

Report of the Data and Information Group (DIG)

25-29 May 2020
Web conference

International Council for the Exploration of the Sea Conseil International pour l'Exploration de la Mer

H.C. Andersens Boulevard 44-46
DK-1553 Copenhagen V
Denmark
Telephone (+45) 33 38 67 00
Telefax (+45) 33 93 42 15
www.ices.dk
info@ices.dk

Recommended format for purpose of citation:

ICES. 2020. Report of the Data and Information Group (DIG). ICES Business Reports, 25-29 May 2020, 29 pp. <http://doi.org/10.17895/ices.pub.7449>

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Executive Summary

At the meeting of the ICES Data and Information Group (DIG) six key areas were progressed (Data Policy and licensing, hosting ad-hoc data sets and data visualisation systems, Data Guidelines and Documents, ICES Data Centre Activities and DIG support, Data Governance, and Future Challenges & Opportunities), with a total of 20 ongoing actions for intersessional work in the group.

DIG is working on refining a proposal for separating data policy and data licensing. Currently all aspects of process and handling of data (policy) are combined with the rights and permissions of data use (license) in the ICES data policy document. This means each variation of data access or use permissions results in a new data policy. DIG is working up a proposal to create a global data policy that outlines all aspects of how data are received, maintained, and safeguarded at ICES, while the data made available via ICES data portals can have different licenses associated with each collection to reflect permissions, limitations, and responsibilities to users of the data.

The work on policy and licensing directly relates to another important strand of work on how to receive and host smaller/one-off community contributed datasets or data visualisations. There is a growing number of requests for such services. Both DIG and the ICES Data Centre welcomes that the ICES community wants to increasingly share data and information openly. DIG will update the Best Practise User handbook to strengthen this procedure, along with a decision making model for licensing, and safeguarding against duplication of data. Thus, work on data policy and licensing, best practise guidance, and the hosting of data and visualisations are all interconnected. These strands will require significant work over the coming year to fully align. The work will need to align with the Data Centre Accreditation, and engage with governance groups and the wider ICES community to ensure that guidance and requirements are approachable yet comprehensive.

The developments in ICES Data Centre are continuing to increasingly align with FAIR principles (Findable, Accessible, Interoperable, and Reusable) with projects further integrating data and advice in a new data portal. There are many other projects in the Data Centre but commonly they are all becomes architecturally aligned through the use of services, common vocabularies, while allow the exploration of new technologies. The revision of the accession system is another particularly important foundation stone in ensuring traceability of data submitted to ICES while incorporating new aspects such as persistent identifiers and license considerations.

DIG received activity updates from governance groups. Across the groups, there is strong engagement from the ICES community of experts in the oversight and management of data and in particular the prioritisation of resources for new developments. These updates reflect a wide variety of activities across the groups. But are all increasing dialogue and delivery of the strategic areas in the ICES science and advice plans relating to improvements in the utilisation and quality of data.

DIG updated the challenges and opportunities tracker. Several items were escalated to a higher potential to disrupt than previously along with new entries. In particular supply of data has been escalated, primarily as a reflection of the current variability in data collection activity surrounding the COVID-19 situation. The work on a quality management framework for ICES has also been identified as a high potential to disrupt, primarily as a positive influence, but nonetheless likely to induce changes and additional work.

1 Meeting structure

Due to the changes in many members' working patterns, and general travel and meeting restrictions during the COVID-19 pandemic, the 2020 annual main meeting of the Data and Information Group (DIG) was held as a series of WebEx meetings spanning Monday 25 May to Friday 29 May 2020. This added two days to the originally planned meeting dates, but consisted of shorter online sessions each day. Prior to the meeting, members were polled for their preference of format for the meeting, either a series of shorter WebEx meetings spanning a slightly longer period, or longer WebEx sessions during the originally planned meeting dates (26-28 May 2020). The response was overwhelmingly in favour of shorter sessions.

The Terms of Reference addressed during the meeting remained the same, and were all addressed:

- a) Provide guidance and feedback to the ICES Data Centre;
- b) Advise on data regulations and their impact on ICES Strategy, ICES Data Policies, and license considerations;
- c) Facilitate data governance by performing evaluations, and encouraging dialogue between expert groups, governance groups, DIG and the ICES Data Centre to adopt best practises in data management;
- d) Evaluate and monitor current and future challenges and opportunities in data management and new technologies for ICES.

Due to the more fragmented nature of the WebEx sessions, and the fact that many members were working from home with additional caring or home education responsibilities, the number of participants was not uniform across the week. However, all Terms of Reference were addressed during the meeting, and the list of participants include members attending part or all of the sessions.

The agenda of the meeting was shaped around WebEx sessions, and an overview of the sessions and agenda are included in Annex 2.

During the meeting six key topics were worked on:

- Data Policy and licensing (ToR b; Section 2)
- ICES role in hosting ad-hoc data sets and data visualisation systems (ToR a, d; Section 3)
- Data Guidelines and Documents (ToR a, c; Section 4)
- ICES Data Centre Activities and DIG support (ToR a; Section 5)
- Data Governance (ToR c; Section 6)
- Future Challenges, Opportunities, and Scope for DIG (ToR d; Section 7)

While each topic is addressed in separate sections of the report, it should be recognised that there are increasingly synergies and common threads arising between them. DIG regards this as a positive step and a sign of a maturing data and information governance process in ICES.

2 Data Policy and Licensing

Following on from the 2019 DIG report and subsequent update to SCICOM in September 2019 and March 2020, DIG is further developing the recommendation for ICES to separate Data Policy and License aspects¹.

DIG is working to provide a revised data policy document in collaboration with the ICES Data Centre. The data policy is still a very important document that outlines the processes for receiving, cataloguing, holding data submitted to ICES. The revision of the data policy document will include findings and wording from the Core Trust Seal accreditation work and will remove some sections that relate directly to the use and citation of data as that is a matter for the data usage license instead.

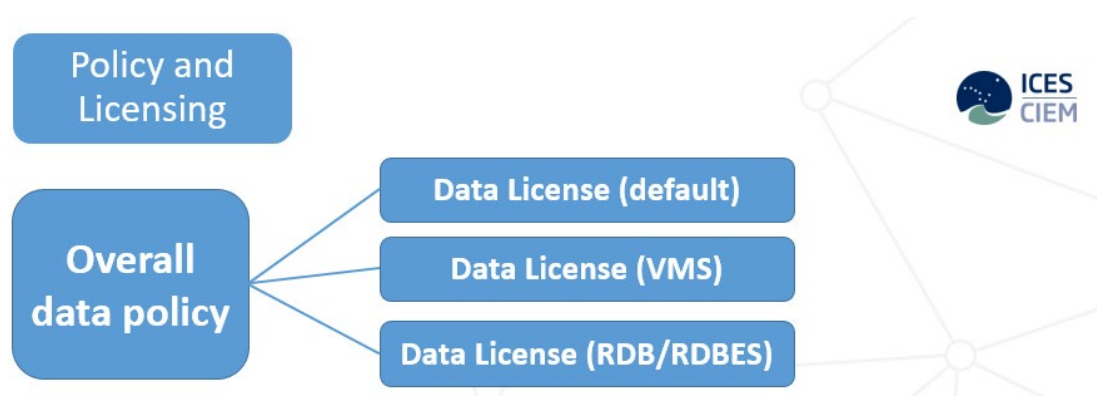


Figure 1. Overview Diagram of Data policy and data licensing from SCICOM March 2020 Update.

DIG also worked on identifying appropriate model data licenses that can be applied to different kinds of data held by ICES. Large amounts of data managed through ICES are openly available, and through both breakout group work and plenary discussion, DIG identified that the license conditions for using this type of data from ICES is largely aligned with the Creative Commons Attribution License² (CC-BY) – when compared to a range of pre-existing open license models. There are however some differences that will need further consideration and decisions for the ICES Science and Advisory Committees and Council over the coming period, specifically:

- The current ICES Data policy requires written consent from ICES if users redistribute data. It is generally recognised that there is little monitoring and means with which this part of the data policy can be enforced, but the requirement would have to be removed for ICES open data if it were to align with the CC-BY license model.
- During data submission process, it will be necessary for submitters to recognise both the ICES data policy (How ICES will handle the data, enable changes/updates etc.) and the data license. If a member country provides data under a less restrictive license than CC-BY, this would technically mean that ICES would violate this license (by imposing additional restrictions). This is effectively already the case, and the issue will be addressed in the final review and recommendation.

¹ Link to current ICES Data Policies: <http://ices.dk/data/guidelines-and-policy/Pages/ICES-data-policy.aspx>

² <https://creativecommons.org/licenses/by/4.0/>

For data that are currently not openly available, ICES has had to redevelop its data policy for each context. With the DIG proposal, the same data policy will apply to all data held in ICES, and the data license for each restricted dataset will vary. To avoid a cumbersome process for expert groups, DIG will develop a common template that will outline which exclusions and limitations should be considered for more restrictive licenses. This will also include draft licenses (following the given model) for the existing restricted ICES datasets.

With the progress on the Transparent Assessment Framework, and expert groups utilising GitHub for collaborative working, it was also recognised that a new ecosystem of licenses are already forming in ICES. A list of current licenses in use for data and/or code through ICES GitHub repositories were reviewed, and although several were in use with no unified rationale behind choices, the considerations of GitHub and code licensing should also be included in the final package of recommendations. Overall, DIG supported the proposal that GitHub repositories under the ICES banner should default to the MIT license model. If the default cannot be accepted, then the same approach as for more restrictive data licenses should be followed to define the license required for specific non-open cases.

DIG considered the possibility of preparing the review in time for the September 2020 SCICOM and ACOM meetings to then align with an October Council meeting to facilitate a faster decision making process on this matter. However, in light of the on-going work on the current application for accreditation for the ICES Data Centre, and the amount of work needing to be done, it was decided to aim for a draft of data policy, restrictive license framework, and model licenses by January 2021 to be able to make a presentation to SCICOM in March (Actions 1 and 2 in Annex 3).

3 Hosting ad-hoc Datasets and visualisations

In September 2019, SCICOM requested DIG to specifically consider the implications of ICES acting as a host for a Shiny Server that will help the community to develop and deploy data visualisations and analysis. During the intersessional period, DIG advised that providing an internal facing Shiny server, only accessible to members of the ICES user community could be a workable initial trial, but that it was recommended to develop clear guidelines for what should be hosted on any external facing server, and that clarity about review of code and methods should also be developed.

At the March 2020 SCICOM meeting DIG was tasked with developing the guidance further. There has also been a request from the ACOM Chair to consider mechanisms in a wider context that could include datasets that cannot currently be hosted on an existing ICES system. DIG is responding to these requests in part with some observations, and in part with forward looking actions - the future challenges and opportunities tracker has subsequently been updated.

3.1 Current situation

ICES Data Centre receives between 10 and 20 new requests each year to host some kind of data, information, or data visualisation that does not fit into existing systems. The requests are seeking to ensure that the work developed in expert groups are properly associated with ICES to reflect both international collaboration and act as an indicator of quality and scrutiny as well. DIG recommends this approach, and recognises that the call for increased openness and adoption of FAIR principles are now starting to ripple through the community, and there is likely to be an increase in these types of requests.

DIG and ICES Data Centre developed the first version of the Best Practice for Data Management³ in 2019, and the document already outlines a number of best practise principles that should ideally have been addressed by the time data are to be hosted at ICES. Unfortunately, for the majority of requests, these considerations are generally not fully documented. This means that any on-boarding or development tasks within the ICES Data Centre will take longer, and thus fewer such requests can be met in any given year.

Where stand-alone datasets or data visualisations are used, those are commonly based on individual data files or extracts rather than direct interchange with web services. This makes them less interoperable, but faster to work up (as you do not need to include coding and considerations for changes to the data). However, across the full collection of ICES Data, it is important to avoid hosting multiple versions of the same dataset – especially where these data are used in advice products.

For many of the existing data systems and types of data, ICES is now successfully implementing governance groups where the user community collaborates in setting out the framework and prioritisation for different data streams and development. The requests for hosting stand-alone datasets and visualisations does not currently fall under any contractual obligation or governed system, and so it falls to the ICES Data Centre to evaluate and prioritise these against resources

³ <http://doi.org/10.17895/ices.pub.4889>

available, and balancing risks to ICES' reputation (e.g. reputational damage may occur if these products do not work correctly or consistently).

In today's offerings of development platforms, cloud hosting, and data visualisation tools, it is not difficult for members of the ICES community to find alternative solutions to hosting content in other places. So there is an element of risk that an inflexible approach from ICES will result in data being added to external systems with less control over quality and scrutiny.

While it is positive that the ICES community increasingly wants to openly share content, it is still important that requests are considered thoroughly to avoid quality issues, duplication, or potential impact on the credibility of the organisation.

For example, data visualisations are a powerful and effective way of communicating trends and patterns in data. With data visualisations often come an ability to dynamically query or "drill down" to lower levels of data granularity. As such, it is particularly important for data that are not currently fully openly available to test thoroughly that agreed aggregation levels are not accidentally circumvented by providing visualisations in a more dynamic tool – this question is thus also linked to the topic of data licensing discussed earlier.

3.2 Addressing the needs

Developing a flexible solution to hosting variable datasets and visualisation is, in itself, not a difficult task. But ensuring that the solution is integrated, supported, and maintainable for the long term requires consideration to avoid ending up with a plethora of unsupported and half-developed ideas.

DIG supports the idea of developing the capability for the wider ICES community to support data dissemination, but recommends exploring the capabilities, needs, and awareness level first. To address this, DIG will present a draft survey for the ICES expert group community in time for the September 2020 Science Committee meeting, in hope that such a survey could be launched and promoted in time for the January 2021 WGCHAIRS Meeting to get widest possible buy in from the community (in the absence of the ASC 2020, which would otherwise have been an opportunity to promote a survey) (Action 3, Annex 3).

Under all circumstances, DIG recognises the need for a clear and effective decision and prioritisation model to help support and govern a rising number of requests in this area. In part, this can be achieved by ensuring inclusion of the topics of the ICES User Handbook: Best Practice for Data Management, but needs to be underpinned by a checklist and decision structure. DIG will draft a decision structure to aid progress (Action 4, Annex 3).

Finally, DIG and ICES Data Centre did observe that requests and visualisation tools rarely make use of the existing web services in ICES. Although it may utilise and transform the same data, there is often a preference for working on local copies. While this may sometimes be necessary, DIG does reflect that there may be additional needs for training in the use and integration of the existing web services to ensure the best possible products can be created by the community, and avoiding manual updates where integration can be achieved. ICES Data Centre has previously provided training in the use of GitHub by request. In part, the further development of both the Transparent Assessment Framework's ability to utilise said web services, and the development of a new ICES Data portal that utilises a micro services design may well help in increasing awareness of working with such technologies.

4 Data guidelines and documents

DIG is responsible for a range of Data type guidelines hosted on the ICES website⁴. The Datatype guidelines are primarily focussed on oceanographic collection and management of data, but also do cover some other aspects such as plankton sampling.

All of the existing data type guides are also published on the IODE Ocean Best Practices portal where they continue to attract readers. They are also referenced within the SeaDataNet quality control manual.

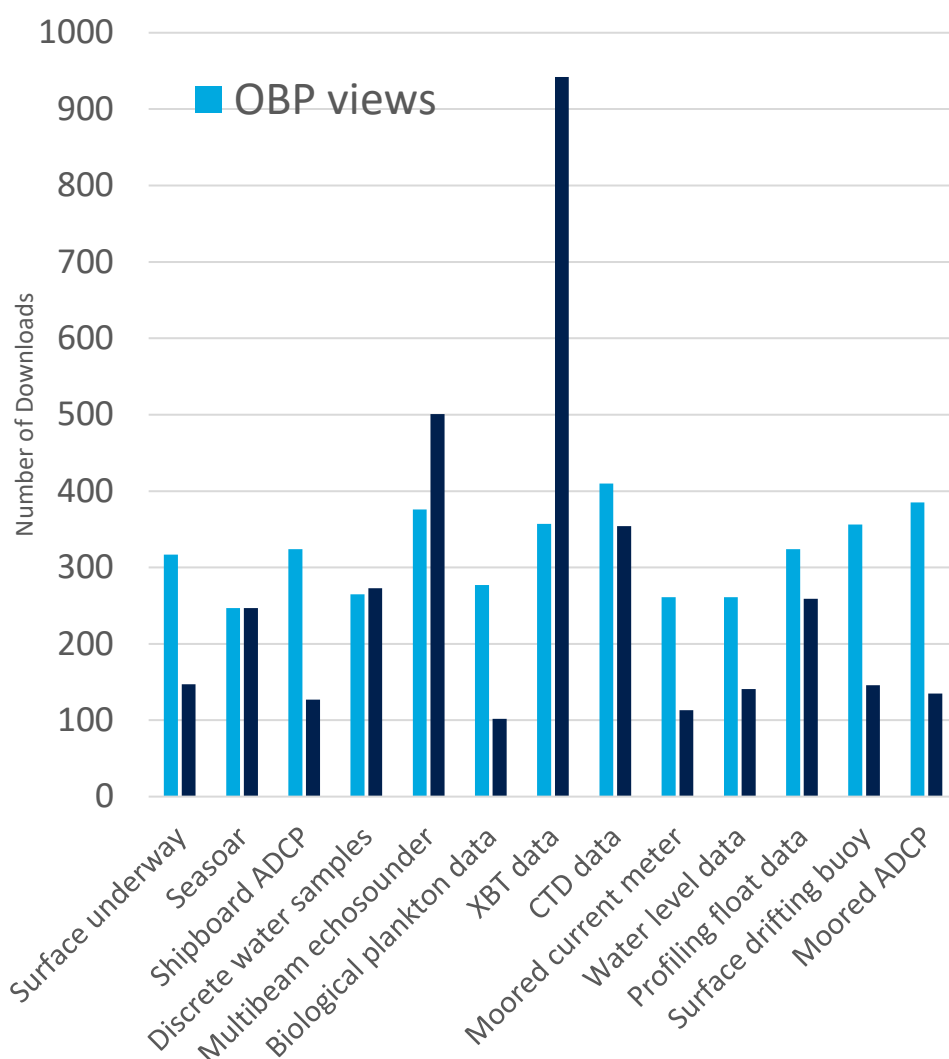


Figure 2. Number of downloads of Datatype guidelines. Note: The number of downloads data are for different periods for Ocean Best Practices (OBP) – 6 months, and for ICES – 5 years.

The guidelines have been around for a long time (most were created around 1999 and revised in 2006), and last year DIG decided to contact other groups to seek assistance in review and ongoing maintenance for a number of these guidelines. Unfortunately, due to losing a critical member in

⁴ ICES Data Type Guidelines link: <http://ices.dk/data/guidelines-and-policy/Pages/ICES-data-type-guidelines.aspx>

this process, the progress has been limited. During the DIG meeting, a renewed approach for consultation and review was developed whereby DIG will remain more actively involved, and still seek outside review assistance, primarily from the ICES community, but also outside with where necessary.

Identification of, and contact to, working groups for specific data guidelines will be established to evaluate scope of review and update. By November 2020, a complete list of status for the datatype guidelines will be ready, and a table will be developed for the ICES website highlighting the last update, and reviewers/maintainers of the guidelines (Actions 5-7, Annex 3)

DIG examined the existing publications' metadata, and identified a potential need for the ability to include versioning of the documents and ideally to be able to link/acknowledge more than one ICES group on a document. This will be reviewed when an overview table of review status is built in November.

DIG also looked at the connections between the ICES Data Centre Quality Control tracking tool, and the links to the datatype guidelines. In places the connection is not specific, and it was recommended that these linkages will need to be examined and reaffirmed with adequate detail once the review is completed.

Finally, as work is also progressing on reviewing the ICES Data Policy, it was observed that it would be beneficial to make links between the data policy and/or the Data User Handbook and the location for format guidance, such as the datatype guidelines, survey manuals, and other standards formats such as the WGFASST development of acoustic metadata standards.

5 ICES Data Centre activities

It has been a long-standing tradition that the ICES Data Centre provides a series of presentations to DIG on the current and developing projects. These presentations provide DIG with the opportunity to provide advice and examples from other national and international settings. Increasingly the collaborations between DIG and ICES Data Centre also mean that DIG or governance group members are involved in projects at earlier stages than previous. This is a positive development as it enhances community awareness of technical solutions, and provides user inputs at earlier stages. This year updates on five key projects were presented, as well as a status update on the work on applying for the ICES Data Centre accreditation.

5.1 Development of a new ICES Data portal

The core phase of the development of the ICES Data portal replacement is nearing completion. The system developed is making extensive use of micro-services, thus allowing data from a wide range of platforms in ICES to be integrated, viewable, and searchable. This approach also enables the addition of additional data collections at later stages as well as potential use of the services to support other workflows (e.g. if a data collection needs to reference or link with content in a separate system, these service can be used to form a bridge).

The ICES website has recently undergone revisions, and the new data portal will, on deployment, become a clear focal point for accessing data, being housed on a much simpler URL at data.ices.dk

Users will be able to search the system by topics, themes, or design their own more advanced searches. Results on the map display can be downloaded, but additional controls also provide in depth information, links to metadata, and other information.

The overall design of the data portal is very clean and minimal, yet provides in depth information across an extensive part of ICES datasets.

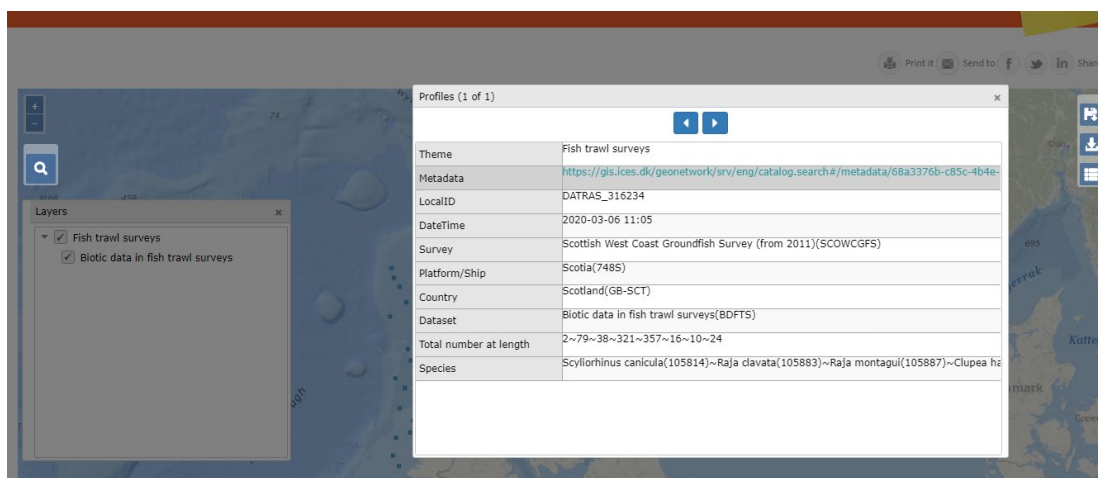


Figure 3. Example of in depth data for individual points on the ICES data portal.

DIG has had a standing action to provide beta testers for any new developments to the portal, and it was agreed to retain this action for the coming year (Action 8, Annex 3).

In addition to functional enhancements, the new ICES Data portal also introduces a new mix of input data, data products, and a range of advisory products. This has been a much requested functionality and will bring together much of the output from ICES in a common searchable interface.

The core phase has seen the inclusion of 9 input data collections, and 7 data products collections with an extended phase targeting a further 6 input collections and 6 data product categories as well. The extended phase of the development during 2021, will also see some useful additions such as the ability to log in to access restricted layers (e.g. layers limited to expert groups) and to save queries for reuse. A stretch goal is also to perform conversion of data into an internationally recognised data format (Darwin Core) where applicable.

DIG supports the developments of the order of prioritisation of features for the system, recognising that this replacement to the ecosystem portal will provide a range of benefits to the wider user community.

5.2 Update to Accessions system

The ICES Accessions are essential for the ability to track submissions across systems. The current system has been operational since 2006, and is comprised of a file system with an associated database and user interface. It is still in use, but with a changing landscape for data submissions via web services and increased automation, it is recognised that there is an opportunity to both strengthen the process and reduce manual interventions for Data Centre staff.

ICES Data Centre staff ran an agile ideation workshop, identifying 3 key areas to address:

- Process and workflow
- Interface functionality
- Outputs, summaries and dashboard.

In the ideation work, it was recognised that the system will need to be able to handle both automatic and manual submissions, while also taking on board previous DIG recommendation on being able to incorporate existing persistent identifiers for submitted datasets.

In subsequent solutions exploration, ICES Data Centre has identified existing technology that will be able to handle large aspects of the workflow requirements out of the box, but will require some work to fully align with all the identified requirements. The identified technology is based around a CRM system designed for handling cases, products, and accounts – which broadly corresponds to submissions, databases, and institutes in the way we think about accessions today. Several DIG members observed that similar considerations around CRM technology had been discussed in their home institutes, and although it is still in an early exploratory phase, DIG welcomes the approach and requirements identified.

5.3 Metadata for fisheries survey series

The EU regional coordination groups, the chair of the Ecosystem Observations Steering Group, Survey governance groups, and the ICES Data Centre are starting to work together to form a comprehensive standard for information about scientific survey series.

While information exists, both in ICES (Metadata, DATRAS, Acoustic portal, SISPs, DCF lists) and on national and international levels (e.g. EDIOS/SeaDataNet) there is not a fully formed standard for how these surveys are described at the summary level.

Work has started on defining attributes requires for each survey series, which will allow mapping of attributes to existing standards and vocabularies as well as any new attributes required.

Due to the timing of this work flow, the list of attributes had already been developed by the time of the DIG meeting, and the regional coordination groups will be reviewing these and making amendments during June–July 2020. The DATRAS governance group (WGDG) was consulted early, and highlighted some key considerations such as maintenance roles/responsibilities (for updating metadata), preventing double efforts (e.g. use what is already there), and how to manage surveys without coordination groups.

DIG expressed some reservation about the idea of developing additional standards, given that many already exist, but recognised the need for more efficient reporting of the different information that is already gathered, and an examination of any gaps. DIG offered to support the process by assisting with mapping the attributes identified by regional coordination groups to existing standards and potential recommendations for establishing practises from a general perspective (Actions 9 and 10, Annex 3).

5.4 Transparent Assessment Framework (TAF)

The Transparent Assessment Framework is now a maturing platform with a recently established governance group. As the range of assessments being run in TAF is growing, development has focussed on strengthening the structure of the framework and supplying tools to the user base. TAF was the first ICES data handling tool to go through the DIG governance evaluation template, and it is positive to see that areas identified for improvement during that process has been significantly progressed and improved.

The use of TAF is now expanding beyond stock assessments, although there are still a number of stocks yet to be incorporated. Spatial fisheries data products, fisheries overviews, management strategy evaluations, and mixed fisheries advice is also developing within the TAF approach, which demonstrates the benefits of the framework for ICES.

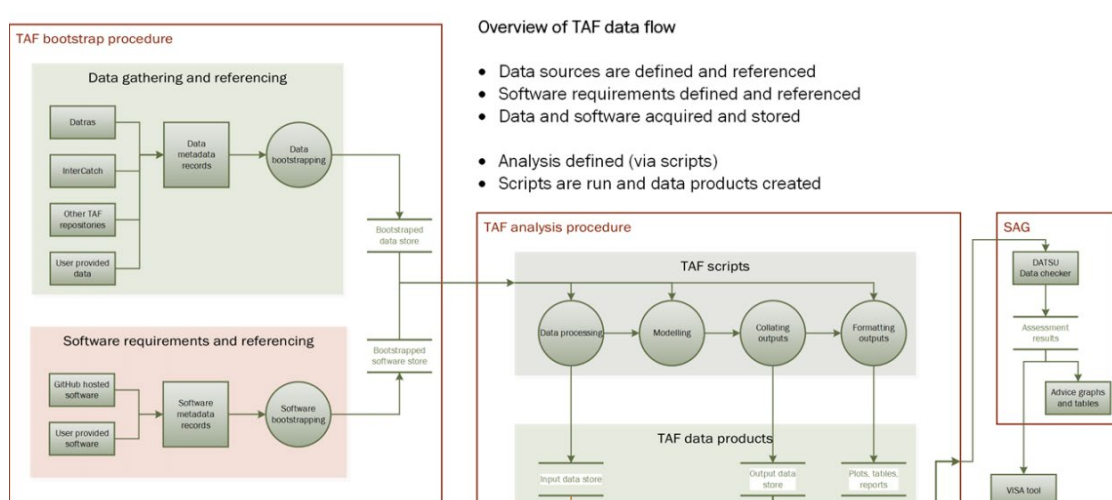


Figure 4. Overview of TAF data flow.

Development work towards a micro-service structure will align the TAF and the data portal work in ICES, creating scope for much more effective data transmission and referencing between platforms. It will also help address work on quality assurance and quality control in ICES as interchange between applications will ultimately need to be able to express a degree of fitness for purpose within the assessment context.

An important aspect of the strategic deployment and use of TAF is to ensure that adequate training is provided on a continuous basis. Two regional workshops for stock assessments are planned for 2020: i) Bay of Biscay, Iberian Coast, Baltic Sea, ii) Southern North Sea, Norwegian, and Arctic Seas. In addition, ICES Data Centre provides support to expert groups developing approaches in TAF.

With a dedicated governance group for TAF, subsequent reviews and prioritisations are now a matter for the Working group on TAF governance (WGTAFGOV), but several DIG members are in this expert group, so sharing of information will continue.

5.5 Continuous Underwater Noise

In 2019, HELCOM contracted ICES to develop and host a database on continuous underwater noise. This will complement existing registers of impulsive noise, but also introduces some significant challenges in terms of handling large data volumes and new technologies.

A continuous underwater noise data format was developed by ICES Data Centre on collaboration with expert groups, utilising the HDF5 format, which is specifically designed for managing high volume tiered data combined with metadata. The standard is split into file information, metadata, and data, and makes use of controlled vocabularies where possible.

File and metadata information will be stored in a relational database, while the high volume data itself will be linked, but exist outside the database.

Data submission started testing in late march, supporting two different modes:

- Files up to 2 GB in size can be uploaded to ICES
- Files up to 30 GB can be linked to the system, but remains at externally hosted locations.

Further development of the solution includes a soundscape tool for visualising modelled sound data, and additional mapping features. This is a discussion between HELCOM and ICES as part of the contractual arrangements.

DIG queried if data streaming and “no-sql” options had been considered as part of the solution. These are new technologies designed specifically for allowing access to high volumes of data without the use of traditional relational databases. Considerations had been made, but it was also deemed important to do gradual steps allowing for faster deployment of known technologies.

DIG highlighted these considerations in the future opportunities and challenges tracker, and it was felt appropriate to make a note of this project in the tracker as it is one of the first projects starting to address solutions in this space.

5.6 ICES Data Centre accreditation update

During the 2019 DIG meeting, the decision to seek accreditation under the Core Trust Seal (CTS) mechanisms was made. The decision did not rule out alternate accreditations at later stages, and there is a recognition that other accreditation systems are also based on the same framework, if expressed different.

The CTS accreditation includes 16 requirements that each require a compliance level corresponding to “being implemented” or “fully implemented”.

Over the past year, the accreditation documentation has been drafted, and reviewed by the secretariat in February 2020. Comments were subsequently sought from the DIG chair in March 2020 and the overall process was presented to for consultation with ACOM in April/May 2020.

The intention of the ICES Data Centre is to incorporate final adjustments and submit the application for accreditation in June 2020, recognising that additional pressure caused by the COVID-19 situation may cause a slight delay.

During the year, information has been gathered on 30 data flows that are considered in scope as being managed by ICES Data Centre. The accreditation application scope only extends to the point at which data arrives in ICES, as prior data controls, collection methods and management aspects are out with the control of ICES. The information for the 30 data flows have been catalogued and will now be used to create schematics that identifies the process steps of the specific flow. These data flows are to be considered ICES Advice outputs.. Given the overall work in the ICES Advisory Committee to develop an overarching quality management framework as described in the Advisory Plan, these work flow schematics and underlying information will be a valuable resource.

At the time of applying for accreditation, ICES Data Centre will have published at least one of the data flow schematics to evidence the approach (the evaluation of the 16 criteria and associated evidence is drafted separately, but draws on the same information that will be used to create the schematics).

As the data flow schematics will be considered ICES Advice, they will also be formally published, providing a great deal of transparency for processes in ICES. While the job of interlinking the data flows with that of developing a quality management framework will not be complete with the publication of the schematics, it will form the backbone of much of this work, and will be a very important resource for ICES in improving quality assurance. From a DIG perspective, the schematics and data flows will also be a resource to help identify where challenges and opportunities for data management will have the greatest disruptive impact, and will help clarify how much of the ICES data governance landscape is well covered, and where further development might be needed.

6 Data Governance

The introduction of governance groups gave governance expert groups specific responsibility for interfacing between the wider ICES community and ICES Data Centre, and to assist in providing a clear vision and prioritising development for large areas of the ICES Data landscape. With a set of overarching terms of reference for most of these groups, there are now direct ICES expert community representation in place for five areas/systems in ICES:

Governance Group	Data/Application area
SC-RDB	Commercial fisheries data, Regional Database (RDB) and Regional Database Estimation System (RDBES)
WGDG	Trawl surveys (DATRAS)
WGSMART	Age reading software and data (SmartDots)
WGTAFGOV	Transparent Assessment Framework (TAF)
WGSFDGOV	Spatial Fisheries Data (VMS/AIS)

Each of the governance groups kindly provided an update to DIG on their outcomes in the past year and plans for the coming year. The groups were also asked for input on whether there was specific assistance or input required from DIG.

DIG in collaboration with ICES Data Centre also drafted a governance evaluation for the DOME (Marine Environment) system.

6.1 Steering Committee of the Regional Fisheries Database (SC-RDB)

The Steering Committee of the Regional Fisheries Database (SC-RDB) is a governance groups which oversees the current regional database (RDB) and the new Regional Database & Estimation system (RDBES) that is under developments.

Over the past year a range of activities have taken place:

- The roadmap for RDBES development was revised.
- ICES “2+2 years” funding for technical development was confirmed. A fully operational RDBES such that statistical estimates for stock assessment can be produced from detailed sample data in a transparent manner by 2022. It will also aim to incorporate detailed data on bycatch and PETS data and/or recreational data by 2023.
- Whilst the focus remains on detailed commercial fisheries, the potential inclusion of different types of fisheries data (such as long distance, large pelagic, diadromous, and recreational fisheries) have been discussed.
- The RDBES data policy was discussed and some changes were recommended to enable regional coordination groups to pre-approve access to detailed data for a list of ICES expert groups.
- Monitoring the use of the regional database. 2019 saw the largest number of groups request data from the RDB as well as feeding into the development of fisheries overviews.

- The group is recommended a change of the name of the group to align with ICES guidelines: WGRDBESGOV.

Looking ahead for the coming year, the group is organising three workshops on populating the data model, design based estimation using the data model, and translating national estimation techniques into RDBES and TAF.

There will also be a data call in 2020, which is purely used for testing and development.

The key challenges for SC-RDB and the development of the RDBES system are to consolidate a diverse range of national sampling schemes into a common data model and to facilitate the storage of detailed biological sample data to produce estimates for use in ICES stock assessments. Both of these aspects represent challenges for a large and complex system, while the funding of the system development is a constant question.

The SC-RDB would like DIG to help place the RDB/RDBES data policy in the wider ICES context, something that is now being addressed by DIG. Given the interlinkage between the RDBES system being used to store detailed data, and using TAF for carrying out estimation procedures, SC-RDB also considered it important that DIG facilitate contact and communication between governance groups to avoid conflicting or parallel developments.

6.2 Working Group DATRAS Governance (WGDG)

WGDG is set up as a group that meets approx. four times a year online, and an annual oral report in the DIG meeting, followed by a written report in June. Between May 2019 and May 2020 the group has met three times. The main achievements in that period mainly related to 'Main developments common functionality across different surveys', especially a unified format for DATRAS data submission. This format on one hand facilitates the use of all available DATRAS fields by all surveys, and on the other hand will facilitate upload of a selection of only relevant variables due to the use of columns with a standard naming convention.

Furthermore, the governance framework for DATRAS has been filled in and been discussed. The first version will be available in autumn 2020. A DIG subgroup will review the filled in framework.

6.3 Working Group on SmartDots Governance (WGSMART)

The ICES Working Group on SmartDots Governance (WGSMART) continues to oversee and advise on the improvements needed to make SmartDots a fully functional tool for age reading and maturity staging exchanges, workshops and training exercises. The group meets four times per year via WebEx plus one physical meeting. In 2020 the physical meeting will be held online with one session prior to the meeting of the WGBIOP (ICES Working Group on Biological Parameters) and one session following the WGBIOP meeting. There is close collaboration between these two groups, many of the SmartDots users are WGBIOP members and the feedback loop between the two groups is important.

There has been a lot of progress in the last 12 months; two new software versions released, continuous improvements to the Web Application, quarterly newsletters to inform users of updates, manual updates and an ICES SmartDots YouTube channel for training purposes. All ToR's are on track and a report on the 2019 WGSMART meeting is available [here](#)

<http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EOSG/2020/WGSMART%20Report%202019.pdf>. In 2020; maturity on SmartDots (including the manual and the reporting module) will be tested; a new software version released prior to WGBIOP featuring developments based on end-user requirements; an improved method for calculation of modal age will be incorporated into the reporting module and vocabularies streamlined with the DATRAS unified format. All requests for development and improvements are incorporated into the GitHub work plan, available here <https://github.com/ices-eg/SmartDots/projects/3> and are currently being handled by WGSMART members. Any major developments will require additional funding.

WGSMART encourages and will participate in initiatives to strengthen the communication between the ICES governance groups, especially those related to future plans for data integration across ICES systems and databases. From DIG, WGSMART would like feedback on the DIG Governance questionnaire and to be kept informed of updates to data quality guidelines.

6.4 Working Group on Transparent Assessment Framework Governance (WGTAFGOV)

The governance group for the transparent assessment framework met for the first time early in 2020 with the aim to produce a manifesto that establishes the framework for prioritisation and development. The manifesto is planned to be complete by September 2020. During the first meetings, WGTAFGOV have recognised that TAF will support analyses other than stock assessment, and are developing two vocabularies

- A list of types of analyses such as acoustic index calculation, stock assessment, or RDBES catch raising
- A set of data formats that a TAF analysis can agree to produce, much like a contract or interface.

WGTAFGOV and ICES Data Centre have also worked to develop a user database that has the correct information to allow authorization to be applied to a variety of resources based on expert group membership and role (such as chair, stock assessor, ACOM member etc.).

A project board has been established on GitHub (<https://github.com/ices-eg/WGTAFGOV>), and WGTAFGOV are encouraging submissions of issues, comments and feedback via this platform for prioritisation

At the moment, WGTAFGOV is getting established, and there is no immediate need for additional DIG input, but as the manifesto is developed, WGTAFGOV will seek input from DIG on guidelines and development on handling publishing, licensing, and sensitive data.

6.5 Working Group on Spatial Fisheries Data Governance (WGSFDGOV)

WGSFDGOV is a newly established governance group. After the 2019 DIG meeting, it was planned to conduct a governance evaluation on the data flows related to spatial fisheries data products. When WGSFD met, and discussed this in detail, it was decided to propose a dedicated governance group. The resolution was subsequently approved, and WGSFDGOV met for the first time on 1 February 2020. Current progress is focussed on writing the manifesto/governance framework, which is aimed for completion in quarter 3, while completion of the governance evaluation template from DIG is aimed to be completed in quarter 4.

In addition, questions have already been discussed in the governance group (during the Thursday break of the DIG meeting, so Thursday 28 May 2020) about the handling of sensitive data. In particular, there is a balance between creating accessible and useful data products while avoiding exposure of commercially sensitive or private data relating to commercial fishing activities. Other aspects discussed was how best to address and signal the level of completeness of data products (e.g. relating to the number of data sets submitted to a data call and whether this is fully representative of the fishing activity for example).

Similar to other working groups, WGSFDGOV is currently developing their framework, so are mainly looking to DIG to answer requests for clarification, and guidance on data policy and licensing.

6.6 Enhancing communication and collaboration with governance groups

While governance groups deal with different data types, systems, and scientific disciplines, there are a number of common interests in aligning with wider principles of best practise data management in ICES. Several of the governance groups requested additional contact and dialogue with DIG, which is both welcome and important. In recognition a follow up WebEx meeting between ICES Data Centre, DIG, and governance groups in November/December 2020 will be organised to ensure communication is maintained and updates can be shared (Action 15, Annex 3).

The format and meeting schedule of governance groups means that the existing scientific report formats is often a poor fit for the groups to report back. The DIG chair will raise this with the secretariat, relevant steering groups, and SCICOM to discuss the best solution (Action 16, Annex 3).

DIG also agreed to provide assistance in the review of drafted framework texts as they emerge. Specifically, WGDG and WGSMAART requested reviews at the meeting (having been operational longer than other groups) (Actions 14 and 17, Annex 3), but it is recognised that other governance groups will likely request similar reviews in between meetings.

6.7 Governance evaluation of DOME (Marine Environment)

The DOME portal is used by OSPAR, HELCOM, AMAP and expert groups in the management of chemical and biological data for regional marine assessments. A sub group of DIG and ICES Data Centre went through the DIG evaluation template and added draft evaluations.

The group completed most of the template, but found there was a need for clarifying some questions and terminology before fully finalising the evaluation in time for the September SCICOM meeting (Action 13, Annex 3)

Overall, the draft evaluation indicates a balanced and mature system with a reasonably even distribution of maturity levels across best practise topics. DIG has previously presented the outcomes of the TAF governance review, and a similar overview will be drawn up for DOME. DIG stresses that although a maturity level score is being used in the evaluation, the core outcomes is the identification of improvements, and the relative maturity level across categories rather than the numerical value itself (e.g. if a system is consistently scoring 3 across all categories, this could actually be better than a system that attain 5 in some categories, but 1 in others).

7 Future challenges and opportunities

DIG has established a future challenges and opportunities tracker over the last 2-3 years. The tracker is used to identify the broad topics that presents disruptive potential to the management of data in ICES. Currently the tracker is primarily maintained by DIG and used to provide updates to SCICOM. At the September 2019 and March 2020 SCICOM meetings, discussions reached a decision that a data and technology focussed steering group will be established in ICES, and so it will hopefully be relevant to share the tracker with both a future steering group chair, and groups within this area.

7.1 Breakout group work

A breakout session reviewing the “DIG Future challenges and opportunities” was held during the DIG 2020 meeting.

All items on the list were reviewed and two items were updated, “Semantic interoperability of data” and “Changed level of detail of data collection”. In addition, four new items were added to the list of items.

1. Adoption of new technology – challenges and possibilities related adoption of new technology in ICES
2. Data availability – challenges related to reduced data availability from data collectors
3. Data licensing – challenges and possibilities related to adopting usage of data licensing
4. Hosting applications developed by EG/WG – challenges and possibilities related to hosting applications developed by EG/WG

Figure 5 provides a summarized version of “DIG future challenges and opportunities”.

7.2 Plenary work

All of the activities discussed and progressed during the DIG meeting now relate to items in the challenges and opportunities tracker, but the introduction of the “Data Availability” topics was primarily highlighted by the effects of the COVID-19 effect on data collection efforts across ICES member countries. However, it was recognised that data availability and responses to data calls in general also fall into the challenging category that has a major potential to disrupt in a way not easily addressed by technology solutions. Currently this topic was placed as a high potential to disrupt, but a sub group will discuss this and mitigation factors and provide and update accordingly (Action 18, Annex 3).

Overall there was consensus on the work of the subgroup, and this means that a number of topics has been escalated to higher levels of potential disruption.

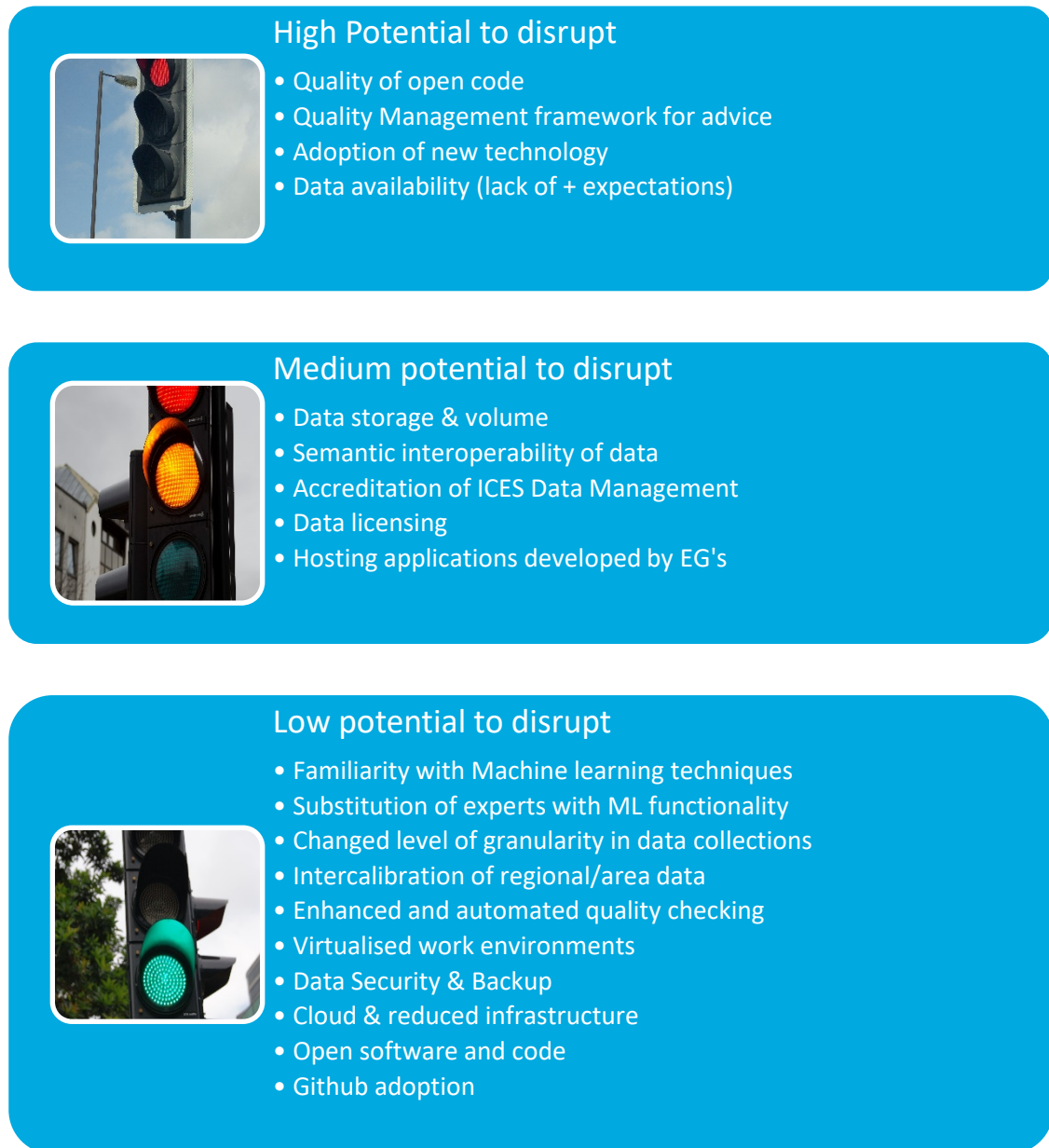


Figure 5. Summary of DIG Challenges & Opportunities tracker

8 Practical Matters

8.1 Scope and role of DIG

Some time was spent at the last two DIG meetings to discuss the role and scope of the group – both as it stands, and in the context of a new data and technology steering group in ICES. Unfortunately, the SCICOM subgroup working on the terms of reference for the Data and technology steering group had not yet concluded at the time of the DIG meeting, so the discussions were limited to the potential collaborations and improvements that this can lead to.

DIG had planned to update and discuss its role and how it fits into wider ICES processes in 2019, and a subgroup further developed the diagram to illustrate this (Figure 6). This is primarily a resource for internal use to aid dialogue and introduce new members to the scope of DIG.

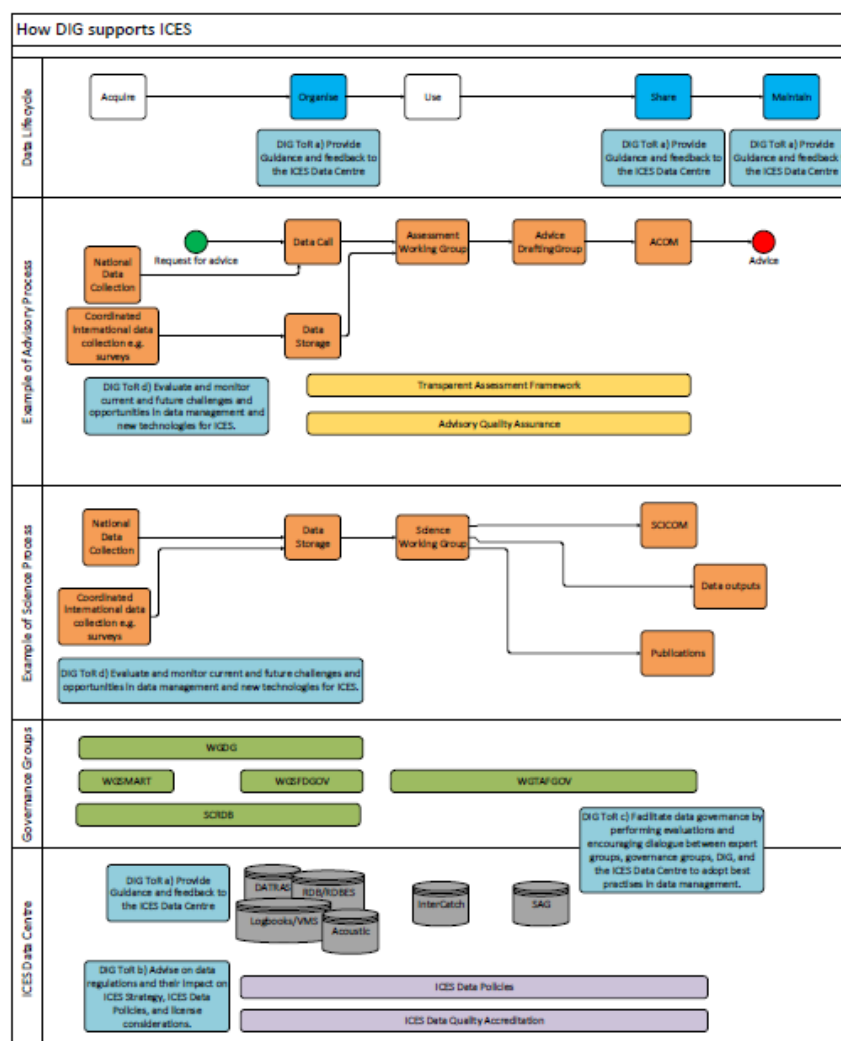


Figure 6. Diagram of DIG functional areas and interactions. Full size at http://community.ices.dk/Committees/DIG/DIG%202020/04.%20Working%20documents/DIG_Scope/DIGSupportingAdvisoryProcess_v02.pdf.

8.2 New chair of DIG

The current chair of DIG has served the 3 year standard period and one year of extension. This year, DIG was pleased to receive a suggestion for a new chair - Sjur Ringheim Lid from the Marine Institute in Norway - who accepted the nomination and was unanimously accepted as the Chair of the ICES Data and information Group from 2021–2023.

8.3 Interim meeting

It was recognised that DIG has an extensive work programme that is including a large amount of work to report to SCICOM and ACOM meetings. Typically, DIG meets in May each year, but it means that between the September and March SCICOM meetings, there are no plenary sessions to address actions or questions raised. To address the, DIG decided this year to hold a shorter WebEx meeting in later September/Early October. This will allow DIG members to provide updates on the existing action list, as well as address any new actions or queries to DIG from SCICOM. The dates of both the interim meeting and the following year's meeting in May/June were polled for a 3 week period after close of the meeting.

8.4 Dates of next meetings

The interim meeting for DIG will take place after September SCICOM meetings to provide and update to members, assign any actions or activities arising, and to review progress on actions from this meeting.

The interim meeting for DIG will take place via WebEx on 28 September 2020, from 14:00–17:00 CET.

Next year's main DIG meeting is scheduled for 18-20 May 2021. The meeting format is hoped to be a physical meeting, but will be monitored and reviewed in alignment with ICES' planning for hosting meetings and overall travel advice related to the COVID-19 situation.

Annex 1: List of participants

Name	Country/Affiliation
Colin Millar	ICES
Chris Moulton	OSPAR
Christian von Dorrien	Germany
Clare Postlethwaite	United Kingdom
David Currie	Ireland
Gisbert Breitbach	Germany
Hans Mose Jensen	ICES
Helge Sagen	Norway
Hjalte Parner	ICES
Ingeborg de Boois	Netherlands
Jens Rasmussen (Chair)	United Kingdom
Josefine Egekvist	Denmark
Jolanta Cesiulienė	Lithuania
Julie Coad Davies	Denmark
Julie Kellner	ICES
Laura Hanley	United kingdom
Lennert Tyberghein	Belgium
Malin Werner	Sweden
Marcin Wichorowski	Poland
Neil Holdsworth	ICES
Örjan Bäck	Sweden
Periklis Panagiotidis	ICES
Ruth Lagring	Belgium
Sjur Ringheim Lid	Norway
Sara Almeida	Portugal
Susanne Tamm	Germany
Taco de Bruin	Netherlands
Wim Allegaert	Belgium

Annex 2: Meeting Schedule and Agenda

The Meeting schedule for online sessions:

Time table of WebEx connections & sessions					
Time (CET)	Monday 25 May	Tuesday 26 May	Wednesday 27 May	Thursday 28 May	Friday 29 May
9-10		Breakout 1	Plenary 3	Breakout 2	
10-11			<i>Data centre update</i>	<i>All day reserved for work in home institutes and/or any outstanding breakout work</i>	Plenary 5
11-12					<i>Close of meeting</i>
12-13					
13-14	Plenary 1	Plenary 2	Plenary 4		
14-15	<i>Opening of meeting</i>				
15-16					
16-17					

The Agenda was then fitted to the WebEx and Breakout sessions. Some plenary discussions had to be shorter than normal to facilitate more compressed working

Monday 25 May 2020 – Plenary session 1

Time	Item	Description
13:00 – 13:15	P1.1	Welcome and introductions
13:15 – 13:30	P1.2	Agenda and key activities for this meeting
13:30- 14:00	P1.3	Action List status
14:00-14:30	P1.4	Update from SCICOM meetings and Formation of a Data/Technology steering group
14:30 – 15:00	P1.5	Work on comparing licenses and ICES Data Policy
15:00 – 15:10		Short break to get coffee/tea
15:10- 15:30	P1.6	Guidelines on ICES hosting data visualisation system(s) e.g. R Shiny
15:30 – 15:40	P1.7	New chair for DIG
15:40 – 16:00	P1.8	Planning tomorrow's breakout sessions: - Licensing and data policy - Hosting of data visualisations - Data Guidelines action plan - Any other?

Tuesday 26 May 2020 – Breakout session 1

Time	Item	Description
09:00 – 09:10	BO1.1	Brief plenary/contact to ensure everything working in breakout sessions
09:10-12:00	BO1.2	Breakout Session on Licensing and Data Policy
09:10-12:00	BO1.3	Breakout Session on Hosting of data visualisation platforms
09:10 – 12:00	BO1.4	Breakout Session on Data Guidelines, status and plan for completion

Tuesday 26 May 2020 – Plenary session 2

Time	Item	Description
13:00 – 13:30	PL2.1	Plenary presentation and discussion from BO1.2 Data Licensing and Policy
13:30-14:00	PL2.2.	Plenary presentation and discussion from BO1.3 Data Visualisation platforms
14:00 – 14:30	PL2.3	Plenary presentation and discussion from BO1.4 Data Guidelines
14:30 – 15:00	PL2.4	Master documents and Future Challenges and opportunities updates

Wednesday 27 May 2020 – Plenary session 3

Time	Item	Description
09:00 – 12:00	PL3	Update on activities from the ICES Data Centre: - New ICES Data portal - Accessions - TAF - Continuous Underwater Noise - Fisheries Survey Metadata

Wednesday 27 May 2020 – Plenary Session 4

Time	Item	Description
13:00 – 13:10	PL4.1	ICES Advisory plan
13:10 – 13:40	PL4.2	Quality assurance framework for advice in ICES
13:40-14:00	PL4.3	ICES Data Centre accreditation. Status, outlook
14:00-14:20	PL4.4	Best Practise document review
14:20 – 14:50	PL4.5	Data hosting in ICES: Standalone datasets?
14:50 – 15:00	PL4.6	Recap and planning for any breakout work (if needed) during Thursday

Thursday 28 May 2020 – Breakout Session 2

Thursday was reserved for additional breakout work and work via correspondence.

Friday 29 May 2020 – Plenary session 5

Time	Item	Description
10:00 – 11:15	PL5.1	Updates from governance groups: - WGDG - TAFGOV - SCRDB - WGSFDGOV - WGSMAART
11:15 – 11:35	PL5.2	Governance evaluations status
11:35-12:00	PL5.3	Summaries from any additional breakout work on Thursday – or any other matter arising
12:00-12:15	PL5.4	DIG Role and scope
12:15-12:35	PL5.5	Selection of new chair for DIG
12:35-13:00	PL5.6	Reports contributions, Action list, AOB Close of meeting

Annex 3: List of Actions

Number	Description	DIG members (lead contact in bold)	Due
1	Revise ICES Data Policy to separate out licensing conditions, focussing on the handling and processing of all data in ICES instead	Chris Moulton, Ingeborg de Boois, Taco De Bruin, Helge Sagen	Jan-21
2	Draft common template for limited data usage licenses and apply to existing examples in ICES	David Currie, Chris Moulton, Ingeborg de Boois, Laura Hanley, Neil Holdsworth, Taco de Bruin	Jan-21
3	Draft a data needs/development needs survey questionnaire for ICES community. Specifically addressing: Capabilities and Competencies, Awareness of Services, Product distribution needs, knowledge of recommendation processes, use of data quality descriptors, awareness of data usage license mandates, and data visualisation needs.	Neil Holdsworth, Adriana Villamor, Ingeborg de Boois, Laura Hanley, Periklis Panagiotidis, Sjur Ringheim Lid, Julie Kellner, Vaishav Soni, Wim Allegaert, Carlos Pinto	Aug-20
4	Draft decision tree and ground rules for establishing hosting of datasets outside of existing core systems or existing formats. Includes data visualisation, hosting, and other material that does not fit into a current resolution or request.	Jens Rasmussen, Carlos Pinto, Laura Hanley, Hjalte Parner, Colin Millar	May-21
5	Contact ICES expert groups and expert organisations outside ICES for contributions to review of ICES Data Guidelines, using and established template and issue log	Clare Postlethwaite, Orjan Back, Laura Hanley, Sara Almedia, Hjalte Parner	Oct-20
6	Hold WebEX to review and update status of ICES Data Guidelines review process, and decide on ongoing activities until following DIG meeting	Clare Postlethwaite, Orjan Back, Laura Hanley, Sara Almedia, Hjalte Parner, Jens Rasmussen	Nov-20
7	Complete an updated list of Data Guidelines review status, including ones that cannot be reviewed or maintained. Update information on Data Guidelines metadata accordingly	Clare Postlethwaite, Orjan Back, Laura Hanley, Sara Almedia, Hjalte Parner	May-21
8	DIG to provide beta testers for testing developments on new ICES data portal	Carlos Pinto, Mehdi Abbasi, Lena Szymanek, Ingeborg de Boois, David Currie, Jens Rasmussen, Chris Moulton, Sjur Ringheim Lid	May-21
9	WebEx to discuss and recommend fisheries survey series metadata approach, examining established practices, and what is available in ICES	Neil Holdsworth, Ingeborg de Boois, Sjur Ringheim Lid, Jens Rasmussen, David Currie, Adriana Villamor	Sep-20

Number	Description	DIG members (lead contact in bold)	Due
10	Following Action 9 - Ongoing work to map content from RCG's to recommended standard	Neil Holdsworth, Ingeborg de Boois, Sjur Ringheim Lid, Jens Rasmussen, David Currie, Adriana Villamor	Dec-20
11	Finalise edits to Best Practises Handbook Version 2.	Ingeborg de Boois, Wim Allegaert, Neil Holdsworth, Laura Hanley, Clare Postlethwaite, David Currie, Jens Rasmussen	Oct-20
12	Incorporate relevant content and sections in Best Practises Handbook version 3 to reflect update to draft data policy. Note Action expected to collaborate with Action 1 & 2	Ingeborg de Boois, Wim Allegaert, Neil Holdsworth, Laura Hanley, Clare Postlethwaite, David Currie, Jens Rasmussen	Mar-21
13	Review and finalise DOME governance evaluation	Chris Moulton, Hans Mose Jensen, Jens Rasmussen, Anna, Joanna	Sep-20
14	Review and finalise DATRAS framework description with WGDG	Ingeborg de Boois, Neil Holdsworth, Jens Rasmussen	Sep-20
15	Governance Group WebEx with DIG and Data Centre	Neil Holdsworth, Jens Rasmussen	Nov-20
16	Discuss Governance group reporting formats with secretariat and steering groups. Communicate to governance groups	Jens Rasmussen	Oct-20
17	Review and finalise SMARTDOTS framework description with WGSMAARTGOV	Wim Allegaert, Julie Coad Davies, Jens Rasmussen,	Sep-20
18	Review and detail the "data availability" item on challenges and opportunities tracker. Discussion of impact level, and mitigation in particular	Sjur Ringheim, Neil Holdsworth, Ingeborg de Boois, Jens Rasmussen	Sep-20
19	Set up and complete doodle poll for DIG interim meeting to follow after September SCICOM & ACOM meetings	Jens Rasmussen + All DIG members to vote	Jun-20
20	Set up and complete doodle poll for next DIG annual main meeting in May 2021	Jens Rasmussen + All DIG members to vote	Jun-20