions for online events enabled us to train an additional 75% more organisations compared to our 2019-20 baseline. Running the course online meant we could reach organisations in all four UK nations, as well as allowing us to expand to colleagues overseas.

The MEDIN portal is one of our key outputs, providing a wealth of information about datasets collected or owned by over 600 different UK organisations. In the coming year we hope to increase the number of people using this informative tool to find and access data. The number of requests for data from our Data Archive Centres has more than doubled from the previous year, which is a fantastic achievement.

MEDIN's reputation has continued to expand. This year the benefits of our services were recognised in publications from the Organization for Economic Cooperation and Development (OECD), the Global Ocean Observing System (GOOS) and the Open Data Institute (ODI).

The 2019-24 MEDIN Business Plan was developed around 3 strategic goals, which encompass MEDIN's vision for all UK marine data to be Findable, Accessible, Interoperable and Reusable (FAIR). MEDIN has defined seven KPIs based on these strategic goals. 2019-20 provided the baseline, towards which we compare the KPIs for 2020-21 and 2021-22. The KPIs are listed below.

**Strategic Goal A: MEDIN delivers its vision for *all* of the UK marine community** by providing tools and services beneficial across the wide spectrum of the marine data community and the full data lifecycle; ensuring widespread archiving and open access to high-quality data to enable maximum use and security and to provide integration and coordination of services.

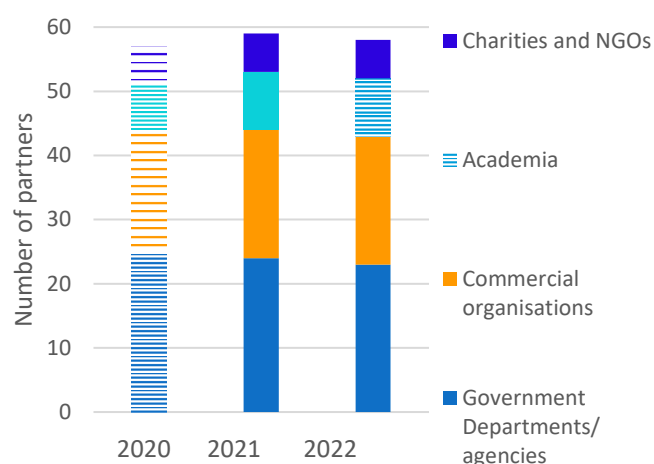
We have 2 Key Performance Indicators that measure progress against this goal:

KPI 1: Number of active MEDIN partners

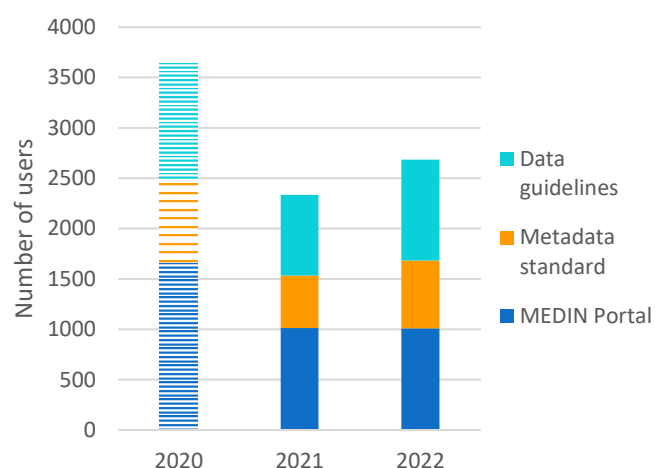
KPI 2: Number of users of MEDIN tools and services

### How did we perform this year?

## 58 partner organisations



## 2687 users<sup>1</sup>



<sup>1</sup> We were unable to capture the number of users of the Data Archive Centres.

**Strategic Goal B: MEDIN delivers the technical infrastructure required to ensure UK marine environmental data are Findable, Accessible, Interoperable and Reusable (FAIR) by** providing: a coordinated network of marine Data Archive Centres; a single portal to access all UK marine data; and standards, tools and services to support the UK marine community.

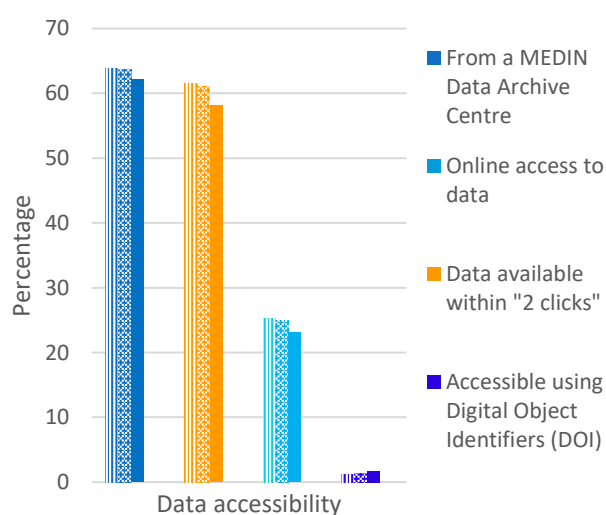
We have 2 Key Performance Indicators that measure progress against this goal:

KPI 3: Summary of access to data described in the MEDIN portal

KPI 4: Number of requests for data at MEDIN Data Archive Centres

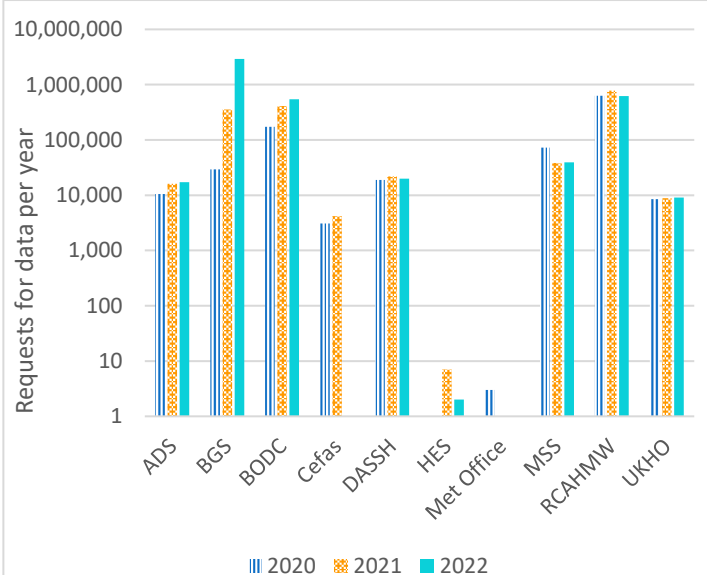
### How did we perform this year?

**64% data available from MEDIN portal is archive quality**



*Hatched bars show data from 2020, dotted bars from 2021 and solid bars from 2022.*

**4.2 million requests for data**



*Hatched blue bars show the number of requests for data in 2020 at each MEDIN Data Archive Centre, dotted orange bars show the requests in 2021 and solid cyan bars show the requests in 2022. Note the logarithmic scale on the y-axis.*

**Strategic Goal C: MEDIN delivers an open and constructive data management culture:** fostering global collaboration and partnerships; addressing skills gaps; providing training and education.

We have 3 Key Performance Indicators that measure progress against this goal:

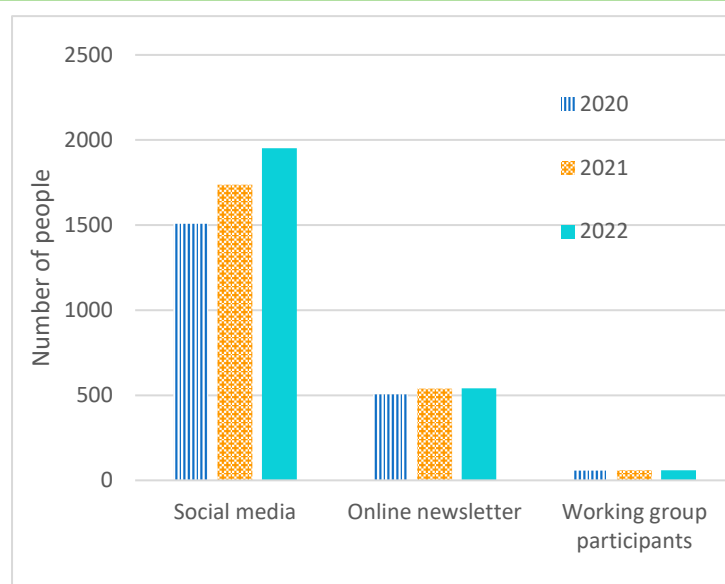
KPI 5: Number of people receiving regular MEDIN updates

KPI 6: Number of organisations receiving MEDIN data management training

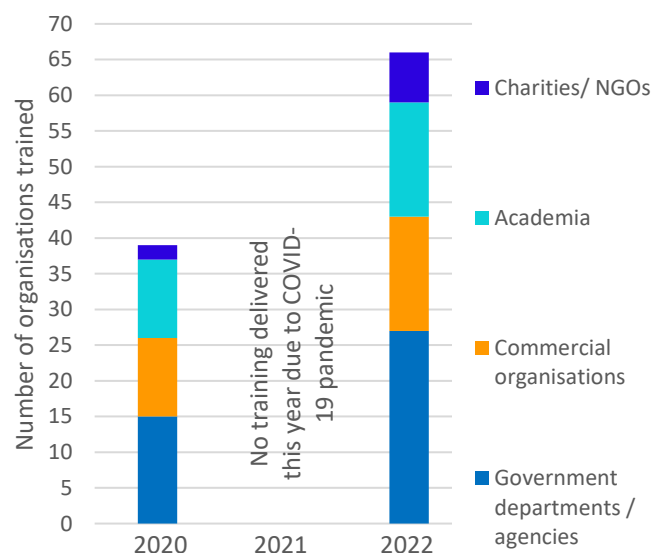
KPI 7: Number of national and international conferences or trade fairs where MEDIN is represented

### How did we perform this year?

## 2,553 update recipients

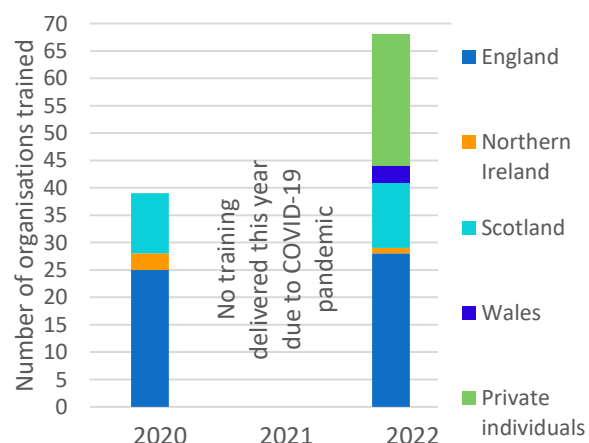


## 66 organisations receiving training



## MEDIN represented at 19 international events

*See page 21 for more details*



# Finance Summary

This year we raised  
£509,000 in  
sponsorship for MEDIN,  
an increase of 0.4%  
from last year

## Available funds

MEDIN is a collaborative initiative that attracts sponsorship from like-minded organisations who recognise the scientific, environmental and financial benefits of providing a coordinated, national framework for managing the UK's valuable and unique marine data resources. £610,564 was available to fund MEDIN activities in 2021-22: £509,000 from the consortium of 15 sponsors, in addition to £101,564 carried over from previous years.

Sponsor Name	Funding level for 2021-22
DEFRA: Department for Environment Food and Rural Affairs	£175,000
NOC: National Oceanography Centre/ NERC: Natural Environment Research Council	£131,000
Scottish Government	£84,000
BEIS: Department of Business, Energy and Industrial Strategy	£30,000
UK Hydrographic Office	£19,000
Cyfoeth Naturiol Cymru / Natural Resources Wales	£14,000
Met Office	£14,000
The Crown Estate	£10,000
Maritime and Coastguard Agency	£7,000
CEFAS: The Centre for Environment, Fisheries and Aquaculture Science	£5,000
Joint Nature Conservation Committee	£5,000
OceanWise	£5,000
DAERA: Department of Agriculture, Environment and Rural Affairs, Northern Ireland	£5,000
AFBI: Agri-Food and Biosciences Institute	£5,000
Welsh Government	£5,000
<b>TOTAL available to MEDIN from sponsorship funding</b>	<b>£509,000</b>
Carry over from previous years	£101,564
<b>Final Total available for 2021-22</b>	<b>£610,564</b>

## Expenditure

MEDIN is split into seven Work Streams (WS), each with its own budget and project manager, to allow efficient delivery and management of MEDIN's programme of work. We spent £533,592 during 2021-22: £353,041 on the employment costs of the MEDIN project managers (the MEDIN Core Team) including all individual and organisational overheads, nothing on travel and subsistence costs and £180,550 on external contract costs required for the operation, maintenance and development of the MEDIN framework.

Expenditure category	Expenditure in 2021-22	Work Stream	Expenditure in 2021-22
Employment Costs of Core Team	£353,041	WS1: Data Archive Centres	£119,893
Travel and Subsistence	£0	WS2: Standards	£99,911
External Contracts	£180,550	WS3: Portal	£108,652
		WS4: International Links	£21,481
		WS5: Resources and Applications	£4,604
		WS6: Communications	£44,038
		WS7: Management and Coordination	£114,447
		Special Projects	£20,566
<b>TOTAL expenditure</b>	<b>£533,592</b>	<b>TOTAL expenditure</b>	<b>£533,592</b>

## End of year balance

This year saw uncertainty in MEDIN's overall funding level until very late in the year. We saw an increase in funding from the UK Hydrographic Office, a decrease in funding from Scottish Government, a new sponsor in the Welsh Government and a severe delay in funding confirmation from the Department for the Environment, Food and Rural Affairs (Defra), MEDIN's biggest financial contributor. To mitigate risk from this uncertainty, we postponed some of our planned activities until future years, which resulted in an **end-of-year underspend of £89,863 for 2021-22**.

## External expenditure

This year MEDIN spent £184,630 on external contract costs required for the operation, maintenance and development of the MEDIN framework.

Supplier	Item	Cost
BGS	DAC costs 2021-22	£11,000
BODC	DAC costs 2021-22	£11,000
DASSH	DAC costs 2021-22	£13,200
UKHO	DAC costs 2021-22	£11,000
Met Office	DAC costs 2021-22	£11,000
Fish DAC CEFAS	DAC costs 2021-22	£6,600
Fish DAC Marine Scotland	DAC costs 2021-22	£13,200
Historic Environment DAC ADS	DAC costs 2021-22	£6,000
Historic Environment DAC HES	DAC costs 2021-22	£5,000
Historic Environment DAC RCHAMW	DAC costs 2021-22	£5,000
<b>Total WS 1 expenditure</b>		<b>£93,000</b>
DASSH	Standards Working Group Support (April-Sept)	£6,972
DASSH	Upgrade to online metadata editor tool	£9,420
CMS	Advert for Online Workshop	£180
<b>Total WS 2 expenditure</b>		<b>£16,572</b>
Maris	UKDMOS Portal Maintenance May 2021-April 2022	£1,800
BODC	MEDIN product hosting and support	£5,000
NOC	Website hosting and support	£5,000
Maris	MEDIN portal and catalogue hosting and maintenance Jan 2022-Dec 2022	£9,720
MBA / DASSH	MEDIN Helpdesk April 2021-March 2022	£7,890
Maris	Upgrade to MEDIN portal	£12,064
<b>Total WS 3 expenditure</b>		<b>£41,475</b>
3 Men Squared Ltd	Graphic design support	£624
MASTS Annual Science Meeting	Conference fee	£53
CMS	Conference fee	£120
CMS	Advert for Open Meeting	£180
<b>Total WS6 expenditure</b>		<b>£977</b>
DASSH/MBA	Representing MEDIN at HBDSEG and BioDIG meetings	£6,169
Professor Peter S. Liss	Representing MEDIN at MSCC and chairing MEDIN meetings	£5,880
<b>Total WS7 expenditure</b>		<b>£12,049</b>
Cefas	Implementation of OGC EDR API Standard	£9,000
DASSH	Implementation of OGC EDR API Standard	£7,488
<b>Total special project expenditure</b>		<b>£16,488</b>



# Governance

## Governing Body

MEDIN was established in 2008 as a collaborative, cross-sectoral initiative for the public good. Our governing body, the MEDIN Sponsors' Board, comprises one member from each funding organisation, ensuring each funder has the opportunity to influence our national and international work. The Board is responsible for defining the strategic direction of MEDIN, approving work programmes and budgets. Professor Peter Liss CBE FRS chairs the MEDIN Sponsors' Board, which met twice during 2021-22.

Sponsor Name	Sponsors' Board member 2021-22
DEFRA: Department for Environment Food and Rural Affairs	Sofiya Stoyanova/Jake Harvey
NERC / NOC: Natural Environment Research Council / National Oceanography Centre	Ian Moores
Scottish Government	Dr Jens Rasmussen
BEIS: Department of Business, Energy and Industrial Strategy	Saravanan Marappan
UKHO: UK Hydrographic Office	James Carey
Cyfoeth Naturiol Cymru / Natural Resources Wales	Barnaby Letheren
Met Office	Jon Turton
The Crown Estate	Chelsea Bradbury
Maritime and Coastguard Agency	Paula English
JNCC: Joint Nature Conservation Committee	Elly Hill
OceanWise	Dr Mike Osborne
DAERA: Department of Agriculture, Environment and Rural Affairs, Northern Ireland	Aoibheann Rooney
AFBI: Agri-Food and Biosciences Institute	Dr Matt Service
Welsh Government	Shelley Vince
<b>Chair</b>	<b>Professor Peter Liss CBE FRS</b>

## Operational Groups

Our Board is supported by an Executive Team, which provides interim guidance and management of our operational work programme between Sponsors' Board meetings. The Executive Team is made up of four sponsor members (DEFRA, NERC/NOC, Scottish Government and a fourth member, currently UKHO, as voted by the Sponsors' Board), three subject experts (the chairs of the MEDIN Working Groups) and the MEDIN work stream managers. Our Executive team met four times in 2021-22.

Executive Team member	Sponsor/Expert member	Executive Team member	MEDIN work stream member
Sofiya Stoyanova (DEFRA)	Sponsor member 2019-2021	Dr Clare Postlethwaite	Since 2012
Jake Harvey (DEFRA)	Sponsor member since 2021		
Ian Moores (NOC/NERC)	Sponsor member since 2021	Dr Robin McCandliss	Since 2017
Dr Jens Rasmussen (Scottish Government)	Sponsor member since 2019	Dr Sean Gaffney	Since 2014
James Cooke (UKHO)	Sponsor member since 2017	Dr Gaynor Evans	Since 2008
Dan Lear (MBA)	Expert member since 2020	Charlotte Miskin-Hymas	Since 2017
Graeme Duncan (JNCC)	Expert member since 2019	Roseanna Wright	Since 2018
Dr Mike Osborne (OceanWise)	Expert member since 2008	Colm Walsh	Since 2021
<b>Professor Peter Liss CBE FRS</b>	<b>Chair since 2008</b>		

The seven MEDIN work streams are project managed and supported by the MEDIN Core Team - seven part-time staff

employed by the National Oceanography Centre within the British Oceanographic Data Centre. In addition to project management, the MEDIN Core Team provide leadership for the work streams and secretariat as well as administrative support to MEDIN. The MEDIN Core Team met monthly in 2021-22.

Core Team member	Work Stream (WS) role
Dr Robin McCandliss	Lead on DACs WS
Roseanna Wright	Lead on Standards WS
Dr Sean Gaffney	Support to Standards WS
Colm Walsh	Support to Standards WS
Dr Gaynor Evans	Lead on Portal, Products and Services WS
Dr Clare Postlethwaite	Lead on International; Resources and Applications; and Management and Coordination WS
Charlotte Miskin-Hymas	Lead on Communication WS and support to International WS
Paul McGarrigle	Administrative Support
<b>Dr. Clare Postlethwaite</b>	<b>Coordinator since 2014</b>

## Working Groups

Our partners help deliver our strategic goals by participating in our working groups, which met regularly throughout 2021-22.

DAC Working Group	Standards Working Group	Portal Steering Group	Resources and Applications Working Group
Archaeology Data Service (ADS) British Geological Survey (BGS) British Oceanographic Data Centre (BODC) Centre for Environment, Fisheries and Aquaculture Science (Cefas) DASSH  Department for Environment, Food and Rural Affairs (DEFRA) Historic Environment Scotland Marine Scotland Met Office Royal Commission for the Ancient and Historic Monuments of Wales (RCHAMW) The Crown Estate Scottish Natural Heritage (SNH) United Kingdom Hydrographic Office (UKHO)	BGS BODC Cefas  DASSH Joint Nature Conservation Committee (JNCC)  Natural Resources Wales (NRW)  OceanWise Scottish Association for Marine Science Nature Scot  The Crown Estate  UKHO	DASSH Marine Scotland NRW  OceanWise  UKHO  Edinburgh Parallel Computing Centre (EPCC)	ABPmer Marine Management Organisation NRW  OceanWise
Dan Lear (Marine Biological Association) <b>Co-chair since 2020</b>	Graeme Duncan (JNCC) <b>Co-chair since 2019</b>	Dr Gaynor Evans (MEDIN) <b>Chair since 2008</b>	Dr Mike Osborne (OceanWise) <b>Chair since 2008</b>
Dr Robin McCandliss (MEDIN) <b>Co-chair since 2017</b>	Roseanna Wright (MEDIN) <b>Co-chair since 2019</b>		

## Parent Body

The Marine Science Coordination Committee (MSCC) is the parent body for MEDIN, providing strategic direction, which MEDIN uses to define its high-level goals. MEDIN reports to MSCC through this annual report and shorter progress updates as requested. MSCC is being reformed in 2021-22.

## Administrative Body

The management and operation of MEDIN is administered by the National Oceanography Centre (NOC), on behalf of the MSCC.

# Network of Data Archive Centres

This year we received  
over 2.5 times more  
requests for data  
than last year

The MEDIN Data Archive Centres (DACs) provide the cornerstone for long-term management of UK marine data and the 'collect once, use many times' philosophy. Each DAC provides expertise for their designated area of activity, applying best practice in the fields of data management and archive to data from disparate source organisations, who are able to free resource for other activity. Together, the DACs form a coordinated network that supports the reuse of data, helps to avoid duplication of primary data gathering efforts and contributes to the drive towards making data Findable, Accessible, Interoperable and Reusable (FAIR). Currently 64% of the data accessible from the MEDIN portal are considered "archive quality". In other words, they are managed, quality controlled and disseminated by one of our accredited Data Archive Centres.

Our DACs provide

- Secure, long-term curation of key marine data sets, according to best practice and to relevant national and international standards as demonstrated by their accredited status.
- Clear, searchable information on their data holdings by the generation and publication of metadata on the MEDIN portal.
- Open and easy access to their data, wherever possible.
- The first point of call for expertise in the management of marine data.

The DACs cover a wide spectrum of data within the marine environment, including bathymetry; fish and shellfish, fisheries, aquaculture and related samples; the historic environment; marine geology and geophysics; marine species and habitats; marine meteorology; water column oceanography. This network provides users from across the marine community with secure, long-term data archiving supported by domain expertise.

## [We provide direct access to UK marine data](#)

We promote open and easy access to marine data. Our DACs continue to develop their systems and processes to make it as easy as possible to access the data they manage. This year we continued to improve direct access to data, whereby a user can access data from the MEDIN Portal within '2 clicks'. Five of our DACs now provide online access to over 80% of their data holdings. In total, there has been a small reduction to 37% of the data held in our DACs that are available to download or use within '2 clicks' of finding it, without needing to register, login or carry out additional searches. Unfortunately, the UKHO, who manage over 6,000 of the data sets in the MEDIN portal, have been unable to make progress with the '2-click' initiative this year but they have made extensive improvements to the search and filter facility on their data portal, reducing the number of clicks to download.

## MEDIN's accredited Data Archive Centres

ADS	Archaeology Data Service
BGS	British Geological Survey
BODC	British Oceanographic Data Centre
Cefas	Centre for Environment, Fisheries and Aquaculture Science
DASSH	Archive for Marine Species and Habitats Data
HES	Historic Environment Scotland
MO	Met Office
MSS	Marine Science Scotland
UKHO	UK Hydrographic Office
RCAHMW	Royal Commission for the Ancient and Historical Monuments of Wales

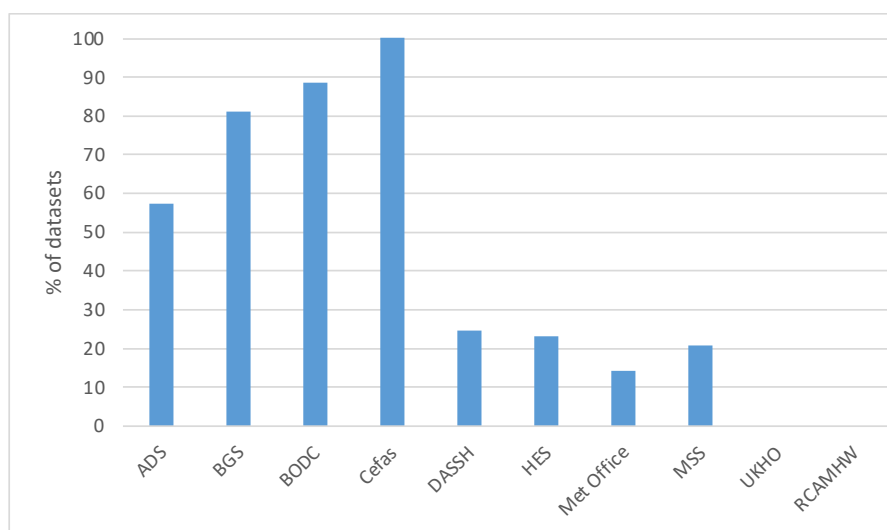


Figure 1: Percentage of each Data Archive Centre's datasets directly accessible within '2 clicks' of finding them on the MEDIN portal.

## We move to international accreditation

The decision was taken in 2019 for MEDIN to transition to the Core Trust Seal (CTS), an internationally recognised standard, as the required accreditation for MEDIN DACs. At the time, two of our DACs (BGS and ADS) had already achieved their CTS accreditation. During this year, HES have successfully gained CTS accreditation and applications are in process for DASSH and UKHO, and pending from the Met Office and BODC. The remaining DACs are now being supported in the process of applying for CTS as their MEDIN accreditations lapse, with RCAHMW now planning submission. CTS is a natural extension of MEDIN accreditation and allows our DACs to broaden their international reputations, further highlighting them as approved, trusted repositories.

## We improve provenance of our data holdings

The provenance of data is a record of the people, organisations and activities involved in producing, influencing, or delivering that data. In particular, provenance is crucial in deciding whether data and information are to be trusted, how they should be integrated with other diverse information sources, and how to give credit to the originators when reusing them. There have been significant developments in improving the underlying metadata source for a number of DACs this year, notably in the area of maritime craft terminology, coordinating and in agreeing consistent organisation naming conventions.

## We improve the user experience when submitting data

Increasingly, the data being collected and submitted for archive within MEDIN are cross-discipline and cross-DAC in nature. For a contributor, interacting with each DAC separately would be both time consuming and counterproductive. During this year, the DACs have continued to develop and strengthen a triage process for archiving multidisciplinary datasets. This provides a clearing house and single point for data to be submitted to the DACs. A further improvement in this system is the development of linkages between the data held in different DACs using persistent identifiers.

### Challenges and opportunities

This year, the Public Sector recruitment freeze led to some DACs having to delay some planned activity. In particular, the CTS accreditation process may be at risk for Cefas.

We continue to note gaps in the MEDIN DAC network, in particular around socio-economic, bird and underwater sound data. This year we held discussions with the Joint Nature Conservation Committee (JNCC) about the possibility of their organisation becoming an accredited DAC for sea bird data, as JNCC collect and handle the flow of significant volumes of this data. JNCC concluded that committing to MEDIN DAC accreditation was not something that they could do in the near future. DASSH have agreed to fill this gap and will add the archival of seabird data to the broad range of marine species and habitats that they manage.

## Standards for marine data and metadata

This year we provided training to more than 60 organisations.

UK marine environmental data are collected or managed by over 600 different organisations. Our metadata standard and data guidelines are the backbone of our vision for all UK marine data to be Findable, Accessible, Interoperable and Reusable (FAIR). By providing consistent, standardised ways to describe datasets, we make sure that the wealth of UK marine data can be easily found, accessed and reused.

### We ensure marine data can be found

We developed the MEDIN Discovery Metadata Standard to ensure all relevant information about a marine dataset is readily available, to allow a potential user to make an informed decision about whether it is pertinent. MEDIN keeps the Discovery Metadata Standard and tools up to date to reflect updates to national (GEMINI) and international (INSPIRE) standards and working practices. Our two tools for creating MEDIN-compliant discovery metadata are Metadata Maestro and the MEDIN metadata editor. Metadata Maestro was downloaded 38 times in 2021-22, a slight increase compared to 2020-21 when it was downloaded 32 times. This is not surprising as the tool was not upgraded this year, so existing users did not need to download an updated version. Additionally, the new online workshops focus primarily on the online tool so may not introduce as many new users to Maestro. It is a positive sign that new users are continuing to download the tool. In 2021-22, 68% of downloads were from the private sector, which is comparable to the previous year. Government (including devolved administrations and arms-length bodies), Non-Governmental Organisations (NGOs) and academic users accounted for 8%, 0% and 13% of downloads, respectively. Private individuals made up the remaining 11% of downloads. Non-UK users accounted for 26% of downloads for 2021-22, a decrease of 5% compared to 2020-21. The non-UK downloads were from commercial organisations and private individuals. The MEDIN metadata editor, a tool hosted by DASSH, had 71 new registrants in 2021-22, bringing the total number of users to 1091; 71 of these users actively updated metadata records using the tool in 2021-22. DASSH recorded 370 new records created in the online MEDIN metadata editor in 2021-22, down from 583 in 2020-21 and 815 in 2019-22, this could be related to the impact of COVID-19 on data collection activities.

### We ensure marine data can be reused

MEDIN offers a suite of 29 data guidelines to help the marine community collect all relevant information to make data reusable. The MEDIN data guideline for bathymetry was the most downloaded guideline this year (Figure 2). Many guidelines have seen an increase in downloads this year compared to the previous year, this may be due to data collection activities beginning to return to normal after the COVID-19 restrictions were lifted. Three new guidelines were published in December 2021 – the MEDIN data guideline for timed search data, the MEDIN data guideline for transect survey data, and the MEDIN data guideline for quadrat survey data, all of which have already been adopted by the community. The shellfish stock guideline also experienced increased downloads this year despite not being downloaded at all last year, this could be related to several fishery-related projects being funded by DEFRA.

The MEDIN Discovery Metadata Standard and suite of data guidelines were downloaded throughout 2021-22 with peaks in uptake in April, mid-summer and October (Figure 3). The MEDIN discovery metadata standard was downloaded 672 times in total (compared to 521 in 2020-21), and the guidelines 1001 times (compared to 799 in

2020-21). An updated version of the MEDIN discovery metadata standard (v3.1.1) was published in December 2021 that brings MEDIN in line with UK GEMINI v2.3. The number of downloads of MEDIN resources may be an underestimate of the number of users, as existing users may only download resources if they have been updated.

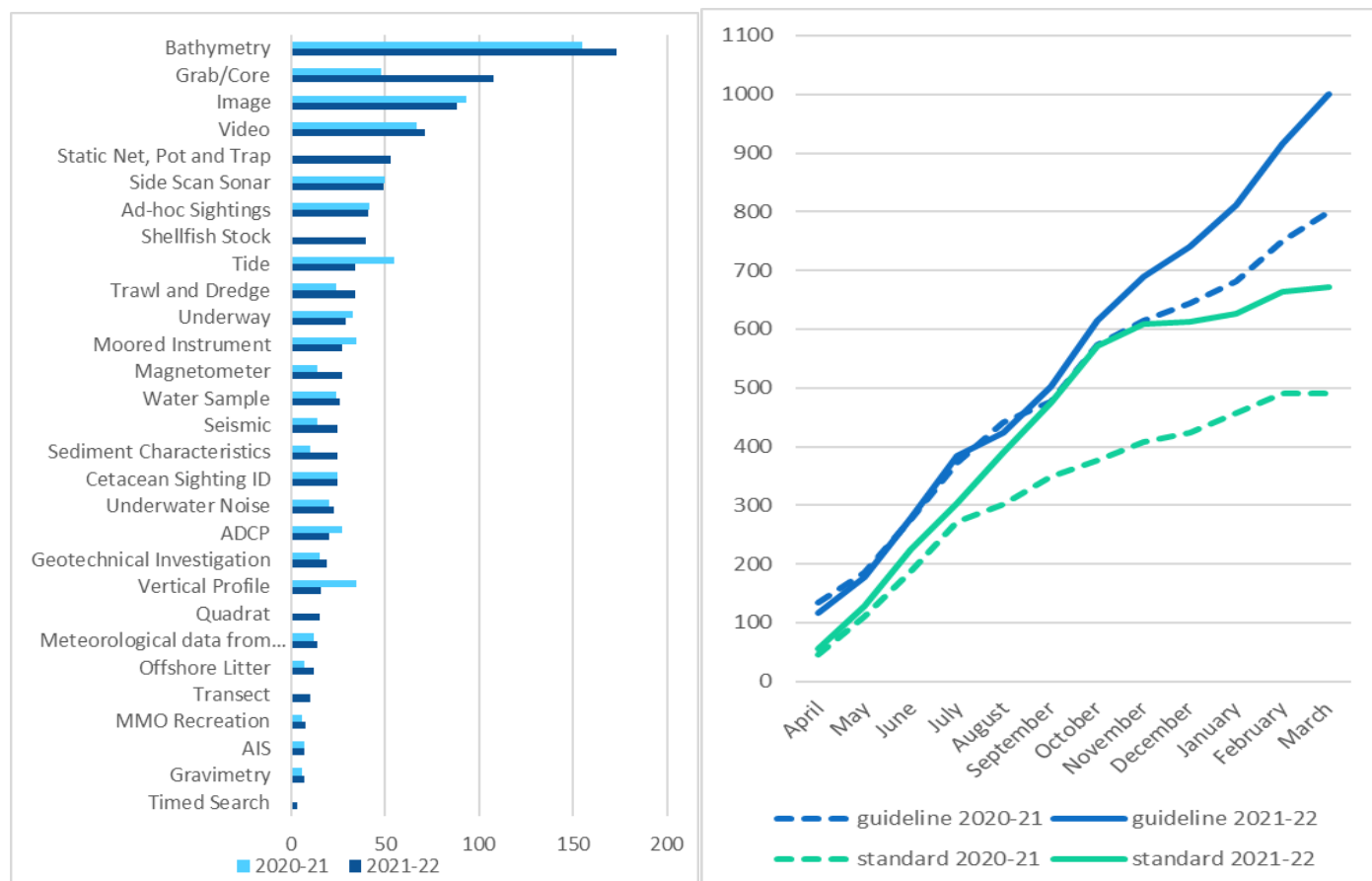


Figure 2: Number of downloads of each of the MEDIN data guidelines in 2020-21 (light blue) compared to 2021-22 (dark blue).

Figure 3: Cumulative number of times the MEDIN data guidelines (blue) and metadata standard (green) were downloaded per month during 2021-22 (solid) compared to 2020-21 (dashed).

## We improve UK marine data management

Having developed a new online version of the MEDIN workshop last year, we were able to resume our programme of outreach and education to ensure our metadata standard and data guidelines are adopted across the marine sector. The modular online training course, hosted on the internationally recognised platform OceanTeacher Global Academy, covers an introduction to data governance and MEDIN, controlled vocabularies, using the MEDIN data guidelines, and creating MEDIN-compliant discovery metadata, as well as general data management modules provided by OceanWise. During 2021-22 we held three online workshops in collaboration with OceanWise, providing the marine community with regular opportunities for data management training. These training workshops help the UK marine community adopt the MEDIN data guidelines and discovery metadata standard and introduce MEDIN as an example data governance framework to the international marine community. This year we welcomed 97 attendees from 66 organisations from the public sector, academia and the private sector, along with 24 private individuals. There were 26 international attendees from 22 organisations. This is a substantial increase compared to in-person workshops and can be attributed to the international reach of the OceanTeacher platform. Additionally, we ran a bespoke workshop for MEDIN partner organisation Nature Scot. The bespoke workshop was aimed at community groups involved in the Marine Biodiversity Monitoring Project, focussing on the use of specific MEDIN data guidelines, and was recorded to act as an [ongoing resource](https://www.youtube.com/playlist?list=PLFHTRJLCAEetalpjiB7mmPmHCJje5A4uq)<sup>2</sup>.

<sup>2</sup> <https://www.youtube.com/playlist?list=PLFHTRJLCAEetalpjiB7mmPmHCJje5A4uq>

# Web portal, products and services

This year we  
released our  
updated, easier to  
use portal

Effective online tools are key to providing users with access to marine data. The MEDIN discovery metadata portal is by far the most comprehensive online catalogue of UK marine environmental data available. We meet the needs of the marine community in finding marine data and information with two main tools: the MEDIN portal and the UK Directory of Marine Observing Systems (UKDMOS). Our users access UKDMOS to discover information about sustained monitoring programmes undertaken in the UK and access the MEDIN portal to search for actual data. The two search interfaces are distinct, allowing users to interrogate the metadata to answer different questions.

## We analyse users of the MEDIN portal

We integrated Google Analytics into the portal in September 2021 as part of this year's developments and going forward, it will be the web traffic tool that we use (Figure 4). This will allow us to better align our portal metrics with those from the MEDIN website. Web traffic during this financial year remains similar to the previous year with an average of 1000 unique visitors per month. The spike in usage in February 2022 was due to a MEDIN workshop in late February (participants are set an 'assignment' to explore the portal). The previous year's metrics for FY 2020/21 are in brackets below; the artificially high visits and pages accessed were a result of a specific bot crawling incident that was identified. There are considerable fluctuations between and within years but, bot crawling incident aside, there has been a marginal upward trend in usage since 2018.

Overall, the headline figures for FY 2021/2022 (using AW Statistics for the whole FY) were:

**1,014** the average number of unique visitors per month (1,016)

**1,577** the average number of visits (=sessions or multiple pages accessed) per month (2,413))

**15,477** the average number of portal pages accessed per month (23,082)

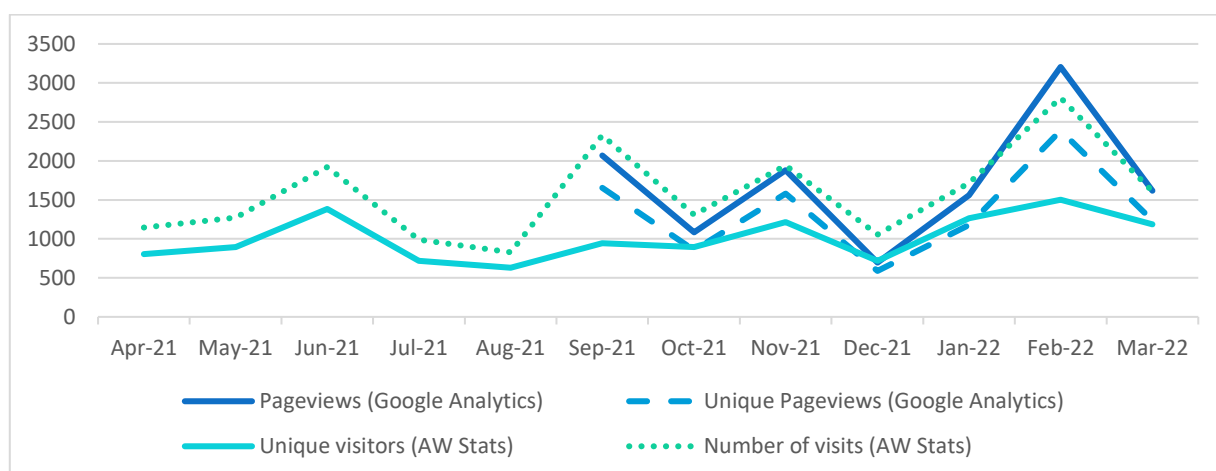


Figure 4: MEDIN Portal web traffic (numbers per month) from April 2021 to March 2022. From September 2021, Google Analytics was integrated into the portal as an alternative web traffic tool to AW Statistics.



The total number of metadata records in the MEDIN portal as of 31 March 2022 was 14,944 (for comparison, the figure for 31 March 2021 was 15,693 and August 2020, 15,909). The drop in record numbers is artificial and a result of the Cefas collection being upgraded to version 3.1.1 of the MEDIN metadata standard and their new harvesting endpoint not being operational at the close of the year. Towards the end of this financial year, BODC were the first metadata supplier to upgrade their metadata collection to Version 3.1.1 of the MEDIN discovery metadata standard (over 1,000 records).

## UKDMOS

This year's traffic to UKDMOS has been steady (Figure 5). The previous year's metrics for FY 2020/21 are in brackets below (the pages accessed per month was higher in the previous year due to MEDIN/BODC work to correct errors in the content). Updates have been made to record content based on originator's feedback over the 2021/22 period.

Overall, the headline figures for FY 2021-2022 were:

**455** the average number of unique visitors per month (520)

**907** the average number of visits (=sessions or multiple pages accessed) per month (724)

**3923** the average number of pages accessed per month (8455)

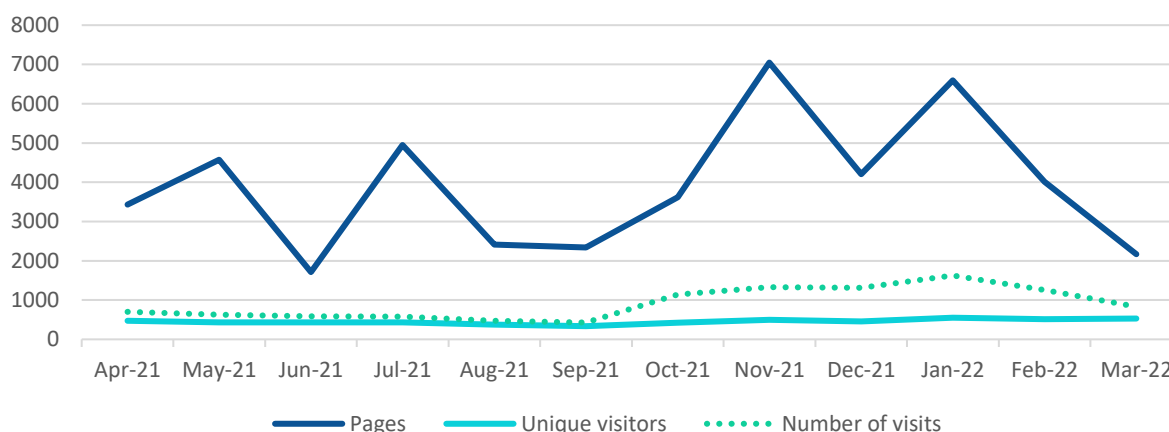


Figure 5: UKDMOS web traffic (numbers per month) from April 2021 to March 2022 (source: AW Statistics)

## We upgrade our metadata portal

The [MEDIN discovery metadata portal](#) is our flagship tool and in July 2021 we released an updated version with over 50 improvements informed by direct user feedback. We believe it is crucial to refine functionality to better enable users to discover marine datasets. This development cycle focussed on making enhancements that improve a users' experience rather than changes to the underlying infrastructure. These are summarised in Figure 6.

## Helping our users

The MEDIN Metadata Helpdesk at DASSH is on hand to help metadata suppliers having technical difficulties generating metadata files and this financial year received 48 requests for assistance, with a total of 240 follow-up e-mail correspondences.

# Upgraded MEDIN portal released – with >50 improvements to make it easier to search for marine data

visit <https://portal.medin.org.uk/portal/start.php>

## Search Tip

you can do a phrase search by wrapping terms in double quotes i.e. "bird survey"

Autocomplete is now in place on all search boxes

You can now search by season or month

The screenshot shows the MEDIN portal search interface. It includes a search bar with a dropdown menu, a date range selector, a season/month dropdown, and a geographical box with a map. A 'Data Collections' table is also visible. Green arrows point from the callout boxes to specific features on the page.

DATA COLLECTIONS		
Choose a partner to browse its list of records.		
UKHO	DASSH	Cefas
TCE	BODC	NRW
MS	ADS	CEDA
BGS		

You can now see update and deletion dates for records here

'Data Collections' section on the front page allows quick access to DAC metadata holdings

The portal is now compatible with Version 3.1 of the MEDIN Standard

Feedback from users informed all of these changes. Contact us with your ideas and suggestions for further improvements you would like to see us implement.

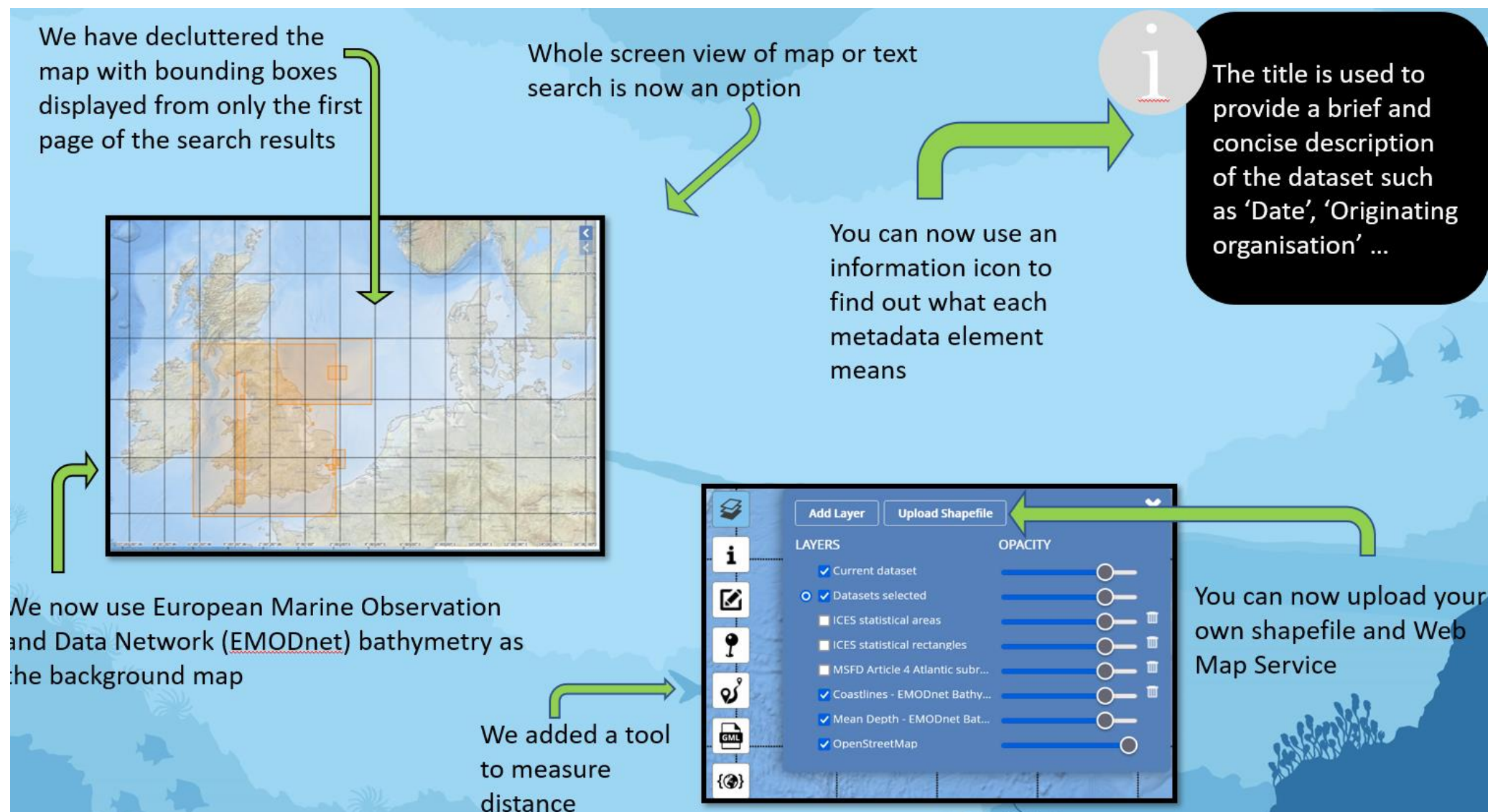


Figure 6: Graphics used to publicise the release of our updated, easier to use portal on social media and in Marine Data News, highlighting details of the upgrades made.

## International awareness and coordination

This year we continued to facilitate international knowledge and data exchange

The UK marine environment is a small part of an ever-changing global system that crosses national boundaries and influences (and is influenced by) conditions in distant regions. UK scientists and decision makers rely on marine data from global databases, as well as national ones, in order to take a wider view of our marine environment. It is therefore crucial that UK marine data can easily flow to global databases and that our Data Archive Centres keep their systems linked in, aligned to and interoperable with international data management initiatives. The key international drivers for ensuring a transparent and efficient flow of marine data are shown below. Many of these international drivers inform UK legislation for the marine environment.

International	European
OSPAR Quality Status Reports	Marine Strategy Framework Directive
United Nations Convention on the Law of the Sea	Water Framework Directive Assessment of Ecological and Chemical Status
United Nations Sustainable Development Goals	Common Fisheries Policy Annual Assessment
	Habitats and Birds Directive reporting
	INSPIRE Directive compliance
	European Environment Agency State of the Environment Reporting <sup>3</sup>
	Copernicus Marine Environment Monitoring Service

### We facilitate international knowledge exchange

During 2021-22 we acted as a hub for promoting global developments in interoperability to the UK marine data community. We did this by facilitating knowledge exchange between UK experts and international initiatives such as the **International Council for the Exploration of the Sea (ICES)** Data and Information Group, and the **Intergovernmental Oceanographic Commission (IOC)** International Oceanographic Data and Information Exchange (IODE). This year MEDIN was acknowledged as an Associate Data Unit of IODE. This recognises the broad range of UK marine data stakeholders that we can bring to the IODE network and allows us to share knowledge and expertise across IODE.

### We deliver data to international systems

Our Data Archive Centres deliver their data holdings to international databases to support science, policy and sustainable development of our seas. For example, MEDIN Data Archive Centres (BODC, Cefas and Marine Scotland) deliver marine contaminants and fisheries data to the **International Council for the Exploration of the Sea (ICES)**. These data are used to make regional assessments of the state of our seas by OSPAR. Similarly, DASSH, the MEDIN Data Archive Centre for marine species and habitats, is the UK node for submitting data to the Ocean Biodiversity Information System (OBIS), part of IODE. For over a decade we have delivered near real-time temperature and salinity data to the **World Meteorological Organisation's** Global Telecommunication System (GTS) on behalf of our

<sup>3</sup> UK is no longer a member of the European Environment Agency

partners. These data are critical for ocean, climate and meteorological forecasting. This year we received confirmation that this service was no longer required of MEDIN centrally and would instead be handled directly by the Met Office, the MEDIN Data Archive Centre for metocean data. This year we facilitated a new international data flow from BODC to the **Global Ocean Acidification Observing Network** (GOA-ON) for the first time. These data can now contribute to the UN Sustainable Development Goal target 14.3 'Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels'.

### We reach global audiences

This has been a standout year for MEDIN reaching global audiences. Our series of online training workshops, delivered in collaboration with our partner OceanWise using the OceanTeacher Global Academy platform, attracted delegates from all over the world. Indeed, over a quarter of those registered for the course were from outside the UK. We also had the opportunity to co-host two joint webinars with the Organisation for Economic Cooperation and Development (OECD) and the Global Ocean Observing System (GOOS) to present the results from the recently published paper: "Value chains in public marine data: A UK case study"<sup>4</sup>. The slides and video from the GOOS webinar are available [here](#)<sup>5</sup>

MEDIN Data Archive Centres contributed to a wide range of international conferences, workshops and webinars including those included in Figure 7.

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<sup>4</sup> Jolly, C., et al. (2021), "Value chains in public marine data: A UK case study", *OECD Science, Technology and Industry Working Papers*, No. 2021/11, OECD Publishing, Paris, <https://doi.org/10.1787/d8bbdcfa-en>.

<sup>5</sup> <https://oceanexpert.org/document/28867> <https://www.youtube.com/watch?v=36dRXGO7Nqs&t=475s>

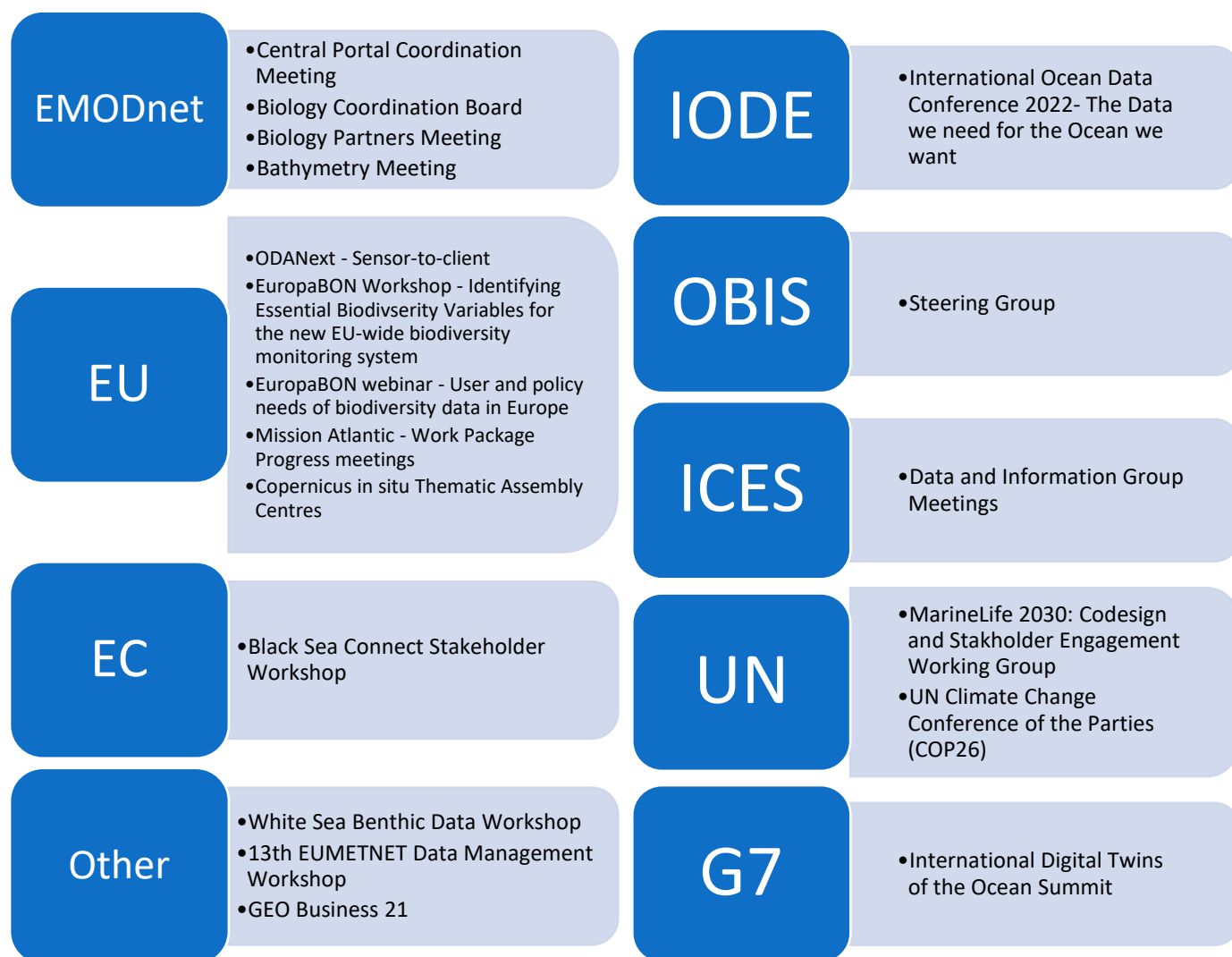


Figure 7. List of some of the international conferences and meetings that MEDIN Data Archive Centres participated in during 2021-22.



## Resources and applications development

## This year we trialled new technology to support our stakeholders

Our users require access to a broad range of marine data services and products in addition to the raw data that forms the core of MEDIN's activities. We work closely with UK marine data holders to encourage and help them deliver on their data sharing and publishing objectives. This includes the role of the Data Archive Centres in delivering data products and services.

### We facilitate access to reference data

The [MEDIN portal](#) provides access to a range of data services and products. Redvelopments to the MEDIN portal completed this year include the option to add your own data product or reference layer to the search interface as a Web Map Service or Shapefile. Adding reference layers to the search interface in this way can help provide additional context for data searches.

### We explore new technology for accessing data

A key objective for MEDIN is to support the UK marine sector to implement globally and cross-domain **interoperable marine data services**. For example, machine-readable Application Programming Interfaces (APIs) for our Data Archive Centres (DACs) and others. This year we issued an open invitation to MEDIN DACs to propose projects that will implement and stress test the recently published Open Geospatial Consortium (OGC) Environmental Data Retrieval (EDR) API standard. This standard is part of the OGC suite of standards and is documented on [Github](#). [OGC API standards](#) define modular API building blocks to spatially enable Web APIs in a consistent way. The three DACs participating in the pilot project (Cefas, DASSH and BGS) will look at using different technologies to implement the standard on some or all of their data holdings and will present consolidated recommendations for the marine community. We believe that this is the first time that this OGC standard is being tested on marine data – another example of MEDIN leading the way.

The pilot projects are due to finish in the next financial year, when we will hold a workshop to share the results with key stakeholders, including MEDIN DACs, the Open Geospatial Consortium and wider MEDIN partnership.



Open  
Geospatial  
Consortium



### Project Objective:

- Implement the OGC EDR API standard on marine data, including a public facing URL to the API



OGC  
APIs

Building Blocks  
for Location

Other Outputs: Technical report, recommendations, workshop

*Slide courtesy of Dan Lear, MBA*

### We horizon scan for innovative technology

This year we continued our technology horizon-scanning exercise so that we can support the UK marine community adapt to advances in technology. We capture community input in an [open forum](#) and invite additional input throughout the year. We will categorise the technology to inform future MEDIN development work.



# Communications: outreach, forums, publicity

This year we broadened  
our outreach and  
improved engagement  
with the marine data  
community

The UK marine community is a large and varied group of organisations spanning government departments and agencies, academia, commercial and industrial partners, and non-governmental organisations to name a few. It is only by working together that we can realise the full financial, scientific and environmental benefits of sharing our marine data. By bringing together the different sectors of the UK marine community, we share knowledge through different channels and provide opportunities for MEDIN Sponsors and Partners to communicate to audiences they may not otherwise access. Communication with these varied stakeholders is key to developing a network that serves all our partners. We raise awareness of MEDIN and spread knowledge of our work throughout the network with high levels of outreach with the marine community and general public. This leads to greater awareness of the importance of marine data management and encourages the improvement of marine data management around the UK and internationally.

We engage with our community

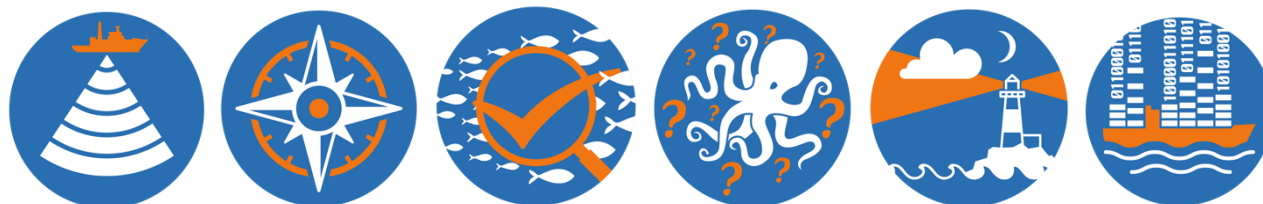
We held a MEDIN Open Meeting on 03 March 2022, entitled “How technology can support the marine community to deliver FAIR data”. A discussion took place in the afternoon to explore each aspect of the FAIR data principles (Findable, Accessible, Interoperable and Reusable). The main aim was to discuss what the marine community needs from MEDIN in order to achieve FAIR marine data. The same themes occurred in each discussion session: training and support, improving the technical process, linked data, portal improvements, making metadata creation easier, improving communications and knowledge sharing. Overall, the most frequently mentioned requirement that came out of the discussion sessions was to make metadata creation easier by improving the technical infrastructure to save resources.



Figure 8. Word cloud representation of the Findable discussion session at the MEDIN Open Meeting, 2022.

## We develop our brand

This year we commissioned a marketing and design agency, 3Men<sup>2</sup> Ltd., to develop new icons to better showcase the core elements of MEDIN on our website in a simple, informative way. Carrying through the website themes of blue, white and a pop of orange in the designs, each icon represents and portrays MEDIN features in an original way. The icons below (left to right) show the controlled vocabularies, MEDIN guidelines, the MEDIN Discovery Metadata Standard, marine information, MEDIN workshops and submitting data respectively.



## We share marine data knowledge

This year we published three editions of Marine Data News, our free online newsletter, to 540 recipients on average. More than 17 short articles were submitted by MEDIN Sponsors, Partners and Data Archive Centres providing a diverse selection of marine data information for our readers. The most popular URL links in the articles were to the MEDIN workshop registration and the [JNCC online image catalogue](#). Figure 9 shows the locations that Marine Data News was opened from during 2021-2022. It's encouraging to see such a broad outreach for a UK-based marine newsletter.

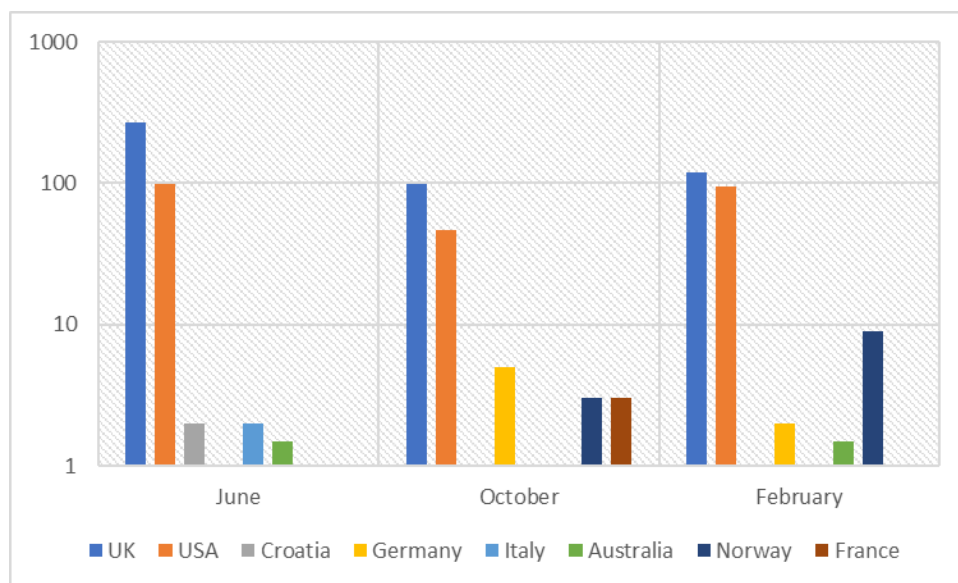


Figure 9. The number of marine data newsletter opens per country for each publication 2021-2022.

MEDIN attended the Marine Alliance for Science and Technology for Scotland (MASTS) annual science meeting virtually in October, along with over 588 attendees. We also virtually attended Coastal Futures in January 2022. The online events reached a larger international audience as resource to travel was not required. As the events were remote, there were more visual aids and more static information for attendees to access (e.g. website links, twitter handles), although we cannot measure if these were utilised and, if so, by how many people. Attending online events provided different opportunities of interaction, which we embraced and will incorporate into future hybrid events.

## We reach new audiences

MEDIN uses online platforms to reach new audiences. Our social media outreach has continued to grow throughout the year and our Twitter posts from @MEDIN\_marine were seen a total of 69,127 times (Twitter impressions). Averaging 10 original tweets per month and gathering an additional 58 followers (total 1759 followers by the end of

March 2022), Twitter is one of our most successful social media tools. Our outreach via LinkedIn is growing and this year our engagement totalled 1530 impressions from 134 connections and 193 followers between 2021-2022.

<a href="http://www.medin.org.uk">www.medin.org.uk</a> 2021-2022	
<b>Total Users</b>	15,176
<b>Total Sessions</b>	21,682
<b>Total Pageviews</b>	37,818
<b>Most downloaded pdf</b>	MEDIN schema documentation
<b>Most downloaded zip folder</b>	MEDIN bathymetry guideline
<b>Top locations website is accessed from</b>	<ol style="list-style-type: none"> <li>1. United Kingdom</li> <li>2. United States</li> <li>3. Germany</li> </ol>
<b>Top pages visited</b>	<ol style="list-style-type: none"> <li>1. MEDIN Homepage</li> <li>2. MEDIN Portal</li> <li>3. MEDIN Discovery Metadata Standard</li> </ol>

The table above summarises the MEDIN website statistics for 2021-2022. One of the challenges that came up this year was to encourage more people to use the MEDIN website and resources. Therefore, during the next financial year, we aim to be more innovative and pro-active about directing traffic to webpages in the easiest ways possible. Similarly, engaging more MEDIN Partners with MEDIN activities, social media and the MEDIN website is a challenge that will be addressed. The hybrid and virtual response to COVID-19 has provided a lot of opportunities to broaden our outreach and share information with new audiences that wouldn't normally have been within reach. 2021-2022 solidified and familiarised the marine community with hybrid and virtual ways of working. Moving forward, we will continue with these working styles and hope to further expand our national and international communication.

## Management, planning and coordination

This year we worked with global experts to demonstrate the societal value of marine data

The seas and coasts surrounding the UK have a complex range of stakeholders who manage, monitor, explore, conserve and sustainably exploit the marine environment. We seek to provide tools and services that support all UK users of marine environmental data. This requires significant coordination to address the (sometimes conflicting) requirements of our users. This work stream provides our partners with overarching coordination, alignment and oversight of marine data management activities in the UK. Long-term strategic planning, annual operational planning and reporting, project and financial management, all essential for the success of MEDIN as a collaborative endeavour, are also covered by this work stream.

### We analyse our users

This year saw our collaboration with the Organisation for Economic Cooperation and Development (OECD) and the Global Ocean Observing System (GOOS) conclude with the publication of a report entitled '[Value chains in public marine data – a UK case study](#)'<sup>6</sup>, supported by a series of workshops and webinars showcasing the results. The report provides first-hand information on the variety of occupations using marine data from our Data Archive Centres, as well as providing evidence of the range of actions taken by our data (re)users. Systemised value chains, such as the one shown in Figure 10, show how data flow from diverse fields of use to actual actions.

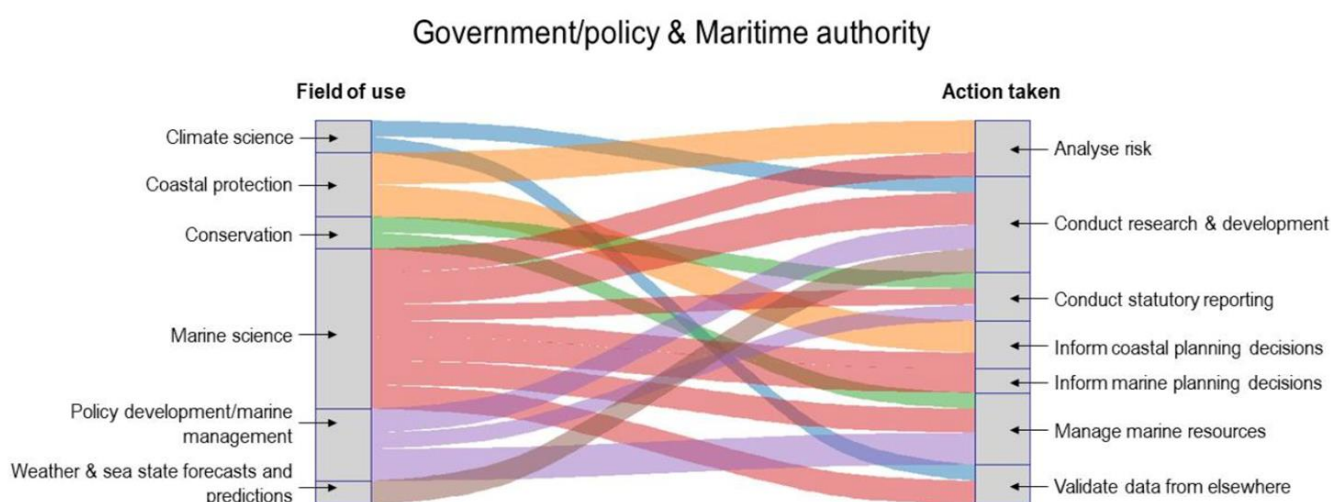


Figure 10: Alluvial diagram showing the areas ('fields of use') where government and policy users apply marine data and the actions they subsequently take with those data.

<sup>6</sup> Jolly, C. et al (2021), "Value chains in public marine data: A UK case study", *OECD Science Technology and Industry Working Papers*, No. 2021/11, OECD Publishing, Paris, <https://doi.org/10.1787/d8bbdcfa-en>.

## Showcasing our expertise

This year, the Open Data Institute (ODI) showcased MEDIN as an exemplar of a UK-based data institution with a specific stewardship role for marine data. ODI published a study that aims to improve understanding of data institutions – organisations that steward data on behalf of others, often towards public, educational or charitable aims – by quantifying the impact they may have on the ecosystems in which they operate. ODI built on the body of evidence showing the impact of open data and open standards, which provides valuable insight into the impact and benefits of data flows, and how they may be measured. There was previously limited collated evidence for the impact of data institutions and the stewardship they perform. Read the full report [online](#). The ODI report concludes that “*MEDIN demonstrates the wide ecosystem of impact that mature data institutions can have.*”

## We inform data strategies

To support UK national and international marine reporting responsibilities, such as for the UK Marine Strategy and OSPAR, we provide marine data management advice and support to the key groups involved in marine assessments. In particular, during 2021-22 we supported the Marine Assessment and Reporting Group (MARG) and the four Evidence Groups that MARG coordinates (the Clean and Safe Seas Evidence Group (CSSEG); the Healthy and Biologically Diverse Seas Evidence Group (HBDSEG); the Productive Seas Evidence Group (PSEG); the Ocean Processes Evidence Group (OPEG), to develop and stress test a data strategy for the UK Marine Monitoring and Assessment Strategy (UKMMAS) community. This data strategy is a concise, high-level and ambitious summary of the expectations for collecting, using and managing marine data by the UKMMAS community, with the overarching aim of ensuring that the marine data produced by the activities falling under the UKMMAS community's remit are made available openly for long-term access and use.

This year we supported our partners to increase access to data collected during activities they fund. For example, we promoted the use of a data clause to Defra, which was subsequently adopted for their new funding call '[Fisheries Industry Science Partnerships](#)'.

## We expand our network

This year we successfully renewed four funding agreements that were coming to an end. Nine of our sponsors have now committed to funding MEDIN until April 2024, which provides financial stability, allowing longer-term planning and decreasing the administrative burden.

Our partners are organisations that commit to best practice marine data management and contribute in kind to delivering our vision. This year we welcomed Cooper Marine Advisors as a new partner, taking the total number of partners to fifty-eight. See the [full list of our partners](#) and contact [enquiries@medin.org.uk](mailto:enquiries@medin.org.uk) if you are interested in sponsoring or partnering MEDIN.

## Challenges and opportunities

This year MEDIN received confirmation that it would receive some funding from the Historic England-led project '[Unpath'd waters](#)'. This is a ground-breaking 3-year research project that aims to unite the UK's maritime heritage collections. MEDIN's involvement will ensure that the project benefits from marine data insights from the broader marine community.



With thanks to  
our 2021-22  
sponsors,

and to our 58 partner  
organisations working  
with us to deliver  
MEDIN's vision



A list of all our 58 partners is available at <https://medin.org.uk/about/sponsors-and-partners>