

Marine Environmental Data and Information Network (MEDIN)

Annual DAC Network Report for 2019-20



'Measure once, use many times'

Summary highlights

The Marine Environmental Data and Information Network (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 is the first DAC annual report falling within the 5-year period of the current MEDIN [Business Plan](#) and the reporting format has changed. DAC metrics are now applied more consistently across the DAC network, being pulled directly from the MEDIN Portal, where possible. The metrics presented here form the baseline for future years.

The 2019-20 DAC annual reports show that:

- Over 65% of the datasets described in the MEDIN portal are available from the MEDIN DACs. That is 9,904 datasets managed, quality controlled and distributed by MEDIN's coordinated network of DACs.
- More than 95% of the datasets available from MEDIN DACs are accessible online and 40% are downloadable within 2-clicks of a mouse.
- 3% of the datasets in the MEDIN Portal available from MEDIN DACs have Digital Object Identifiers (DOIs).
- 4% of the datasets have been submitted to the MEDIN DACs from Marine Science Coordination Committee (MSCC) organisations.
- More than 940,000 'requests' for data were made to MEDIN DACs during the reporting year.

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. Those 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 INSPIRE.

As a condition of its accreditation, each MEDIN Data Archive Centre 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, 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 current status of 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. These reports are available on request to enquiries@medin.org.uk.

2 DAC Listing

There are currently seven DACs in the MEDIN DAC network, as listed in Table 1 below. More details are available on each DAC through links on the DAC web page on the MEDIN website at <http://www.medin.org.uk/about/data-archive-centres>. These pages include information on what types of data are held and top-level guidelines on how to submit data to, and to access data from, each DAC.

Table 1: MEDIN Data Archive Centres

Name	Coverage	Contact Information	Web links	MEDIN Status
British Oceanographic Data Centre (BODC)	Water column Oceanography	enquiries@bodc.ac.uk 0151 795 4884	www.bodc.ac.uk	Accredited 2009; Re-accredited 2017; operational.
British Geological Survey (BGS)	Marine geoscientific data	medin@bgs.ac.uk	www.bgs.ac.uk/services/ngdc/management/marine/home.html	Accredited 2009; Re-accredited 2017; Core Trust Seal accreditation 2018; operational.
The Archive for Marine Species and Habitats Data (DASSH)	Marine Species and Habitats	Dassh.enquiries@mba.ac.uk 01752 633291	www.dassh.ac.uk	Accredited 2009; Re-accredited 2017; operational.
Met Office	Marine Meteorological Data	enquiries@metoffice.gov.uk	www.metoffice.gov.uk	Accredited Dec 2011; Re-accredited 2018; operational.
United Kingdom Hydrographic Office (UKHO)	Bathymetry	bathy.dac@ukho.gov.uk	www.gov.uk/guidance/inspire-portal-and-medin-bathymetry-data-archive-centre	Accredited 2009; Re-accredited 2017; operational.
FishDAC <ul style="list-style-type: none"> • Cefas • Marine Scotland Science (MSS) • DASSH 	Fish and Shellfish, Fisheries, Aquaculture and related samples and environmental data	Cefas: data.manager@cefas.co.uk	http://www.cefas.defra.gov.uk/publications-and-data/fishdac.aspx	Accredited 2012, Re-accredited 2018; operational.
		Marine Scotland Science: jens.rasmussen@gov.scot	http://www.gov.scot/Topics/marine/marine.gov.scot/maps.marine.gov.scot/data.marine.gov.scot	Accredited 2012; Re-accredited 2018; operational.
Historic Environment DAC <ul style="list-style-type: none"> • Archaeology Data Service (ADS) • Historic Environment Scotland (HES) • Royal Commission on the Ancient and 	Marine Historic Environment fieldwork derived datasets	Archaeology Data Service: help@archaeologydataservice.ac.uk	http://archaeologydataservice.ac.uk	Accredited 2012; Re-accredited 2018; operational; Core Trust Seal accreditation 2020
		Historic Environment Scotland: peter.mckeague@hes.scot	www.canmore.org.uk	Accredited May 2014; Re-accreditation due 2019; operational.

Historical Monuments of Wales (RCAHMMW)		Royal Commission on the Ancient and Historical Monuments of Wales gareth.edwards@rca hmw.gov.uk	www.coflein.gov.uk	Accredited June 2016, operational.
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3 DAC Performance

Each year MEDIN asks the DACs to report on their performance using a standard set of metrics. This is the first year reporting under the new MEDIN Business Plan and, as such, the metrics reported are different from previous years and will form a baseline for future years.

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. Nevertheless, the new metrics are a marked improvement on previous assessments of DAC performance.

The new metrics are as follows:

- Total number of metadata records present in the MEDIN Portal where each DAC holds the data.
- Number of new or updated records in the MEDIN Portal in reporting year where each DAC holds the data
- Number of records where DAC holds the data, with:
 - A URL leading to online access to data
 - A URL allowing direct access (i.e. within 2-clicks of a mouse)
 - A URL containing a Digital Object Identifier
- Number of records in the MEDIN Portal for Marine Science Coordination Committee (MSCC) partners who have data archived in a MEDIN DAC.
- 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

Table 2 below gives the figures from 2019-20, as the first year of the new MEDIN Business Plan.

Table 2: Annual metrics for the MEDIN DACs

Year	BODC	BGS	DASSH	Met Office	UKHO	Cefas	MSS	ADS	HES	RCAHMMW
Total number of metadata records where DAC is custodian										
2019-20	1107	857	710	7	4736	2058	282	74	47	26
New/updated records in reporting year										
2019-20	45	22	496	1	0	536	54	74	25	13
Records with online access to data										
2019-20	1056	855	631	2	4736	1914	240	74	17	0
Records with 2 clicks to data										
2019-20	997	694	165	1	0	1914	57	73	12	0

Records with DOI										
2019-20	54	0	1	0	0	101	49	73	12	0
Total number of records for data from MSCC organisations										
2019-20	16	151	15	5	34	2058	213	0	0	0
New records in reporting year for data from MSCC organisations										
2019-20	4	0	9	0	0	536	21	0	0	0

Please note that it is not advisable to compare absolute values between DACs, as the size of data sets can vary significantly between DACs (and even within DACs). For instance, all the data held in the Met Office MEDIN DAC for marine meteorology data are held within 7 data sets, which are augmented each year with that year’s new data. Over 9 million observations were added to the Met Office’s five data sets during 2019-20.

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

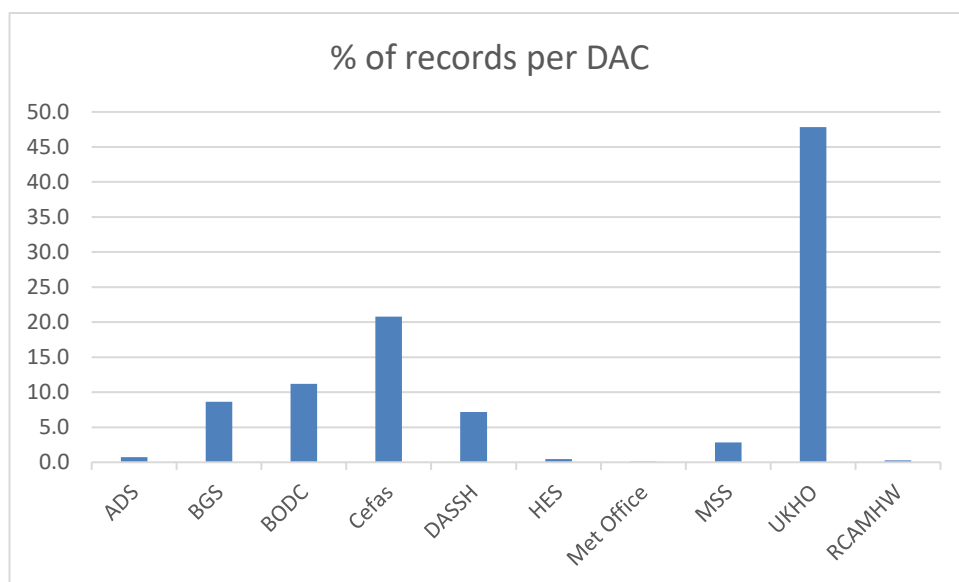


Figure 1 shows that the UKHO is the DAC with the most metadata records in the MEDIN Portal, with almost 50%. However, as noted earlier, the different DACs have different granularity in their metadata records so a direct comparison between DACs is not appropriate. Four of the DACs have updated or increased their metadata records in the MEDIN portal by over 50% in the past year (Figure 2). Some of this will relate to new datasets and some to improving the quality of existing metadata. Note that making updates to existing metadata records will count as changes in this metric.

Figure 3 shows there are seven MEDIN DACs with over 80% of the metadata records for data they hold that have a URL leading to some form of online access to that data (not necessarily direct access in 2 clicks). MEDIN has been promoting direct access to data for several years and is pleased to record that four of the MEDIN DACs now provide direct access to data (within 2 clicks of a mouse) to over 80% of their metadata records in the portal (Figure 4). One of the ways to provide direct access to data is using a Digital Object Identifier. Almost all of ADS metadata records in the MEDIN Portal have a Digital Object Identifier (DOI) for the dataset (Figure 5).

The breakdown of country of origin for the metadata records in the MEDIN portal where the DACs are custodian is shown in Figure 6. Figure 7 shows the percentage of records at each DAC where data

originate from organisations that are involved with the Marine Science Coordination Committee (MSCC). MEDIN is a partnership initiative of the MSCC and MEDIN reports progress to MSCC. The number of MSCC organisations archiving data at MEDIN DACs is very variable across the DACs, as the data from each MSCC organisation is more relevant to some DACs than others.

Figure 2: Percentage of metadata records in the MEDIN portal per DAC that are new or were updated during 2019-20.

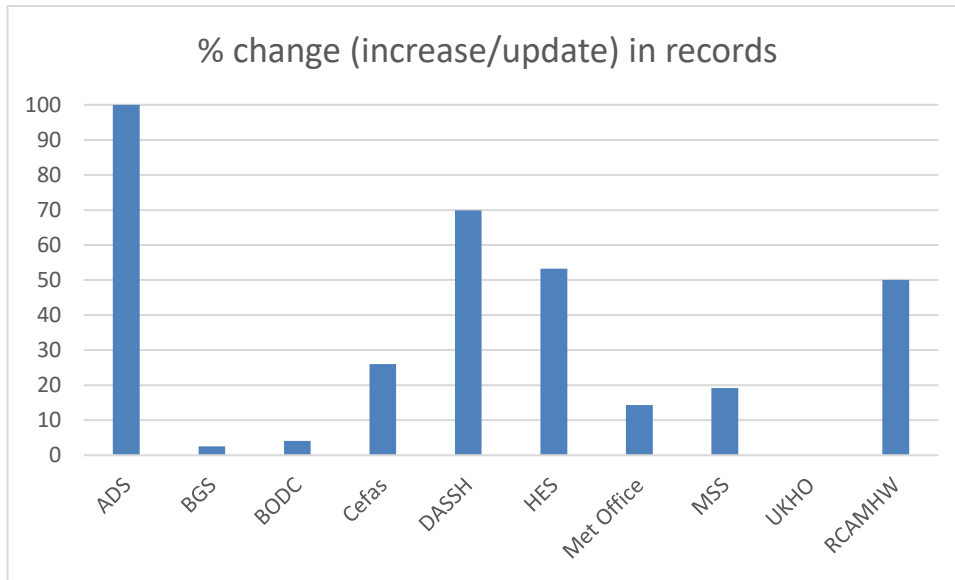


Figure 3: Percentage of metadata records per DAC in the MEDIN Portal with online access to data.

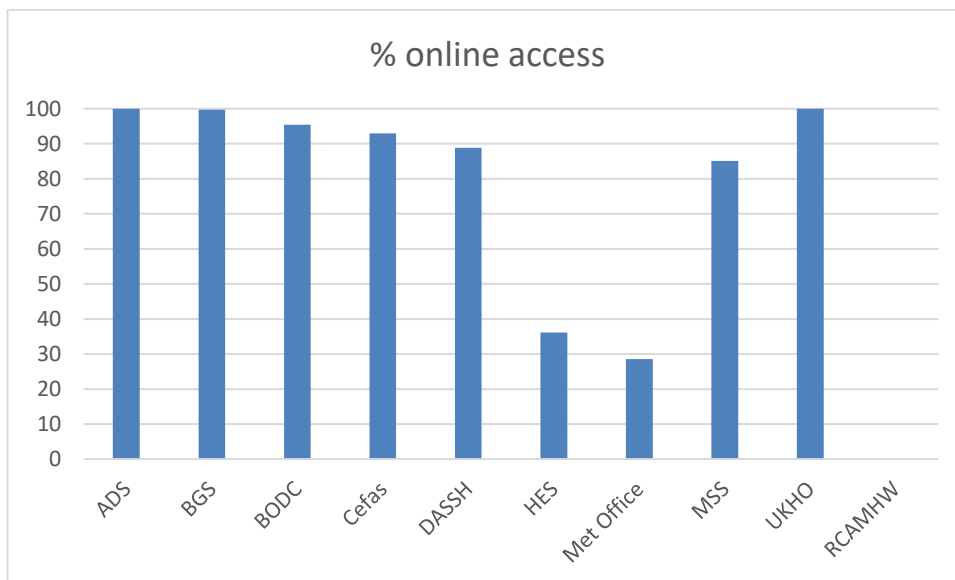


Figure 4: Percentage of metadata records per DAC in MEDIN Portal that offer 2-clicks to data.

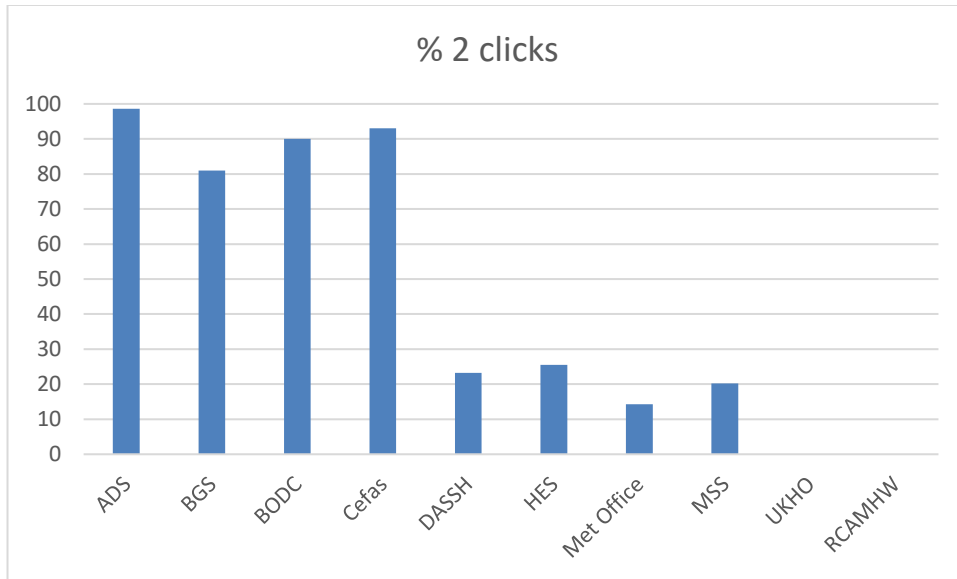


Figure 5: Percentage of metadata records per DAC in the MEDIN Portal with a Digital Object Identifier (DOI).

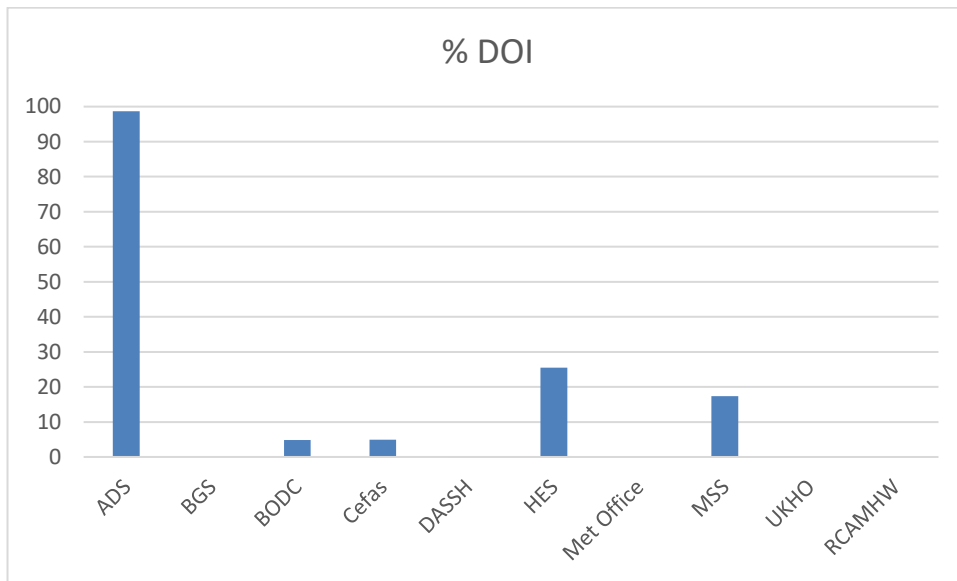


Figure 6: Percentage of metadata records per DAC in the MEDIN Portal by country of origin.

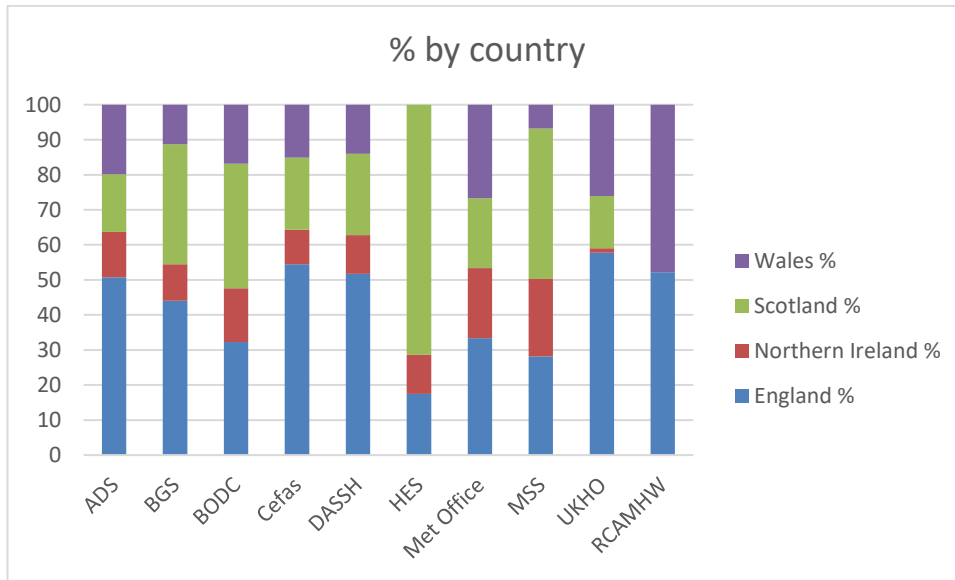
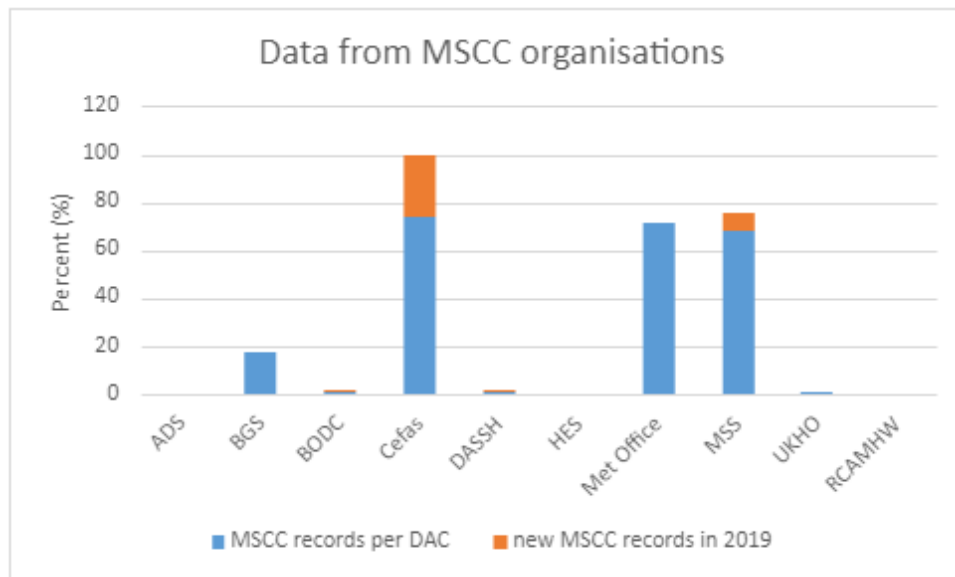


Figure 7: Percentage of all metadata records per DAC in the MEDIN Portal where data is archived in a DAC and was collected by MSCC organisations.



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) 2019-20.

Table 3: Summary of new datasets archived at MEDIN DACs during 2019-20.

ADS (Historic Environment DAC)	RCAHMW (Historic Environment DAC)
<p>New marine datasets added to the ADS archive during 2019-20 include:</p> <p>Stirling Castle Archive Assessment: https://doi.org/10.5284/1058978 The Stirling Castle was a 70-gun 3rd-rate ship-of-the-line, built in Deptford in 1679, rebuilt at Chatham in 1699 and lost on the Goodwin Sands during the Great Storm of 1703. The ship is highly significant from an historical perspective because it was launched as part of the Thirty Ships building programme overseen by Samuel Pepys and Charles II.</p> <p>Wheel Wreck Investigation 2018: https://doi.org/10.5284/1055091 The waters around the Isles of Scilly contain a formidable number of historic shipwrecks, including five protected wreck sites. One of the most intriguing and enigmatic of these is the Wheel Wreck, a collection of corroded iron machinery lying in an orderly pile on the seabed in 16m of water. In April 2018, Cornwall and Isles of Scilly Maritime Archaeology Society (CISMAS) carried out a six-day survey of the site. The cargo mound was measured, surveyed and enumerated. This has allowed the production of a cargo list, site plan and identification of most of the cargo items lying on the seabed. A limited search around the cargo mound produced a small quantity of pottery and glass which was used to indicate an earlier date for this site.</p>	<p>During 2019-20 RCAHMW received and archived project archives and reports from Clwyd-Powys Archaeology Trust (CPAT), Archaeology Wales and Gwynedd Sub Aqua Club relating to the following maritime sites:</p> <ul style="list-style-type: none"> • Pwll Fanogl AENT42_18 • Wreck on Pensarn Beach, Abergele CPATP053 • SS Dameo and King Edgar AWP346 <p>We have also catalogued a number of the Royal Commission’s own aerial photographic surveys, including:</p> <ul style="list-style-type: none"> • The Paul and other wrecks on Cefn Sidan • Royal Charter • William Bromham • The Vigilance
<p>Met Office</p> <p>There are 5 datasets on the MEDIN portal, which together describe most in-situ marine meteorological observations collected by the Met Office.</p> <p>Overall, the number of unique observations contained within those datasets increased by over 9.1 million during 2019-20.</p>	<p>BGS</p> <p>New datasets archived during 2019-20 include:</p> <ul style="list-style-type: none"> • Further Civil Hydrography Programme (CHP) backscatter and sample data. • Marine geoscience related data from Natural Environment Research Council (NERC) grants.
<p>CEFAS (FishDAC)</p> <p>New datasets added to the Cefas archive during 2019-20 include:</p> <ul style="list-style-type: none"> • Commonwealth Litter Programme Waste Audit and Microplastic Datasets (11 components) • Collated new non-native species records for UK from 2003-2014 • International Bottom Trawl Survey Jellyfish Data - North Sea - 2012 to 2018 	<p>DASSH</p> <p>During 2019-20 DASSH archived the following pelagic lifeform datasets used in indicator development for the UK Marine Strategy:</p> <ul style="list-style-type: none"> • 1992 – Ongoing Plymouth Marine Laboratory (PML) Zooplankton and Phytoplankton data collected at L4 (doi.org/10.17031/1632) • 1987 – Swedish Meteorological and hydrological Institute (SMHI) Plankton Swedish West Coast (doi.org/10.17031/1633)

<ul style="list-style-type: none"> Trends and status of liver neoplasms in flatfish from UK waters collected between 2004 and 2015 	<ul style="list-style-type: none"> CEFAS_SmartBuoy (doi.org/10.17031/1634) Environment Agency (EA) Phytoplankton Datasets 2000-2017 (doi.org/10.17031/1635) Marine Biological Association (MBA) L4 and E1 Young Fish Survey 1924-2013 (doi.org/10.17031/1636) Marine Science Scotland Phyto and Zooplankton records from Lock Ewe, Scalloway, Scapa and Stonehaven (doi.org/10.17031/1637)
<p>UKHO</p>	<p>HES (Historic Environment DAC)</p>
<p>During 2019-20 UKHO archived and released all data in relation to the General Lighthouse Authority.</p> <p>Irish Bathymetry data is now archived and coverage within the UKHO portal is soon to be extended.</p>	<p>During 2019-2020, 49 items, relating to 21 wreck locations were catalogued. These relate to a number of small projects including</p> <ul style="list-style-type: none"> Photography (2010) of The Cygnet paddle steamer -Camas na Gualainn, Loch Ailort, Highland from Jean and Ken Bowker Archive A Headland Archaeology survey (2008) of an unknown Craft, Traigh Bhan, Fuday, Sound Of Barra 17 images Database, GIS data, video from a survey of Roan Head Boom Buoy project, Flotta, Orkney
<p>Marine Scotland Science (FishDAC)</p>	<p>BODC</p>
<p>Marine Scotland Science publishes a number of routine survey datasets each year as well as individual annual activities.</p> <p>For 2019-20 these include:</p> <ul style="list-style-type: none"> 3 Monkfish surveys 6 Clyde acoustic surveys (2012-2018) 14 Collaborative Industry Herring Surveys (2016-2019) 1 Deep water survey (North East Atlantic Shelf Slope) 1 Gear trials/gear comparison survey 1 Herring Acoustic Survey 3 Mackerel Acoustic Surveys (2014-2016) 2 North Sea International Bottom Trawl Surveys (Quarter 3 2019 + Quarter 1 2020) 2 West Coast Bottom Trawl Surveys (Quarter 4 2019 + Quarter 1 2020) Are MPAs effective in removing fishing pressure from benthic species and habitats? - Associated datasets and code. Report on razor clam surveys in the Sound of Harris and the Ayrshire coast of the Clyde (Girvan to North Bay) Updated Girnock and Baddoch Fish trap counts First year of releasing Scottish Fish Farm Production Survey data as fully open data Scottish Shellfish Farm Production Survey data 	<p>During 2019-20, BODC received 261 accessions of data from 55 organisations in 15 countries as follows:</p> <ul style="list-style-type: none"> 11 accessions from NERC laboratories (not including collaborative centres & National Oceanography Centre (NOC)) 22 accessions from UK universities 12 accessions from UK Government funded laboratories 1 accession from commercial organisations 145 accessions from charitable organisations (including from NOC centres) 70 accessions from overseas laboratories <p>The data comprise physical, chemical, biological and geophysical observations in a variety of forms including profiles, time series and discrete samples.</p> <p>Data sets are prepared using MEDIN guidelines and are loaded into the National Oceanographic Data Base (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.</p> <p>During 2019 - 2020, an additional 69 datasets (55% increase) were added to the Published Data Library (PDL) and received a DOI. The PDL had 1064 active downloads from 235 published datasets.</p>

4 Highlights

In addition to providing metrics, the DAC reports also detail highlights from the previous year, which together show levels of activity, examples of usefulness of the DAC network and indicate how nationally and internationally integrated the DAC system is.

4.1 New developments and capabilities:

Marine Species and habitats DAC (DASSH) implemented an online MEDIN Guideline Validator - <https://www.dassh.ac.uk/validator/> to automate checks/validation of data. The Biodiversity Data and Information Group (BioDIG), a subgroup of HBDSEG was launched with DASSH as lead.

Bathymetry DAC (UKHO) has a new portal which enables access to combined and deconflicted 100m gridded dataset.

Fisheries DAC (MSS and Cefas)

MSS transferred its Fisheries Independent Survey database to a new operating system and database version.

Cefas achieved its first example of direct data flow using Ocean Biodiversity Information System (OBIS) format to transfer data into DASSH node for OBIS, Global Biodiversity Information Facility (GBIF) and EMODnet Biology (Young Fish Survey). Cefas is also providing the metadata of DOI datasets to the Defra Data Services Platform.

Historical Environment DAC (ADS, RCAHMW and HES)

ADS gained Core Trust Seal accreditation in April 2020. See <https://www.coretrustseal.org/wp-content/uploads/2020/04/Archaeology-Data-Service.pdf>. All metadata records: grey literature from OASIS and datasets from archives, combined in ADS account within MEDIN metadata Portal (with help from DAASH).

RCAHMW commenced a major Digital Delivery project to move to a completely new platform for the delivery of its data systems, including site and archive data, online access and digital storage. The main, initial stage of this is due to be completed by the end of June 2020.

HES undertook work on scoping the identification and addition of wrecks designated under the Protected Military Remains Act 1986 for publication on PastMap.

Water column oceanography DAC (BODC) has been carrying out a number of new developments, including:

- A 'data submission app' to enable originators to submit and publish their data with greater automation.
- Improvements to the Cruise Summary Report infrastructure and automation of the workflows.
- Completion of a proof of concept sprint to look at ingesting a small subset of Conductivity Temperature Depth (CTD) parameters from our CTD data files into ERDDAP, a data server allowing consistent and easy download of data.
- Improvements in delayed mode data quality control (QC) for Argo float profiles by standardising and improving QC mechanisms.
- General Bathymetry Chart of the Oceans (GEBCO) data meet the two-click download function since the new grid release in April 2019 and now have a DOI associated to the data for ease of

attribution. Development has provided a new data download app (cloud based for service reliability).

- All BODC European Directory of Marine Environmental Data Sets (EDMED) records and Published Data Library (PDL) records under NERC Open Government Licence now have a landing page marked up with schema.org.

Marine geology and geophysics DAC (BGS) launched a new Strategic Environment Assessment (SEA) Data Portal (<https://www.bgs.ac.uk/data/sea/>). The portal gives free access to available information and reports which have been produced through the Department for Business, Energy & Industrial Strategy (BEIS) SEA process.

Marine meteorology DAC (Met Office) have had a couple of major developments in the last reporting year.

- Installation of new hardware on many of our observing ships which draw power from the ship rather than solar panels, leading to a significant improvement in observation output during the winter.
- Designed and launched/will launch several large software upgrades.
- Improved metadata record keeping and sharing with international partners.

4.2 New funding streams:

Some of the MEDIN DACs received new funding streams during 2019-20 including:

- **Marine Species and habitats DAC (DASSH)**: Defra R&D for development of Pelagic Lifeform Tool.
- **Bathymetry DAC (UKHO)**: Funding for the Bathymetry DAC is inbuilt in future plans at UKHO and more investment is being made each year to ensure continued and increased availability of bathymetry data.
- **Historical Environment DAC (ADS)**: University of York internal funding for development of continuous professional development (CPD) courses aimed at the heritage community, introducing them to digital preservation responsibilities.
- **Water column oceanography DAC (BODC)**: Part of European Union (EU) funded Environmental Research Infrastructure building Fair services Accessible for society, innovation and research (ENVRI FAIR), as part of the European Open Science Cloud (EOSC) project stream. The overall goal is for the Research Infrastructures to meet FAIR data principles. BODC funding is linked to activities within the Argo programme and SeaDataCloud. BODC is also involved in new externally-funded projects requiring glider data management.
- **Marine geology and geophysics DAC (BGS)** received some funding from Hartley Anderson to upgrade the SEA portal on behalf of BEIS.

4.3 International meetings

Many of the DACs have been involved in a broad spectrum of international meetings during the reporting year:

- **Marine Species and habitats DAC (DASSH)**:

- European Marine Observation and Data Network (EMODnet) Biology, Launch of European Atlas of Marine Life & Partners Meeting, Lisbon, Portugal. 15-17th May 2019
- Ocean Biodiversity Information System (OBIS) Steering Group Meeting, Santa Marta, Colombia, 4-8th Nov 2019
- Fostering FAIR Data Practices in Europe (FAIRsFAIR) 1st Certification Support Workshop for Data Repositories, Den Haag, Netherlands, 6th Feb 2020
- **Fisheries DAC (MSS and Cefas):**
 - MSS
 - International Council for the Exploration of the Seas (ICES) Data and Information Group,
 - ICES Annual Science Conference,
 - Marine Alliance for Science and Technology Scotland (MASTS) Annual Science Meeting
 - Cefas
 - EMODnet Biology, Lisbon –May 2019 (European Atlas of Marine Life Showcase and Partners Meetings)
 - Vlaams Instituut voor de Zee (VLIZ) FAIR Data Workshop, Oostende – June 2019
- **Historical Environment DAC (ADS, HES and RCAHMW)**
 - ADS presented papers on digital preservation at the following International meetings and conferences in the reporting year:
 - Cultural Heritage and New Technologies (CHNT2019), Vienna, November 2019
 - European Association of Archaeologists (EAA) Annual Conference, Bern, September 2019
 - Computer Applications and Quantitative Methods in Archaeology CAA Conference, Krakow, April 2019
 - RCAHMW held its annual Digital Past Conference in February, which is an international conference on the use of digital technology in recording, interpreting and engaging with heritage
- **Water column oceanography DAC (BODC):**
 - Seabed 2030
 - Argo
 - Commonwealth Marine Economies (CME) Programme
 - ENVRI-FAIR WP9 meeting
 - Enabling FAIR
 - FAIRsFAIR
 - Southern Ocean Observing System Scientific Steering Committee and Data Management Sub-Committee
 - ICES Data Information Group Meeting
 - Ocean Obs' 19
 - OpenSeaLabs hackathon (ICES and EMODNET)
 - Research Data Alliance (RDA)
 - Everyone's Glider Observatory (EGO)
 - International Marine Organization (IMO) MSC 101 Marine Safety Conference
 - 16th Session of the Intergovernmental Oceanographic Commission (IOC) Group of Experts for the Global Sea Level Observing System
- **Marine geology and geophysics DAC (BGS):**
 - EMODnet High Resolution Seabed Mapping
 - EMODnet Ingestion

- EMODnet Geology project meetings.
- BGS was also involved in many non-marine specific international meetings
- **Marine meteorology DAC (Met Office)**
 - Fifth Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) Workshop on Advances in Marine Climatology (CLIMAR-V)
 - In Situ Marine Wind Workshop in Hamburg 6-9th May 2019
 - Deutscher Wetterdienst (DWD) Collaboration meeting 7th May 2019 Hamburg

4.4 Data Access and Sharing:

Data from most of the MEDIN DACs are being made available under open licences such as the UK Open Government Licence (OGL) for data. The majority of data from MSS, NERC (e.g. BGS and BODC), UKHO, Met Office, and Cefas are made available under this licence.

The ADS have moved from an older form of licence to Creative Commons (CC) CC-BY or CC-BY-NC for new datasets. ADS is slowly addressing updating historic licences where depositor/originator can be contacted.

For RCAHMW, licensing of datasets is governed by the [Re-use of Public Sector Information Policy](#). For HES, Canmore location data is released under an Open Government Licence. Individual archive items are subject to copyright terms agreed with depositor.

For 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.

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

Bathymetry DAC (UKHO): Data are available to download and be interrogated through a geospatial viewer and search query. The new portal enables access to more than just bathymetry data held at UKHO. The data are licenced under OGL and are also made available through third party portals such as Data.gov.uk, EMODnet, and the International Hydrographic Office (IHO) Data Centre for Digital Bathymetry (DCDB).

Marine species and habitats DAC (DASSH): Data are published via OGC web services, a map-based, web-accessible query tool and the Integrated Publishing Toolkit using Darwin Core Archive structured data. The underlying data systems have been completely redesigned and improved to provide rapid querying and greater integration. The ability to publish data in OBIS-compliant formats has been improved to decrease the lag in data availability to downstream aggregators. Further improvements in data exchange with the UK National Biodiversity Network have been trialled and will be operationalised in 2020. Data are made available through the following third-party portals National Biodiversity Network Atlas – atlas.nbn.org.uk, EMODnet Biology, EurOBIS, OBIS, GBIF.

Fisheries DAC (Cefas and MSS): MSS: For repeated annual surveys that are internationally coordinated through ICES working groups, the data are submitted to the ICES Database for Trawl Surveys (DATRAS), while metadata is sent to MEDIN with link directly to the DATRAS system. For nationally coordinated surveys or other datasets, data are to the extent possible uploaded to the Marine Scotland Open Data portal and minted with DOI. Metadata are submitted to MEDIN containing the DOI.

For some aggregated data, spatial resources are made available on Marine Scotland Maps portal (<http://maps.marine.gov.scot>) and described on the Marine Scotland Information portal (<http://marine.gov.scot>). For spatial resources originating in or maintained by Marine Scotland and relating to fisheries, metadata are forwarded to MEDIN, with links directly to layers or information

pages. Data are made available through third party portals such as ICES DATRAS - <https://ices.dk/marine-data/data-portals/Pages/DATRAS.aspx>
Scottish Spatial Data Infrastructure - <https://www.spatialdata.gov.scot/>

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

Improvements to access in the past year include Publication of specific datasets directly available in OBIS Core Format.

All metadata is automatically exported to MEDIN and data.gov via Web Accessible Folders (WAFs). All metadata that include a DOI are also served to the Defra Shared Services platform.

Historical Environment DAC (ADS, HES and RCAHMW):

ADS: Datasets are available for download directly from ADS website. Datasets 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. A number of grey literature reports (155) are disseminated as individual records within an application known as the ADS Library. Each report has its own DOI. The ADS Library was redeployed in March 2020 with a range of improvements to search functionality, and a focus on leveraging DOIs (via DataCite API) to aid discovery and citation.

The ADS undertook an audit of the whole ADS website to ensure AA Accessibility (W3C). Website is to be redesigned to meet these requirements by September 2020 (following guidelines from University of York).

ADS data are made available through third party portals such as

- AriadnePlus <https://ariadne-infrastructure.eu/>
- Keepers Registry <https://keepers.issn.org/>
- Heritage Gateway <https://www.heritagegateway.org.uk/>
- NERC Data Catalogue <https://csw-nerc.ceda.ac.uk/geonetwork/srv/eng/catalog.search#/home>

HES: Data made available Online portal (Canmore) and map based search (PastMap), View and download services. Improvements to access include

- ATOM feed for (entire) Canmore record
- Third party portals: National Marine Plan Interactive (NMPi)
- Scotland's Environmental Web (SEWeb)

View and Download services are available through the Scottish Spatial Data Infrastructure portal and also harvested by Data.gov.uk and INSPIRE Geoportal.

RCAHMW: Our data is mainly accessed via Coflein our online database, and Historic Wales the collaborative historic environment portal for Wales. Data downloads are available on request to the RCAHMW enquiry service.

We are moving to a new data platform, this includes the internal data applications and an improved version of our public web access system, Coflein. This work is ongoing and will be completed by the end of June 2020. Our full maritime INSPIRE-compliant dataset has been made available on the Welsh Government's Lle Geo-Portal. [Licensing of datasets is governed by our Re-use of Public Sector Information Policy](#)

Water column oceanography DAC (BODC): The BODC National Oceanographic Data Bank (NODB) delivery system, https://www.bodc.ac.uk/data/online_delivery/nodb/, now gives access to ~132,000 data series; a 2% increase in the number of series available online from last year. Data are available such that users can search across cruises, time, location, originator, parameter etc. Services offer a user choice of a one-click download (for publicly accessible data) or 'online shopping' with a basket and check out mechanism. Data are made available in various data formats under secure access control methodologies which includes user request tracking of auto-downloads.

There was an 8% increase in the number of described 'data collection' aggregation records in the MEDIN Discovery Metadata portal. The BODC tally now sits at 231 data collection aggregations and 1085 cruise collection aggregations. Where appropriate, these discovery metadata records carry a URL within the online resource metadata element that leads directly to the data.

BODC have made improvements to access arrangements through further development of ERDDAP instances (a proof of concept delivery) and schema.org. All metadata records through the Published Data Library (PDL) have been published with schema.org. These improvements are ongoing within BODC and will be expanded upon in the following year.

The BODC autonomous platform data system (APDS) is a modular transfer system for near-real time data that adheres to the Open Geospatial Consortium (OGC) Sensor Web Enablement (SWE) marine profile and the global ocean observing system (GOOS) networks. The current implementation facilitates the processing and dissemination of ocean glider data. Recent developments include improvements to the metadata system to enable the complexity of sensors to be captured and mapped to common vocabularies, near-real-time dissemination of open access glider deployments to the EGO Global Data Assembly Centre, addition of open glider data to the BODC website via the ERDDAP tool within an hour of receiving the source.

Data are made available through third party portals such as SeaDataNet; EMODnet Chemistry via SeaDataNet; MERMAN data incorporated into DOIs by Marine Science Scotland (MSS) and Cefas and harvested by SeaDataCloud and EMODnet chemistry.

Marine geology and geophysics DAC (BGS): Data are made available through the Offshore GeoIndex – <https://www.bgs.ac.uk/GeoIndex/offshore.htm> (also available as a Web Map Service) SEA Data Portal - <https://www.bgs.ac.uk/data/sea/home.html>
BGS Deposited Data Search - <https://www.bgs.ac.uk/services/ngdc/accessions/index.html?>

Improvements to access include

- An upgraded Strategic Environmental Assessment (SEA) Data Portal
- Ongoing improvements/additions to the Offshore GeoIndex
- Use of GeoNetwork to improve access to Discovery Metadata
- Improvements to BGS Deposited Data Search
- Data Discoverability and other projects under Geospatial Commission

Geological maps created from data are incorporated into EMODnet map products and made available through the EMODnet Geology Portal.

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

Data is also shared in real time through the World Meteorological Organisation's (WMO) Global Telecommunications System (GTS).

Regarding improvements to access, plans have been made to improve communication in cases of data failure and platform movement. Additional metadata has been made available as well.

Moored platform data for the previous 24 hours are available, either in full or in part, on:

- The Cefas WaveNet webpage
- The National Data Buoy Centre (NDBC) portal run by the US National Oceanic and Atmospheric Administration (NOAA)
- ICOADS – run by NOAA
- CEDA

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. Some DACs, such as Cefas and MSS only receive data from staff in their own organisations. The MEDIN metadata standard is followed, but the use of the guidelines is not widespread. BODC and 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. DACs such as UKHO, RCAMHW, Met Office 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). Current status of the individual DACs is as follows:

- Funding for the **Bathymetry** (UKHO) and **Marine Meteorology** (Met Office) DAC activities have been incorporated into operational plans and are considered part of business as usual.
- **Species and Habitats DAC** (DASSH) receives rolling year-on-year funding from Defra and the Scottish Government, assessed against a series of Key Performance Indicators. EU EMODnet Biology funding is also secured into 2021.
- Funding for the **Water-column Oceanography** (BODC) and **Marine Geosciences** (BGS) DACs appears secure in the short to medium term with no reductions (although this is not inflation-proofed). These two data centres have been through the NERC Data Centre National Capability evaluation and commissioning process 5-year funding cycle (2018-2023). NERC remains committed to data management for the medium and long term.
- **FishDAC**: Cefas operates under a yearly funding cycle and funding is approved to support data management activities in FY2021. For Marine Scotland Science, the funding situation is stable, but with a growing workload.

- **Historic Environment DAC:** The ADS 5-year plan currently runs to 2021 and is reviewed by the Management Committee, on which MEDIN is represented. Although the ADS operating environment is likely to become more difficult in the next 3-5 years, the plan to 2021 is robust and commits to the furtherance of ADS aims and objectives and continuance of relationships with existing external partners such as MEDIN. No significant variation to the basic business model is expected for the next 5-year plan (2021-2026), although opportunities for exploring core funding for infrastructure is being investigated via UK Research and Innovation (UKRI).
- The other two components of the **Historic Environment DAC** (Historic Environment Scotland and RCAHMW) are funded through the Scottish and Welsh Governments respectively, which are committed to ensuring that they are properly resourced in the current, short term and medium-long term. Historic Environment Scotland receives additional revenue from its Commercial and Tourism arm. COVID-19 has already had a substantial impact on HES funding this year and will likely continue.

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