Marine Environmental Data and Information Network (MEDIN)

Data Archive Centre (DAC) Network Annual Report for 2024-25

'Measure once, use many times'

Executive summary

This report represents the continuing efforts of the distributed network of Marine Environmental Data and Information Network (MEDIN) Data Archive Centres (DAC) to underpin MEDIN's overall aim of facilitating access to UK marine data. Whilst the majority of the report's content is derived centrally from information in the MEDIN portal, it is also important to reflect on the achievements against the DAC Work Programme for the year.

All DAC activities were maintained during the past year. Work has continued on understanding the use of Persistent Identifiers (PIDs) to support a DAC-wide approach to provenance. The coordination of multi-disciplinary data submissions through a single point of contact and triage system to notify all relevant DACs is now being introduced. Work has been undertaken to look at versioning as well as the cloud services used by the DACs. A workshop looking at the submission/ingestion routes into the DACs has also been held, with the aim of sharing new developments and best practice.

The uptake of the CoreTrustSeal accreditation scheme, which provides a globally recognised framework for the accreditation of data repositories, fully aligned with the MEDIN DAC accreditation process, is stable across the MEDIN DACs. As existing MEDIN accreditation expires, some of the DACs are preparing submissions to CoreTrustSeal, however, the accreditation for some of the DACs has now lapsed. It should be noted that the review process for CoreTrustSeal is outside the influence of MEDIN and can take a significant time to complete. Accreditation is an area of concern, as due to resourcing issues, we are aware that gaining CoreTrustSeal accreditation is now not on the priority list for all DACs.

The funding of the DACs is currently an area of concern, as there is a cut across the historic environment sector particularly affecting Historic Environment Scotland (HES) and the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), whilst the funding for the British Geological Survey (BGS) and British Oceanographic Data Centre (BODC) is not inflation proofed.

We continue to encourage direct access to data and some DACs are continuing to increase both the number, and proportion, of datasets that are accessible within "2-clicks" of finding them on the MEDIN portal. The figures are somewhat distorted due to the wide range of granularity used for MEDIN records. For example, 53% of the MEDIN records originate from UKHO and none of the corresponding datasets are available within 2 clicks of finding them on MEDIN. However, these data *are* accessible online and significant improvements have been made across all the DACs in terms of discoverability and accessibility of data holdings. The DACs continue to provide the foundational infrastructure for the delivery of Findable, Accessible, Interoperable, Reusable (FAIR), open access to UK marine data and in the promotion of best practice in marine data management.

Summary highlights

MEDIN coordinates an operational network of seven linked marine Data Archive Centres (DACs) covering bathymetry; fish and shellfish, fisheries, aquaculture and related samples; the historic environment; marine geology and geophysics; marine species and habitats; marine meteorology; and water column oceanography. The DACs continue to archive data from MEDIN partners and third-party organisations to agreed individual programmes.

This DAC annual report is the first under the MEDIN 2024 to 2029 Business Plan. DAC metrics are now applied more consistently across the DAC network, being pulled directly from the MEDIN Portal, where possible.

The 2024-25 DAC annual reports show that:

- Seven DACs have a URL leading to online data access for over 85% of their metadata records.
- 95% of DAC metadata records in the portal have a URL leading to online data access.
- The use of DOIs (Digital Object Identifiers) has increased by 88% in this reporting year.

- Three of the MEDIN DACs now provide direct access to data (within 2 clicks) from over 82% of their metadata records in the portal.
- Over 2,700 datasets in the MEDIN portal were added to or updated during 2024-25.

1 Introduction

MEDIN has established an operational network of linked marine Data Archive Centres (DACs) to provide secure long-term storage for, and access to, marine data. This network provides the capability for users to upload and retrieve data. Organisations archiving data at a MEDIN DAC have free access to their data, and DACs manage third-party access to these data according to the data provider's specification.

The required capabilities of DACs within the MEDIN framework are:

- To ensure the secure, long-term curation of key marine data sets, according to best practice and to relevant national and international standards.
- To make available clear, searchable information on their data holdings by the generation and publication of metadata on the MEDIN portal.
- To form the first point of call for expertise in the management of marine data.

In addition, MEDIN will, on request from the data provider, publish metadata records to data.gov.uk and hence the INSPIRE geoportal.

In order to maintain its status as a MEDIN Data Archive Centre, each DAC is required to provide a short annual report so that Sponsors can assess how well the DAC framework is operating.

The MEDIN Sponsors' Board has emphasised the following requirements:

- Provide a statement on funding and sustainability.
- Include Key Performance Indicators (KPIs), specifically measures of use (numbers of enquiries, numbers of downloads).
- Further information on dissemination – how is access to data currently served and how do the DACs see their interaction with the MEDIN portal.

This document provides a report on the status of the DACs in terms of metadata records in the MEDIN Portal where the DAC is custodian of the data, requests from users for data, and financial outlook. This is a summary of information from the individual DAC reports, which are available on request to enquiries@medin.org.uk.

The MEDIN DAC Working Group (WG) continues to provide guidance and strategic oversight of Work Stream 1 activities. The WG promotes inclusive, engaged and proactive ways of working to ensure each DAC has opportunity to contribute and support the objectives.

2 DAC Listing

There are currently seven DACs in the MEDIN DAC network, which involve ten organisations, as listed in

Table 1. More details of each DAC are available through links on the DAC web pages of the MEDIN website. These pages include information on the data types held and top-level guidelines on how to submit data to, and access data from, each DAC.

Table 1: MEDIN Data Archive Centres

Name	Coverage	Contact Information	MEDIN Status
British Oceanographic Data Centre (BODC)	Water Column Oceanography data	enquiries@bodc.ac.uk 0782 512 0946	Accredited 2009; Re-accredited 2017; CTS accreditation 2023;

			operational.
British Geological Survey (BGS)	Marine Geology and Geophysics data	medin@bgs.ac.uk	Accredited 2009; Re-accredited 2017; CTS accreditation 2018; CTS re-accreditation 2022; operational.
The Archive for Marine Species and Habitats Data (DASSH)	Marine Species and Habitats data	Dassh.enquiries@mba.ac.uk 01752 633291	Accredited 2009; Re-accredited 2017; CTS accreditation 2024; operational.
Met Office	Marine Meteorology data	enquiries@metoffice.gov.uk	Accredited Dec 2011; Re-accredited 2018; Accreditation lapsed; operational.
United Kingdom Hydrographic Office (UKHO)	Bathymetry data	CustomerServices@ukho.gov.uk	Accredited 2009; Re-accredited 2017; CTS accreditation 2022; operational.
FishDAC Cefas Marine Directorate, Scottish Government (MDSG) DASSH	Fisheries data - Fish and Shellfish, Aquaculture and related samples and environmental data	Cefas: data.manager@cefas.co.uk	Accredited 2012; Re-accredited 2018; Accreditation lapsed; operational.
		Marine Directorate, Scottish Government: jens.rasmussen@gov.scot	Accredited 2012; Re-accredited 2018; Accreditation lapsed operational.
		For DASSH – see above	For DASSH – see above
Historic Environment DAC Archaeology Data Service (ADS) Historic Environment Scotland (HES) Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW)	Marine Historic Environment fieldwork derived data	Archaeology Data Service: help@archaeologydataservice.ac.uk	Accredited 2013; Re-accredited 2018; CTS accreditation 2020; CTS re-accreditation 2024; operational;
		Historic Environment Scotland: peter.mckeague@hes.scot Hannah.smith@hes.scot	Accredited May 2014; CTS accreditation 2021; CTS re-accreditation in progress operational.
		Royal Commission on the Ancient and Historical Monuments of Wales General: Gareth.edwards@rcahmw.gov.uk Maritime: julian.whitewright@rcahmw.gov.uk	Accredited June 2016; CTS Application in progress; Accreditation lapsed operational.

3 DAC Performance

Each year, MEDIN asks the DACs to report on their performance using a standard set of metrics.

The metrics are now pulled directly from the MEDIN Portal where possible. They therefore show the number of metadata records in the portal where a DAC is the custodian of the data. This is not always directly representative of the number of data sets held at a DAC because of some variability in the granularity of metadata records. This is the fifth year of reporting using metrics from the MEDIN Portal.

The key metrics are as follows:

- Total number of metadata records present in the MEDIN Portal where each DAC holds the data. For some cases, particularly HES and the Met Office, there are records available in the portal where the DAC is the data holder but did not provide the MEDIN record. In these cases, there has previously been duplication of records, and these have been removed this year, leading to an apparent reduction in records for these DACs.
    - A URL leading to online access to data
    - A URL allowing direct access to data (i.e. within 2 clicks)
    - A URL containing a Digital Object Identifier
- Number of requests for data for each DAC (using figures supplied by DACs as it is not possible to obtain this from the MEDIN portal).

3.1 DAC Metrics

The metrics for 2019-20 to 2024-25 are shown in Table 2.

Table 2: Annual metrics for the MEDIN DACs

Year	BGS	BODC	DASSH	UKHO	Met Office	Cefas	MDSG	ADS	HES	RCAHMW
Total number of metadata records where DAC is custodian[1]										
2019-20	857	1107	710	4736	7	2058	282	74	47	26
2020-21	857	1107	723	4736	7	2096	308	263	47	26
2021-22	857	1143	724	6050	7	2108	334	265	26	13
2022-23	936	1144	745	6365	7	2174	351	266	7	1
2023-24	938	1147	759	6610	7	2197	365	270	7	1
2024-25	952	1166	800	6938	5	2230	394	279	6	1
New/updated records in reporting year[2]										
2019-20	22	45	496	0	1	536	54	74	25	13
2020-21	693	2	152	0	2	421	54	189	7	1
2021-22	1	1029	118	4600	3	1637	42	259	2	0
2022-23	0	1	45	5865	0	561	28	55	0	0
2023-24	2	7	45	1729	1	389	19	4	2	0
2024-25	0	62	189	2134	0	198	103	21	1	0
Records with online access to data										
2019-20	855	1056	631	4736	2	1914	240	74	17	0
2020-21	855	1056	635	4736	2	1958	254	153	17	0
2021-22	855	1082	382	6049	2	2108	278	155	9	0
2022-23	936	1083	396	6363	2	2171	299	156	7	1
2023-24	938	1085	415	6608	2	2194	311	160	7	1
2024-25	952	1103	429	6936	1	2227	336	172	6	1
Records with 2 clicks to data										
2019-20	694	997	165	0	1	1914	57	73	12	0
2020-21	694	997	124	0	1	1958	64	150	12	0
2021-22	694	1013	178	0	1	2108	69	152	6	0
2022-23	769	1014	191	0	1	2168	81	153	0	0
2023-24	770	1014	218	0	0	2191	87	157	0	0
2024-25	785	1042	244	0	0	2224	94	168	0	0
Records with DOI										
2019-20	0	54	1	0	0	101	49	73	12	0
2020-21	0	54	9	0	0	115	56	150	12	0
2021-22	0	80	15	0	0	115	61	152	6	0
2022-23	0	81	30	0	0	136	72	153	0	0
2023-24	2	81	70	0	0	156	78	157	0	0

[1] These do not include records where the DAC compiled the metadata but is not custodian of the data.

[2] Where number of new records is large compared to total number of records, this normally reflects replacement of records with updated versions

Year	BGS	BODC	DASSH	UKHO	Met Office	Cefas	MDSG	ADS	HES	RCAHMW
2024-25	3	108	199	0	0[3]	163	89	168	0	0
Data download requests										
2021-22	2,920,975	540,380	19,889	9,027	Unknown	3,541	39,332	17,284	2	619,043
2022-23	3,934,470	605,620	22,240[4]	471[5]	Unknown	4,609	80,804	18,651	2[6]	731,100
2023-24	1,616,073	469,995	37,039	506	Unknown	4,712	130,158	16,565	5	538,200
2024-25	1,871,590	986,833	45,824	142	Unknown	8337	127,462	14,079	5	744,500

Please note that it is not advisable to compare absolute values between DACs, as the granularity of the metadata records varies significantly between (and even within) DACs. For instance, all the data held in the Met Office MEDIN DAC for marine meteorology data are held within 5 data sets, which are augmented each year with that year's new data and their associated metadata records updated accordingly.

Figure 1: Number of metadata records in the MEDIN portal per DAC.

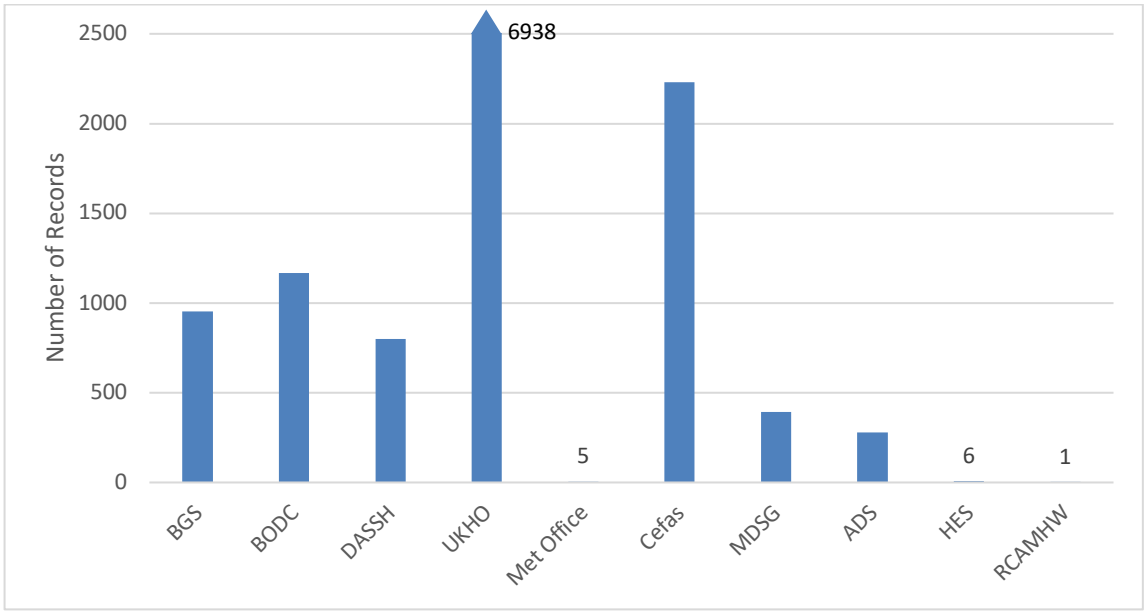


Figure 1 shows that the UKHO remains the DAC with the most metadata records in the MEDIN Portal, accounting for more than 54% of the total. However, as noted earlier, the difference in metadata granularity between DACs means a direct comparison between DACs is not appropriate (as noted above for the Met Office). The UKHO have updated or increased their metadata records in the MEDIN portal by over 31% in the past year, closely followed by the Marine Directorate at 26% and DASSH at 24% (Figure 2). Some of this will relate to new datasets, or new data added to existing datasets such as time series, and some to improving the quality of existing metadata. Note that any updates to existing metadata records count as changes in this metric.

[3] The Met Office have one DOI for the DAC, not for each metadata record.

[4] DASSH recorded 14,827 dataset downloads over 2022/3 period. However, due to internal recording issues, data are missing for 4/12 months. Accounting for these missing months, the estimate for the period is 22,240 data requests

[5] In 2022/3 requests were based on users that entered the order page, 2021/2 requests were based on user selected downloads from the bathymetry and seabed mapping apps.

[6] Most are self-serve from the website

Figure 2: Percentage of metadata records in the MEDIN portal per DAC that are new, or were updated, during 2024-25.

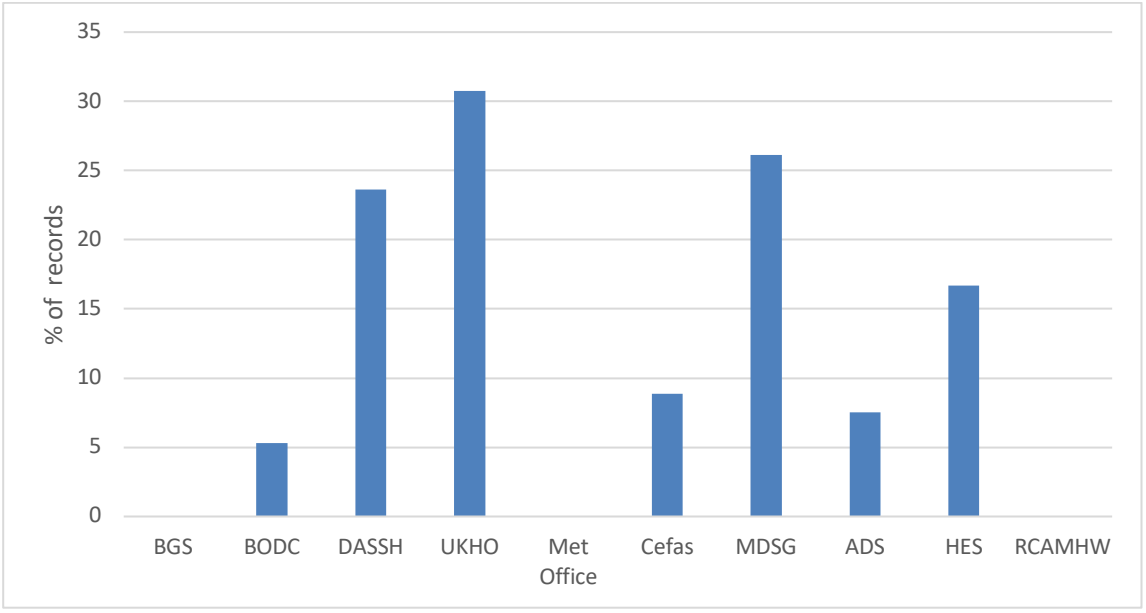


Figure 3 shows that seven MEDIN DACs have a Uniform Resource Locator (URL) leading to some form of online access to data (not necessarily 2-click access) for over 85% of the metadata records for data they hold. In total this represents more than 95% of all metadata records from DACs in the portal. One way to provide direct access to data is by using a Digital Object Identifier (DOI) and the use of DOIs has increased by 88% this year, although the proportion of records with a DOI has remained relatively stable (Figure 4).

Figure 3: Percentage of metadata records per DAC in the MEDIN Portal with online access to data.

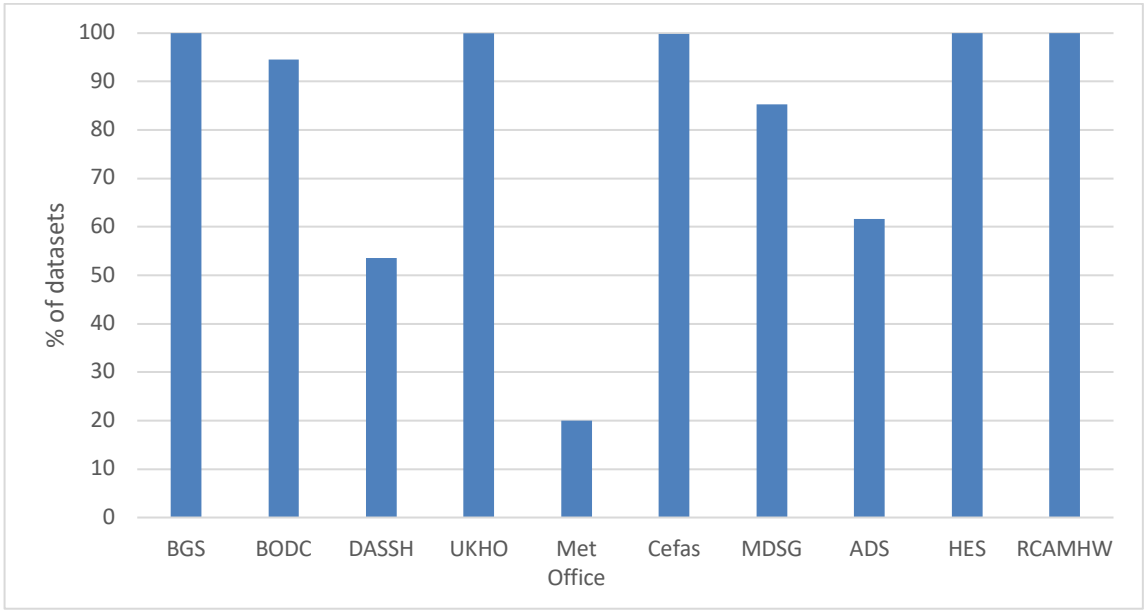
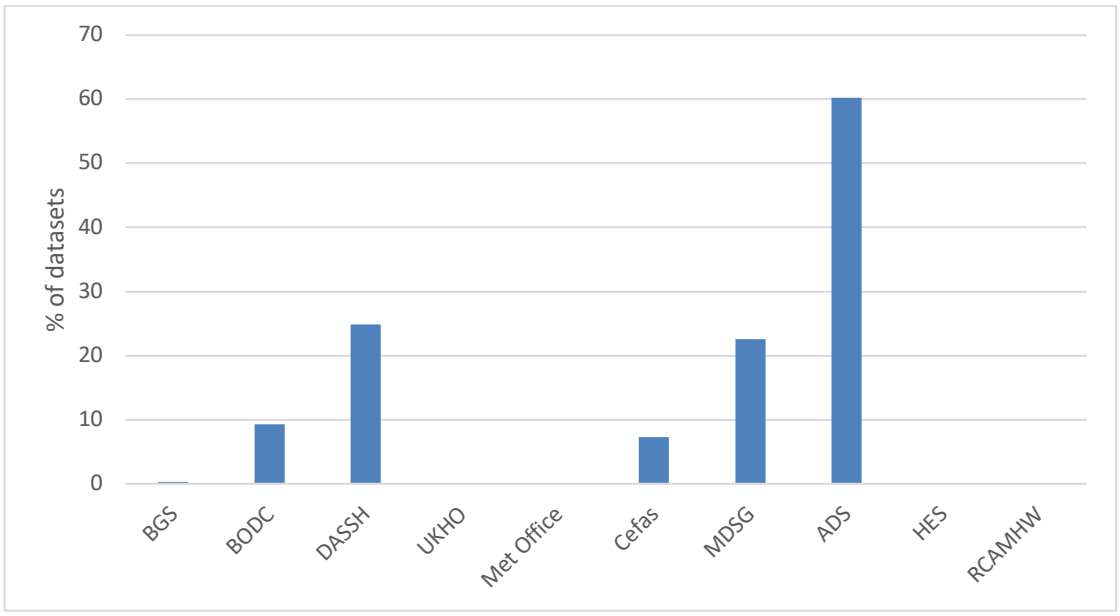
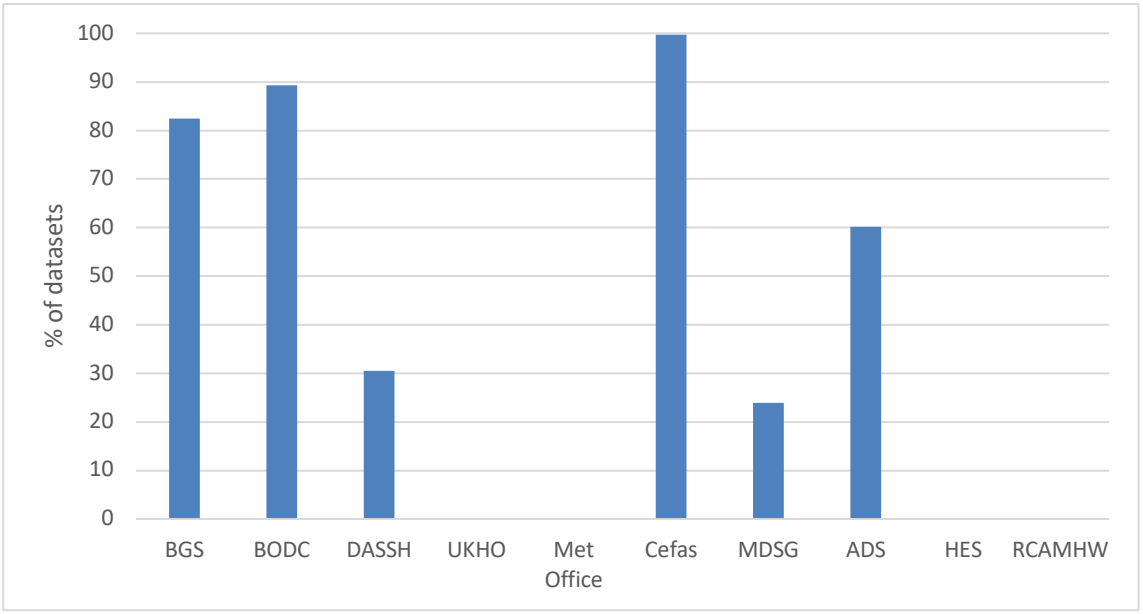


Figure 4: Percentage of metadata records per DAC in the MEDIN Portal with a Digital Object Identifier (DOI).



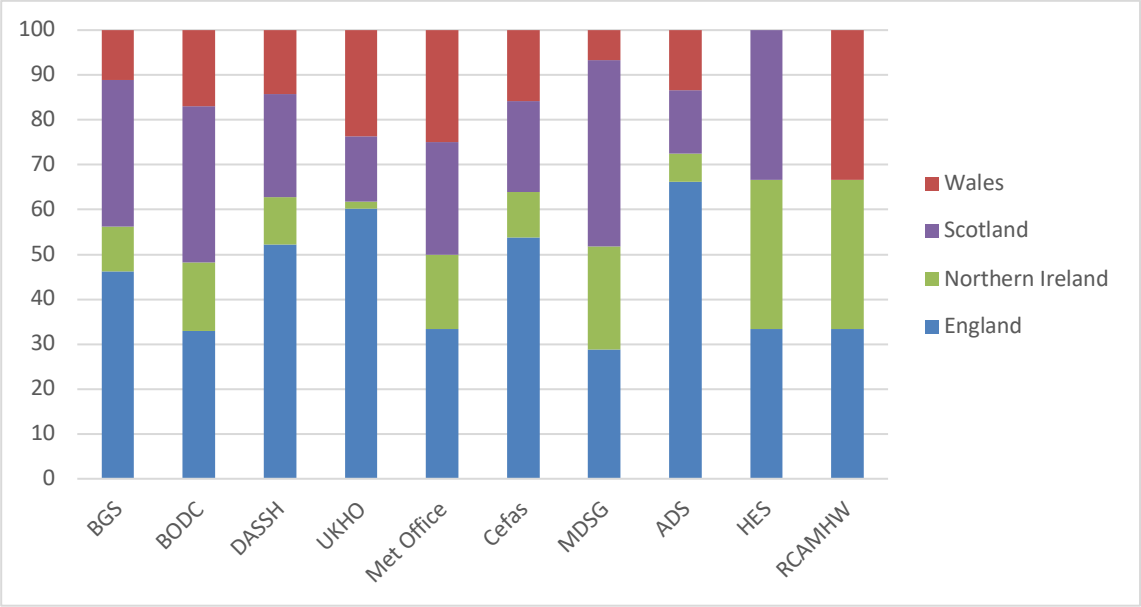
MEDIN continues to promote direct access to data, ideally within 2 clicks of finding it on the MEDIN portal. The DACs are continuing to increase the number of metadata records providing data with '2-click' direct access, although the proportion of records remains similar to 2023-24 as new records are not all associated with 2-click download options. Three of the MEDIN DACs now provide direct access to data (within 2 clicks) from over 82% of their metadata records in the portal (Figure 5).

Figure 5: Percentage of metadata records per DAC in MEDIN Portal that offer 2-clicks to data.



The percentage breakdown of metadata records which originate in the UK, and are available in the MEDIN portal, by country of origin, where the DACs are custodian, is shown in Figure 6. The breakdown remains similar to 2023-24.

Figure 6: Percentage of metadata records, originating in the UK, per DAC in the MEDIN Portal, broken down by country of origin.



3.2 New datasets

The MEDIN DACs continue to archive major new datasets. Table 3 summarises new datasets archived by each DAC during the financial year (FY) 2024-25. To enhance clarity, we have added a glossary of organisational and project acronyms that feature in the text at the end of this document.

Table 3: Summary of new datasets archived at MEDIN DACs during 2024-25

Met Office	**UKHO**
No new datasets, but the amount of data in existing datasets increases considerably on a daily basis as marine meteorological observations are collected in real time. Data is also received in delayed mode from voluntary observing ships and international partners	A number of datasets added to/updated, but no significant surveys or areas added
DASSH	**BODC**
50 new datasets archived into DASSH between 31/03/2024-01/04/2025.	During 2024/25, BODC received 407 accessions of data from 76 organisations in 13 countries as follows: • 6 accessions from NERC laboratories (not including collaborative centres and NOC) • 78 accessions from UK universities • 190 accessions from charitable organisations (includes NOC) • 133 accessions from overseas laboratories • The data comprise physical, chemical, biological and geophysical observations in a variety of forms including profiles, time series and discrete samples. • Data sets are prepared using MEDIN guidelines and are loaded into the NODB (either the BODC Series or the BODC Samples database) after re-formatting, usage metadata compilation, quality control (automatic tests and visual inspection), documentation and audit. • During 2024-25, an additional 99 datasets were added to the PDL and received a DOI.

RCAHMW (Historic Environment DAC)	ADS (Historic Environment DAC)
24 datasets relating to 3D digital survey (primarily photogrammetry-based) of maritime sites located in the intertidal zone, or adjacent coastal zone were archived during 2024/2025. Currently, there is no backlog of surveyed data for maritime archaeological sites, awaiting archiving. These are derived from the RCAHMWs own maritime survey programme and represent a major development in the baseline record afforded to these sites. The surveyed sites represent a cross-section of intertidal and coastal archaeological sites within Wales, including shipwrecks, fish traps, harbours/quays, and coastal installations such as lime kilns.	• Images from the Mary Rose https://doi.org/10.5284/1122936. This dataset comprises high-quality images of finds recovered from the wreck of the Mary Rose; this is a high-profile archaeological discovery that has public appeal. • Digital Data from the Land Beneath the Sea Palaeolandscapes Project (Unpath'd Waters), 2016-2024 https://doi.org/10.5284/1126107 The dataset covers the UK and Dutch southern North Sea from the Latest Pleistocene to the Early Holocene, a time when the southern North Sea was a terrestrial environment. The shapefiles include a Palaeolandscape Features file and a Peat Occurrence file, which depict channels, lakes, and estuaries derived from various sources. These resources can be integrated to visualize and study the submerged landscape of the southern North Sea.
HES (Historic Environment DAC)	**BGS**
• Archive from Scapa Flow Underwater Salvage Sites Survey: Phase 2, Orkney The German High Seas Fleet was scuttled in Scapa Flow in 1919 and represents the largest assemblage of World War I vessels and is a popular diving attraction. The location of the wrecks is being proposed as a Historic Marine Protected Area.	• Bangor University: Particle Size Analysis and organic carbon content data from marine sediment samples within the Trevose Box, off southwest England, April 2023 (DEFRA funded FISP project) • University of Oxford: Geochemical analysis of wells in the North Sea offshore region (Endurance Site) • SEPA: Loch Shiphoirt / Seaforth and Loch Shell / Sealg WASSP hardness • MCA: Seabed texture maps from Civil Hydrography Programme (MOU with MCA updated to include this)

Marine Directorate, Scottish Government (FishDAC)	Cefas (FishDAC)
• 3 anglerfish surveys • 2 North Sea International Bottom Trawl Surveys (Quarter 1 and 3) • 2 West Coast Bottom Trawl Surveys (Quarter 1 and 4) • West of Scotland Deepwater Trawl Survey 2023 • Herring Acoustic Survey • West of Scotland acoustic sprat survey • Rockall Haddock survey • Freshwater Fish Trap data updates • Scottish Sea Fisheries Statistics	• Collingridge et al. (2024). Phytoplankton abundance data from pelagic surveys in the Celtic Seas and English Channel for autumn 2017 to 2023. Cefas, UK. V2. https://doi.org/10.14466/CefasDataHub.156 This dataset makes available long time series of high-quality phytoplankton data which can be used to assess elements including as environmental status and non-native species. • Hyder, Edwards & Radford. (2024). Sea Angling Diary Catch, Participation and Economic Estimates 2016-2021. Cefas, UK. V1. https://doi.org/10.14466/CefasDataHub.151 These data represent a very rich socio-economic dataset, giving insights into UK sea angling which can be used to inform elements such as policy. • Righton & Wright. (2024). Horizontal and vertical movement data derived from a data storage tag deployed on a single Atlantic cod in the North Sea from 2001 to 2002. Cefas, UK. V1. https://doi.org/10.14466/CefasDataHub.159 309 days of data – this data has been used to informed cod stock structure around the British Isles. • Thompson et al (2024). Modelled and observed fish feeding traits for the North Atlantic and Arctic Oceans (1836-2020) and population estimates of fish with different feeding traits from Northeast Atlantic scientific trawl surveys (1997-2020). Cefas, UK. V1. https://doi.org/10.14466/CefasDataHub.149 This data product can be used to complement and integrate with wider biodiversity and fisheries data to produce new scientific insights into the behaviour of fish populations and their interaction with prey species. • Walker et al. (2024). 2015-2016 Acoustic Telemetry data for European eels (Anguilla anguilla) in Hanningfield reservoir, Essex, UK. Cefas, UK. V1. https://doi.org/10.14466/CefasDataHub.152 European eels are critically endangered so this dataset has contributed spatial and temporal behavioural pattern information which is sparse, to inform conversation and management.

4 Highlights

In addition to providing metrics, the DAC reports also detail highlights from the previous year, which together show levels of activity and examples of usefulness of the DAC network and indicate how nationally and internationally integrated the DAC system is. A number of new developments and initiatives took place during 2024-25, enhancing the capability of the MEDIN DACs to the benefit of MEDIN's users.

4.1 New developments and capabilities:

Marine Species and Habitats DAC (DASSH): Website has been updated with a new home page that directs users to the main resources they might want to access and includes a statistics dashboard, clearer headers to allow users to find what they need more easily, the addition of a Projects and Partnerships section to clarify DASSH role in these. A new DNA data filter on the DASSH mapper now allows users to easily identify which records are derived from DNA methods.

Bathymetry DAC (UKHO): Continued rolling out of UKHO Data Upload Portal allowing users to submit bathymetric data to the UKHO with all the correct metadata required for MEDIN standards. Users do

not have to email in large sized datasets anymore. Metadata is available on dropdowns to allow users to select the correct attributes.

Fisheries DAC (MDSG and Cefas)

MDSG: Moved the open data portal to a new cloud platform this year. No immediate end user benefits but creates a stable and scalable platform for future developments.

Cefas: This year has seen numerous changes to the Cefas Data Portal, demonstrating improvements for both depositors and requestors. Data can now be uploaded and downloaded in GeoJSON format, as an open alternative to ESRI Shapefile improving interoperability. After a pause due to standards updates, Cefas metadata is now shared from the MEDIN portal to data.gov, improving discoverability. A new rich html widget has been developed, which means that multiple rich text elements can be published for a given metadata record, for example clickable links to GitHubs and associated datasets, improving findability.

Historic Environment DAC (RCAHMW, ADS, HES):

RCAHMW: In response to the climate emergency, in 2022 RCAHMW started a formal rolling programme of digital survey of historic assets located in the inter-tidal zone and coastal margin. In time, this will feed through to enhanced/upgraded records of maritime sites most at risk from the impact of climate change. This survey programme is now fully embedded into the RCAHMW work programme and is beginning to become highly impactful in the coverage that can be afforded to archaeological sites. For example, in May 2025, 37% of the intertidal sites (c. 150) around Wales have been visited since January 2022, with 22% of them (33 sites) afforded a 3D Digital Survey.

Work has continued to overhaul the shipwreck holdings within the National Monuments Record of Wales (NMRW) and to ensure better consistency with the UKHO wreck dataset. To this end, 157 records were added to the NMRW in 2024-25, completing the process of updating the NMRW with sites surveyed by the UKHO that were missing previously

ADS: The ADS now has a new search interface allowing users to cross-search all datasets (collections and grey literature), which should be released very shortly. A new ingest system (ADS Ingest) allowing users to deposit data is currently undergoing external review and testing. The new system streamlines the workflow for deposition and makes it easier for users to adhere to metadata standards.

HES: Historic England's project, UKRI Toward a National Collection (TaNC) Unpath: To unpath'd waters, undream'd shores was completed in February 2025 with the publication of the final project report. The report highlights the wealth and range of data about the UK's maritime heritage. The report makes a number of high-level recommendations about the future direction of maritime archaeological records which will be contextualised for developing a plan for the maritime record structure at HES in 2025-26.

Water Column Oceanography DAC (BODC): Under the Biodiversity Data for Digital Twins of the Ocean | DTO-BIOFLOW (DTO-BioFlow) project BODC have re-activated their Integrated Publishing Toolkit (IPT), hosted at The Flanders Marine Institute (VLIZ), enabling seamless publishing and sharing of biodiversity data, developing a semi-automated process to convert their database into the Darwin Core Archive (DwC-A) format. This process ensures that data is consistently formatted and ready for integration into global biodiversity databases. The BODC Data submission application was launched in September 2024, this will be the primary mechanism for submitting data. This should improve transparency of submissions and ensure suitable collation of metadata for submission with efficiencies to ingest data into the systems and generation of DOIs.

Marine Geology and Geophysics DAC (BGS): BGS has a new GeoIndex in development, with metadata improvements as part of this.

Marine Meteorology DAC (Met Office): The Met Office have continued their improvement of PowerBI reporting to aid in quality control work and generation of reports.

4.2 New funding streams

Some of the MEDIN DACs received new funding streams during 2024-25.

The Marine Species and Habitats DAC (DASSH) received funding for the mNCEA (marine Natural Capital and Ecosystem Assessment) Image Catalogue: Defra through the mNCEA. In addition, the Data Management Strategy for AIGCFD (Ascension Island Government Conservation and Fisheries Directorate) was UK Government funded through the Blue Belt Programme, with partial funding from the Ascension Island Government.

Water Column Oceanography DAC (BODC) received funding through the UKRI Digital Research Infrastructure programme. There was a renewal of GEOTRACES funding stream, for a further three years. Funding has been received from Europe (e.g. EMODNet) along with EU Horizon Europe funding (e.g. DTO-BioFlow, ENVRI-Hub).

Historic Environment DAC (RCAHMW, ADS, HES):

ADS: The ADS has received an Irish Research Council award; “Radiocarbon Ireland: Making chronological datasets FAIR for the future".

4.3 International meetings

Many of the DACs have a strong presence internationally, reflected in the broad spectrum of international meetings attended. A few examples from this reporting year include:

A variety of EMODnet meetings (e.g. Biology, Chemistry, Geology, Ingestion, Partners meetings) involving **Marine Species and Habitats DAC (DASSH)**, **Water Column Oceanography DAC (BODC)**, **Marine Geology and Geophysics DAC (BGS)** and the **Fisheries DAC (Cefas)**

A number of International Council for the Exploration of the Sea (ICES) meetings and working groups were attended by the **Fisheries DAC (MDSG and Cefas)** and the **Water Column Oceanography DAC (BODC)**.

The **Marine Species and Habitats DAC (DASSH**) attended the OBIS (Ocean Biodiversity Information System) Steering Group, the State of Marine Biodiversity Monitoring in Europe Workshop (online), the Ascension Island Government Conservation and Fisheries Directorate site visit to data audit and data management meetings on Ascension Island, the iNaturalist Global Members Network Meeting (online), the DTO Bioflow 2nd General Assembly in Spain, the Marine Imaging Workshop in the USA, the MARCO BOLO 2nd General Assembly in Spain and the IODE-28/IODC III Meetings in Colombia.

The **ADS (Historic Environment DAC):** attended the National Conference for Open Archaeology in Stockholm, a University of Copenhagen (UCPH) School of Archaeology Retreat in Snekkersten, Avifauna in archaeoecological networks (AviArch) Kick-off Meeting in Turin, the European research infrastructure for heritage science (E-RIHS) Public celebration in Florence, COST – NSF Joint Session in New York, the International Conference on Digital Preservation in Ghent, European Association of Archaeologists 2024 in Rome, Open research data in Humanities in Barcelona, ARIADNE RI Training School in Greece, SHADE National Workshop in Greece and the Digital Preservation Coalition Members Unconference and Networking Event in Dublin.

The **HES (Historic Environment DAC)** presented at the Europae Archaeologiae Consilium in Poland ‘Life after life of archaeological archives – accessibility and re-use of archaeological collections in heritage management' at the Ocean Heritage and Marine Archaeology: Waves of Change in Scotland and attended the 42nd International Shipwreck Conference in Plymouth.

The **Marine Geology and Geophysics DAC (BGS)** attended the Coordination and Support Action Geological Service for Europe (CSA-GSEU) meetings.

Marine Meteorology DAC (Met Office) attended the E-Surfmar Annual Meeting, the WMO Task Team on Voluntary Observing Ship Delayed Mode Data meetings and SOT.

Bathymetry DAC (UKHO) attended the Atlantic/Indian Oceans Regional Mapping meeting for Seabed 2030.

The Fisheries DAC (Cefas) attended OSPAR (including EIHA, ICG-Noise and ICG-QSR) and various IODE meetings, the Offshore Energies Digital Strategy Group – Open Data Portals workshop in London, the Biocides Europe conference, 5th International MICRO 2024 conference held in Lanzarote, Ecopath with Ecosim (EwE) at the Institute of Marine Sciences (ICM-CSIC) in Barcelona and the NUTEC Plastics IAEA

The **Water Column Oceanography DAC (BODC)** attended the 28th Session of the IODE Committee in Colombia, various Argo meetings, various GEBCO meetings, I-ADOPT and OGC-OMS Modelling workshop in Vienna, the Helmholtz Metadata Collaboration Conference 2024, the Blue-Cloud2026 General Assembly, the Research Data Alliance (RDA) Plenary Meeting in Costa Rica, the eLTER Semantic Workshop, the 2024 CF Workshop in Sweden, the ICOS away day in Norway, the International Underwater Glider Conference 2024 in Sweden, the International workshop to advance ocean carbon and acidification data management and interoperability in Venice, the International Conference on Marine Data and Information Systems (IMDIS) 2024 in Norway and the UN Ocean Decade Conference in Barcelona.

4.4 Data Access and Sharing

Data from most of the MEDIN DACs are made available under open licences such as the UK Open Government Licence (OGL) for data. Most data from MDSG, NERC (e.g. BGS and BODC), Met Office and Cefas are made available under this licence. UKHO data are made available under the UKHO Bathymetry Data Licence, which allows users (with caveats) to copy, publish, distribute and transmit the information; adapt it or exploit it commercially, for example, by combining it with other Information or by including it in their own product or application. For data centres accepting data from non-government or Research Council sources, there may be additional constraints applied to the license agreements.

DASSH licensing is assigned in consultation with the data provider. All data are made “as open as possible, as closed as necessary”. DASSH promote CC-BY or OGL as the preferred license but in some cases, data are deposited under CC-BY-NC, restricting reuse to non-commercial purposes.

At HES, Canmore location data and HES Spatial datasets and services are released under an Open Government Licence, whilst individual archive items are subject to Crown Copyright and other Intellectual Property Rights held by HES and Individual Contributors.

At the Met Office, marine observation data from the last 24-hours from buoys, light vessels and coastal stations is held under the Met Office DataPoint Reserved Content Licence.

The DACs’ data access mechanisms are described below, along with improvements made during the reporting year:

Bathymetry DAC (UKHO): Data sets are accessible from the UKHO via the Seabed Mapping Service, which provides a geospatial viewer and search query and allows users to download individual surveys or select surveys within an area.

Marine Species and Habitats DAC (DASSH): Data are published via OGC webservices, a map-based, web-accessible query tool and the Integrated Publishing Toolkit using Darwin Core Archive structured data. Data are also made available through the following portals; the National Biodiversity Network Atlas – atlas.nbn.org.uk, EMODnet Biology, EurOBIS, OBIS and GBIF.

Fisheries DAC (Cefas and MDSG):

MDSG: Most datasets are published via Marine Directorate open data portal (https://data.marine.gov.scot). Where international survey data are submitted and published via ICES DATRAS, this is signposted to point to the ICES system rather than creating duplicates. Data are also available through ICES DATRAS (https://www.ices.dk/data/data-portals/Pages/DATRAS.aspx) and Find.data.gov.scot (https://find.data.gov.scot/).

Cefas: Metadata and datasets are made available via the Cefas Data Portal, with no registration or sign-in required. All data can be downloaded from the website in csv, shapefile or GeoJSON format, additional spatial data is available via WMS/WFS direct feeds. Public APIs are available to access all metadata and data.

Following Cefas2030 Strategy and Cefas Data Management Policy Cefas work towards making 100% of their data openly available via the Cefas Data Portal by default, except where there is good cause the restrict e.g. commercial sensitive or personal data.

All discovery *metadata* is automatically linked to the MEDIN Data Portal, OneOceanInfoHub and data.gov via Web Accessible Folders (WAFs) and all metadata including a DOI are also served to the Defra Shared Services Platform. Such third-party data portals direct external users directly to the Cefas Data Portal to access the data. Selected biodiversity timeseries datasets are published on the Cefas Data Portal and distributed by DASSH to the EurOBIS / OBIS data systems which are in turn made accessible via the GBIF and EMODnet data portals. Data submissions are also provided to and accessible via ICES including ICES Database on Trawl Surveys (DATRAS) meeting national commitments.

Historical Environment DAC (ADS, HES and RCAHMW):

ADS: Data sets are available for download directly from the ADS website. Data sets are normally grouped by collections that reflect the project carried out by the originator, such as a survey or monitoring project, each collection has a DOI. Grey literature reports are disseminated as individual records within an application known as the ADS Library, each report has its own DOI.

ADS data are available through the following portals: Unpath, ARIADNE, Keepers Registry, Heritage Gateway and the NERC Data Catalogue.

HES: Public access is provided through the online portal (Canmore) trove.scot (from February 2025) and map-based search (PastMap). Users may select and download up to 1,000 records in .csv or .kml formats under an Open Government Licence.

HES Public Services are the principal point of contact for bespoke data requests and downloads. They do not distinguish between terrestrial and marine data requests. Two marine data requests were forwarded to the Data Management team.

HES spatial datasets and services such as Historic Marine Protected Areas, Scheduled Monuments (for Inter-tidal and wrecks), Listed Buildings (for Coastal built heritage) and Canmore – National Record of the Historic Environment, are available to download and access as view and download services from the HES spatial downloads page and through the Scottish Government Spatial.data.gov.scot metadata portal. Records are harvested to data.gov.uk but, following Brexit, no longer appear on the INSPIRE Geoportal. Marine Scotland's National Marine Plan Interactive Portal, SEWeb, the Scottish Government Spatial.data.gov.scot metadata portal are harvested to data.gov.uk. A copy of the Canmore record is provided periodically to the ADS for uploading onto ArchSearch and for onward use in the ARIADNEplus and Unpath'd Waters portals.

RCAHMW: The main online way to distribute data is Coflein, there is also a full remote enquiries service and a public reading room where archives can be accessed. A growing selection of digital maritime surveys are also disseminated to the public in the form of a 3D model, freely available to view and more readily accessible than an archive point cloud, etc, through the SketchFab portal. Maritime data is now also fully disseminated through DataMapWales and updated on a biannual basis.

Water Column Oceanography DAC (BODC): The BODC National Oceanographic Database (NODB) delivery system now gives access to 152,900 data series, a 0.6% increase in the number of series available online last year. Data are available in a fashion that allow users to search across cruises, time, location, originator, parameter *etc.* Services offer users the choice of a one-click download (for publicly accessible data) or 'online shopping' with a basket and checkout mechanism. Data are available in various data formats under secure access control methodologies, which includes user request tracking of auto-downloads.

The BODC has 286 data collection aggregations and 875 cruise collection aggregations. Where appropriate, these discovery metadata records carry a URL within the online resource metadata that leads directly to the data. The URLs are of two types:

- If a dataset has an associated DOI, the URL resolves to a landing page within the BODC Published Data Library (PDL) that incorporates a one-click download service.
- For non-DOI datasets, a URL resolves to a pre-filtered search result set in the BODC online web user interface (UI) specific to the data or cruise collection. The UI incorporates a one-click download service.

BODC have made further improvements to access arrangements through continued development of ERDDAP (Environmental Research Division's Data Access Program) instances, sensor web enablement schema and Google's schema.org. All metadata records in the PDL have been published with schema.org. These improvements are ongoing pieces of work within BODC, who will continue to provide improvements to DOI/PID services.

Data are additionally disseminated through a variety of additional mechanisms and tools. An adaptation of the bespoke all series app delivers files that have a DOI, typically originator flat files. Some data are delivered through ERDDAP tool, which BODC are looking to expand the use of. Glider, seal tag and Argo data are disseminated to the Met Office via Global Telecommunications System (GTS). Argo data are delivered to the ARGO international Data Assembly Centre for delivery/dissemination through existing partnerships and pipelines. Ingested data are disseminated in a semi-automated manner to SeaDataNet/EMODnet through existing partnerships and pipelines. A semi-automated pipeline for ingested CTD (conductivity, temperature, depth) sensor data to ICES has also been developed. A new pipeline to semi-automate data flows to OBIS has been created. BODC use CEDA (Centre for Environmental Data Analysis) infrastructure to deliver high volume data. High volume data may also be stored on tape.

Marine Geology and Geophysics DAC (BGS): Data are made available through several portals, including OGC API, The Offshore GeoIndex (also available as a Web Map Service), Offshore GeoIndex Web Map Service, Offshore Products Web Map Service, SEA Data Portal and the BGS Deposited Data Search.

Additional services provide access to the DAC holdings such as Geological maps created from data are incorporated into EMODnet map products and made available through the EMODnet Geology Portal and Web Map Services are used in various portals (*e.g.* BGS Offshore map products).

Marine Meteorology DAC (Met Office) Datasets are requested through email/telephone enquiry. The request may be passed to the Data Provisioning team which then provides a quote for the extraction of the data and the information requested. In addition to this, there is data available on the public website for the previous 24 hours for the moored platform data. Furthermore, Voluntary Observing Ship data and ship-borne automatic marine observations are available through ICOADS (International Comprehensive Ocean-Atmosphere Data Set). Data is also available through CEDA.

Data are also available through third party portals; Marine meteorological observations from ships, moored buoys, light vessels and platforms are available through CEDA and ICOADS. Moored platform data for the previous 24 hours are available, either in full or in part, from the Cefas Wavenet webpage and the National Data Buoy Centre portal run by NOAA as well as other weather websites such as Windy.com.

4.5 Data standards and data quality

Use of MEDIN guidelines by depositors using the MEDIN DACs is variable across the DACs. DASSH and ADS promote the MEDIN guideline formats with their depositors to standardise the data being submitted. BODC has a quality management system (QMS) which is compliant with and conforms to ISO 9001, the international standard for quality management. All data submitted to BODC are prepared using MEDIN data guidelines, but it is recognised that, for those not engaged with data management on a regular basis, detailed discussions can be useful in addition to documented guidance. The BODC Data Submission App requires users to submit data with appropriate metadata, which meets the MEDIN standards. The UKHO has rolled out a Data Upload Portal for bathymetry data requiring users to submit data with the correct metadata required for MEDIN standards.

Cefas only receive data from staff in their own organisations. The MEDIN metadata standard is followed but the use of the guidelines is not widespread within the organisation.

BGS receive data from a wide range of originators and in many formats and it is not known whether the MEDIN guidelines are used by their depositors. However, this year a couple of BGS deposits have used MEDIN guidelines. DACs such as RCAMHW, Met Office, MDSG and HES promote the use of specific standards relevant to their communities.

5 DAC Sustainability and Funding

An important aspect of the DAC network is the assurance of long-term sustainability and continuity of service provision. The MEDIN DAC network achieves this by requiring that the core capability of each DAC is underwritten by an organisation or group of organisations (usually the host organisation) that itself has a business requirement to manage data of a particular theme. This approach forms the backbone of the funding/cost model for the MEDIN DACs (see box below). The current status of the individual DACs is as follows:

Funding for the **Bathymetry (UKHO)** and **Marine Meteorology (Met Office)** DAC activities has been incorporated into operational plans and is considered part of business as usual. Funding for the Bathymetry DAC is built into the future plans at UKHO.

Core **Species and Habitats DAC (DASSH)** funding is secure from Defra/Scottish Government until September 2025, with discussions currently underway with Defra about renewal. At the time of submission, it is unclear on the mechanism for funding that will be put in place. Changes are expected from October 2025.

Funding for the **Water Column Oceanography (BODC)** DAC appears secure in the short term with no reductions reported (although this is not inflation-proofed). The **Marine Geology and Geophysics (BGS)** DAC describes the funding situation as challenging and reports a significant decrease in funding for the next year. These two data centres had their NERC Data Centre National Capability evaluation and commissioning process approved in 2023 for a further 5-year funding cycle. There have also been funding calls from the UKRI Digital Research Infrastructure programme. NERC remains committed to data management for the medium and long term. For **BODC** there is further funding from EU projects.

FishDAC: Cefas operates under a yearly funding cycle and funding is approved to support data management activities in FY24-25. For **MDSG**, the funding situation is stable, with the Marine Directorate funding a full-time data management post with responsibility for the MEDIN DAC function.

Historic Environment DAC: The **ADS** is hosted by the University of York, Department of Archaeology as a Cost Centre. The ADS business model is a mix of direct core funding, project funding and consultancy. ADS continues to receive core funding from the UKRI, as part of the Infrastructure for Digital Arts and Humanities (IDAH) programme overseen by the AHRC. The ADS receives project funding through research projects (for example AUTOMATA or Artemis). ADS consultancy archives datasets for long-term preservation on behalf of a depositor, with charging for deposition that covers all parts of the data

lifecycle. Since the decision in 2020-2021 by the Chartered Institute for Archaeologists (CIfA) to impose new requirements for digital archives from commercial fieldwork to be deposited with a CoreTrustSeal accredited repository there has been a continued increase in the number of datasets deposited with the ADS. To this, the funding from the UKRI for provision of the Heritage and Conservation Science Data Service (ASDS) should be added. The ADS operating environment is still extremely optimistic. This healthy funding situation has seen the ADS able to invest in key staffing areas, and the team currently stands at 33 full time members of staff (compared with 24 in 2023/2024 report). The ADS's long-term business plan is under constant review and is monitored by the ADS Management Committee on which MEDIN is represented. The ADS' operating environment for the next 5 years is forecast to remain at current levels and allows continued commitment to the furtherance of ADS aims and objectives and continuance of relationships with existing external partners such as MEDIN. There is no significant variation to the basic business model expected within the next 5-year plan (2026-2031).

The other two components of the Historic Environment DAC (**HES** and **RCAHMW**) are funded through the Scottish and Welsh Governments respectively. However, funding for 2024-25 has been cut by 11% across the historic environment sector. This cut may have an impact in the next reporting year. This cut resulted in a reduction of staff at the RCAHMW, with resultant pressure on their ability to operate. Historic Environment Scotland receives additional revenue from its Commercial and Tourism arm. Additionally, the UKRI funded Unpath'd Waters project supported data standards tasks until autumn 2024.

Acronyms and Glossary

ADS	Archaeology Data Service
AGU	American Geophysical Union
AHRC	Arts and Humanities Research Council
AIGCFD	Ascension Island Government Conservation and Fisheries Directorate
APDS	Autonomous Platform Data System
API	Application Programming Interface
ARGO	Array for Realtime Geostrophic Oceanography
AUV	Autonomous Underwater Vehicle
BGS	British Geological Survey
BODC	British Oceanographic Data Centre
CC-BY	Creative Commons License (Credit must be given to the creator)
CC-BY-NC	Creative Commons License (Credit must be given to the creator, only non-commercial uses of the work are permitted)
CDI	Common Data Index
CEDA	Centre for Environmental Data Analysis
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CHNT	Cultural Heritage and New Technologies
CIG	COST (Cooperation in Science and Technology) Innovation Grant
CSB	Crowdsourced Bathymetry
CSR	Cruise Summary Report
CTD	Conductivity temperature depth
DAC	Data Archive Centre
DARIAH	Digital Research Infrastructure for the Arts and Humanities
DASSH	The Archive for Marine Species and Habitats Data
DATRAS	Database for Trawl Surveys
DBOSSH	internal DASSH database
DCDB	Data Centre for Digital Bathymetry
Defra	Department for Environment, Food & Rural Affairs
DOI	Digital Object Identifier
EDR	Environmental Data Retrieval
EDS	(NERC) Environmental Data Service
EGO	Everyone's Glider Observatory
EIHA	Environmental Impacts of Human Activities
EMODNet	European Marine Observation and Data Network
ENVRI	European network of environmental research infrastructures
ERDDAP	Environmental Research Division's Data Access Program
EU	European Union
EurOBIS	European node of the Ocean Biodiversity Information System (OBIS)
FAIR	Findable, Accessible, Interoperable, Reusable
FAIR-EASE	Horizon Europe project - Building Interoperable Earth Science & Environmental Services
FAIR-IMPACT	Horizon Europe project - expand the use of FAIR-enabling solutions across the European Open Science Cloud
GBIF	Global Biodiversity Information Facility
GDAC	Global Data Assembly Center
GEBCO	General Bathymetric Chart of the Oceans
GEOTRACES	International study of the Marine Biogeochemical cycles of trace elements and their isotopes
GLOSS	Global Sea Level Observing System
GOA-ON	Global Ocean Acidification Observing Network
GOOS	Global Ocean Observing System
HE	Historic Environment
HES	Historic Environment Scotland
HTTP	Hypertext Transfer Protocol
ICES	International Council for the Exploration of the Sea
ICG-Noise	Intersessional Correspondence Group on Underwater Noise

ICG-QSR	Intersessional Correspondence Group on managing the Quality Status Report
ICOADS	International Comprehensive Ocean-Atmosphere Data Set
IDAH	Digital Arts and Humanities
IDP	Intermediate Data Product
iFDO	image FAIR Digital Object
IHO	International Hydrographic Office
INSPIRE	INfrastructure for SPatial Information in Europe
IOC	Intergovernmental Oceanographic Commission
IODC	International Oceanographic Data Conference
IODE	International Oceanographic Data and Information Exchange
IPT	Integrated Publishing Toolkit
JASMIN	The UK's data analysis facility for environmental science
MBA	Marine Biological Association
MCA	Maritime and Coastguard Agency
mNCEA	marine Natural Capital and Ecosystem Assessment
MDSG	Marine Directorate, Scottish Government
MEDIN	Marine Environmental Data and Information Network
MERMAN	Marine Environment Monitoring and Assessment National database
MOU	Memorandum of Understanding
MSS	Marine Scotland Science
NBN	National Biodiversity Network
NCEA	Natural Capital and Ecosystem Assessment
NERC	Natural Environment Research Council
NMRW	National Monuments Record of Wales
NOAA	National Oceanic and Atmospheric Administration
NOC	National Oceanography Centre
NODB	National Oceanographic Database
NODC	National Oceanographic Data Centre
NVS	NERC Vocab Server
OASIS	Online system for reporting archaeological investigations and linking research outputs and archives
OBIS	Ocean Biodiversity Information System
OceanOPS	International Center of Excellence for Coordination and Monitoring of Meteo-Oceanographic Observing Systems
ODA	Open Document Architecture (format)
ODIS	Ocean Data and Information System
OGC EDR API	Open Geospatial Consortium Environmental Data Retrieval Application Programming Interface
OGL	Open Government Licence
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
OTGA	Ocean Teacher Global Academy
PDL	Published Data Library
PID	Persistent Identifiers
QMS	Quality management system
RCAHMW	Royal Commission on the Ancient and Historical Monuments of Wales
RDA	Research Data Alliance
RI	Research Infrastructure
SAMS	Scottish Association for Marine Science
SeaDataNet	Pan-European Infrastructure for Ocean and Marine Data Management
SEADDA	Saving European Archaeology from the Digital Dark Age
SEPA	Scottish Environment Protection Agency
SOT	Ship Observations Team
STAC	Spatio-Temporal Asset Catalogue
TNC	Towards a National Collection
UI	User Interface
UNESCO	United Nations Educational, Scientific and Cultural Organization
UK	United Kingdom

UKRI	UK Research and Innovation
UKHO	United Kingdom Hydrographic Office
UNPATH	Unpath'd Waters: Marine and Maritime Collections in the UK
URL	Uniform Resource Locator
VLIZ	The Flanders Marine Institute
WAFS	Web Accessible Folders
WMS	Web Map Service
WMO	World Meteorological Organisation
XML	Extensible Markup Language

MEDIN DAC Cost Model

The DAC cost model proposed and adopted in November 2010 identifies four aspects of the DAC function: Core Capability, MEDIN Coordination, Additional Archiving, and Data retrieval / distribution, as described below:

Core DAC Capability
"Core" DAC capability includes infrastructure costs and some routine data archiving. It is expected that core DAC funding is provided by organisations with a strategic interest in a national DAC capability for specific data types. MEDIN acts to provide an overview and to consider whether funding of this core capability is secure or at risk.
Funded by the organisation hosting the DAC, or in the case of DASSH by a consortium of organisations.

MEDIN co-ordination
MEDIN acts to ensure common standards and service provision across the MEDIN DAC network. The cost of MEDIN coordination activities is shared between MEDIN Sponsorship funds and the DACs themselves.
Funded by MEDIN Sponsor funds and DACs through in-kind effort

Additional Archive Costs
In the general case, the costs of archiving newly collected data should be funded by the data providers, in the form of one-off fees to the DACs in return for the services provided. This data archiving cost is not currently included in the overall budget of many monitoring and research programmes.
Funded by data suppliers

Data retrieval / distribution
MEDIN DACs will provide data access to the original data provider at no cost and will manage third party access to data sets according to terms agreed with the data provider. If no constraints are required by the owner, data will be made available to third parties at no cost, beyond any necessary to cover costs of retrieval / provision.
No cost