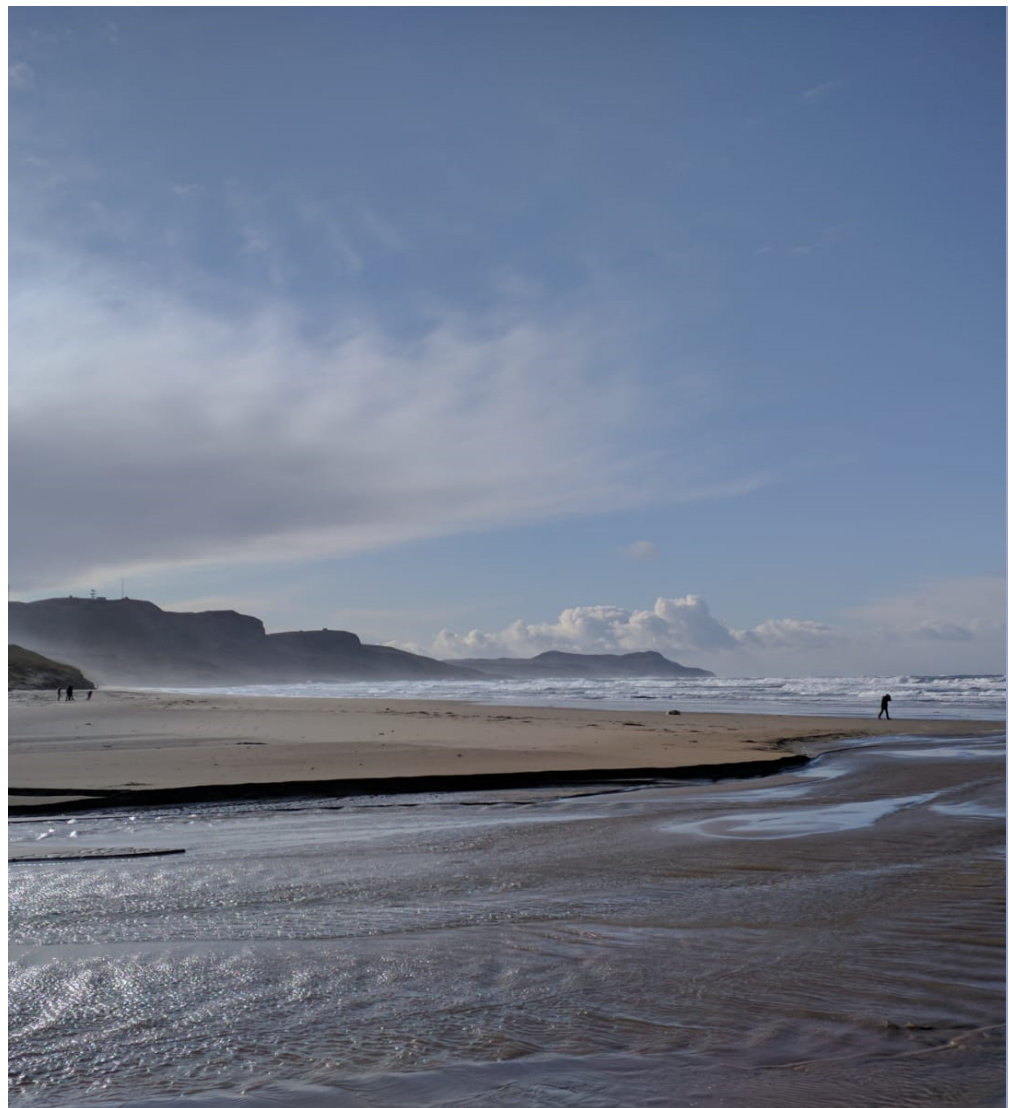


SCICOM PROGRESS REPORT 2022

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ICES BUSINESS REPORTS



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i Extended summary

Council is invited to:

- **Endorse the Stakeholder Engagement Strategy**
- **Endorse the Code of Ethics and Professional Conduct**
- **Take note of the Science Plan Implementation**
- **Take note of the new library and the ability to track the metrics of the use and citation of ICES publications**
- **Take note of the Strategic Initiative on the Integration of Early Career Scientists and the activities in support of opening up the ICES network to Early Career Scientists**
- **Take note of Science Cooperation, WGCHAIRS 2022, the Training Programme and the activities in the Strategic Areas**

The **ICES Science Committee** continues to support ICES science to grow in scale, scope and impact. The general objectives of the Science Committee are to work with the ICES community and Secretariat to keep the ICES science programme dynamic, internationally relevant, and impactful; to ensure seamless links between science, data and advice; and to engage with scientists in ICES member countries and beyond by planning an annual cycle of meetings and workshops as well as the Annual Science Conference.

2022 has been, and still is, a challenging year for everyone. The **COVID-19 pandemic** continued to influence the work in the network. In addition, the decision of the Council in March to place a temporary suspension on all Russian Federation delegates, members, and experts from participation in ICES activities has affected groups, symposia, and cooperation activities with other organisations. The immense commitment and tireless work of the whole network, including all individual scientists and especially the Secretariat, helped to adapt to the challenges and to resume the work of groups.

One new steering group chair was elected in September 2022 to lead the Fisheries Resources Steering Group. The incoming chair will work with the current chair to ensure a smooth transition for 1 January 2023.

Notable activities in 2022 included (i) the development of a stakeholder engagement strategy, (ii) a strong focus on supporting expert groups, including support for online and hybrid meetings; (iii) furthering the engagement of new scientists participating in the ICES community; (iv) an increased frequency and strategic emphasis on science communication; (v) increasing the links between science and advice; (vi) maintaining and further develop international collaborations, (vii) fostering activities to increase links between national activities and ICES (viii) the development of a code of ethics and professional conduct, including measures to increase diversity, equity and inclusion, (ix) and the first hybrid ICES Annual Science Conference, including dedicated activities for Early Career Scientists.

These activities have taken place alongside the continued delivery of science outputs and publications by the expert groups.

One hundred and eighteen working groups and forty-three workshops, supported by seven steering groups, were active in 2022. Expert group meetings in 2022 saw again a very high number of new participants and had a higher overall attendance than in previous years. An

overview of the groups is presented in the new ICES Activities Dashboard developed by Secretariat. The Dashboard is still in a beta version, thus should be used with caution.

The Steering Groups are meeting regularly to enable communication and create linkages between the Expert Groups within a Steering Group and across Steering Groups, and the SCICOM Chair meets regular with the Steering Group Chairs to keep informed about developments in the network and allow SG Chairs to put forward any issues and jointly discuss solutions.

The **Strategic Initiative on the Integration of Early Career Scientists** (SIECS) was very active and one key achievement is the new themed article series *Rising tides – voices from the new generation of marine scientists looking at the horizon 2050*. It is a new collection of articles, jointly developed by ICES Strategic Initiative on Integration of Early Career Scientists ([SIECS](#)) and ICES Journal of Marine Science. The new collection is dedicated to and will be written by early career scientists.

Publications in 2021 and 2022 included, five CRRs, two TIMES, five Identification (ID) Leaflets for Plankton, and two ID Leaflet for Diseases in Fish and Shellfish, have been published. In addition, six CRR, six TIMES, 12 ID Leaflets for Plankton, and nine ID Leaflet for Diseases in Fish and Shellfish are in the publication process. A project to digitize all ICES historical publications is ongoing. A record of all ICES publications has been compiled, resulting in a list of 42 publication series (the oldest of which started in 1900), and 34 publications out of series.

The **Science Impact and Publications Group** together with the secretariat has worked on developing a new library platform for ICES, which is now implemented by the editorial office together with the company providing the platform (Figshare). The new library has launched in March 2022 and will increase the findability and accessibility of ICES publications and support the ongoing increase in outside recognition of ICES science.

The **Training Group** has developed a roadmap for the Training Programme from 2022 to 2026. They will closely communicate and work with the Education Initiative, which will be launched later this year.

The **Data and Information Group (DIG)** worked with the Data Centre on the Core Trust Seal (CTS) accreditation application, which was approved in 2021. DIG is also working towards a single data policy proposal that will address all aspects of how data is received, maintained, and safeguarded by ICES. SCICOM has recommended to Council the approval of the revised data policy and license.

The **Fourth ICES PICES Early Career Scientist Conference** welcomed the next generation of marine scientists to St. Johns in Canada. The conference, run in fully physical mode, was a success. 115 Early Career Scientists attended the conference and all sessions, workshops and the social programme were held according to plan.

The ASC was held as a hybrid event this year. We had over 500 participants registered as in-person and an additional 200 as online. The feedback from the participants, the conveners and the staff will be used to further develop the format for the ASC 2023 in Bilbao, Basque Country, Spain. The Secretariat has put in a lot of effort to allow a smooth execution and the conveners ran the theme session successfully as interactive discussion sessions. The community was highly engaged in the network session on Gender equality, diversity, equity, and inclusion in ICES community.

Inter-institutional collaborations in 2022 have included running or setting up joint expert groups, including with PICES, IOC, IMO and PAME. A new cooperation agreement with SCOR was signed in June. At other levels, and with inputs from SCICOM, ICES has engaged in

international processes linked to the Arctic, the UN Decade of Ocean Science for Sustainable Development, science and advice in Areas Beyond National Jurisdiction and the World Ocean Assessment.

In 2022 five **ICES co-sponsored international symposia** were held: the 4th Symposium on Decadal Variability of the North Atlantic and its Marine Ecosystems: 2010–2019, the Fourth ICES PICES Early Career Scientist Conference, "Ocean sciences for the future we want", the Oceans Past IX Conference, the Symposium on Capelin - The canary in predicting effects of climate on the arctic marine environment and the International Symposium on Small Pelagic Fish: New Frontiers in Science for Sustainable Management. In 2023, we will have the Human Impacts on Marine Functional Connectivity, the 5th Effects of Climate Change on the World's Oceans (ECCWO), and the From Echosounders to the Cloud: Transforming Acoustic Data to Information. For 2024 we will have the 7th Zooplankton Symposium, the Oceans Past Historical perspectives on human-ocean interactions: deep understandings for informing ocean futures, the Third International Science and Policy Conference on Implementation of the Ecosystem Approach to Management in the Arctic and the Marine Socio-Ecological Systems - MSEAS 2020: Navigating global change in the marine environment with socio-ecological knowledge

ICES is currently involved in 15 **projects**. The changing funding landscape as well as new developments in relation to international programmes (UN Ocean Decade) has led to a discussion on international cooperation as well as better links to national activities in SCICOM. Stronger lead and coordination of projects will increase the benefit for member countries.

The implementation of the ICES Science Plan will be further progressed and supported by the ongoing efforts to introduce more consistent and concise resolution forms, to improve and quality control expert group descriptions and terms of reference and to implement the resolutions database. The main priorities beyond this are detailed in the implementation plan and include efforts to

- i. promote ICES science to a wider international constituency and to early career scientists through collaborations and training, broadening of expert groups, targeted early career and new topic events at the ASC and ICES co-sponsored symposia, increased use of science highlights and an active communications strategy, development of impact case studies, and broader ASC formats;
- ii. continue to provide clear and accessible paths for new participants to engage with ICES;
- iii. continue to strengthen links between science and advice;
- iv. develop measures for to increase diversity, equity and inclusion;
- v. put in place and embed all processes for monitoring implementation of the Science Plan (especially collation and reporting of science information and statistics across all expert groups in a consistent way);
- vi. increase international scientific cooperation through targeted and concrete activities with scientific partner organisations like PICES, CIESM, IOC, FAO, AMAP; PAME; IASC, GFCM; SCOR; and through the activities within the UN Decade of Ocean Science for Sustainable Development; and
- vii. improve the link to national science activities relevant to ICES.

Beyond the implementation plan, the focus is on further developing effective work environments for expert groups meeting remotely and in hybrid format, early career scientists,

and developing formats for online and hybrid symposia and the ASC, which support the scientific exchange and networking capabilities for all scientist.

1 Introduction

This introduction defines the purpose of the SCICOM Progress Report and the role of SCICOM and associated groups. Much of the content of this Progress Report is compiled from submissions provided by ICES groups and the ICES secretariat.

1.1 Purpose of the progress report

The SCICOM Progress Report is an annual report to the ICES Council that summarises the scope, scale and impact of ICES science in 2022 and SCICOM plans for future science delivery. The primary purposes of the report are to update Council on the scope, scale and impact of ICES science, implementation of the ICES Science Plan, and the work of SCICOM.

The report covers activities in the steering groups, expert groups, strategic initiatives, operational groups as well as the implementation of the ICES Science Plan and progress by SCICOM in relation to the SCICOM work plan. It also summarises ICES contributions to co-sponsored conferences, training courses and publications. It also reports on the outcome of the Annual Science Conference.

1.2 Role of the Science Committee

The Science Committee is the main scientific body in ICES and is ultimately responsible for the scope, scale and impact of ICES science. SCICOM works with the ICES community to set the direction for ICES science and to implement and monitor the ICES science plan. Through planning of the work of ICES groups, the science committee strives to ensure effective working relationships between all parties contributing to the implementation of the ICES Science Plan. SCICOM is empowered to speak on behalf of ICES on science priorities and strategies, and on the state of knowledge of topical marine issues. The empowerment is provided by national representation from member countries. SCICOM has the authority to establish and dissolve expert groups and subordinate governance bodies (strategic initiatives, operational groups) as deemed necessary to deliver the ICES Science Plan.

The general objectives of SCICOM are:

- (1) To keep the science programme dynamic, internationally relevant, and impactful,
- (2) To ensure seamless links between science, data and advice,
- (3) To engage with scientists in ICES member countries and beyond by planning an annual cycle of meetings and workshops as well as the Annual Science Conference,

The current priorities for SCICOM are to:

- (1) identify and promote science priorities within a science programme that is dynamic, internationally relevant and impactful, while fully taking account of national needs and providing added value to national programmes,
- (2) collate information on ICES science outputs in accessible and searchable formats, to develop and publicise metrics of impact, and to ensure expert group outputs acknowledge ICES contributions,

- (3) collate information on ICES science outputs in accessible and searchable formats, to develop and publicise metrics of impact, and to ensure expert group outputs acknowledge ICES contributions,
- (4) develop and regularly update website text relating to science, SCICOM, steering groups and personnel to increase awareness, visibility and impact of our people and work,
- (5) develop and run an engaging training programme that achieves cost recovery and enables participants to develop their careers, broaden their knowledge base, widen their professional network and add value nationally,
- (6) promote and support frequent and effective communication between expert groups, steering groups and SCICOM to increase network engagement and efficiency in all activities relevant to SCICOM,
- (7) promote science activity and collaboration within and beyond the ICES network,
- (8) ensure effective communication and seamless links between science, data collection, storage and processing, and advice.

1.3 Summary of Science Committee scientific and operational structures

Four types of groups contribute to the work of SCICOM and have roles in implementing ICES Science Plan. Other temporary groups are also formed to develop content for conferences and symposia and to address other transient actions. In addition, SCICOM is supported by the ICES secretariat Science Support.

The following descriptions of groups are also made available in the 'Guidelines for ICES groups' to help broaden community understanding of the ways in which different groups can, and do, contribute to delivery of ICES science. The Advisory Committee, the Data Centre and the ICES community also play vital roles in delivering science and implementing the Science Plan, but working in roles alongside SCICOM. Their roles are documented in the science implementation plan.

Expert groups

Expert groups (EG) are groups of scientists who collaborate during scheduled meetings, and often intersessional, to advance understanding of marine systems by tackling fundamental and applied scientific questions and developing analyses that underpin state-of-the-art advice on meeting conservation, management, and sustainability goals. The questions they address are defined by terms of reference that are re-viewed and signed off by the science and advisory committees. Expert groups publish the outputs of their work in the series "ICES Scientific Reports".

Steering groups

Steering groups (SG) address broad and enduring areas of science and advice and "parent" a number of expert groups. They are responsible for guiding and supporting expert groups and helping to ensure their work is effectively coordinated, conducted and reported.

Operational groups

These groups develop ICES capability in areas beyond the remit of expert groups. Currently ICES has three operational groups: Data and Information Group (DIG), Science Impact and Publication Group (SIPG) and Training Group (TG).

Data and Information Group

The Data and Information Group (DIG) is an operational group reporting to the Science Committee that advises on all aspects of data management, including data policy, data strategy, data quality, technical issues, and user-oriented guidance. Their work is closely coordinated with the ICES Data Centre and helps to ensure that expert groups have access to data and the support for data handling that is essential to their work.

Science Impact and Publication Group

The Science Impact and Publication Group (SIPG) is an operational group reporting to the Science Committee that coordinates and supports the publication and dissemination of research conducted under the auspices of ICES. The group is responsible for guiding, monitoring, and sharing ICES publication output and increasing the reach and impact of ICES publications.

Training Group

The Training Group (TG) is an operational group reporting to the Science Committee that develops the structure and content of ICES training programme and then guides and supports the provision of training.

Strategic initiatives

Strategic initiatives (SI) report to the science committee and develop and co-ordinate cross-cutting science that impacts and interacts with the science of many expert groups. They also focus on building science collaborations outside ICES member countries.

The Strategic Initiative on the Human Dimension (SIHD) aims to develop strategies to support the integration of social and economic sciences into ICES work.

The Strategic Initiative on Climate Change Impacts on Marine Ecosystems (SICCME) coordinates ICES science that seeks to understand, estimate and predict the impacts of climate change on marine ecosystems.

The Strategic Initiative on Integration of Early Career Scientists (SIECS) aims to make ICES more visible and accessible to early career scientists from various disciplines and backgrounds.

ICES Secretariat

The ICES secretariat provides essential secretarial, administrative, logistical, scientific, and data handling support to the preceding groups and ICES community in general. This facilitates effective planning of meetings, reporting and external communication.

2 Science priorities, planning and delivery

2.1 Science Plan and Science Plan implementation

The progress of implementation is documented in the Science Implementation table (see Annex 1).

Overall, the implementation is going well, and the missing reporting on mapping science priority areas to Expert Group Terms of Reference will be implemented once the new resolution database is in place. The implementation is pending the feedback to the BCSGC-19 group recommendations. The main changes to the implementation plan showing an improvement are:

- **A5** “Complete work in support of ToR to timescales specified in EG resolution” and **A8** “Effective review of expert group descriptions, ToR and expert group outputs for science content and clarity of presentation” switched from yellow to green through the full implementation of e- evaluations.
- **A12** „Support diversification of ICES research topics by co-organizing science symposia with strategic partners“, switched from yellow to green, now completed with all seven science priorities reflected through co- sponsored symposia.
- **C6** “Bibliographic analysis of ICES publication output and impact“, switched from red to yellow as we have now the new library in place, that allows summarizing the metric necessary to deliver information on this action (see section 3).
- **E1** “Develop topical and engaging ASC programme” and **E2** “Support the Science Committee to deliver a relevant, inclusive and modern annual conference programme” switched from yellow to green as the 2021 ASC was evaluated very positively.
- **G3** “Identify and shape emerging areas of science and maintain preparedness for future science planning” switched from yellow to green, through continued consultation with SCICOM and ACOM.

There are also two elements that changed from yellow to red and from green to yellow, respectively:

- **F1** “Work with partners to identify needs and opportunities for joint expert groups conducting work of mutual and added benefit and initiate these expert groups” and **F3** “Develop and co-sponsor conferences with partners and ensure partners have a visible role at the annual science conference“, are threatened by the temporary suspension of Russian Federation to interact with organizations which still have representation of Russian Federation experts. Details of these threats are outlined in DOC 11.1.

However, we have had healthy engagement in 2021/2022 with a number of organizations in these joint working groups, co-sponsored symposia, and other scientific cooperation activities, including with NOAA, NAFO, FAO, PICES, FAO, GFCM, IOC, IMO, EIFAAC, European Commission, and a number of other organizations.

2.2 Increasing international collaboration

Most international cooperation occurs through joint groups, workshops and co-sponsored theme sessions and symposia. The aims for these collaborations are to advance and exchange knowledge on common science topics, expanding expertise in the network, sharing financial and human resources for activities, and expanding participation and representation, such as broader regional representation of both member and non-member countries, and the inclusion of more academics and national scientists.

SCICOM’s mandate is to strategically develop science according to the Strategic and Science Plans and support the implementation of the Advice Plan.

Objectives:

- 1) Develop, strengthen and support science collaboration by coordinating with other regional and international organisations, understanding that links to advice need to be considered as part of this process as some organisations may also be advice requestors:
 - a) Engaging in and developing new joint Expert Groups with a number of regional and international organisations,
 - b) Linking efforts where national interest and engagement on a regional or international level are meaningful.

- 2) Support science collaboration through dialogue with ongoing EU and other international projects:
 - a) Scientists in Expert Groups are often working in international projects which have no formal involvement from ICES (e.g. Secretariat); improved communication and knowledge synthesis across projects can be facilitated through Expert Groups, e.g., topical workshops.

On objective 1: the current cooperation can be strengthened by reaching out to organizations with similar thematic focus and to extend the pool of experts to be able to cover global topics in a more holistic way. Opportunities for further synergies between ICES and other organisations will also be explored through the UN Decade of Ocean Science activities and especially together with PICES through the joint ICES/PICES decade programme SMARTNET.

On objective 2: activities are currently happening on an ad hoc basis and can be strengthened and further developed by expanding capacity in the science department, specifically to support coordination and strategic development of projects.

2.3 Link to national science activities

A lot of science is funded and carried out in national activities and projects. Much of this work is relevant to ICES science priority areas and is often conducted by scientists from national research institutes and universities. Thus, there is a clear benefit to reaching out and including this expertise, especially in areas where we might have knowledge gaps. On the other hand, national activities can benefit from engagement in ICES to increase impact, visibility, societal relevance and international collaboration.

Objectives

- 1) General dimension:
 - a) Integrating science across scales and disciplines,
 - b) Broaden the scientific discourse.
- 2) National dimension:
 - a) Access to expertise not available within the respective country,
 - b) Discussing science related to and needed for international commitments,
 - c) Facilitate dialogue across different ministries.
- 3) Institutional dimension:
 - a) Connect to a wider range of institutes and universities to support EBM development.
- 4) Individual dimension:
 - a) Build and grow their professional network,
 - b) Enhance skillset and knowledge sharing by collaborating in an international setting.

Identified tools and mechanisms for implementation

- 1) National ICES workshops (like BICEpS and other national ICES days):
 - a) Open ICES to more national scientists (including academia and government bodies other than fisheries),
 - b) Facilitate the conversation between national researchers and national policy makers.

- 2) ICES can participate in or offer networking with national research projects on topics of interest:
 - a) ICES issues letter of support to national proposals when it is clear how the projects will interact with expert groups,
 - b) ICES can facilitate interaction between national projects on same topics (e.g., through topical workshops).

2.4 Science collaboration

Scientific cooperation on the community level happened through 15 joint Experts Groups in 2021/2022. On an organisational level, the General Secretary, the President, the SCICOM and ACOM Chair, as well as the Heads of the Science and Advisory Department and Head of Data and Information attended high-level meetings.

ICES is currently a partner in 15 projects. In 2021, the EU launched the new Framework Programme Horizon Europe with the focus on Missions. The Mission Ocean, Seas and Waters included 13 calls in the first round and has now an additional 10 calls open. ICES Secretariat is included as partner in the Coordination and Support Actions for the “Baltic and North Sea basin lighthouse” and the “Atlantic and Arctic basins lighthouse” and the “European Blue Parks”. ICES is currently partner or part of the stakeholder or advisory board in 4 Horizon Europe proposals.

2.4.1 PICES

We have ongoing cooperation with PICES on joint groups, co-sponsored symposia, and through other joint activities, specifically the joint programme SmartNet, in the UN Decade of Ocean Science for Sustainable Development.

2.4.2 SCOR

The Letter of Cooperation with SCOR was signed at the UN Ocean Conference in Lisbon. The SCOR Working Group 157 “Toward a new global view of marine zooplankton biodiversity based on DNA metabarcoding and reference DNA sequence databases (MetaZooGene)” met after the ASC in Dublin, allowing participation of members of the Zooplankton Ecology Working Group (WGZE) and the Working Group on Integrated Morphological and Molecular Taxonomy (WGIMT).

2.4.3 UN Decade of Ocean Science

The main activities are organized through the joint ICES/PICES UN Ocean Decade programme SMARTNET (read also the article in the ECO magazine: <http://digital.ecomagazine.com/publication/frame.php?i=707374&p=1&pn=&ver=html5>).

SMARTNET is one of 34 programmes endorsed by the UN Decade Advisory Board, the full list of programmes can be found on the Ocean Decade webpage. The programme is a good opportunity to develop joint activities with existing partner organisations as well as start expanding this collaboration to include organizations and institutes and individuals beyond our member countries, and to facilitate ocean science research and collaboration among countries in both the Northern and Southern hemisphere.

The ICES/PICES Ocean Decade Steering Committee (IPOD SC) has held three meetings in April, July, and August, to outline concrete activities to be implemented within the joint Decade

Programme SMARTNET and to develop an implementation plan for the period 2021 to 2024. The implementation plan will outline:

SCICOM has identified national UNDOS committees or focal points for some countries. The ICES/PICES UN Decade Steering Committee (IPOD-SC) will contact these when appropriate, but national committees and focal points are invited to actively reach out to ICES and PICES with suggestions for activities.

Most of the funding for Ocean Decade Activities will probably be leveraged on the national level. Thus, we encourage Council delegates to inform the SCICOM Chair about national coordination bodies and funding opportunities, to help SMARTNET meaningfully support activities across member countries.

ICES, represented by Jörn Schmidt, SCICOM Chair, is also participating in the high-level stakeholder advisory board of the UN Ocean Decade endorsed project of the [Empowering women for the United Nations Decade of Ocean Science for Sustainable Development](#) lead by the Global Ocean Institute at the World Maritime University. A WMU team, including ICES Coordinating Officer, Ellen Johannesen is conducting research with a focus on gender equality and the empowerment of women in the practice and delivery of ocean scientific research, in particular in relation to fisheries, oceanography, hydrography and climate change. A greater focus on collecting demographic information for the ICES network, in connection with nominations will be part of the project, in line with the Strategic Plan.

ICES is partner in the newly endorsed UN Ocean Decade programme Global ONCE (Ocean Negative Carbon Emissions), an activity led by the Working Group on Ocean Negative Carbon Emissions (WGONCE). The SCICOM Chair contributed to three UN Ocean Decade Laboratories (A Clean Ocean, an Accessible Ocean and a Productive Ocean). The Joint ICES/PICES SmartNet programme was featured in the Productive Ocean Laboratory.

We have received endorsement of 3 symposia for the UN Ocean Decade (MSEAS, SPF, Decadal), with plans for at least one more already (Echosounders).

2.4.4 2022 UN Ocean Conference

The 2022 UN Ocean Conference was held in Lisbon from 27 June to 1 July. The SCICOM Chair spoke at the side event "*Digital Ocean systems to support and strengthen implementation of sustainable development goals*" organized by Mercator, UNEP, IOC-UNESCO, and the European Commission and is moderating a session on "*Strengthening the science-policy interface for a healthy ocean*" at the UNESCO-UNDOALOS "*Delivering the science we need: Scaling Sustainable Ocean Solutions by Strengthening the Science-Policy Interface*" side-event. The Coordinating Officer was on the panel of the "*Empowering Women*" side-event organized by WMU and DFO.

2.4.5 Arctic

The ICES Secretariat with support from the SCICOM Chair is involved in the Coordination and Support Action for the Arctic and Atlantic Lighthouse within the EU Framework Programme Horizon Europe (see projects). The SCICOM Chair has attended the inaugural meeting of the Fourth International Conference on Arctic Research Planning (ICARP IV) as member of its International Steering Committee. ICARP IV will be held in Boulder, Colorado, USA in 2025. The SCICOM Chair has also attended a meeting of the Capardus (*Capacity-building in Arctic Standardisation Development*) Project at the Arctic Science Summit Week in Tromsø as member of the advisory board. ICES was present at the Provisional Science Coordination Group meeting for the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, represented by the SCICOM Chair.

2.5 Symposia

In 2021, three co-sponsored symposia took place with two as online events and one in person. The change in COVID regulations enabled all conferences in 2022 to be held in person. Scientists in the ICES community are energized by the resumption of opportunities to share science and network in person and we have already seen record numbers of abstract submissions for a few of our 2022 symposia. Some symposia have been able to facilitate remote participation but accommodating global time zones and the added technical support and costs for holding a hybrid symposium remain challenging. SCICOM approved co-sponsoring of symposia for 2023 and 2024 at its meeting in May. A full list of Symposia from 2021 to 2024 can be found in Annex 2.

There are already two anticipated symposium resolutions for 2025. The announcement for resolution submissions will be made mid-November and collated for approval from SCICOM at the March 2023 meeting. The ICES Secretariat has enhanced the [ICES Activities Dashboard](#) to include a new tab for conferences, symposia, and training. A full list of Symposia 2021–2024 with details can be found in Annex 2.

2.6 Interactions with Expert Groups

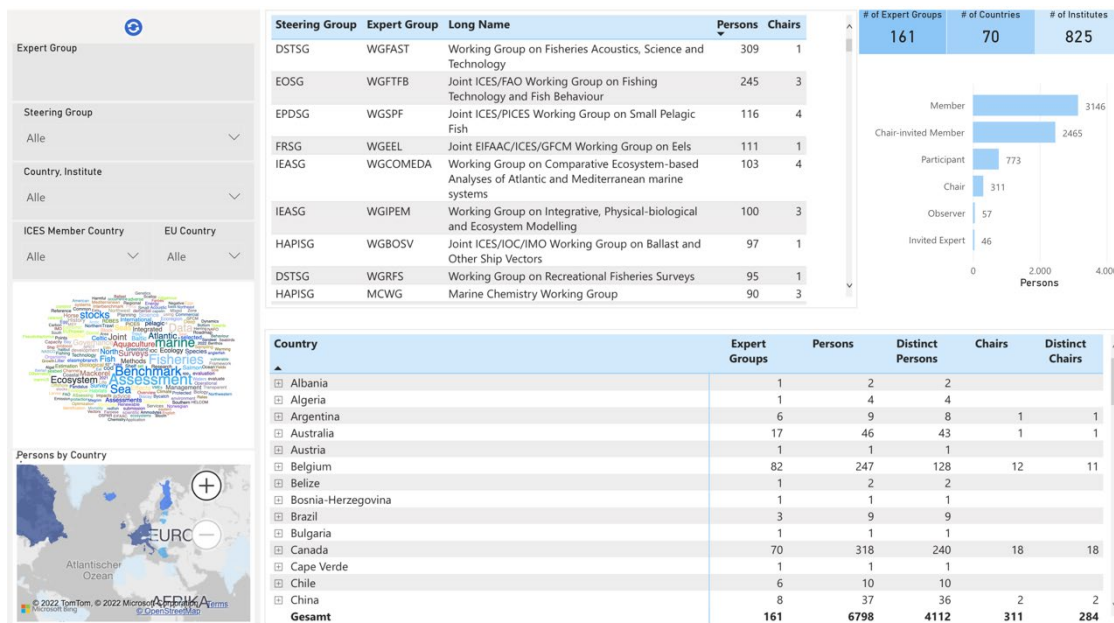


Figure 3.1. Screenshot from [ICES Activities Dashboard](#).

Expert groups are at the heart of ICES, engage the largest proportion of scientists in our community, and are responsible for generating the majority of our science output, including the basis of ICES advice. For these reasons, it is essential to ensure their work is valued, highlighted and accessible, and that chairs are engaged with the ICES community and effectively supported by other ICES groups. Since the specific scientific foci and activities of our expert groups are described elsewhere in this report, this section focuses on cross-cutting actions and system modifications that are being used to engage and guide chairs and to strengthen the coordination and impact of expert groups and their science. One hundred and eighteen working groups, forty-five workshops were active in 2022 (see Annex 3 for new and dissolved groups). The groups can be explored now using the [ICES Activities Dashboard](#) developed by Secretariat. The Dashboard is still in a beta version, thus should be used with caution.

2.6.1 Engagement and guidance

In January 2022, the WGCHAIRS meeting was held as an online meeting and included an extra day for incoming chairs, covering an introduction on the responsibilities for chairs, an introduction to the guidelines for ICES groups and a forum to express expectations and ask questions for the chairs. The meeting was very well attended with at times over 120 participants and was very well received, particularly the extra day for incoming chairs. Key action items include:

- to develop measures based on the reinvigorating the community brainstorming exercise to support the community
- to support national ICES activities like ICES days and promote the engagement of Early Career Scientists
- to explore options to support groups to increase geographic coverage of experts
- to explore options to add a technical summary in addition to the more general summaries of Scientific Reports

WGCHAIRS also established a subgroup on Diversity, Equity and Inclusion (DEI) to provide input into the development of measures to promote DEI.

The WGCHAIRS report 2022 is published and I want to draw the attention of the Council to section 18 and 19, which present the experiences throughout 2021 and the outcome of an activity to identify ways to “reinvigorate” the ICES network.

Guidance for groups in general is given in the Guidelines for ICES groups. This document is continuously updated and contains a thorough and complete set of guidelines for all aspects of EG work.

ICES science continues to flourish and attract new participants to our expert groups. The measures taken over the last years seem to have had an effect. This year has again seen an increase of participation in expert groups due to the ability to more easily join groups remotely. A larger proportion of members participated in meetings and we saw an increase in new participants again.

3 Steering Groups

3.1 Overview

The following section is the reporting from the seven Steering Groups. All Expert Groups active in the network and being described in the SG reports can be explored using the [ICES Activities Dashboard](#). An overview of Science Highlights from Experts Groups is in Annex 4. All peer reviewed publications that came out of a given expert group can be found in our new online library.

3.2 Aquaculture SG (Ann-Lisbeth Agnalt, term started January 2022)

3.2.1 Introduction

The Aquaculture Steering Group (ASG) is responsible for guiding and supporting expert groups that are working on science and advisory topics contribution to sustainable development of aquaculture. Aquaculture has been the fastest growing food sector for many decades and on a global level contributed in 2020 to about half of the seafood production. Sustainable growth is a prerequisite for the industry and entails economic benefit, contribution to local community as well as having as little impact or footprint on the environments as possible.

Topics covered include:

- social and economic dimensions of aquaculture operations
- pathogens and disease affecting cultured species and also includes new and emerging diseases and measures
- risk assessment methods for environmental impacts of aquaculture
- ecological carrying capacity and relative efficiencies of alternate aquaculture systems
- genetics of cultured species, and application of molecular techniques to aquaculture questions
- projecting the future development of aquaculture and its implications for the food system

Due to the COVID-19 pandemic, none of the EGs have yet had the opportunity to meet in person in 2022. One EG is planning to have an in-person meeting during October 2022 (WGOOA) while WGECCA has had monthly on-line meetings during the entire 2021 and 2022. WGPDMO has postponed their meeting until February 2023.

3.2.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
a) Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives	Working with the Chairs through regular web meetings. We have agreed to have at least three per year, and as well a presentation by one of the WG chairs on a pre-selected subject. We are discussing potential cross-cutting issues to improve the communication and collaboration. We have had a few meetings this year, but unfortunately it

Terms of Reference	Progress
<p>and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>has been difficult to get full attendance. I have attended as many WG meetings as possible to introduce myself to the individual expert groups during 2022.</p> <p>The upcoming ICES ASC 2022 will provide the possibility to network and discuss future relevant topics in aquaculture and possibly new collaborations.</p>
<p>b) Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;</p>	<p>Two new issues have been identified: animal welfare and circular aquatic food production (sustainable feed). The process of potential new working groups within these scientific topics have been initiated.</p>
<p>c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;</p>	<p>See above</p>
<p>d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;</p>	<p>In 2022, work with Aquaculture Overviews (AO) has progressed. The Celtic AO will be published. The Faroes workshop took place, and the advice has been scheduled to be released in 2023. There has been initiative taken by ACOM leadership and from ASG side to develop ICES aquaculture viewpoints. This work will continue.</p>
<p>e) Enhance the visibility of the EGs' work inside and outside the ICES network.</p>	<p>This includes reporting the work of the EG's for the ICES 2021 annual report. In addition, presentations at international conferences, e.g. at the North Atlantic Sea Food Conference Bergen June 2022, with the industry, three of the WG's chairs (WGREIA, WGECCA, WGOOA) gave presentation in addition to ASG chair. At the Aquaculture Europe 2022 the chairs and members of WGSEDA had a session on "Socio-economic challenges for sustainable aquaculture in a changing environment". The goal is also to improve the visibility of aquaculture at the ICES annual conference, and as such at least three theme and network session proposals were submitted for the ACS2023. Advice to implement the ICES Aquaculture Overview as a template in other countries has been made and is implemented in a Norway-Colombia project.</p>
Specific ToR	
<p>f) Maintain the awareness of the impacts of climate change on the aquaculture industry, with particular focus on increasing the knowledge base.</p>	<p>This is in progress. There will be a side-event at the ECCWO5 conference on Climate taking place in Bergen April 2023; Building Collaborations to Identify and Address Knowledge and Technology Gaps with the Goal of Promoting Resilient Aquaculture in the Face of Climate Change. https://meetings.pices.int/meetings/international/2023/eccwo-5/special-events.</p>

3.2.3 Science highlights

- The current COVID-19 pandemic and the global implications of the Ukrainian war are stark examples of the vulnerability of global interconnectedness. Global societies thus have been exposed to a new degree of vulnerability, revealing social-ecological interactions and repercussions that previously have been overlooked. As cross-border investments, trade and supply chains have shrunk, deliberations on shortening, i.e.,

regionalizing, value chains to avoid the negative repercussions of globalization pathways have intensified. Endorsing a system perspective within marine aquaculture, we identify key issues of sustainability themes that warrant consideration when refocusing marine aquaculture towards regional production systems. By exploring the sustainability consequences and trade-offs of regionalization in marine aquaculture production systems, we investigate the implications of regionalization and their related risks and benefits as a strategy in globalized economies to improve the five dimensions of sustainability: cultural, environmental, economic, governance and social. We develop a framework that will be published (WGSEDA).

- The newly published paper on risk assessment methodology presented by Andersen *et al.* (2022), recently published in the ICES Journal of Marine Science, provided an interesting and novel approach to conducting aquaculture risk assessments using Bayesian networks. This approach, adds theoretically, more clarity to the meaning of probability and uncertainty in risk assessments and contributes to better analyzing, evaluating, and communicating risk. One question that remains to be answered, is how the newly developed methodology, will couple with the existing ones i.e., GESAMP and FAO frameworks to provide short-term and long-term foresight to risk assessments conducted in other ICEAS member states. As a follow-up, it would be interesting to test this methodology in various aquaculture contexts and assess its validity and operability (WGREIA).

The citation is: Andersen, LB, ES Grefsrud, T Svåsand & N Sandlund. 2022. Risk understanding and risk acknowledgement: a new approach to environmental risk assessment in marine aquaculture. ICES Journal of Marine Science, 0: 1-10. Food for thought.

3.2.4 Science to Advice

The main activity to report during this period has been Aquaculture Overviews. The first one for the Norwegian Sea was presented towards the end of 2021. The Norwegian AO was further updated, including advice, in 2022 and the update version will be released in 2022. The progress on two others have proceeded in 2022; The Celtic Sea ecoregion and the Faroes ecoregion. The Aquaculture Overview for the Celtic Sea is in progress with referees and the goal is to finish by the end of this year. ASG has also worked with ACOM in developing Viewpoints for aquaculture issues. This work is in progress.

3.2.5 Communication with EG (summary paragraph of activities undertaken)

Aquaculture Steering Group held three meetings in 2022, and some of us will also meet in Dublin for the ASC 2022.

3.2.6 Summary of new EG proposals and EG closing

No EG are being proposed and none are closing.

3.2.7 Forward look (including actions for SG and SCICOM/ ACOM)

Much has already been reported. There is a need to strengthen communication and collaboration within ASG, and there are many ways to do this. Regular meetings will continue aiming to enhance the communication between the ASG and EG's. Developing Aquaculture Viewpoints will

also continue and might also be an approach for cross-cutting cooperation. It will further be important to continue the work on Aquaculture Overviews. Work to increase the visibility of ICES aquaculture is of great importance, and some approaches are being discussed.

Ideas for new working groups include:

- Animal welfare
- Circular aquatic food production (sustainable feed)
- Food safety and nutrition
- Aquaculture Marine Spatial Planning/Analysis

3.3 Data Science and Technology Steering Group (Jens Rasmussen; term started 2021)

3.3.1 Introduction

The Data Science and Technology Steering Group is responsible for guiding and supporting expert groups that are developing, assessing and applying new technologies as well as advancing data science, systems management, quality assurance, and data governance.

Topics covered include:

- Increasing the representation, profile and application of new technologies and data science in ICES
- Ensuring ICES community evaluates and, where relevant, adopts new methods, systems and devices
- Assessing implications of new and emerging technologies
- Supporting continued improvements in monitoring through application of innovative technologies and optimization of sampling designs
- Supporting and advancing effective data governance, data management, analytics and quality assurance methods

3.3.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
<p>a) Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>With a wide range of workshops and governance groups that are directly linked with and collaborating with groups across the steering groups in ICES, the DSTSG focus is very much on facilitating collaboration and defining priorities that reflect the needs of the community, paired with the resources available for development and improvement.</p> <p>The groups in DSTSG have been proactive in outreach and involving communities that haven't typically been as deeply engaged with ICES (e.g. computer science and machine learning specialists, manufacturers, and other regions adopting approaches developed in ICES). This takes the form of integration into the delivery of working groups and workshops as well as presentations, publications, and participation in conferences outside of the ICES community.</p> <p>Some DSTSG groups have extensive geographic reach. In particular WGFASST has a near global reach, developing open data standards and methods while sharing science across many participating countries.</p>

Terms of Reference	Progress
<p>b) Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;</p>	<p>DSTSG is successfully linking up workshops with existing groups both inside and outside of the steering group. Methodology focussed workshops and methods for working with new systems like RDBES are progressing well, after a challenging period of reduced meeting activities during the Covid lockdowns.</p>
<p>c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;</p>	<p>DSTSG groups primarily focus delivery and development around areas Observation and Exploration and in particular on Emerging Techniques and Technologies. Within these areas, ICES has a large amount of work already in maintaining, operating, and improving analytical tools, quality management, and data platforms. There are clearly new techniques and tools emerging as technology develops, and it is important for ICES to remain ready and responsive to the needs of the community. However, from a pragmatic perspective, it is also necessary to balance the development of new capabilities with the requirements of the existing workload. Thus, it is important to be receptive and responsive to emerging topics within the wider ICES community – across all steering groups, and to then ensure that where processes are maturing into something that can be operationalised and utilised in further ICES Science and Advice, we can adopt standards and potentially systems.</p> <p>This is not always a question of completely new systems, but rather refinement of the use cases or interoperability between existing data sources and material within ICES that can support new analytical approaches. In the past year, DSTSG groups have supported the ongoing improvement of existing systems and methods as well as seen the new governance for cetacean data being brought in. The huge amount of work on the RDBES tool is aiming towards a more integrated and unified approach towards data submission and estimation – and represents a large amount of effort, both within the ICES secretariat and among member states.</p>
<p>d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;</p>	<p>DSTSG does not produce much formal advice on a regular basis. However, several groups are directly working on the governance and improvement of workflows that enable and support the data and evidence utilised in advice production by groups in other steering groups.</p> <p>Examples include:</p> <p>WGQUALITY: Creating an end-to-end quality assurance framework for advice production</p> <p>WGDG: Datras governance group, working on and improving the data flow from fisheries independent surveys.</p> <p>WGSFDGOV: Overseeing relevant processes for working with fisheries spatial data, ensuring data calls are rationalised and relevant while protecting commercial and personal data.</p> <p>WGAcousticGOV: Providing a governance framework for the ICES Acoustic Trawl data portal, bringing together survey groups, method development groups and assessment working groups.</p> <p>WGRDBESGOV explores data governance questions for the development of the RDBES system ensuring that data can be made available for the coordination of regional fisheries, and providing regional estimation systems – supporting and facilitating the production of fisheries management advice and status reports.</p> <p>WGBIOP: Provides reviews of status, issues, and quality assurance of biological parameters used in assessment and management (e.g. age and maturity)</p>

Terms of Reference	Progress
	<p>WGCATCH: Documents national fishery sampling schemes, and collaborates in the advisory process, liaising with assessment groups and benchmarks on commercial catch issues.</p>
<p>e) Enhance the visibility of the EGs’ work inside and outside the ICES network.</p>	<p>DSTSG groups are active in promoting their science across, and out with the ICES Science network. This is achieved in a variety of ways, but arrangement of symposia, outreach through social media, and shared sessions with other working groups are common.</p> <p>Examples include:</p> <p>WGFAST convening the 8th International symposium on fisheries acoustics in March 2023</p> <p>WGMLEARN co-convening ICES ASC 2022 theme session on Processing and interpreting big data using machine learning: Acoustic, optic, and other observations in marine research.</p> <p>WGRFS convening session at the World recreational fishing conference, and presenting work at RecFish Forum.</p> <p>WGTIFD working with technology developers outside of regular ICES community as well as ASC Theme Session “Can technology-based monitoring deliver timely, cost-effective and high-quality fishery-dependent data?”</p> <p>WGSMAART providing support for multiple workshops, as well as close working relationship with WGBIOP. In addition, the Smartdots platform is used for age reading for a widening range of species and geographic coverage (16 distinct workshop/comparison events since last ASC, covering 12 different species)</p>
<p>Specific ToR</p>	
<p>f) Represent and provide leadership of technology and data science in ICES;</p>	<p>DSTSG groups and chair have been involved in developing shared approaches to evaluate profiles of datasets used in ICES products. This profiling exercise is primarily a process, but with the use of relatively simple technology, we are now creating linkages between evidence and products beyond the internal ICES Data systems.</p> <p>WGMLEARN are in the process of finalising their report (although we are providing a 1-year extension to the original 3-year term to ensure this can line up with peer reviewed publications that outline the landscape of the use of machine learning in marine science areas relevant to ICES).</p>
<p>g) Ensure that ICES community is sighted on and responsive to technology and data science developments with potential to advance the tasks identified in ICES Science and Advisory Plans;</p>	<p>One of the inescapable facts of marine scientific sampling is that many vessel platforms are generating a large amount of emissions. This is an issue of increasingly awareness among member states that are looking to modernise their research fleets. Currently a new working group resolution is being worked on for a DSTSG working group to look at the issues of greening the research fleet. The group will examine existing vessels as well as look at the provision of guidance on considerations for new built vessels, as well as how either new or existing vessels may be fitting to support increasing activity with autonomous vessels that can extend coverage with less fuel consumption and emissions.</p>
<p>h) Expand emerging technology and data science areas in ICES (e.g., unmanned systems, artificial intelligence and 'Omics) and guide related and transformative advancements in ICES science, products and services;</p>	<p>Through contractual work, the ICES Data Centre has developed and are hosting the Joint Cetacean Data Programme. Originally developed in the UK, the platform is now extending wider, and a governance group (WGJCDP) within DSTSG will now work with a wider membership to promote and facilitate cetacean data standardisation and enhancing access to the data.</p>

Terms of Reference	Progress
i) Support continued improvements in environment and ecosystem monitoring through innovative technologies and optimization of sampling designs;	Other governance groups and methods-based groups are providing the standardisation that enable the continued flow of data from monitoring and survey activities, while enabling a responsive mechanism for identifying new requirements as well.
j) Foster the complementarity and interoperability of different technologies and data streams to achieve a digital ocean representation;	Currently, ICES role in fostering approaches towards digital ocean twins/representatives is primarily one of data aggregator and enabler. By combining data from members states, ICES is well positioned to deliver integrated datasets into wider
k) Contribute to the development of a world-leading data collection-to-advice quality assurance framework;	<p>The overarching work of developing and promoting quality assurance within the ICES advisory process is a dedicated piece of work for WGQUALITY, but is also supported widely by the wider ICES community. The role of governance groups in ensuring there are standards and well-defined workflows for the data collections is an important piece of the work.</p> <p>Likewise, having a platform for shared determination of biological parameters, and extensive description of methods and approaches are being progressed by all the groups and workshops in DSTSG.</p> <p>There is still work to do to bring all the threads together, but with a common structure and approach for groups developing governance and methodologies will make this exercise more manageable.</p>
l) Advise on new data management and data science methods and infrastructure, and support ICES Data Centre in strengthening data governance, quality assurance and systems design.	There is an ongoing dialogue with the ICES Data centre and DSTSG chair. In addition, all governance groups within DSTSG are working closely with representatives and developers within the ICES Data Centre. This governance approach ensures there is clarity of the priorities in identified needs for existing and new systems. While prioritising alone helps create dialogue, it can now also be matched against realistic estimates of the support the ICES Data Centre can provide, so the governance group members can communicate realistic expectations to the wider ICES community.

3.3.3 Science highlights

- WGTIFD has grown to over 60 members representing countries in Europe, the United States, Canada, Chile, and South Africa; this has increased the communication and collaboration. The chairs have presented to a number of other ICES working groups, other organizations and networks, hosted a theme session at the 2021 ICES ASC, and generally raised the awareness of the working group and the challenges we are attempting to address.
- WGSMAART have continuously worked to improve the SmartDots age reading software to ensure it functions optimally in its role as an international tool (Figure 1) for standardisation of age reading procedures and methods. In addition, it has supported the standardisation of maturity staging procedures by developing a module in the web application. Additional requests for the development of an egg and larval identification module and a fecundity and atresia module, both outside the initial 3-year plan for WGSMAART, have been answered. These two additional modules have supported three international online workshops (WKIDCLUP2, WKMACHIS and WKAPEM) which could not take place as physical meeting due to the covid-19 pandemic. By November 2021 731 users from 36 countries are registered in SmartDots.
- Within the ICES Advisory Plan quality assurance has been identified as a priority area and the work of WGQuality supports this. WGQuality will analyse the existing quality management processes within advice production and evaluate their coherence with the objectives of the advisory plan. We will create a draft ICES quality manual which will

describe the overall approach to assuring the quality of assessment and advice - from data management, data integration, data analysis, and data use, to the process of translating that data into ICES advice. We're not intending to design a new system from scratch but to build on all the good work that has already been done and that is still ongoing.

- one major achievement of WGMLEARN was to bring together scientists from different backgrounds, within marine sciences and across marine and computer sciences. This contributes to bridging the gap between disciplines which is a major hindrance to the application of machine learning in marine sciences. Geographically, it was also a rare opportunity of discussion between scientists from Europe, North and South America, who are more often involved in projects at national or "continental" (European in particular) level. Furthermore, one of ICES priorities is "Emerging techniques and technologies", which completely aligns with the goal of this Working Group.
- WGMLEARN has collated a bibliographic database of published work using machine learning in the context of marine sciences:
<https://www.zotero.org/groups/2325748/wgmlearn/library>
- A biological sampling strategy review launched by WGAcousticGov. A call was sent to WG chairs for input from members regarding individual sampling strategies employed in the collection of biological data at sea. These data, along with acoustic data, are the backbone of reporting on trawl acoustic estimates of biomass and abundance. A from deck-to-database review across all the survey groups. Understanding how data are stored nationally, transformed prior to upload to the ICES trawl acoustic database and handled within sampling software programs such as StoX is of great importance in terms of transparency and repeatability.
- Inter-WG collaboration was greatly increased by joint discussion among WGSMArt, WGBIOP & WGALES on the application of SmartDots for multiple purposes across groups. Examples of successful applications for ichthyoplankton-ID was presented by the chair of WKIDCLUP2 and WKMACHIS. To further increase the collaboration between BIOP and ALES and to bring more ichthyoplankton-expertise into BIOP, it was agreed on a joint session within the next BIOP meeting. Aspired goals are a) a common guideline on creating SmartDots calibration events for ichthyoplankton and fecundity, and b) that the list of future ichthyoplankton and fecundity events be annually decided and recommended jointly by WGBIOP and WGALES.

3.3.4 Communication with EG

DSTSG held a steering group meeting in May as well as attendance at WGCHAIRS. Another meeting is planned towards the end of October to capture work on resolutions packages. During the steering group meeting, one of the most discussed items was the handling of hybrid format meetings. Many chairs find the extra workload of facilitating potentially both face to face and online participation quite significant – in that they want to provide a good experience for all participants. In addition, there is a recognised difference in the contribution levels, partially due to the logistical challenges of breaking people into subgroups across two working methods, and partly because conversations flow around the meeting during breaks and in smaller groups during a physical meeting.

Another observation was that meetings tend to be cut shorter while conducted online to avoid screen fatigue. This can be countered by either periods of separated work, or more focussed/reduced agendas.

Most chairs recognised that hybrid meeting formats enable a wider range of participants, which is positive, but that there is a considerable overhead on conducting a meeting that mixes participation methods. One of the key discussion points was that perhaps not all aspects of a meeting needs to be run in full hybrid format. Rather, periods for focussed work discussions for physical participants followed by a shared online plenary/knowledge exchange session might work better. However, this will inevitably lead to distinctly different experiences among participants, and chairs within DSTSG are querying if this needs to be recognised by ICES more formally.

3.3.5 Summary of new EG proposals and EG closing

New workshops (Resolutions approved prior the joint Resolution forum in November 2022)

- Fifth Workshop on Optimization of Biological Sampling (WKBIOPTIM5)
- Workshop on developing guidance for ensuring the integrity of scientific information submitted to ICES by data providers (WKEEnsure).
- Fourth Workshop on Age reading of Horse Mackerel, Mediterranean Horse Mackerel and Blue Jack Mackerel (T. Trachurus, T. mediterraneus and T. picturatus) (WKARHOM4)

Closing workshops

- WKOISS - Workshop on Operational Implementation of Stomach Sampling (to be dissolved after meeting in November 2022)
- WKRARE - The Workshop on Estimation of Rare Events (to be dissolved after meeting in December 2022)
- WKARHOM4 - Workshop on age reading of Horse Mackerel, Mediterranean Horse Mackerel and Blue Jack Mackerel (to be dissolved after meeting in November 2022)
- WKRDBES-INTRO - Workshop on introduction to RDBES data submission
- WKRDBESRaiseTAF - Workshop on Raising Data using the RDBES and TAF

3.3.6 Forward look (including actions for SG and SCICOM/ ACOM)

The working group on fisheries acoustics, science and technology (WGFAST) is organising a symposium "From Echosounders to the Cloud: Transforming Acoustic Data to Information" to be held in Portland, Main, USA, 27-30 March 2023. This symposium facilitates exchange among the spectrum of scientists and engineers who develop acoustic instrumentation, collect data, and transform those (tera)bytes to information critical for conserving fisheries and ecosystems. The symposium will specifically address the use of big data analytics, such as artificial intelligence and machine learning in response to the rapid increase in data volumes from acoustics technologies on crewed, remote, and autonomous platforms.

A resolution is currently being drafted for a working group on Greening the research the research fleet, with a goal to review the existing impact of the research fleet, explore best practise and general recommendaitons for new vessels and/or adaptation of vessels to increasingly accomodate other patforms such as autonomous vehicles. This will potentially bring in members to the ICES community from the vessel operations side of organisations, providing practical and operational knowledge that can hopefully be merged with the experience of other ICES groups that design, coordinate, and conduct surveys.

WGMLEARN – 3 year resolution approved in 2018 with meetings in 2019, 2020, 2021; granted one year extension until the end of 2022. The extension was to facilitate the completion of peer reviewed documents that will feed into the report as well as to allow a longer period

3.4 Ecosystem Processes and Dynamics SG (Steven Degraer, term started January 2021)

3.4.1 Introduction

The Ecosystem Processes and Dynamics Steering Group is responsible for guiding and supporting expert groups that study the state and resilience of marine ecosystems and food webs, as well as the life histories, diversity and interactions of component biota.

Topics covered include:

- oceanographic characteristics of marine systems and their influences on population, food web and ecosystem dynamics,
- origins and transformations of matter in biogeochemical and production cycles,
- measuring, understanding, reporting and forecasting the dynamics of populations, food webs and ecosystems,
- life histories, diversity and ecology of microbes, phytoplakton, zooplankton, benthic invertebrates, cephalopods, crustaceans, fish, and other top predators,
- ecosystem services,
- ecosystem resilience.

3.4.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
<p>a) Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>EPDSG speed dating event organized on 28/09/21.</p> <p>EPDSG@WGCHAIRS meeting organised on 27/01/22.</p> <p>EPDSG@ASC meeting organized on 22/09/22.</p> <p>Bilateral meetings with eight (out of 21) EGs. In total 18 bilateral meetings were organised in 2021-2022.</p>
<p>b) Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;</p>	<p>No specific action.</p>
<p>c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;</p>	<p>This topic has been explicitly tackled during the bilateral meetings with the EG Chairs: no major issues about expert availability, skills and knowledge were identified. In contrary, many EG Chairs reported on a significant increase in number of participants when organising hybrid meetings.</p>
<p>d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;</p>	<p>Requests for stock advice to WKSCALLOP (beyond the ICES advisory process) were highlighted during the bilateral meeting. Action to liaise WGSCALLOP with ACOM was taken. ICES viewpoint is on its way.</p> <p>Similar requests from WGCRAb and WGEVO are identified; action pending.</p>

Terms of Reference	Progress
e) Enhance the visibility of the EGs' work inside and outside the ICES network.	<p>The wish for EG promotion videos has been discussed with the EG Chairs. Interested EGs have been identified.</p> <p>Kick-off towards the development of an EPDSG-wide position paper organised.</p> <p>16 publications, seven of which being journal contributions.</p>
Specific ToR	<p>The originally proposed ToR specific for EPDSG "Enhance the visibility of the EGs' work inside and outside the ICES network" has been moved to the list of generic SG ToRs.</p>

3.4.3 Science highlights

- WGSPF symposium (7–11 November 2022, Lisbon, Portugal): [International Symposium on Small Pelagic Fish: New Frontiers in Science for Sustainable Management \(ices.dk\)](https://www.ices.dk) (WGSPF)
- «[Ongoing ocean climate observations \(ices.dk\)](https://www.ices.dk): ICES Working Group on Oceanic Hydrography publishes North Atlantic ocean climate highlights for 2021» (WGOH)
- «[ICES working group uncovers Crangon crangon connections](https://www.ices.dk)» (WGCRAN)
- ASC2022 Network Session «[Advancing the pathways for oceanography to ecosystem science and advice](https://www.ices.dk)» (organisation: WGOH, WGOOFE)
- ASC2022 Theme Session «[Oceanography and ecosystems in the North Atlantic: science and operational services](https://www.ices.dk)» (organisation: WGOH, WGOOFE)
- ASC2022 Theme Session «[Invertebrate life in three-dimensional habitat](https://www.ices.dk)» (co-organised by WGCRAB)
- WKSTARGATE (23–25 August 2022, Copenhagen), workshop on impacts of stickle back and round goby on coastal fisheries and fish (feedback/report awaited)
- Special issue: "Ecology of Marine Zooplankton" of the Journal of Marine Science and Engineering. Submission deadline: 10/10/2022 (EUROBUS)

Between 1 September 2021 and today, EPDSG EGs produced 16 publications, seven of which being journal contributions to e.g. Science of the Total Environment and Frontiers in Marine Science (with JIFs above 5). WGZE coordinated a Themed Article set on Marine Zooplankton Time Series in the ICES Journal of Marine Science (published in 2022) (Introduction: <https://doi.org/10.1093/icesjms/fsac048>). The EGs most actively contributing to journals (for the last three years) are WGCEPH, WGEUROBUS and WGIMT. The ambition to publish journal contributions has been expressed by many EPDSG EG Chairs during the bilateral meetings; this to maintain the groups' attractiveness particularly towards the academic EG members. It however seems not all that easy for all groups to actually get to that kind of publications. Since the new library has been launched mid-2021, EPDSG publications attracted 3,746 views and yielded 1,095 downloads.

The ICES Working Group on Oceanic Hydrography (WGOH) is looking to evaluate its products to make sure they are as useful as possible. As part of this, they are seeking views on our products from those who have used them in the past, and from the wider ICES community. You can participate in the survey :

<https://response.questback.com/scottishgovernment/ICESOceanography>.

3.4.4 Science to Advice

Mid-2021, WGSCALLOP took the first steps of an ACOM-steered process towards a collation of a Viewpoint and Management Strategy Evaluation of Irish Sea scallops. This viewpoint will be developed in cooperation with ACOM leadership and is included as an anticipated product for their 2022-2024 term (ToR c deliverable). Similar initiatives (i.e. viewpoint / demonstration advice) may be or are considered by WGCRAb and WGEVO; action pending.

3.4.5 Communication with EG

Organization of an EPDSG speed dating event (28/09/2021), with the aim of (1) identifying a series of high-level topics within EPDSG and hence, natural links among EGs, (2) establishing new and strengthening existing bonds among EGs and (3) highlighting the work that is done under the EPDSG umbrella. This meeting was co-organized with Marco Uttieri (WGEUROBUS) and Dave Clarke (WGHABD). In preparation of the meetings, both realized and aspired collaborations among EGs (with focus on the links among EPDSG EGs) were mapped and high-level topics within EPDSG EGs were identified. The chairs of 17 (out of 21) EGs attended the meeting and pitched the focus and highlights of their respective EG. Nine EG expressed interest in extended collaborations (within EPDSG). were presented at EPDSG@WGCHAIRS (27/01/2022).

The EPDSG@WGCHAIRS meeting (1) overviewed the progress with regard to the extended collaborations (as identified during the EPDSG speed dating event) and (2) scoped for the way forward with regard to the EG promotion videos (as conceptually launched at the EPDSG 2021 mid-term meeting). Arantza Iriarte (EUROBUS) and Johan Craeymeersch (BEWG) testified about their experience with the extended collaborations. Groups that did not yet take action to launch the identified extended collaboration were encouraged to do so and to keep the SG Chair informed. Discussion about the EG promotion videos touched upon various aspects like goal, target audience, content, style and who to take action. Not all EG Chairs are on the same page: the Chairs would consult their respective EG during their meeting(s) in the course of 2021, with the aim to opting in/out by mid-2022. The results of this consultation will be reviewed during the EPDSG@ASC meeting (22/09/2022) and further action (who, what, when) will be defined.

The bilateral meetings with EG Chairs series was continued with another eight bilateral meetings organized late 2021, early 2022 (BEWG, JWGBIRD, WGCEPH, WGCRAb, WGCRAb, WGEUROBUS, WGEVO, WGGRAFy). Aside of the importance of this kind of rather informal meetings, challenges as well as opportunities are discussed and action points are raised, where needed. Some examples: some EGs fancy the plan to write an EPDSG-wide opinion or viewpoint paper (subject: ecological indicators, or climate change and species distributions); many EGs are still struggling with finding the best way to work in a hybrid way (e.g. difficulties to keep the momentum for all members and to collect innovative ideas for future EG work); the war in Ukraine created some confusion about how to best move forward with initiatives in which Russian members are involved; the need for guidance to fully understand how ICES as an organization works; new suggestions for demonstration advice (or similar) from WGCRAb and WGEVO. Bilateral meetings have now organized with 18 (out of 21) EGs, with yet to meet: WGBIODIV, WGHABD, WGSPPF.

3.4.6 Summary of new EG proposals and EG closing

WGS2D (last meeting in 2019) did not succeed in finding a new chair to continue its work. A solution with SCICOM and the EPDSG chair has been searched for in consultation with the former WGS2D chair. WKCLIMAD (under EOSG) did not create a new momentum for the group. WGS2D has been dissolved.

WGEVO has last met in 2020 and did not report by e-evaluation or by a report (reporting period 2019-2021). Last online meeting with the chair was on 21/01/2022; last contact by email on 14/09/2022. The chair still is enthusiastic about the work and mentioned that the group was typically meeting on a biweekly basis, and that they were planning to have a CRR as one of the outputs for the next cycle (2022-2024). A group member who will assist the chair to meet the EG's reporting obligations, has now been appointed: we expect both a report for the period 2019-2022 and new resolutions for the period 2023-2025 in due time.

There are currently no new EG proposals for EPDSG.

3.4.7 Forward look (including actions for SG and SCICOM/ ACOM)

- EG promotion videos
 - Who's in and how to get it done will be discussed at the EPDSG@ASC meeting. This information will be available by the time of reporting to SCICOM.
 - Establish contact with ICES Communication services for professional guidance.
 - First videos are expected by early 2024.
- EPDSG-wide position paper
 - Decide on topic (that is shared by as many EGs as possible and for which EG Chairs express commitment), identify who's in and agree on a timeline. This information will be available by the time of reporting to SCICOM.
 - Establishment of core team around the EPDSG-wide position paper on ecological indicators, or climate change and species distributions.
 - Facilitate the core team's actions towards drafting the position paper by the second half of 2023.
- Second round of bilateral meetings with EG chairs
 - All EGs will be invited for a bilateral meeting in the course of 2023.
- EPDSG EG Chair mid-2024 meeting, with focus on
 - taking stock re the creation and publication of the EG promotion videos,
 - taking stock of the development of the position paper, and
 - any other issue that EG Chairs may want to raise.
- Advisory products (or rather, alike)
 - Liaise with WGCRA and WGEVO Chairs with ACOM leadership to define what product would be the most suitable outlet for their messages (e.g. ICES Viewpoint).

3.5 Ecosystem Observation SG (Joël Vigneau, term started January 2021)

3.5.1 Introduction

The Ecosystem Observation Steering Group is responsible for guiding and supporting expert groups that are meeting immediate data demands and contributing to the running and further development of effectively coordinated, integrated, quality assured, and cost-effective monitoring in the ICES region and beyond.

Topics covered include:

- Evaluating and optimising survey design to meet the needs of member countries and support advisory requests,

- Design, planning and coordination of egg and larval, acoustic and trawl surveys,
- Identifying and evaluating new technologies for observation and monitoring,
- Advising on the design, deployment and efficiency of sampling methods and gears and the use of resulting data for assessment and advice,
- Aging and estimating life history parameters of sampled fauna,
- Developing monitoring to meet emerging data, science and advisory needs, with a focus on integrated ecosystem assessment and ecosystem-based management.

3.5.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
<p>Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>Routine Quarterly meetings</p> <p>Exchange on Science plan codes used for new resolutions</p> <p>Routine collaboration with ICES end-users of fisheries-independent data (assessment and ecosystem working groups) and data governance groups and ICES Data Centre at both WG and SG levels.</p>
<p>Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;</p>	<p>Ongoing initiative to restructure the technical WGSDAA in the light of the two Wks (WKUSER2 on preparing for the future of surveys at sea and WKPILOT-NSEA on regionalisation of the governance of the surveys)</p>
<p>c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;</p>	<p>Reflection on the future of WGELECTRA with new research on emerging techniques and technologies that have potential to become alternatives for Electrical Trawling is fading (only one remaining in 2022)</p> <p>AI technology (links with DSTSG) given to be of high interest to survey groups (e.g. WGNEPS)</p>
<p>d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;</p>	<p>Ongoing initiatives with ICES Data Centre (database for Nephrops TV surveys) and use of AI for counting burrows (WGNEPS)</p> <p>Development of cross participation of end-user (assessment and ecosystem WG) at the start of EOSG/WG for a feedback on quality of the data and participation of key experts from EOSG/WG into benchmarks. Action to be more visible in the future.</p>
<p>e) Enhance the visibility of the EGs’ work inside and outside the ICES network.</p>	<p>Proposal of a theme session for ASC 2023</p> <p>Relations with EU RCGs on scientific surveys at sea</p>
<p>Specific ToR</p>	
<p>f) Develop and coordinate integrated, quality assured, and cost-effective monitoring programmes to improve our understanding of the distribution and function of marine life and habitats;</p>	<p>Coordination of surveys is done within survey WG and communication between them is done through EOSG quarterly meetings;</p> <p>Regional integration of surveys will be given a preliminary pilot exercise in 2022 (WKPILOT-NSEA)</p>

Terms of Reference	Progress
	<p>Progress made on TAF and quality of the data provided to end-users with recent development of shared R scripts on a github (WGSINS, WGBEAM, WGNEPS, ...)</p> <p>Ongoing work to include more data into ICES database (burrows counting from Nephrops UWTV surveys, WGNPEP)</p> <p>All survey manuals completed with plans for updates and shift towards TIMES series</p>
<p>g) Evaluate and optimize survey design and advance and implement innovative technologies to collect, process and analyse data, with a focus on supporting fisheries assessment, integrated ecosystem assessment and ecosystem-based management.</p>	<p>Survey design is discussed within each EOSG/WG with the support of transversal WG (WGISDAA) and dedicated WK (9 of these in 2021)</p> <p>Test of regional coordination in 2022 (WKPILOT-NSEA)</p> <p>WKUSER2 (Sept. 2022) to reflect on survey design for flexibility and dealing with data gaps, using modelling and simulations and describe technological and analytical tools that can provide information on the quality of survey deliverables and advisory products</p>

3.5.3 Science highlights

The bullet points below reflect most recent science highlights:

- WGBEAM - A new hermit crab species for the North Sea was encountered (*Pagurus longicarpus*) in the German inshore survey.
- WGELECTRA – The group is facing some difficulties finding sufficient input for 2022 and future meetings, the reason for low input is due to a recent ban on the fishing technique discussed by WGELECTRA. The group participants indicate that they would like to keep the group alive although only one research project remains on pulse technologies on razor clams.
- WGIDEEPS - Monitoring pelagic beaked redfish is challenging. Data from the WGIDEEPS surveys are essential support for the advice on beaked redfish stocks in the Irminger Sea and adjacent waters and in the Barents and Norwegian Seas. Data from the WGIDEEPS surveys constitute the only regular information source about deep sea ecosystem status in these regions. The key difficulties include the basin-wide geographical distribution (> 650 000 NM²), seasonal and ontogenetic large-scale migrations, the occupation of demersal and benthic habitats at different stages of the life cycle and generally poor knowledge of pelagic beaked redfish interactions with the pelagic ecosystems of the Irminger and Norwegian Seas.
- WGSINS - All surveys and time series have been continued. New surveys were established and additional information on ichthyoplankton became available. Quality assurance were included on index calculations (MIK) and species identification.
- WGNEPS – Ongoing development of AI technology for classification of Nephrops burrows.
- IBTSWG discussed the roadmap for a new survey trawl, following on from the Workshop on the Further Development of the New IBTS Gear (WKFDN). IBTSWG agreed the main aspects of the new trawl, and trials are planned to start in late 2022 with the subsequent introduction of the trawl in the North Sea over the next few years.
- WGIBTS made progress in visual distinction between *Mustelus asterias* (starry smoothhound) and *Mustelus mustelus* (common smoothhound) using barcoding on some species.

- More to come after communication with EOSG/WG chairs and the Q3 meeting

3.5.4 Science to Advice

Most of the EGs composing EOSG collate and review ocean observations in the North Atlantic Ocean and conduct gap analyses to inform integrated ecosystem assessments and ecosystem science activities. In particular, estimates of biomass and abundance indices of marine resources (eggs, larvae, juveniles and mature fish) provide backbone of relevant stock assessments for key species at relevant WGs (Advisory Requirements) through ICES data services (DATRAS) and TAF.

Links with assessment working groups are effective through Working Group on Improving use of Survey Data for Assessment and Advice (WGISDAA), which also works together with survey working groups to provide resolution to problems associated with index calculations, survey design changes (proposed or realized) to ensure efficient and effective use of survey resources.

The variety and volume of data arising from EOSG/EGs and serving assessment and advice makes it difficult to catalogue comprehensively. One of the terms of references of the WKPILOT initiative (see further) will be to initiate such a data catalogue in the North Sea, in coordination with ICES data services.

3.5.5 Communication with EG

The EOSG quarterly meetings are run in routine from 2021 and are proving to be effective in enhancing communication horizontally between all EOSG/WG and vertically. Short minutes are quickly shared among the group to keep track of the shared information and actions to be followed-up.

The follow-up on WKREO (ICES, 2019) recommendation was initiated in 2021 and discussed in the following quarterly meetings and the WKPILOT-NSEA is now scheduled to be held in November 2022.

Gathering potential ASC theme sessions for ASC 2022 and 2023 were also discussed during the quarterly meetings and one proposal emerged for 2023.

Collaborating with EU Regional Co-ordination Groups and national data collectors to evaluate and optimise survey design to better support advisory requests, and aid ICES science development is routinely carried out. Making sure of participation to international surveys through cost sharing and setting up a stomach sampling plan over the next 6-year period in the North Sea is implemented in the IBTS surveys; During EOSG quarterly meetings, participants from Norway and UK agreed to follow this test in their own surveys.

3.5.6 Summary of new EG proposals and EG closing

New EGs in 2022 and 2023

Currently there are no new expert group or workshop proposals for the remainder of 2022 and 2023.

EGs ending in 2022

- Workshop on unavoidable survey effort reduction (WKUSER2)

- Workshop on Pilot North Sea Fisheries Independent Regional Observation Group (WKPilot NS-FIRMOG)

3.5.7 Forward look (including actions for SG and SCICOM/ ACOM)

- WGNEPS - Support needed to help in the process of developing international UWTV database.
- WGNEPS – Support needed and exchanged initiated with WGMLEARN to develop AI technology for classification of Nephrops burrows – general potential use of AI technology to be discussed in WKUSER2
- WGELECTRA – Reflection engaged on the future of the group
- Need to develop a transversal WG on survey integration, data quality and survey design beside WGSDAA (Improving use of Survey Data for Assessment and Advice) – reflexion will be based on WKUSER2 and WKPILOT-NSEA outputs
- What will emerge from WKUSER2 and WKPILOT-NSEA will help structuring the prospective for EOSG/WG in the future months. Indeed, drastic evolutions in the context of operating surveys at sea are ongoing (global change, increase of use of marine areas for renewable energy, shift to more ecological-friendly means of assessing marine resources, regional integration and optimisation of sampling effort, ...) challenge all EOSG/WG into shifting mindsets towards the anticipating and developing responses to these demands and unavoidable changes. Critical discussions will come ahead and will need insights from SCICOM, ICES Data Centre and all other SG for a community of views.
- Address the issue of survey coordination beyond the existing EU Regional coordination groups (RCG) to include all countries in strategic development of coordination.

3.6 Human Activities, Pressures, and Impacts SG (Andy Kenny, term started January 2022)

3.6.1 Introduction

The Human Activities, Pressures, and Impacts Steering Group is responsible for guiding and supporting Expert Groups that seek to describe the diversity of pressures affecting marine ecosystems and the impacts that follow.

Topics covered include:

- describing and projecting trends in human pressures and impacts on marine ecosystems, including analysis of historical change
- understanding and quantifying multiple impacts of human activity on populations and ecosystems, and proposing options for mitigation
- prevalence and effects of contaminants, invasive species, shipping, noise, renewable energy, fishing, climate, acidification and habitat loss
- estimating the vulnerability of marine ecosystems to pressures and impacts, including risk assessment and identification of limits and thresholds
- developing indicators of pressure and impact and testing their role in management systems
- assessing human impacts on ecosystem goods and services and developing approaches to mitigate undesirable impacts

3.6.1 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
<p>a) Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>Full ‘online’ meetings of HAPISG organised in October 2021 and January 2022 at WGCHAIRS (28 EG Chairs attended). Agreed new specific ToRs to i. improve information exchange and links between EGs, ii. to develop good practice guidance and standards for HAPI data and web-based applications, and; iii. to promote methods and products to assess HAPIs and their cumulative effects.</p> <p>HAPISG Chair to attend OSPAR ICG-EcoC workshop for the QSR 2023 (13 – 14 Sept.) in light of recent greater North Sea EO risk assessment.</p> <p>Attended EU Life Platform meeting on ‘strictly protected areas’ in La Rochelle (22 – 23 Mar.)</p> <p>Four ASC 2022 Theme Sessions convened by HAPISG EG Chairs, covering topics related to shipping, seafloor ecosystem impacts, spatial management & climate, and off-shore wind.</p> <p>Develop links between WGFBIT/ WGDEC and RFMOs in particular NAFO (WGESA) in developing the methodologies for the assessment of VMEs and SAI.</p>
<p>b) Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;</p>	<p>The role of Area-based Fishery Management Measures and Other Effective Area-based Conservation Measures in protecting biodiversity, restoring ecosystem functions and their role in ensuring climate resilience.</p> <p>A new Working Group on Marine Protected Areas (WGMPPAS) has been established – (1st meeting planned Paris, 28 Nov. – 2 Dec.)</p>
<p>c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;</p>	<p>Attended SCICOM meetings and provided written reports of meeting attendance on behalf of ICES (e.g. EU LIFE Platform meeting).</p> <p>Review of EG interim and final evaluations to identify science highlights and priorities.</p> <p>Noted some groups having difficulty maintaining delivery where meetings are held virtually and involve members from North America or other regions which have a big-time difference to Europe.</p>
<p>d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;</p>	<p>Four key areas of science advice supported by HAPISG this year, i. VME benchmark assessment for the provision of VME advice to RFMOs and EU (WKVMEBM, 7 – 10 Mar.), ii. assessment methods to set thresholds and assess adverse effects on seabed habitats (WKBENTH2, 24–26 May and 8–10 Jun.), iii. workshop on mitigation measures to reduce bycatch of short-beaked common dolphins in the Bay of Biscay (WKEMBYC2, Oct. 2022) and iii. Revision of Greater North Sea Ecosystem Overview (WGINOSE, 9 – 13 May), where WGECON in collaboration with WGSOCIAL contributed to a new section on socio-economic indicators.</p>
<p>e) Enhance the visibility of the EGs’ work inside and outside the ICES network.</p>	<p>Four ASC 2022 Theme Sessions convened by HAPISG EG Chairs, covering topics related to shipping, seafloor ecosystem impacts, spatial management & climate, and off-shore wind.</p>

Terms of Reference	Progress
	Production of TIMES and CRRs (5 in production and 3 proposed), including a review of the ICES Manual for seafloor litter data collection and reporting from WGML.
Specific ToR	
f) Consider mechanisms to evaluate EGs and their ToRs against the ICES Science Plan and its advisory work (e.g. through a mapping exercise), to ensure ICES science and advice is informed by knowledge of current and emerging science with potential to effectively contribute to the ICES EBM framework, and advice on ecosystem services and effects, including Ecosystem Overviews and Viewpoints.	<p>This ToR will be the focus of a HAPISG meeting in Oct/Nov 2022. To date the focus has been on engaging with EGs that can provide input to a revision of the North Sea ecoregion.</p> <p>It is noteworthy that WGOWDF Chairs have a bimonthly meeting with the Chairs of WGMBRED and WGOE to ensure their activities are complementary. This may serve as an exemplar of inter-EG working within HAPISG.</p>
g) Promote within EGs the development of standards and guidelines for good practice and Quality Assurance in the collation and use of data and development of web-based applications to increase the visibility, availability, interoperability and reproducibility of EG data, information and outputs	<p>WGSFD presented plans at WGCHAIRS to develop a common spatial data framework (to be developed in consultation with the ICES data centre) for the integration of different marine layers generated by HAPISG EGs.</p> <p>Working with ICES Data and Information Group on the availability and quality of information on areas potentially closed to fishing activities, especially data sets included on EMODnet.</p> <p>Supported the development of R-Markdown VME advice product as part of the VME benchmark assessment (WKVMEBM, 7 – 10 Mar.).</p>
h) Promote within and across EGs the development and implementation of methods and development of products that assess individual human activity pressures and impacts, and their cumulative effects on the marine environment for operational use within the wider ICES community	WGCEAM is to investigate, as part of its ToRs, the development of a cumulative effects estimate for potential inclusion in the EOs.

3.6.2 Science highlights

- Attended EU LIFE Platform meeting on “strictly protected areas” in La Rochelle (22 – 23 Mar.)
- A new Working Group on Marine Protected Areas (WGMPAS) has been established – (1st meeting planned Paris, 28 Nov. – 2 Dec.)
- Implementation of WGCEAM framework - links with IEA and EBM. Developing a cumulative effects estimate for potential inclusion in the EOs.
- Seafloor assessment pipeline proposal accepted for the ICES ecosystem overviews (WGDEC, WGSFD and WGFBIT). Workshop is planned for quarter 2 in 2023.
- WGSFD developing a common spatial data framework for the integration of different marine layers generated by HAPISG EGs.
- Workshop on Climate Change Considerations in Marine Spatial Planning (WKCCCMSP), Oct 2022, now likely to take place in 2023.
- Manual for seafloor litter data collection and reporting from demersal trawl samples (WGML).
- Historical and unconventional data sources (Photos, paintings and figures) to reconstruct past fishing practices, and changes in marine social ecological systems through

- time (WGHIST) and WGHIST organised Ocean Past IX conference where ICES co-sponsored the participation of early career scientists.
- WKVMEBM (7 – 10 Mar.). Successfully conducted an ICES benchmark for scientific advice on VMEs, which represents the first time a benchmark has been conducted on a non-fisheries component of the marine ecosystem. <https://www.ices.dk/community/groups/Pages/WKVMEBM.aspx>
 - Convening four Theme Sessions at the 2022 ASC - covering topics related to shipping (L), seafloor ecosystem impacts (H), spatial management, climate & biodiversity (B), and offshore wind (O).
 - Production of TIMES (3 reports) and CRRs (2 reports), including a review of the ICES Manual for seafloor litter data collection and reporting from WGML.

3.6.3 Science to Advice

Four key areas of science advice were supported by HAPISG EGs this year,

- i. VME benchmark assessment for the provision of VME advice to RFMOs and EU (WKVMEBM, 7 – 10 Mar.).
- ii. Workshop to scope assessment methods to set thresholds and assess adverse effects on seabed habitats (WKBENTH2), 24 – 26 May and 8 - 10 Jun.
- iii. Follow-up on WKBENTH2 a second workshop WKBENTH3 is planned 3–7 October 2022. In support of setting threshold values for assessing GES for EU seafloor.
- iv. Workshop on mitigation measures to reduce bycatch of short-beaked common dolphins in the Bay of Biscay (WKEMBYC2, Oct. 2022), and
- v. Revision of Greater North Sea Ecosystem Overview (WGINOSE, 9 – 13 May). Several HAPI EGs provided input – WGSHP, MCWG, WGECON, WGITMO, WGBOSV, WGCEAM, WGM BRED

3.6.4 Communication with EG

Routine communications with EGs with respect to HAPISG meetings and responding to delivery issues, mainly associated with the need for rescheduled meetings. Specific EGs contacted include WGFBIT (links with NAFO WGESA on VME fishing impacts), WGDEC (review of VMEs), WGSFD (developing standardized pressure/ activity data layers), WGEXT (web-based data assessment tools) WGSHP (input to North Sea EO), MCWG (input to North Sea EO), WGITMO (input to North Sea EO), WGBOSV (input to North Sea EO), WGCEAM (input to North Sea EO), WGECON (input to North Sea EO) and WGM BRED (input to North Sea EO).

HAPI EGs planning to attend, or attended in 2022:

- WGDEC (virtual) 2 – 6 May.
- WGMHM (virtual) 29 Aug – 2 Sept.
- WGSFD (virtual) 26 – 30 Sept.
- WGCEAM (virtual) 24 – 27 Oct.
- WGMPAs (virtual) 28 Nov – 2 Dec.
- WGM BRED (virtual) 28 Nov – 1 Dec.

3.6.5 Summary of new EG proposals and EG closing

New EGs

- Working Group on Marine Protected Areas and other Spatial Conservation Measures (WGMPAS)

EG closing

- Benchmark Workshop on the occurrence and protection of VMEs (WKVMEBM)
- Workshop to scope assessment methods to set thresholds and assess adverse effects on seabed habitats (WKBENTH2)
- Workshop on mitigation measures to reduce bycatch of short-beaked common dolphins in the Bay of Biscay (WKEMBYC2)
- Workshop on Climate Change Considerations in Marine Spatial Planning (WKCCCMSP) [to be dissolved after the meeting in autumn 2022 - potentially postponed to 2023]

3.6.6 Forward look (including actions for SG and SCICOM/ ACOM)

- Input on EU request to ICES on fishing revenues inside and outside MPAs (WGMPAS, WGSFD).
- WGOWDF together with WGMBRED and WGOORE are proposing a joint Theme Session on how multiple offshore renewable energy installations affect both the marine ecosystem and society across large geographical areas for the Annual Science Conference (ASC) 2023 in Bilbao, Spain.
- HAPISG fall meeting to explore synergies between EGs.
- Finalise EG contributions to North Sea EO.
- Potential request from OSPAR to evaluate MPA nominations
- Potential request from DGENV to provide as re-current advice on trade-offs (2020 advice) between fishing and seafloor impact.
- WGMHM follow-up workshop on predictive habitat modelling (in 2023)

3.7 Integrated Ecosystem Assessments SG (Debbi Pedreschi, term started January 2021)**3.7.1 Introduction**

Integrated Ecosystem Assessments synthesise and evaluate information on physical, chemical, ecological, human and environmental process affecting ecosystems.

This Steering Group is responsible for guiding and supporting Expert Groups that develop ecosystem modelling and assessment methods, contribute to state of the environment reporting and underpin guidance on meeting ecological, social and economic objectives.

Topics covered include:

- Development of integrated ecosystem assessments for the Arctic, Baltic, Barents, Celtic, North, Greenland, Northern Bering-Chukchi, northwest Atlantic and Norwegian seas, the Azores, Bay of Biscay, and Iberian Coast,
- Comparative analyses of marine ecosystems,
- Ecosystem modelling,
- Methods and application of ecosystem-based management and risk assessment,
- Linking ecological, economic and social models and analyses to understand interactions and trade-offs between management objectives,
- Defining data needs to support integrated ecosystem assessment,
- Development of integrated advice to support ecosystem-based management.

3.7.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
<p>a) Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>On track:</p> <p>Review and discussion on Resolutions and e-evaluations.</p> <p>Three annual IEASG Chairs meetings (WGCHAIRS Jan, May, and Sept at ASC)</p> <p>Additional meeting for IEASG chairs on the Data Profiling Tool with the ICES Data Centre and Ecosystems Overviews Operational Group.</p> <p>Regular ad hoc emails with relevant updates (e.g. ICES WKs, news, special issues, conferences).</p> <p>‘Open door’ policy has led to frequent communication with EG chairs, including discussions and email correspondence on the development of ToRs.</p> <p>IEASG Chair is a member of the WGCHAIRS Diversity, Equity and Inclusion (DEI) Group</p>
<p>b) Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;</p>	<p>On Track:</p> <p>Emerging science topics have been successfully integrated into existing group ToRs.</p> <p>No need for additional groups identified at this time.</p> <p>Cross-group issues/interests for workshops have been identified and are in development, including WKASCAPES in November 2022, and a food web modelling workshop for Q3/4 2023 to build on the outcomes of 2 external workshops.</p>
<p>c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;</p>	<p>On Track:</p> <p>Attendance, reporting and engagement at SCICOM and SG Chairs meetings.</p>
<p>d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;</p>	<p>On Track:</p> <p>IEASG Chair has been working with Marie-Julie Roux (ACOM) to co-chair and lead on the development of an ICES EBM framework.</p> <p>IEASG Chair is a member of the EOO (Ecosystem Overview Operational group) and attends regular meetings to help identify emerging issues and ensure delivery of the Ecosystem Overviews.</p> <p>IEASG Chair works directly with groups preparing EOs to give advice, support and training where needed.</p> <p>No additional requests have been received for advisory services, but the groups are interested in demonstrating their ability to provide EBM-informed advice and are thinking about ways to do this.</p>
<p>e) Enhance the visibility of the EGs’ work inside and outside the ICES network.</p>	<p>IEASG Chair takes every opportunity to do so, including taking part in International Women and Girls in Science initiatives, and engaging directly with SIIECS about the IEASG and ICES more widely, and co-chairing ICES ASC network session The Krakens Lair. IEASG also hosted a joint ICES-EuroMarine workshop (WKCCMM).</p>

Terms of Reference	Progress
Specific ToR	IEASG Chair has worked to enhance cross-SG connections through presentations from other SG Chairs and EG at IEASG meetings.
<p>f) Promote the development (including new products and contributions from groups within and beyond IEASG) of the Regional Ecosystem Overviews, including standardisation of formats and improving transparency in line with Data Profiling Tool and TAF where possible (with support from the Secretariat and ICES Data Centre).</p>	<p>On Track:</p> <p>The first Ecosystem Overview for the Central Arctic ocean was published in 2021 (WGICA).</p> <p>2021 saw the first EO published for the Celtic Seas (WGEAWESS) using the Data Profiling Tool (DPT) and full referencing. This group was critical in supporting the pilot for the DPT, which is an important step towards meeting FAIR goals.</p> <p>The Celtic Seas EO included new sections on the socio-economic aspects, climate change, vulnerable marine ecosystems (VMEs), and productivity were added, along with a dramatically improved oceanography section</p> <p>The Celtic Seas EO overhaul included a record number of contributions from over 23 ICES groups, and has provided a good model of leveraging the ICES network for the drafting of other EOs, including WGINOSE this year.</p> <p>The CS EO is currently being used as a template for this year's update (North Sea)</p> <p>New guidelines proposed by WKTRANSPARENT (co-chaired by IEASG Chair) currently being implemented.</p> <p>Presentation from ICES Data Centre to IEASG and additional HAPISG groups that have contributed to the EOs on the Data Profiling Tool.</p> <p>TAF not currently relevant to the EOs or IEASG.</p>
<p>g) Promote the development of Integrated Ecosystem Assessments within the IEA EGs, and movement towards operational assessments. It is recognized that a variety of approaches to IEA exist (including both quantitative and qualitative methods), and different approaches will be appropriate to the different IEA EG based on skill sets and local conditions. IEASG will support efforts to share knowledge and methods across inter alia IEA groups, particularly through workshops and training proposals.</p>	<p>On Track:</p> <p>Regular discussions on progress and approaches at meetings and identification of needs for workshops</p> <p>WKCCMM: Workshop on Common Conceptual Mapping Methodologies Nov 2021 (co-chaired by IEASG Chair)</p> <p>Risk Assessment/Pressure Diagram Methods training workshop Feb 2022 by IEASG Chair. Recorded and stored on EO site, along with templates, analysis script, and 'living' Q&A document</p> <p>WKASCAPES: Workshop on ASsessing CAPacity to supply Ecosystem Services in November 2022</p> <p>Foodweb modelling workshop for Q3/4 2023. Chairs identified and resolution in progress</p>
<p>h) Support and promote the work of the SIHD and related groups to broaden IEA work and Ecosystem Overviews to include social and economic drivers and impacts.</p>	<p>On Track:</p> <p>Q4 2021: As above, addition of new sections expanding on the socio-ecological aspects, including a new figure on fishing communities and a summary of key socio-ecological issues affecting the fishery in the Celtic Seas EO (contributions from WGEAWESS, WGSOCIAL, WGBESEO (IEASG) and WGECON (HAPISG)).</p> <p>Q4 2021 WKCCMM (co-chaired by IEASG Chair) focused on ways to expand beyond fisheries and ecosystems through conceptual modelling</p>

Terms of Reference	Progress
	2022: Continued to liaise with SIHD groups, and have helped to expand on the addition of the fishing communities/ports work into the North Sea EO which is being updated this year. This is a collaboration between WGINOSE, WGSOCIAL (IEASG) and WGECON (HAPISG).

3.7.3 Science highlights

- Continued work of all IEASG despite the continuing pressures of COVID-19, and the ongoing war in Ukraine and suspension of activities involving the Russian Federation.
- Successful improvement of integration across IEASG through shared members, presentations at IEASG meetings, workshops, and cross-group collaborations. Also reaching out to other SG Chairs to improve connections between SGs.
- Publication of Cooperative Research Report: "[Ecosystem assessment of the Central Arctic Ocean: Description of the ecosystem](#)" by WGICA.
- WGIPEM led on a MEPS Theme Section [on Advancing dynamic modelling of marine populations and ecosystems](#). They have also reached over 100 members of their group!
- IEASG co-chairing of ACOM/SCICOM EBM framework and progress on CRR publication on the framework for ecosystem-informed science and advice (FEISA)
- WGNARS hosted a public seminar [on Structured Decision Making, Risk Assessment, and understanding Fisheries Governance in IEAs and EBM](#)
- WGIBAR and WGINOR reports published with ecosystem status annexes responding to stakeholder needs
- WGBESEO continued to encourage collaboration with ECRs, identifying appropriate institutional support, with mentorship and feedback from the group. This year's ECR project focused on understanding the use and uptake of the EOs outside of ICES, with previous projects focusing on identifying ecological, social and economic objectives, and building a social science glossary to improve communication and understanding across groups
- [Third International Science and Policy Conference on Implementation of the Ecosystem Approach to Management in the Arctic](#) approved for ICES co-sponsorship. WGICA chair Lis Jørgensen will provide a key role as a lead convener for this symposium that will be held in Tromsø in 2024; good participation by the ICES network is anticipated, including members of ICES expert groups (WGICA, WGIBAR, WGINOR, WGIEAGS, WGIEANBS-CS). Funds will support participation of both ECS and indigenous knowledge holders.
- WGMARS substantially contributed to the organisation and leadership of WKCCMM, along with carrying out research into IEA in ICES, behavioural economics in fisheries, and social network analysis of ICES for upcoming papers, despite facing a range of challenges.
- IEASG Chair is supporting Humans Impacts on Marine Functional Connectivity Conference Spring 2023 as a member of the Scientific Steering Committee: <https://www.ices.dk/events/symposia/ImpactsMFC/Pages/default.aspx>
- ASC: IEASG Chair is co-chairing a Network Session (The Krakens Lair). Two IEASG related sessions have been submitted for 2023.
- Current library stats (since launch) for IEASG: 193 publications (59 journal contributions, 133 reports), 2,261 views, 569 downloads (as of 6/9/22)

3.7.4 Science to Advice

- Delivery of the first [Ecosystem Overview for the Central Arctic Ocean](#) (WGICA)

- Delivery of the [Celtic Seas overhauled Ecosystem Overview](#) (WGEAWESS) with referencing, new sections on socio-economic aspects (including a new figure on fishing communities including and a summary of key socio-ecological issues affecting the fishery), climate change, vulnerable marine ecosystems (VMEs), and productivity, along with a dramatically improved oceanography section. This overhaul took 2 years and included coordination with, and contributions from, over 23 ICES groups, including some that had never contributed to advice products before.
- Participation of IEASG Chair at ADGEO 2021
- Current review and update of the North Sea EO (WGINOSE) adhering to new Technical Guidelines
- IEASG Chair contributions to Ecosystem Overview Operational group (EOOP)

3.7.5 Communication with SG

Many groups renewed their resolution terms this year. Each EG resolution and e-evaluation is reviewed with direct feedback. Most groups are up-to-date, and where there are delays there has been communication. Three annual IEASG Chairs meetings (WGCHAIRS Jan, May, and at ASC) were held to provide updates, gather feedback, and assess capacity and interest for workshops. Meetings continue to be used as an opportunity for knowledge sharing, with presentations from WKINTRA and EOSG Chair this May. At each meeting, expert group chairs are reminded of standing items that should be raised at their annual meetings; Gender, Diversity & Inclusion, Integration of Early Career Scientists, and the Code of Conduct and Conflict of Interest. Discussions have also been held on Chair mentorship. An additional meeting was arranged with the ICES Data Centre on the Data Profiling Tool. Ad hoc emails with relevant updates (e.g. ICES news, special issues, conferences) are circulated when appropriate. IEASG Chair maintains an 'open door' policy in relation to the groups, and a number of EG Chairs have been in touch with specific issues throughout the year, including challenges due to COVID, RF suspension and personal matters.

3.7.6 Summary of new EG proposals and EG closing

No New WG at this moment in time.

WKASCAPES Workshop on ASsessing CAPacity to supply Ecosystem Services will be held in November and closed by the end of 2022.

A food web modelling workshop for Q3/4 2023 is in progress but the resolution has not yet been submitted. Interest in the development of new WKS is high, but we are checking regularly with the community to ensure participation is achievable when determining the schedule for these new WKS.

3.7.7 Forward look (including actions for SG and SCICOM/ ACOM)

Overall IEASG plans to continue to build on the progress to date, maintaining active engagement and follow suggestions from the community. We particularly have an eye on developing ideas and proposals (via the pipeline) for EBM in practice.

Specific questions and issues of note:

- Capacity remains an ongoing issue, and it is a struggle to balance ambition with capacity to deliver
- Many groups continue to use intersessional meetings to progress work

- Discussions have continued on the EO Advice drafting process. There have been major improvements in transparency and communication about changes and ADGEO processes, but there remain questions about whether the feedback should be shared more widely with IEASG Chairs as a learning exercise to help streamline future revisions.
- There is enthusiasm from a number of groups to update the EOs on a more regular basis. Secretariat and ADG capacity are severely limited in this respect. This warrants serious consideration from ACOM and SCICOM.
- There is also enthusiasm from the groups to make the data and methods used in IEAs more transparent, possibly through the Data Profiling Tool. Again, there are capacity implications here, particularly for the Data Centre and also the IEASG groups that will need to gather more thorough information on the datasets if they aren't generated by the groups themselves, as well as greater documentation of any syntheses (including code, etc.). There is also some hesitancy by a few members about retaining rights, although they have been encouraged that proper attribution is part of the FAIR goals.
- There is enthusiasm to learn more about the Aquaculture Overview process which differs from the EO process. **IEASG Chair to liaise with ACOM vice chair/ASG Chair.**

3.8 Fisheries Resources SG (Patrick Lynch, Chair, term started February 2019)

The Fisheries Resources Steering Group (FRSG) is responsible for guiding and supporting expert groups that are working on advisory-related and science topics contributing to the management of wild-capture fisheries.

Topics covered include:

- single-species and multi-species stock assessment, including data-limited methods,
- management strategy evaluations, addressing uncertainty, and improving the transparency, robustness, efficiency and repeatability of stock assessment,
- operationalisation of ecosystem-based fishery management and maximum sustainable yield concepts and their application in mixed, multispecies and emerging fisheries,
- fisheries spatial dynamics, mixed fishery interactions and responses to management measures.

3.8.1 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
<p>a) Ensure the work of the EGs support the implementation of the Strategic Plan, as well as address science objectives and advisory needs of ICES by:</p> <p>Facilitating active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES;</p> <p>Identifying opportunities for internal and external collaboration;</p>	<p>The FRSG supported multi-directional communication throughout 2023 in support of the Strategic Plan.</p> <p>Matters relevant and important to the member EGs were communicated to ACOM and SCICOM at appropriate times. This information was gathered through discussions in FRSG meetings and by correspondence. The group also decided on a communication process that is appropriate for the FRSG.</p> <p>At the September FRSG meeting, the group held a discussion on incorporating socioeconomic information in the stock assessment process, which was coordinated with SIHD and included an invited speaker. This discussion set the stage for potential follow workshops and symposia.</p>

Terms of Reference	Progress
b) Assure emerging science topics from within the science network are being identified and support the establishment of new groups as needed;	The FRSG currently has two standing meetings per year, one around the WGCHAIRS annual meeting and one around the Annual Science Conference and ACOM and SCICOM meetings. There are also intersessional meetings as needs arise. The standing meetings dedicate some portion of the agenda to aspects of emerging science that would apply to improving stock assessments.
c) Report on the science implementation and provide feedback on emerging science topics, gaps in expert availability, skills and knowledge to SCICOM;	FRSG EGs are largely operational and feed directly into the science advice. In that sense the need vastly exceeds capacity and the FRSG has numerous discussions related to capacity and the advice process. Part of this gap is related to expertise. In this year, expertise related to data-limited stock assessment methods and the implementation of SPiCT was frequently highlighted.
d) Work with ACOM Leadership, SCICOM Chair and Secretariat to support groups in addressing advisory ToR and to identify science needs for advisory services;	As a rule, ACOM leadership are invited to, and are typically present at FRSG meetings. This facilitates good interaction between EG Chairs, the FRSG Chair, and ACOM leadership. In 2022, the FRSG discussed numerous operational and science needs. Much of this is communicated to the SCICOM Chair via Steering Group meetings.
e) Enhance the visibility of the EGs' work inside and outside the ICES network.	Most science-focused workshops under FRSG are open to wide participation from within and outside the ICES network. This broad global collaboration has been very successful in advancing the science. Also, the use of the Transparent Assessment Framework (TAF) is another way for EGs to increase visibility of their work. It is an ongoing challenge to increase TAF usage, but it remains a priority focal area among the FRSG.
Specific ToR	Progress
a) Engage with and work with Chairs of EG, SCICOM and ACOM to enable and support EG contributions to both the science objectives and advisory needs of ICES;	Ongoing via remote meetings and correspondence (e.g., WGCHAIRS), and a hybrid meeting during the 2022 ASC. The FRSG Chair is a conduit between Steering Group meetings and ACOM and SCICOM through attendance at those meetings.
b) Review and report on the science being undertaken within EG to SCICOM and ACOM, with a focus on identifying science highlights and priorities and demonstrating the impact of their science, including how science was used in ICES advice (method development, advisory products);	Ongoing through this report, participation at ACOM, SCICOM, and FRSG meetings, working with the Secretariat, as well as the EG summary table on SharePoint.
c) Provide feedback to SCICOM and ACOM on research priorities and implementation of ICES strategy;	Ongoing via collection of research priorities on FRSG SharePoint site and reporting at ACOM and SCICOM.
d) Identify shortfalls in expert availability, skills and knowledge needed to achieve ICES objectives within the SG area and work within the SG and through SCICOM, ACOM, Strategic Initiatives and operational groups to develop capacity and capability;	Expert capacity is an active discussion among the FRSG. In fact, the topic has been given more attention to address challenges posed by the COVID pandemic. FRSG reports capture capacity gaps that apply to most, if not all, EGs. The capacity issue needs rapid attention and action as the groups are challenged to even meet the minimum requirement for providing advice.

Terms of Reference	Progress
e) Identify gaps and overlaps in the work of EGs, and propose consolidation, rationalization or forming of new EGs to SCICOM and ACOM as appropriate;	Consolidation, rationalization, or forming new EGs has not been identified as a priority.
f) Facilitate active horizontal and vertical communication, collaboration and co-ordination between EG and all other parts of ICES and identify, in cooperation with EG Chairs, opportunities for internal and external collaboration;	Communication throughout the ICES community occurs via regular operations (remote correspondence, meetings, etc.).
g) Help EG Chairs to adopt working practices which ensure scientific information generated by EG is receiving adequate quality control consistent with scientific norms;	Ongoing via working with ACOM and the ICES Secretariat on quality control policies. FRSG products are generally subject to a high level of quality control and quality assurance as required in the stock assessment process.
h) Review EG reports and activities and, in dialogue with the SCICOM chair and ACOM leadership, provide feedback on ways to improve the impact, communication and influence of their work;	In addition to internal FRSG communications, EG reports are reviewed and discussed by ACOM and other groups during the advisory process.
i) Encourage EGs to come forward with proposals and initiatives for longer term science development in support of ICES advice;	EGs have been encouraged via in-person meetings and identification of strategic directions for ICES. These directions have been ranked and communicated to ICES. At the September FRSG meeting, the Group is discussing the incorporation of socioeconomics in the stock assessment process.
j) Help EG Chairs to formulate and prepare their draft ToR and Resolutions for research-oriented work;	Ongoing with FRSG review occurring in close coordination with ACOM leadership prior to submission to ACOM or SCICOM.
k) For advisory ToR: to work closely with the ICES secretariat, ACOM leadership and the EG chairs in preparing the research and advisory work plans for the upcoming year to ensure the advisory ToR are allocated to EGs and addressed adequately and within the advisory request timeframe;	Ongoing via routine coordination with the Secretariat and ACOM/ACOM Leadership.
l) To give Special Requests received during the year immediate and rapid attention to inform the decision about whether or not the Special Request can be accepted and addressed;	Ongoing as Special Requests are received. Also, EG chairs have expressed concern over being able to address all special requests, and are encouraged to decline when there is not sufficient capacity to appropriately respond to the request.
m) To support the ICES Secretariat and/or the ACOM leadership in liaising directly with the Chairs of relevant EG when processing Special Requests;	This has been facilitated particularly through WGCHAIRS, but there is also regular remote dialogue between EG Chairs, ACOM Leadership, and the FRSG Chair.
n) Represent the SG in SCICOM and ACOM meetings, SCICOM/ACOM leadership meetings, WGCHAIRS and at the ASC.	Ongoing with participation and presentations at all stated meetings, and continued plans to do so.
o) Represent fisheries assessment and management science in SCICOM and ACOM and work with other SG Chairs and Chairs of EGs to ensure that ICES maintains active and impactful research on these topics.	Ongoing via active participation in SCICOM, ACOM, and SG Chairs meetings.

Terms of Reference	Progress
p) Ensure that the development of ICES science is informed by knowledge of current and emerging advisory needs.	Ongoing through communication of advisory needs and priorities via regular presentations to SCICOM.
q) Provide feedback to ACOM and advisory services to ensure they are well informed of current and emerging science with potential to meet their needs.	Ongoing through regular participation and presentations to ACOM and ACOM Leadership. Additionally, ACOM pays close attention to the results of many of the workshops under FRSG.
r) Provide feedback to SCICOM and research-oriented groups to ensure they are well-informed of developments in advisory request with potential to meet their needs.	Ongoing via this report and participation in SCICOM meetings, SG Chairs meetings, and participation at the ASC. The FRSG is coordinating within the ICES community on sessions at the ASC as well as proposed workshops and working group activities.
s) Contribute to the development of an ICES culture where other SGs and all EGs better understand advisory needs and have the potential to support advice.	Ongoing through collaboration with other SG chairs and communication within FRSG in coordination with ACOM/ACOM Leadership. The FRSG Chair continues to contribute to new ICES initiatives and activities, such as the formation of a new Data Science and Technology Steering Group, TAF Governance, and others.
t) Work with ACOM leadership to review suggestions from EG for benchmark processes and present to ACOM and SCICOM an annual plan for benchmark processes for the coming three years.	Ongoing, particularly through the FRSG Chair as an active member of the Benchmark Oversight Group.
u) Steer the development and implementation of methods to assess the state of fisheries resources and account for the fisheries impacts in advisory/management perspective.	The FRSG has highlighted various needs, challenges, and priorities and will continue meeting to establish initiatives and activities that address needs via development and implementation of new methods.

3.8.2 Science highlights

- In 2022, 23 FRSG working groups are meeting, and 22 workshops are being held
- 15 of the FRSG stock assessment groups were able to provide input to the draft advice for 113 fish stocks (January – June).
- There were 7 benchmark and interbenchmark stock assessment workshops, leading to benchmarks on 21 fish stocks
- One of the higher profile workshops, WKREF2 met in January to review the WKREF1 report and based on the outcome, develop updated guidelines for the ICES reference points system and recommendations for ACOM consideration. There was no consensus for a revised reference point framework, however, the main elements of such a framework were discussed. The report includes 6 recommendations for ACOM consideration.
- WKFISHDISH2, the second workshop on Fish Distribution met during June to review models to derive spatial distribution of fish and cephalopods from survey data with the aim of producing temporally resolved distribution maps for individual species based on data from surveys with varying in spatio-temporal coverage. The workshop discussed best practice guidance for model structure to derive distribution maps and as well how to implement these, defining and establishing an efficient and transparent approach to producing updates of these maps.

3.8.3 Science to Advice

With a stock assessment focus, nearly all FRSG groups conduct science that forms the basis for the advice. Thus, there is a direct line between the FRSG and the advisory process. The Working Group on Transparent Assessment Framework Governance (WGTAFGOV) and the workshops under FRSG are more strategic in nature. Unfortunately, while the FRSG supports the TAF concept, usage is decreasing due to capacity strains. WGTAFGOV is working to increase use, and the FRSG maintains this as an active conversation.

While FRSG groups continue to meet the advisory needs, capacity is a serious issue, and there is also an ongoing need to adapt to working in a new hybrid environment. The FRSG has discussed this topic, and in particular, how to maintain scientific integrity in the advice, given challenges associated with hybrid meeting participation.

3.8.4 Communication with EG

The FRSG recently discussed its communication process and agreed on two meetings per year (one as a breakout at WGCHAIRS, and another during the ASC). Remote correspondence is ongoing and FRSG members are encouraged to provide the FRSG Chair with important information to convey before each ACOM and SCICOM meeting. The FRSG had a very active and productive discussion during WGCHAIRS, covering numerous topics. The FRSG meeting during the ASC is focused largely on two topics; incorporating socioeconomic information in the stock assessment process, and the use of the Transparent Assessment Framework. In addition to supporting development of ToRs, the FRSG Chair participates in and represents the FRSG in numerous ICES groups (e.g., BOG, RCG, TAF Governance). The EGs themselves follow fairly prescribed operating procedures as they provide directly to ICES's annual advisory process. Overall, concerns and recommendations are communicated to ACOM, SCICOM, and the ICES community.

3.8.5 Summary of new EG proposals and EG closing

The FRSG now includes the new Working Group on American Eel (WGAMEEL) (resolution approved in November 2021)

3.8.6 Forward look

Given its scope of work, the FRSG is well-positioned to coordinate on strategic and research directions that are advice-relevant. For example, the discussion during the September FRSG meeting, that focused on socioeconomics in the stock assessment process, will likely lead to symposia and/or workshops in the coming years. Additionally, Jonathan White has been named the new FRSG Chair, and he has a strong vision for the future of the Group. Any activities or initiatives important to the FRSG will be closely coordinated with SCICOM and other ICES Steering Groups, particularly if there are recommendations that align with EBFM or EBM objectives.

4 Operational Groups

4.1 Data and Information Group (DIG)

4.1.1 Summary

In 2022 DIG was able to have its first hybrid meeting where part of the group members met up in person for the first time since 2019 at the ICES headquarters in Copenhagen. Four key areas were progressed during the 2022 meeting:

- Guidelines on reference management best practices
- Data profiling tool
- ShinyApp hosting and
- Data preservation plan

A total of 15 ongoing actions for intersessional work in the group is planned for the coming year.

In addition to these topics, DIG also discussed the potential challenge that the temporary suspension of all Russian data will have at present and potentially in the future.

4.1.2 Risk of decreased data availability

The decision made by Council on 30 March 2022 to place a temporary suspension on all Russian federation delegates, members and experts from participation in ICES activities may affect the data availability at present and potentially in the future.

DIG has over the last years had two items on our challenges and opportunities overview relating to possible lack of data, one relating to the lack of data collection (major risk of disruption) and the other relating to the willingness and ability to share data (minor risk of disruption). As we now are in a situation where these items have become very relevant it is important that ICES as a whole considers how it may and most likely will affect the work being carried out. It has been noted that ACOM and SCICOM have been made aware of these challenges. As an operational group, DIG is available for consultation regarding these matters. As a result of this discussion, Bureau (June 2022) considered this in their organizational risk register and raised the level of risk entitled "ICES does not receive data or receives poor quality or late data" from a medium to major threat.

4.1.3 Reference Management Best Practices

Using the same terms for the same topic has always been a challenge within data management when users of data are able to use their own way of describing (free text) what they are seeing. To alleviate this the usage of reference lists has been prevalent and makes it possible to make sure that data is describing the same phenomenon.

This however moves the challenge of data description to another level, as a badly managed reference list can make for just as bad data as no reference list. DIG together with the ICES data centre has started the work on creating a best practice guideline document for the management of reference lists. The document, as well as a workflow for how management of reference lists are managed by ICES, will be presented to the intersessional DIG meeting this fall.

4.1.4 Data profiling tool

As mentioned in last year's report, the Data Profiling Tool (DPT) has been made into a fully functioning tool for gathering information about ad-hoc datasets and visualizations being requested to ICES Data Centre or utilized in ICES advice outputs. The DPT went through a thorough testing period for the Ecosystem overview for the Celtic Seas. Presenting the tool to new groups, dealing with feedback and evaluating the incoming registrations through the online form is a substantial undertaking. DIG is monitoring the associated workload, and will outline a resourcing plan for the sustainability of this tool as it moves into the mainstream of ICES core work. The registered datasets have been evaluated by a dedicated sub-group of DIG and the dataset users received feedback on how to proceed. After the testing period minor changes to the tool have been made to both fix some issues and add a few additional questions that were deemed necessary to be able to give good feedback to the users.

The DPT is now in a stable state and will be promoted wider in the ICES community. ICES data centre and DIG will continue improving the tool as new datasets and services are registered.

For anyone that has a dataset or application that they want to register or evaluate, the tool is available at <https://www.ices.dk/data/tools/Pages/Data-profiler.aspx>.

4.1.5 ShinyApp hosting

The ICES data centre has set up an externally hosted service for R ShinyApp through <https://www.shinyapps.io/> that provides a secure method for hosting this type of ad-hoc applications in a safe manner. Hosting these applications on this external service means ICES runs no risk of security breaches in the standardized infrastructure from these kinds of ad-hoc applications. This means that technically hosting ShinyApps by ICES is possible.

However, there is an implication for the integrity of ICES, as a trusted provider of science-based advice, that we have to ensure a review and onboarding publication process that meets an agreed standard, and that ShinyApps used in an ICES context are documented and stored appropriately.

A separate document describing both the process and the documentation needed for ICES to host a ShinyApp is being developed as a collaborative effort between DIG and the ICES data centre.

4.1.6 Data preservation plan

Work on the Data preservation plan has been moving forward slowly throughout the last year. An outline for the chapters and their content has been generated. During the 2022 May meeting DIG had a separate breakout session on this topic to get the general content in place. A first draft of the report is to be presented during the intersessional DIG meeting in February 2023 while the final version will be agreed upon at the 2023 May DIG meeting.

The current outline for the Data preservation plan is as follows.

1. Scope
2. Agreement between repository and data submitter
3. Data storage
4. Backup and retention policy
5. Measures in place to handle technology change and file format obsolescence
6. Transfer of assets
7. Asset tracking

4.1.7 Data.ices.dk portal

The data portal has shown a steady use during its time in production and is a good tool for data users both within and outside of the ICES community to both find and access the data from the multitude of fields that are made available by ICES.

The plans for the continued work for the data portal was presented to DIG and DIG provided both feedback on future plans as well as made themselves available for participation in the next phase.

4.2 Training Group (TG)

Training Group: Anders Nielsen (Chair), Steven Cadrin, Amanda Schadeberg, Jörn Schmidt, Rafael González-Quirós, Pieter Jan Schon, Jan Jaap Poos, Daniel Duplisea

4.2.1 Background

The ICES Training Programme was initiated in 2009 to help build capacity in ICES and to support the scientists involved in the advisory process. ICES offers training courses by high-profile scientists and instructors to ensure that those involved in advisory process, have the skills necessary to complete such work. The objective of ICES involvement in training is quality assurance in the advisory process.

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Number of courses	1	7	6	7	8	5	4	6	9	4	7	3	5	2+3*

Table 1: Number of courses held each year (*planned courses).

Over 70 courses have been offered on a range of topics, including stock assessment (introductory and advanced), ecosystem modelling, model building, management strategy evaluation, Bayesian inference, fisheries advice, trawl survey design and evaluation, integrated ecosystem assessment, analysis and visualization of Vessel Monitoring Systems, communication of science and advice, and how to lead an effective technical meeting. Excluding the first year and the Covid period this averages to about six courses per year.

Since 2009 the training group has used various funds as well as course registration fees to fund the training program. In an effort to make the training program more self-sufficient, the registration fee for courses increased from 500 Euros for a five-day course to 750 Euros. From 2017 to 2021 the ICES training program has operated with a total combined surplus of about half a year's expenses of the training program.

4.2.2 Courses held in 2021

Five courses were offered (all online, due to Covid making physical courses impossible) those were:

- Introduction to Management Strategy Evaluation (33 participants)
- Scientific writing and publishing (31 participants)
- Analyses of VMS data for ecosystem and economic impacts of fisheries (28 participants)
- Introduction to Stock assessment (32 participants)
- Introduction to tag-recapture campaigns (17 participants)

All five courses were well attended and positively evaluated.

4.2.3 Road-map 2022-2026

The goals of the training program going forward are to: 1) Provide training courses which support present and anticipated future needs for ICES science and advice. 2) Develop the use of modern tools as a means of disseminating ICES training. 3) Achieving cost neutrality in the ICES training program. There are a number of spin-off benefits of the ICES training program such as publicity, increased credibility, and networking opportunities for young researchers, which benefits ICES as a whole.

Re: 1) The training group will continue to offer both “tactical”¹ and “strategic”² courses. To ensure that the courses offered are relevant to ICES science and advice the training group is composed so the majority of members should be members of SCICOM and at least one member from ACOM. The training group considers courses which are: proposed via ICES web page, proposed by expert groups (including the methods working group), and proposed in evaluations of previous courses. Further, the training group may actively seek out courses and instructors on particular topics to fill specific ICES needs.

Re 2: Face-to-face courses will continue to form the backbone of the ICES training program, as such courses offer better interaction between instructor and participants and better networking opportunities. However, remote learning has now been extensively tested (in the COVID period) and has proven to be a useful supplement. The longer-term goal could be to have entire courses available online but that will require much more work particularly on the payment model to make this work.

Re: 3) Tactical courses are often fully subscribed and hence self-funded or have a small surplus, whereas strategic courses are sometimes run at a loss (within reason) in order to seed ideas into expert groups. The teaching group aims for a 75:25 mix of tactical and strategic courses. To further achieve a cost neutral training program the following tools are available to the training group (in order of priority): offering courses which are estimated to be well attended, advertise courses via all ICES channels, extend registration deadlines along with targeted publicity, postpone courses, or cancel courses.

Conflict of interest is avoided by not making unilateral decisions about which training courses to offer. Decisions about future training courses are made by consensus in the training group and in the interest of ICES and the objectives of the training programme.

The role of the training group will in the coming period evolve and adapt in a collaboration with ICES new strategic initiative (WKEDU) for long-term capacity building, which involves an effort to coordinate among North American and European Universities to develop multi- and trans-disciplinary curriculum to meet future ICES science-based advisory needs.

4.2.4 Courses planned for 2022

Five courses are planned:

- Stock assessment rollover from 2021, 21–25 February
- Reproducible science, best practices and ICES TAF, 5–7 September

¹Tactical courses are the courses which teach ideas and techniques which are currently used in ICES expert groups and which are essentially for developing the present-day ICES advisory products.

²Strategic courses are those for which there is some need presently, but more importantly, they are courses for which the training group sees an increasing need over time.

- A practical course in selecting configurations for the state space assessment model SAM, 3-5 October (postponed to 2023)
- Statistical foundation for stock assessment, 24–28 October (postponed to 2023)
- Close-Kin Mark-Recapture: building models and designing projects, 21–25 November

These courses are all evaluated to cover important and timely topics and hence prioritized in a year where the training group was asked to consider that the ICES secretariat is limited by scarce resources.

4.3 Science Impact and Publication Group (SIPG)

The Science Impact and Publication Group (SIPG) was established in 2017 and coordinates and supports the publication and dissemination of research conducted under the auspices of ICES. The group is responsible for guiding, monitoring, and sharing ICES publication output and increasing the reach and impact of ICES publications. SIPG is chaired by Nils Olav Handegard, and has eight external members and three members from the ICES Secretariat (ICES Editor, Editorial Associate, and Head of ICES Data).

4.3.1 SIPG status update

4.3.1.1 New ICES Library (ToR a and b)

At the 2020 SCICOM meeting, SCICOM approved that ICES use a commercial repository to host the ICES library. The new library system was launched in March 2022 and is now operational (<https://ices-library.figshare.com/>). All new publications are published through the new system.

4.3.1.2 Digitizing ICES historical publications (ToR b)

ICES has been publishing reports, advice, and scientific outputs since the 1900s, and there is an ongoing process on digitising and making these publications openly available to the public on our online library. SIPG has compiled a list of all ICES publications we have a record of, resulting in a list of 42 publication series (the oldest of which started in 1900), and 34 publications out of series. The publications have been priority ranked. The work was commenced by ICES Editorial office in January 2021 and is progressing well.

4.3.1.3 How to publish publications that do not currently fit to any structure/standard publication type? (ToR c)

A broad range of reports, outreach documents, and other documents come to the editorial office and do not fit in any of our current series. There are two types of publications that we are currently looking into: publications that do not fit the current series available, including “working documents”, and publications with frequent updates that do not fit the normal publication cycle.

For publications that do not fit the current series available, we are looking into whether one of our current series can be expanded to accommodate them, or whether a new publication outlet/s is warranted.

Publications with frequent update cycles are unsuited for our standard way of publishing since each update requires re-publishing as a new PDF. We are currently exploring the possibilities using Github to track versions, since it can be synced to the new library platform.

4.3.1.4 Reporting and metrics for ICES impact (ToR b)

The new library system allows us to report on ICES impact, and offer basic statistics on downloads, reads, and where the items have been accessed from (<https://ices-library.figshare.com/stats>). The Figshare system also allow us to harvest publication data through

their application programming interface (API), allowing us to tailor reports on specific items in the library.

The API offer a very flexible approach to calculate different metrics, allowing us to report volume (Figure 1), download, view (Figure 2) by series, expert groups, or steering groups. Note that the usage statistics are limited to the usage of the new library. SIPG is currently looking into how to set up standard reporting for SCICOM.



Figure 1. the number of items currently in the system for the different series.



Figure 2. Download by series since the library was made openly available.

The Figshare API does not include citations information or media tracking, like Web of science or Altmetrics. This requires separate accounts on these or similar services. SIPG is looking into how to obtain API access and provide reporting combined with the library. If access is provided, the library system can be used to harvest the individual publications and allows us to merge the information from the library. The API also allows us to harvest the pdfs for detailed analysis of publication content by, e.g., year, EG, and provide reports like word clouds and other metrics based on the content of the publications.

4.3.2 Updates on ICES Publications

4.3.2.1 General updates

(i) ICES Editorial Office noted in 2020 that there was severe gender imbalance in potential peer-reviewers suggested by authors to review CRR or TIMES manuscripts – only 3 out of 33 were women in 2020. On from January 2021 a sentence was added to encourage considering gender, geographic, and career stage diversity in the e-mails sent to request potential reviewers names. This prompt seems to have had an effect resulting in a more balanced peer-reviewer gender distribution for 2021 and 2022 to date, with women constituting 40% of suggested peer-reviewers.

(ii) The current licence used by ICES (CC-BY version 4.0) has been instated our default licence - i.e. it will also apply to any documents in the library that have been published with no reference to permissions for use or type of licence.

(iii) The ICES external publication database collects all journal articles/books/reports/etc that are (1) published by the groups externally (e.g. in scientific journals), (2) which use ICES data, or (3) are otherwise linked to ICES (e.g. result from ICES sponsored symposia or reference ICES in the text). It has now has been fully transferred to the new library and is openly accessible and searchable. In 2021 and 2022 to date 120 entries were added to the external publications database, which can be viewed here:

https://ices-library.figshare.com/search?sortBy=publication_date&sort-Type=desc&groups=37287&pubPublishDate=2021-01-01%2C2021-09-30. All entries to the external publications database can be viewed by category here: <https://ices-library.figshare.com/external-pubs/groups>

4.3.3 Peer-review publications update

An overview of the ICES peer reviewed publication series can be seen in the Annexes

5 Strategic Initiatives

5.1 Strategic Initiative on Climate Change Impacts on Marine Ecosystems (SICCME)

The Strategic Initiative on Climate Change Impacts on Marine Ecosystems (SICCME) is a mechanism set up by ICES and PICES to coordinate northern hemisphere efforts to understand, estimate and predict the impacts of climate change on marine ecosystems. The objectives of the initiative are:

1. To advance scientific capacity on the three main challenges identified above by engaging the PICES and ICES scientific community in focused workshops, theme/topic sessions and symposia that target key uncertainties and technical barriers that impact the predictive skill of ocean models used to project the impacts of climate change.
2. To effectively communicate this capacity to clients, Member Countries, stakeholders and the broader scientific community.
3. To facilitate international efforts to design data collection networks at the spatial and temporal scales needed to monitor, assess and project climate change impacts on marine ecosystems.
4. To facilitate international collaboration to design and implement comparative analysis of marine ecosystem responses to climate change through modelling and coordinated process studies.

SICCME is chaired by Kathy Mills (US) and Alan Baudron (UK) on the ICES side, and Kirstin Holsman (US) and Xiujuan Shan (China) on the PICES side.

5.1.1 Activities 2021/2022

As reported last year, SICCME struggled to build momentum and a community during the COVID pandemic, and both prior ICES chairs of SICCME needed to step down prematurely due to changes in their positions and work commitments. Kathy Mills and Alan Baudron took on their roles as SICCME chairs in September 2021. Since that time, they have made several steps towards planning for a reinvigorated SICCME over the coming years, including:

- SICCME ToRs from the ICES side were slightly revised to include 'fisheries' alongside 'ecosystems', thereby acknowledging the human dimension of climate change in marine ecosystems and to better align with the PICES ToRs.
- An online meeting with former SICCME chairs was held to gather their perspectives on SICCME's role in ICES, PICES, and the broader scientific community and to discuss future directions for SICCME. This meeting resulted in recommendations of approaches and activities to strengthen the SICCME community, improve communications, and reinvigorate knowledge sharing and collaborations among SICCME members.
- SICCME chairs are compiling a list of ongoing large-scale climate-fisheries research projects and activities in order to inform SCICOM on current relevant research, enable SICCME members to identify connections and synergies among distinct efforts underway in the region, and identify common areas of research interests.

In the past year, SICCME members have contributed to a variety of activities that align with SICCME's Terms of Reference, including:

- IPCC AR6 WKII report was finalized and released to the public early in 2022. A number of SICCME members served as co-authors, including Drs. John Pinnegar, Christian Möllmann, Helen Gurney-Smith, Mette Skern-Mauritzen, Kirstin Holsman, and Shin-ichi Ito (ToR g).
- Dr. Kathy Mills and Kirstin Holsman are authors on the 'Oceans and Marine Resources' chapter of the 5th US National Climate Assessment, which will be finalized in fall 2023 (ToR g).
- SICCME chairs and many members contributed to WKCLIMAD workshop (October 2021), with Dr. Kirstin Holsman (PICES chair of S-CCME) serving as one of the chairs of WKCLIMAD (ToR b). The workshop report has been drafted and is currently under review by participants.
- Dr. Kathy Mills co-convened a session on Fish and Invertebrates for the ICES Symposium on Decadal Variability in Bergen, Norway in June 2022. Dr. Anne Hollowed served as the invited plenary speaker for the session (ToR b).
- SICCME and Strategic Initiative on the Human Dimension (SIHD) chairs held a joint meeting titled “SICCME/SIHD joint session on the human side of climate change in marine ecosystems: from mitigation to adaptation”, in a hybrid format, during the 2022 ICES ASC.
- Drs. Alan Baudron and Kathy Mills (SICCME chairs) and several SICCME members are part of the steering group for the 5th International Symposium on the Effects of Climate Change on the World’s Ocean (ECCWO5; 17-21 April 2023 in Bergen, Norway) and are contributing to the development of its scientific program (ToR b).
- SICCME members proposed multiple sessions and workshops at ECCWO5 (ToR b):
 - S5: Measuring and predicting responses of marine social-ecological systems to climate extremes (K. Mills)
 - S7: Nature-based solutions for climate adaptation and mitigation—from planning to practice (M. Peck)
 - S8: Advances in coupling regional climate and social-ecological models to improve climate-ready ecosystem management (K. Holsman, S. Bograd, P. Woodworth-Jefcoats)
 - S10: Beyond species on the move: emerging climate change impacts on the spatial dynamics of marine species, from detecting to forecasting and projecting (S. Ito)
 - S14: Cumulative anthropogenic impacts on key Arctic species (F. Mueter)
 - S17: Coupling social science and economics in integrated marine climate modelling efforts (A. Haynie)
 - W5: S-CCME/SICCME workshop on integrated modelling to identify climate change tipping points in marine ecosystems (K. Holsman, E. Hazen, K. Mills)
- SICCME chairs have started compiling a list of ongoing climate-fisheries research projects and activities to support our efforts to facilitate knowledge exchange and build collaborations among regional efforts and to inform SCICOM on current relevant research (ToR a, ToR f). To date, we have documented several new projects of interest that SICCME members are leading or involved in, including:
 - Climate Change and Future Marine Ecosystem Services and Biodiversity, FutureMARES (led by Myron Peck, NIOZ)

- Achieving Good Environmental Status for Maintaining Ecosystem Services by Assessing Integrated Impacts of Cumulative Pressures, GES4SEAS (led by Angel Borja, AZTI)
- Advancing Understanding of Cumulative Impacts on European Marine Biodiversity, Ecosystem Functions, and Services for Human Wellbeing, ACTNOW (led by Myron Peck, NIOZ)
- Mapping and assessing present and future status of Atlantic marine ecosystems under climate change and exploitation, Mission Atlantic (led by Patrizio Mariani, DTU)
- Canada (DFO) and US (NOAA) Climate and Fisheries Science Collaboration (led by Nancy Shackell, DFO)

5.1.2 Upcoming activities

In the upcoming year, we plan several organizational and substantive activities, in addition to those noted above:

- Conduct a close review of SICCME ToRs on the ICES side as they approach renewal. SICCME chairs are planning to consider updates that will better align the ToRs with those of PICES S-CCME and with current activities and needs.
- SICCME chairs submitted a proposal for a Theme Session at the 2023 ICES ASC, *Towards climate-informed ecosystem-based fisheries management*. Our intention is to pair this ICES ASC session with a workshop at the PICES meeting to develop a joint synthesis paper on the integration of climate information into fisheries management.
- Develop a SICCME ‘roadmap’ that builds on member projects and activities to identify possible collaborations and connections within ICES (including working groups) and with PICES. This process will also identify knowledge gaps and areas that may require more attention moving forward.

5.2 Strategic Initiative on the Human Dimension (SIHD)

5.2.1 SIHD Chair news

Alan Haynie (USA) has resigned as SIHD Chair since being appointed General Secretary of ICES in Summer 2022. Together with the SCICOM chair, member of ICES Secretariat and the chairs of WGSOCIAL and WGECON, the current chair Katell Hamon (Netherlands) will discuss the future of the Strategic initiative and identify how to best continue to advance the integration of the human dimension in ICES.

5.2.2 Recent SIHD activities

This year again, SIHD Chairs and members have engaged in a variety of activities, most of which have been online due to COVID-19. Many SIHD activities have been presented at the 2022 ASC and many SIHD members were present.

5.2.3 SIHD coordination activities

SIHD Chairs led several Coordination Meetings of SIHD-related expert group chairs this year, which has been very useful to promote ongoing collaboration and discussion of common goals across these groups. We will continue these efforts. SIHD chairs have also been actively involved in discussions with ACOM about the integration of human dimensions in current advice products of ICES.

While SIHD chairs have actively reached out to the human dimensions researchers involved in aquaculture (WGSEDA), little progress has been made regarding the involvement of aquaculture experts in SIHD.

Specific activities of SIHD-related Expert Groups

Some SIHD related groups have held a concentrated workshop during a single week and other groups have held shorter but more regular meetings. There seemed to be trade-offs to both approaches. Online meetings may have particularly benefited group members whose travel funding limits attending physical ICES meetings.

The Working Group on Balancing Economic, Social, and Ecological Objectives in Integrated Assessments (WGBESEO, ToR), chaired by David Goldsborough (The Netherlands), David Langlet (Sweden), and Paulina Ramirez-Monsalve (Denmark) is now working towards closing its first three-year period. The focus of the annual meeting (October 2022) is to finalize the ToRs that the group has been working on (e.g. pilot cases of cooperation between WGBESEO and some of the IEA groups; and draft manuscript on Methods to identify Ecological, Social, Economic, and Institutional objectives from policy documents). And to draft realistic ToRs for the new term.

The **WGMARS** group was at the end of its three-year cycle. Current chairs Jennifer Bailey (Norway), Leyre Goti (Germany) and Patricia Clay (USA) are joined by Jessica Fuller as Chair of WGMARS. Patricia Clay agreed to remain beyond her term in order to ease the transition of the three new chairs in the past two years. The group has worked on completing its current ToRs with several manuscripts getting ready to be submitted and drafted new ToRs for the coming term.

The WGECON and WGSOCIAL expert groups held partially overlapping online meetings in May 2022. This format provided again lots of great interdisciplinary discussions and collaboration and research planning.

WGECON, chaired by Rasmus Nielsen, Denmark, Olivier Thebaud, France, and Arina Motova, UK, also held an interim online meeting in February. The 2022 online meetings held in subgroups focused on five ongoing activities, i) a review on the current needs for economics analysis in ICES (accepted with major modifications), ii) contribution to ecosystem overviews with WGSOCIAL ([Celtic Sea Ecosystem Overview \(EO\)](#) is now published and Greater North Sea is on its way), iii) Fisheries-windfarm interactions analyses with WGSOCIAL, iv) developing guidelines for Trade-off analysis with WGSOCIAL and v) a comparative assessment of Rights Based Management systems.

WGSOCIAL was chaired by Amber Himes-Cornell (FAO) and Marloes Kraan (The Netherlands), Lisa Colburn (USA) having stepped down during this period. In addition to the work reported with WGECON, the group has continued its work on its ToRs including i) continuing to build capacity, through ICES course planned in 2023, links with MARE and #MarSocSci and with the DGMARE of the EU commission, ii) developing guidelines to create social indicators with EU data and iii) the work on fishing communities.

5.2.4 Recent external research and communication activities

SIHD members have recently gotten positions in external networks: three STECF members (Arina Motova, Leyre Goti and Katell Hamon) and the president of IIFET (Olivier Thebaud). In addition, existing positions as the director of the MARE (Marloes Kraan) and at FAO (Amber Himes Cornell).

Recent SIHD-related activities include:

- In December 2021, [MSEAS online webinar](#)
- In January 2022, unformal online event with SIHD members.
- SIHD and SICCMME joint session on the human dimension of climate change at ICES ASC 2022.

5.2.5 Upcoming SIHD Planned Activities

The following table summarizes a number of planned activities of SIHD groups.

Group(s)	Event	Month/Year
All Groups	ASC	September 2022
WGBESEO	Hybrid annual meeting	October 2022
SIHD	Share Roadmap	October 2022
WGECON/WGSOCIAL	Intersectional sessions on Fisheries-windfarm interactions	Autumn 2022, spring 2023
SIHD/SICCMME	ECCWO5	Spring 2023
WGSOCIAL	ICES course on social science methods	2023
WGSOCIAL	Subgroup on developing guidelines for social indicators and identifying community data gaps	Jan 2023
WGECON, WGSOCIAL, WGMARS	Annual meeting	Spring 2023
SIHD + All	MARE conference	June 2023
SIHD + All	ASC Bilbao 2023	Sept 2023
MSEAS	MSEAS in person	Spring / Summer 2024
SIHD	WKCONSERVE 2	Early 2024

5.2.6 SIHD Roadmap

In the last year, several virtual meetings were held and feedback was received on an early version of our Roadmap. Following the discussions, we have decided to center the roadmap around three axes: research, advice and community.

In Research we will focus on demonstrating the added value of social science to management through case studies and guidelines. In addition, we will identify needs and gaps in data and methods.

In Advice, we will work with the expert groups providing advice to offer our support and demonstrate what can be added from the human dimension.

In community, we will continue to reach out to the various experts, trying to improve the SIHD membership of aquaculture experts. We will provide training, organize conference sessions and topic specific workshops while having realistic expectations of the members of the SIHD community.

5.2.7 Additional planned activities

- Work with other Strategic initiatives to find synergies
- With one active chair remaining SIHD needs to identify potential and realistic activities in the coming year. A discussion between SIHD chair, the ICES secretariat and the Chairs of SIHD “companion” expert groups is on-going to define the best strategy for the near future, ensuring a sufficient discipline, sector and geographical expertise coverage.

5.3 Strategic Initiative on Integration of Early Career Scientists (SII ECS)

5.3.1 General

SII ECS consists of (i) three co-chairs of the initiative, (ii) a core group of roughly 20 ToR leaders (Table 1) and (iii) a wider group of ECS interested in contributing to the initiative (roughly 150 members) with three chairs (Amanda Schadeberg, Alina Wieczorek, and Côme Denechaud). In the past year, SII ECS has proudly achieved several important aims across all Terms of Reference.

5.3.2 Promote ICES among ECS from global marine science community (ToR a)

ToR a) aims to increase the visibility of ICES amongst ECSs and to recruit ECSs that are not already connected to ICES. SII ECS members have promoted SII ECS and ICES amongst their direct networks and on social media via #SII ECS. Some of the institutions of SII ECS members have promoted SII ECS and ICES themselves. Examples include bulletins in institutes, an FAQ info pack for new members, and a logo to help increase SII ECS visibility. Eventually, SII ECS would like to help ICES develop an attractive video or some other document (such as an infographic) explaining the ICES structure, answering some of these FAQs and describing how ECSs can become involved in ICES, which will be distributed via social media and early career networks. SII ECS would also like to highlight that much of this work, which has been targeted to ECS will also be relevant for non-ECS people interested in the work of ICES.

In the coming year, SII ECS will work towards a monthly newsletter for the wider SII ECS community to engage them in the activities of ICES. Content of the newsletter will include ICES announcements, job opportunities, and ad hoc activities related to SII ECS.

5.3.3 Connect with other marine ECS groups (ToR b)

The ToR b) leaders have organized an ICES/SII ECS Digital Open Day on 19 October 2022. The aim of the Open Day is to introduce ICES to prospective and recent marine science graduates.

The focus of the open day will be on different career paths into ICES and what role ECS can play in the different working groups. Steering group chairs will be invited to become involved and SIIIECS collaborate with the IT department of ICES.

For the coming year, SIIIECS plans to run an interview series with ECS who have a policy and/or industry background within ICES member states (starting with Ireland, the Netherlands and Norway). An application has also been made to host a summer school about interdisciplinary marine science and policy, funded by [Call to Host EuroMarine Summer School on Ocean Transformation](#). The goal of the summer school would be to promote cross-institutional collaborations and to deliver interdisciplinary training to participants while connecting to other ECS networks (e.g. OYSTER, IMECaN, ECOPS).

5.3.4 Participate in ICES discussion and action on diversity, equity and inclusion (ToR c)

SIIIECS provided interim feedback on the ICES Gender Equality Plan (GEP). SIIIECS are represented in the WGCHAIRS subgroup that is working on specific recommendations for DEI in the work of ICES, the outcomes of which will also feed into the GEP. SIIIECS members will also convene a theme session at the 2023 ASC on DEI. SIIIECS member Ellen Johannessen is also part of the Ocean Decade ECOP DEI task team.

5.3.5 Encourage inclusion of ECS in ICES WGs and other activities (ToR d)

SIIIECS has established a keynote speaker slot for the ICES ASC and developed an equitable selection process. Cornelia Jaspers from DTU Aqua presented her keynote at the 2022 ASC to much positive feedback. SIIIECS would like to suggest to SCICOM that the same or similar selection process will be used for all keynote speakers for the improvements it offers to reducing bias and increasing diversity, equity and inclusion within ICES.

Another important achievement in 2022 was the organisation of the networking session [Connecting ICES expert groups to early career scientists](#) convened by Amanda Schadeberg, Okko Outinen and Robert Mussnug. The session presented ICES structure, some personal reflections about being involved in WGs, and connected 10+ WG chairs with 70+ ECS for informal networking and a Q&A session. A flyer about SIIIECS was distributed during the 2022 ASC and available as outreach material thereafter.

Amanda Schadeberg gave a short presentation at the joint ICES PICES ECS conference in St John's in July 2022 about SIIIECS during the opening ceremony and SIIIECS members promoted SIIIECS and ICES during the poster session and other networking breaks.

Plans for the coming year include the compilation of an article in the new Rising Tides ICES JMS series about why ECS volunteer their time to networks such as SIIIECS and what impact this has on their personal lives and professional career.

5.3.6 Foster interdisciplinary work by connecting ECS from various ICES WGs (ToR e)

SIIIECS was particularly excited about its collaboration with the ICES Journal of Marine Science. Members Okko Outinen, Côme Denechaud and Valentina Melli have been working closely with editor Howard Browman to launch the article series "[Rising tides – voices from the new generation of marine scientists looking at the horizon 2050](#)" in May 2022. Two articles are under review

within the series and the first article: "[The deep sea and me](#)" was recently published. A presentation about the new article series was given during the 4th ICES/PICES ECS conference (18–21 July 2022, St. John's, Newfoundland, Canada) and a poster was presented at the 2022 ASC to call for submissions. For 2022/23 it is planned to coordinate the writing of an interdisciplinary science article with representatives of ECS from various ICES working groups.

5.3.7 Contribute to the collection of basic statistics on the number of ECS per ICES country of WG, the stage of their career and main fields of interest (ToR f)

Led by Szymon Smolinski, SIIIECS members have analyzed a database of peer-reviewed articles to (i) provide basic indices on the authorship of ECS in the field of marine and fisheries sciences, (ii) assess temporal trends in the contribution of ECS to the general scientific output in the field, and to (iii) compare the citation impact of articles led or co-authored by ECS with those which are solely authored by senior scientists. The results of the study were presented during the 4th ICES/PICES ECS conference (18–21 July 2022, St. John's, Newfoundland, Canada) and a manuscript entitled "Counting stars: contribution of early career scientists to marine and fisheries science" has been accepted at the ICES Journal of Marine Science. For the next year it is planned to look into further analyses of the extracted dataset and SIIIECS hopes to apply similar analyses to ICES reports to identify and highlight the contribution of ECS.

5.3.8 Additional items

SIIIECS would like to welcome Barbora Valachova as our new supporting officer. We give a warm thanks to outgoing supporting officer Martin Rasmussen for his support on behalf of the ICES secretariat during the past year. We would also like to thank the rest of the team at ICES HQ for their support and guidance over the past year of fruitful ECS-led activities.

6 Annual Science Conference

6.1 ASC 2022

The hybrid ASC was held 19–22 September 2022, with the online conference app available from the 5 September and open until the end of 2022. The conference was held in the Aviva Stadium in Dublin, Ireland and made use of the Whova app for all online content, being available on mobile devices and as desktop version. All presentations and posters were available on the app, for all registered participants to view. Participants were encouraged to view all pre-recorded presentation before the conference, to participate in active discussion during the live sessions. Theme and Network sessions were held in hybrid mode, allowing viewing, and commenting online. Conveners were invited to run interactive sessions with focus on discussion and exchange.

Some statistics in person:

- 18 Theme sessions
- 5 Network sessions
- 38 Business meetings
- 572 Abstracts submitted in March 2022
- 45 Received withdrawals by September 2022
- 534 Participants registered for in person attendance
- 240 Participants registered for online attendance
- 489 Checked in at the registration desk

And online:

- 774 Participants downloaded the app
- 6271 Messages sent via the app
- 134 Community posts
- 103 Shared photos
- 341 6-minute videos
- 108 Posters available on the Whova app

The most popular streams, based on attendee numbers:

- Open Ceremony with plenary “[Climate change impacts on North Atlantic/Irish waters: four perspectives](#)”
- Keynote: “[Marine ecosystems under change: Do we face a more gelatinous future?](#)”
- Keynote: “[Marine ecosystem, fisheries, social, economic, and ocean science: why do we keep missing key dimensions, focusing on the wrong scales, and committing other sins of reductionism?](#)”

Feedback to the conference was generally positive. Several technical glitches were observed. Specific feedback from the participants and staff surveys will be analysed and will feed considerations on future formats. Full feedback can be provided by anna.davies@ices.dk upon request.

6.2 ASC 2023

The 2023 Annual Science Conference will be held in Palacio Euskalduna, Bilbao, Basque Country, Spain from 11–14 September. The organizing team, together with the SCICOM subgroup on the ASC format, will develop and deliver the programme considering feedback from the first ASC that was run in hybrid mode this year.

Annex 1: Implementation plan

a) To catalyse, shape, facilitate and promote marine science which has a high and beneficial impact on society and addresses all priorities identified in the science plan

Establish terms of reference (ToR) and new expert groups as appropriate: to address all science priorities identified in the Science Plan. Ensure effective and ongoing review of expert group activity and outputs.

Action and code	Lead entity	2021-04-11, narrative on progress
A1. Work with the expert group chairs to ensure their ToR, individually and collectively, address the priorities identified in the science plan	SCICOM (lead)	Work to do. Terms of reference for majority of workshops and all new fixed-term working groups mapped to science plan codes. Generally little or no mapping of ACOM legacy group terms of reference to Science Plan. Challenge to date is existence of four separate resolution forms, with only one providing an explicit requirement for codes. This will be rectified with the introduction of a common resolution form for all expert groups. (ongoing)
A1. Work with the expert group chairs to ensure their ToR, individually and collectively, address the priorities identified in the science plan	SCICOM (lead)	Analytical tools not in place. This will be fixed by the introduction and adoption of the resolutions database.
A2. Identify needs for new expert groups and rationalization of existing groups	SCICOM (lead)	Analytical tools not in place. This will be fixed by the introduction and adoption of the resolutions database
A2. Identify needs for new expert groups and rationalization of existing groups	SCICOM (lead)	On target, supported by direct review of terms of reference by EG chairs, SG chairs and on forum.
A3. Develop and prepare resolutions and web text for expert groups with all fields completed and ToR linked to science plan codes	Expert group chairs (lead)	Ongoing. Terms of reference for majority of workshops and all new fixed-term working groups mapped to science plan codes. Generally little or no mapping of ACOM legacy group terms of reference to Science Plan. Challenge to date is existence of four separate resolution forms, with only one providing an explicit requirement for codes. This will be rectified with the introduction of a common resolution form for all expert groups in 2021 (ongoing)
A4. Conduct final and/ or interim evaluations of expert group activity using forms provided	Expert group chairs (lead)	On track. New interim and final evaluation process introduced and completion on target at present time. Evaluations on SCICOM forum for review.
A4. Conduct final and/ or interim evaluations of expert group activity using forms provided	Expert group chairs (lead)	New interim and final evaluation process introduced in 2019. Not achieving 100% return in 2020, but very few overdue in practice

Action and code	Lead entity	2021-04-11, narrative on progress
A5. Complete work in support of ToR to timescales specified in EG resolution	Expert group chairs (lead)	Analytical tools not in place. This will be fixed by the introduction and adoption of the resolutions database.
A6. Submit timely reports to the Secretariat for final formatting and publication and provide follow up responses to Secretariat requests for support	Expert group chairs (lead)	Almost on track. There are still recurrent issues with some late reports.
A7. Ensure that the work of expert groups is well coordinated to increase interaction and synergy and avoid inefficiencies and repetition of work	Steering group chairs (lead)	On target.
A7. Ensure that the work of expert groups is well coordinated to increase interaction and synergy and avoid inefficiencies and repetition of work	Steering group chairs (lead)	On target, supported by direct review of terms of reference by EG chairs, SG chairs and on forum.
A8. Effective review of expert group descriptions, ToR and expert group outputs for science content and clarity of presentation	Steering group chairs (lead)	On target for ToR. Not on target for group descriptions. For descriptions this will be rectified with the introduction of a common resolution form in 2022. A format for descriptions has been agreed with WGCHAIRS and SCICOM

Strengthen our expert groups, creating stronger and more dynamic links between science and advice, attracting and engaging a wider range of scientists from the natural and social sciences and supporting and capturing innovation

Action and code	Lead entity	2021-04-11, narrative on progress
A9. Publish ICES science plan in an attractive and accessible format for physical circulation at ICES events and for web viewing	Secretariat (lead)	Complete
A10. Opening link to science content on front page of ICES website	Secretariat (lead)	Completed and site launched April 2020, link cleaning in progress
A11. Identify and promote science priorities, nationally and internationally	SCICOM (lead)	On target. 2021: DFO workshop with ACOM and SCICOM Chair presenting on ICES; presentation of SCICOM chair at national marine science conference Lithuania
A11. Identify and promote science priorities, nationally and internationally	SCICOM (lead)	Progress in 2021: Joint ICES/PICES UN Decade of Ocean Science for Sustainable Development Steering Committee and programme proposal SMARTNET endorsed; Contribution to SCAR-Fish; Arctic activities (see SCICOM September doc 13.2_1)

Action and code	Lead entity	2021-04-11, narrative on progress
A11. Identify and promote science priorities, nationally and internationally	SCICOM (lead)	Lead transferred to ACOM vice-chairs (2019).
A12. Support diversification of ICES research topics by co-organizing science symposia with strategic partners	Secretariat (lead)	On target, for 2022-2024; co-sponsored symposia now signed off address all seven science priorities. New process was introduced for symposium review and selection from 2020, to ensure equitable review by year in SCICOM.

b) To ensure expert groups have flexibility to innovate and explore new topics and encourage and support cross-cutting science activity

Capturing and highlighting innovation by the expert groups and working quickly to review and respond to this innovation

Action and code	Lead entity	2021-04-11, narrative on progress
B1. Annual review of all expert group outputs and recommendations	SCICOM (co-lead)	On target, increasing frequency of recommendations review meetings, review of content through introduction of interim and final e-evaluations
B1. Annual review of all expert group outputs and recommendations	Steering group chairs (co-lead)	On target, increasing frequency of recommendations review meetings, review of content through introduction of interim and final e-evaluations, feedback by SG chairs
B2. Regular review of science priorities to meet current and emerging advisory needs, with distribution of highest priority work to expert group network	ACOM and SCICOM (lead)	On track. ACOM and FRSG report on priorities to SCICOM meeting Sept 2021.

c) To increase the visibility of, and access to, our science, data and advice and recognize, promote and use the science outputs from expert groups

Provide outlets for publishing the science catalysed by this plan, measuring its impact and sharing it via a range of media channels, within our existing network and beyond. Develop services and tools to enable visualization and easy access to data to meet the needs of users in our groups

Action and code	Lead entity	2021-04-11, narrative on progress
C1. Identify authors (group members) and editors (chairs) on the cover of ICES expert group reports and state citation and DOI on cover of all expert group final reports. [and place in a series with ISSN]	Secretariat (lead)	On track. On target for majority of 2021 meetings, but with publication of a small number of reports overdue owing to late submission by expert groups. New guidance issued on executive summaries and review process introduced. Quality of summaries and adherence to guidance now improving.
C2. Increase ICES impact through communication and publication of science highlights	Secretariat (lead)	On track. Secretariat initiated clear process for collation of highlights and prioritised topics with SG chairs, first outputs published, including long format highlight on monitoring by EOSG groups and on UN Decade- plans in place for

Action and code	Lead entity	2021-04-11, narrative on progress
		forthcoming series in biodiversity, in other words and aquaculture
C3. Project ICES work in new engaging/branded/relevant formats (infographics that communicate ICES products effectively)	Secretariat (lead)	New project by Communication Team: video series "Eye on the Expert": 20 Expert Groups across the network (all SGs covered) highlighted through interviews with Early Career Scientists from the groups
C4. Continue editing/formatting/checking, cataloguing and digitalizing of in-house publications	Secretariat (lead)	On track. Ruth Andersen leading project to address these and related aspects of ICES publication processes
C5. Roll out Digital Object Identifiers (DOI's) for data outputs and ICES publications for better citation and traceability	Secretariat (lead)	On track, all published in 2019, 2020 and 2021 to date with DOI
C6. Bibliographic analysis of ICES publication output and impact	Science impact and publication group (lead)	Ongoing. Complete and also checked by EG mailing for 2017-2020, but past years incomplete at present. 2021 processed and checked by SG chairs.
C6. Bibliographic analysis of ICES publication output and impact	Science impact and publication group (lead)	The new library system (FigShare) is now in place. Metrics will be summarized for the Council report October 2022. Ongoing
C7. Annual analyses of ICES science impact for reporting to SCICOM ASC meeting and Council October meeting	Science impact and publication group (lead)	Ongoing

d) To provide an efficient, collaborative, respectful and rewarding working environment for all scientists, as well as the resources and infrastructure needed by groups to develop and share knowledge and expertise

Provide effective support and appropriate facilities for meetings. Institute and raise awareness of ICES codes regarding work practices and expected behaviours in expert groups.

Action and code	Lead entity	2021-04-11, narrative on progress
D1. Sign-off and implement ICES code of conduct, conflict of interest policy and standard of conduct policy	ICES Council (lead)	On target, completed. New process on developing a Code of Ethics and Professional Conduct initiated.

Give effective guidance on running expert groups, support chairs with implementation and ensure all scientists in the network know how and where to get support. Institute and raise awareness of ICES codes regarding work practices and expected behaviours in expert groups.

Action and code	Lead entity	2021-04-11, narrative on progress
D2. Update and make available revised "Guidelines for ICES groups" and highlight the update to expert group chairs.	SCICOM (lead)	On target for all issues to date (latest version will be published soon as 1-2022)

e) To provide more and better networking opportunities and encourage engagement of a new and emerging generation of scientists with ICES and expert groups

Ensure that the scientific programme at the ASC and symposia provides opportunities for everyone, from students and early career scientists through established leaders of large research institutes, to engage and contribute.

Action and code	Lead entity	2021-04-11, narrative on progress
E1. Develop topical and engaging ASC programme	SCICOM (lead)	The online ASC was very successful and the most attractive elements (pre-recorded presentations and interactive sessions) will be maintained for the hybrid conference in Dublin 2022.
E2. Support the Science Committee to deliver a relevant, inclusive and modern annual conference programme	Secretariat (lead)	Very positive feedback on ASC 2021 speakers

Develop and implement a training strategy

Action and code	Lead entity	2021-04-11, narrative on progress
E3. Evaluate and develop a strategy for the ICES Training Programme, including assessment of training needs, online training courses, considerations of alternative training initiatives (courses arranged by PhD/Post.doc), and exploring options for accreditation of the training course (ICES work plan 1.3.x)	Council (lead)	Ongoing, TG lead
E4. Implement ICES Training Programme	Secretariat (lead)	Training Group started the process. Survey on past Training Courses sent to former participants to develop baseline

f) To exchange knowledge and expertise with regional and global partners through collaborative projects, networks and training; to shape and advance marine science and advice and meet joint scientific goals

Strengthening our relationships with existing strategic partners through joint missions and activities. By developing joint expert groups, co-sponsoring conferences and conference sessions and contributing to overviews and assessments of the state and uses of the marine environment. Developing new partnerships to increase reach and impact of science and support capacity building (training issues addressed under 'training')

Action and code	Lead entity	2021-04-11, narrative on progress
F1. Work with partners to identify needs and opportunities for joint expert groups conducting work of mutual and added benefit and initiate these expert groups	SCICOM (lead)	Mostly on track, groups initiated: 15 joint Expert Groups to date (2022-06-09); threatened by the temporary suspension of Russian Federation to interact with organizations which still have representation of Russian Federation experts.
F2. Contact in cooperation with ICES Member Countries relevant public and non-profit institutes, academia currently not actively involved in ICES with the aim of including them in ICES community. Plan to be presented to Council based on suggestion from SCICOM and the Secretariat. Identify funding schemes in Member Countries to highlight different models of participation (especially for academia)	Secretariat (lead)	In Progress. Consultation with national SCICOM members in 2020/21. Network session on national activities at ASC 2022. Task also formulated for the soon to be established Strategic Initiative on Education.
F3. Develop and co-sponsor conferences with partners and ensure partners have a visible role at the annual science conference	Secretariat and SCICOM (co-lead)	On track in terms of co-sponsoring symposia in 2019-2020-2021-2022-2023-2024 with PICES, FAO, PAME, CAFF, AMAP, Arctic Council, Nordic Council of Ministers, OSPAR and IOC. Implementation could be affected by the temporary suspension of Russian Federation to interact with organizations which still have representation of Russian Federation experts.
F4. Develop integrated ecosystem assessments and ecosystem overviews for new regions with partners.	Integrated ecosystem assessment SG (lead)	On track

Develop and coordinate cross cutting science activities related to climate change and the sea and society

Action and code	Lead entity	2021-04-11, narrative on progress
F5. Strategic initiatives to establish and implement cross-cutting plans	Strategic initiatives (lead)	SIHD and SICCME on target- SIHD identified links with several groups (see SIHD webpage) and engagement is facilitated through regular online meetings. Joint meetings to identify joint activities between SIHD and SICCME.

g) To monitor and report on progress towards meeting the goals of the science plan

Monitor implementation of the science plan and report on progress, innovation and science highlights through reports to Council, web communications and publications.

Action and code	Lead entity	2021-04-11, narrative on progress
G1. Regularly and actively solicit inputs from member country institutions, partners, clients and stakeholders on the development of our science	SCICOM (lead)	Ongoing for 2022 and 2023
G2. Annually report to ICES Council on implementation of the science plan and summarize activity and output from the expert group network and at the Annual Science Conference and symposia	SCICOM (lead)	Q3 2021 report published
G3. Identify and shape emerging areas of science and maintain preparedness for future science planning	SCICOM	Completed 2021. Ongoing for 2022. New group on Greening the Research Fleet under discussion. Group on spatial conservation measures established.

Annex 2: ICES co-sponsored symposia

Year	Date	Title	Venue	Conveners	Co-sponsors
2024	17-21 March	7th Zooplankton Symposium	Hobart, Australia	Anthony Richardson (University of Queensland and CSIRO), Kerrie Swadling (University of Tasmania), Sophie Pitois (CEFAS), Sonia Batten (PICES), Akash Sastri (DFO)	PICES
2024	10-14 June	Oceans Past 2024: Historical perspectives on human-ocean interactions: deep understandings for informing ocean futures	Penryn, Cornwall, United Kingdom	Ruth Thurstan (University of Exeter), Gesche Krause (AWI)	
2024	Spring	Third International Science and Policy Conference on Implementation of the Ecosystem Approach to Management in the Arctic	Tromsø, Norway	Lis Lindal Jørgensen (IMR), Libby Loggerwell (NOAA)	IMR, PAME
2024	TBD	Marine Socio-Ecological Systems - MSEAS 2020: Navigating global change in the marine environment with socio-ecological knowledge	tbd	Rich Little (Australia), Marloes Kraan (Netherlands), Mitsutaku Makino (Japan), Doug Lipton (US) and Keith Criddle (US)	PICES UNDOS endorsement
2023	27-30 March	From Echosounders to the Cloud: Transforming Acoustic Data to Information	Portland, Maine, USA	Michael Jech (NOAA), Anne Lebourges-Dhaussy (IRD), Gayle Zydlewski (University of Maine)	IRD, NOAA, SeaGrant Maine, University of Maine UNDOS endorsement
2023	17-21 April	5th Effects of Climate Change on the World's Oceans (EC-CWO)	Bergen, Norway	Geir Huse (IMR, Norway), Jörn Schmidt (ICES), Sonia Batten (PICES), Kirsten Isensee (IOC-UNESCO), Tarub Bahri (FAO)	PICES, FAO, IMR, IOC-UNESCO
2023	22-25 May	Human Impacts on Marine Functional Connectivity	Sesimbra, Portugal	Lucía López López (CN IEO, CSIC/ICES, Spain), Manuel Hidalgo (CN IEO, CSIC/ICES, Spain), Susanne Tanner (MARE/University of Lisbon/ICES, Portugal), Ant Türkmén (Ecological Research Society, Turkey), Maria Beger (University of Leeds/Sea-unicorn, UK)	Sea-unicorn, COST, Sesimbra, Museo Marítimo de Sesimbra UNDOS endorsement
2022	20-22 June 2022	ICES 4th Decadal Variability of the North Atlantic and its Marine Ecosystems: 2010-2019	Bergen, Norway	Kjell Arne Mork (Norway), Cesar Gonzalez-Pola (Spain), Paula Fratantoni (USA), Caroline Cusack (Ireland), Stephen Dye (UK) and Barbara Berx (Scotland)	IMR, NAFO UNDOS endorsement

Year	Date	Title	Venue	Conveners	Co-sponsors
2022	22-25 June *Online workshops in 2021	Oceans Past IX Conference	Seattle, Washington, United States	Ben Fitzhugh (USA) & Ruth Thurstan (UK)	
2022	18-21 July	Fourth ICES PICES Early Career Scientist Conference	St. John's, Newfoundland, Canada	Sonia Batten, PICES, Andrea White, Fisheries and Oceans Canada, Wojciech Wawrzynski, ICES	PICES, DFO
2022	10-15 October	Symposium on Capelin—The canary in predicting effects of climate on the Arctic marine environment	Bergen, Norway	Samuel Subbey (Norway), Johanna Fall (Norway), Warsha Singh (Iceland), Kerim Aydin (USA), Hannah Murphy (Canada)	Norwegian Research Council
2022	7-11 November	International Symposium on Small Pelagic Fish: New Frontiers in Science for Sustainable Management	Lisbon, Portugal	Susana Garrido (Portugal, ICES), Myron Peck (Germany, ICES), Ryan Rykaczewski (USA, PICES), Ignacio Catalán (Spain, ICES), Akinori Takasuka (Japan, PICES)	PICES, FAO, Gulbenkian Foundation UNDOS endorsement
2021	2-4, 8-9 March 2021	International Symposium on Plastics in the Arctic and Sub-Arctic Region	Online	Hrönn Jörundsdóttir, Matis, Reykjavik, and Thomas Maes, Centre for Environment, Fisheries and Aquaculture Science, Lowestoft	The Icelandic Ministry of Foreign Affairs, The Icelandic Ministry of the Environment and Resources, The Icelandic Ministry of Industry and Innovation, The Marine and Freshwater Research Institute, The Nordic Council of Ministers
2021	20-24 September 2021	World Fisheries Congress 2020	Online	Bronwyn Gillanders (Australia) and Tim Ward (Australia)	Brand South Australia, PIRSA, SARDI, Adelaide Convention Bureau, Adelaide Convention Centre, FRDC, CSIRO, Austral Fisheries, FMA, IMAS
2021	18-22 October 2021	Baltic Sea Science Congress	Århus, Denmark	Professor Jacob Carstensen (chair), Associate professor Peter Grønkjær (Department of Biology), Nikolaj Reducha Andersen (Department of Bioscience), Helle Knudsen-Leerbeck (Department of Bioscience), Charlotte Hviid (Department of Bioscience), and Anne van Acker (Department of Bioscience).	Århus University

Annex 3: List of ICES Groups that were dissolved, established, or changed chairs

Change of Chairs (ACOM, SCICOM, Steering Groups (SG)/Operational Groups (OG)/ Strategic Initiatives (SI))

Parent	Acronym	Expert Group name	Outgoing chair	Incoming chair
SI	SIHD	Strategic Initiative on the Human Dimension	Alan Haynie	–
SG	FRSG	Fisheries Resources Steering Group	Patrick Lynch, USA	Jonathan White, Ireland
SI	SIECS	Strategic Initiative on the Integration of Early Career Scientist	Fedor Lishchenko, Russian Federation	Côme Denechaud, Norway

Established Expert Groups

Parent	Acronym	Expert Group name	Outgoing chair	Incoming chair
DSTSG	WGGRF	Working Group on Greening the Research Fleet	NA	Sonja Endres, Germany, and Aodhan Fitzgerald, Ireland
DSTSG	WGBIOPTIM	Working group on Optimization of Biological Sampling	NA	Patrícia Gonçalves, Portugal and Isabella Bitetto, Italy

Change of Expert Group chairs

Parent	Acronym	Expert Group name	Outgoing chair	Incoming chair
DSTSG	WGALES	Working Group on Atlantic Fish Larvae and Eggs Surveys	Cristina Nunes, Portugal Patrick Polte, Germany (11/2023)	Maik Tiedemann, Norway, and Carolina Giraldo, France
DSTSG	WGFAST	Working Group on Fisheries Acoustics, Science and Technology	J. Michael Jech, USA	Anne Lebourges-Dhaussy, France
EPDSG	WGIMT	Working Group on Integrated Morphological and Molecular Taxonomy	Elaine Fileman, UK Jasmin Renz, Germany	Dafne Eerkes-Medrano, UK, Aitor Albaina, Spain

Parent	Acronym	Expert Group name	Outgoing chair	Incoming chair
EPDSG	WGCEPH	Working Group on Cephalopod Fisheries and Life History	Ana Moreno, Portugal Graham Pierce, Spain	Catalina Perales-Raya, Spain Vladimir V. Lap-tikhovsky, UK
EPDSG	WGScallop	Scallop Assessment Working Group		Isabel Bloor
EPDSG	WGCRAB	Working Group on the Biology and Life History of Crabs	Carlos Mesquita	Ann Merete Hjelset
FRSG	HAWG	Herring Assessment Working Group for the Area South of 62° N	Afra Egan	Aaron Brazier, UK
FRSG	NIPAG	Joint NAFO/ICES Pandalus Assessment Working Group	Ole Ritzau Eigaard, Denmark	Fabian Zimmermann, Norway
FRSG	WGBFAS	Baltic Fisheries Assessment Working Group	Mikaela Bergenius Nord, Sweden	Is not being replaced, Kristiina Hommik will continue as single Chair in 2023
FRSG	WGBIE	Working Group for the Bay of Biscay and the Iberian Waters Ecoregion	Cristina Silva, Portugal	tbc
FRSG	WGDEEP	Working Group on the Biology and Assessment of Deep-sea Fisheries Resources	Elvar H. Hallfredsson, Norway	Juan Gil Herrera, Spain
FRSG	WGEEL	Joint EIFAAC/ICES/GFCM Working Group on Eels		Caroline Durif will chair together with Jan-Dag Pohlmann who will continue for another term
FRSG	WGEF	Working Group on Elasmobranch Fishes	Pascal Lorange, France	Sophy McCully Phillips, UK
FRSG	WGWIDE	Working Group on Widely Distributed Stocks	Andrew Campbell, Ireland	tbc
FRSG	WGNSSK	Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak	Raphaël Girardin, France Tanja Miethe, Germany	Alessandro Orio, Sweden Lies Vansteenbrugge, Belgium
HAPISG	WGITMO	Working Group on Introductions and Transfers of Marine Organisms	Cynthia McKenzie, Canada	Joao Canning-Clode, Portugal
HAPISG	WGSFD	Working Group on Spatial Fisheries Data	Neil Campbell, Scotland, UK	tbc
HAPISG	WGMPCZM	Working Group for Marine Planning and Coastal Zone Management		Talya ten Brink, USA
IEASG	WGMARS	Working Group on Maritime Systems (WGMARS)		Jessica Fuller, Norway

Parent	Acronym	Expert Group name	Outgoing chair	Incoming chair
IEASG	WGEAWESS	Working Group on Ecosystem Assessment of Western European Shelf Seas	Marcos Llope, Spain	
IEASG	WGIAZOR	Working Group on Integrated Assessment of the Azores (WGIAZOR)		Andreia Braga-Henriques, Azores
IEASG	WGINOSE	Working Group on North Sea Integrated Ecosystem Assessment (WGINOSE)	Andrew Kenny (UK)	Andrea Belgrano, Sweden
IEASG	WGBESEO	Working Group on Balancing Economic, Social and Ecological Objectives (WGBESEO)	David Langlet, Sweden	NA
IEASG	WGIPEM	Working Group on Integrative, Physical-biological, and Ecosystem Modelling	Solfrid Hjøllø, Norway	Erik Askov Mousing, Norway
IEASG	WGIBAR	Working Group on the Integrated Assessments of the Barents Sea	Elena Eriksen, Norway	Bérengère Husson, Norway
EOSG	WGNAEO	Working Group on Northwest Atlantic Ecosystem Observations	Don Clark, Canada	Lindsay Beazley, Canada
EOSG	WGNEPS	Working Group on Nephrops Surveys	Jennifer Doyle	Jónas Jónasson, Iceland

2023 workshops

Parent	Acronym	Workshop name	Chair	Comments
ASG	WKBoBICAO	Workshop on the Bay of Biscay and Iberian Coast ecoregion Aquaculture Overview	Myriam Callier, France, and Francis O'Beirn Ireland	
DSTSG	WKARHOM4	Workshop 4 on age reading of Horse Mackerel, Mediterranean Horse Mackerel, and Blue Jack Mackerel (<i>T. Trachurus</i> , <i>T. mediterraneus</i> , and <i>T. picturatus</i>)	Andrea Massaro, Italy, and Alba Jurado-Ruzafa, Spain	
DSTSG	WKEnsure	Workshop on developing guidance for ensuring the integrity of scientific information submitted to ICES by data providers	Nathalie Steins, the Netherlands, and Bjarte Bogstad, Norway	
DSTSG	WKOISS	Workshop on Operational Implementation of Stomach Sampling	Maria Cristina Follesa - Pierluigi Carbonara -	Transferred from 2022; Original resolution approved in 2020, pending new resolution and dates
DSTSG	WKPET-SAMP2	Workshop on appropriate sampling schemes for Protected Endangered and Threatened Species bycatch 2	Katja Ringdhal, Sara Königson, Estanis Mugerza	

Parent	Acronym	Workshop name	Chair	Comments
DSTSG	WKPET-SAMP3	Workshop on appropriate sampling schemes for Protected Endangered and Threatened Species bycatch 3	Katja Ringdhal, Sara Königson, Estanis Mugerza	
EOSG	WKMADE	Workshop on Mackerel Daily Egg production	Dolores Garabana, Spain, and Anders Thorsen, Norway	
EPDSG	WKSA2	Workshop on Scallop Aging 2	Karen Vanstaen, UK, Charlotte Reeve, UK	Post-poned/transferred from 2022 – no new resolution needed
FRSG	WKBALTPEL	Benchmark workshop on pelagic stocks in the Baltic Sea	Johan Lövgren, Sweden	
FRSG	WKBCOD	Benchmark Workshop for Northern Shelf cod stocks	Noel Cadigan, Canada	
FRSG	WKBELASMO	Benchmark workshop on selected elasmobranch stocks	Alain Biseau - Manuela Azevedo -	
FRSG	WKBGREEN-COD	Benchmark Workshop on three Greenland cod stocks	Rick Rideout, Canada, and Arved Staby, Norway	
FRSG	WKBM-SYSPIC	Benchmark workshop on the development of MSY advice using SPiCT	Massimiliano Cardinale, Sweden, and Henning Winker, Italy	
FRSG	WKBNORTH	A Benchmark workshop on Greenland halibut and redfish stocks	Pamela Woods, Iceland, and Vladlena Gertseva, USA	
FRSG	WKBSalmon	Benchmark Workshop on Atlantic salmon (<i>Salmo salar</i>) in the North Atlantic	XXX and Jonathan White, Ireland	
FRSG	WKBSEABASS	Benchmark Workshop for Seabass stocks in Divisions 4.b-c, 7.a	Massimiliano Cardinale, Sweden, and XXX	
FRSG	WKBSEALS	Benchmark workshop on harp and hooded seal	Daniel Howell, Norway, and Alejandro Buren, Argentina	
FRSG	WKEVALMAC	Workshop on the Evaluation of NEA Mackerel Stock Components	Richard Nash, UK, and David Secor, USA	
FRSG	WKFO2	Workshop on Fisheries Overviews	Kristjan Kristinsson, Iceland, and Youen Vermard, France	

Parent	Acronym	Workshop name	Chair	Comments
FRSG	WKLIFE XI	Workshop on the Development of Quantitative Assessment Methodologies based on Life-history traits, exploitation characteristics, and other relevant parameters for data-limited stocks	Carl O'Brien, UK, Tobias Mildener, Denmark, and Simon Fischer, UK	
FRSG	WKMIXFISH2	Scoping workshop on next generation of mixed fisheries advice	Paul Dolder, UK, and Marc Taylor, Germany	
FRSG	WKMSDEV	Workshop on MSE development	Daniel Howell, Norway	Postponed from 2019
FRSG	WKPANDLT-MSE	Workshop on a long-term management strategy evaluation for the Pandalus in Subdivision 3.a.20 and Division 4.a East	Cóilín Minto, Ireland	
FRSG	WKRFSFA	Workshop on Recreational Fisheries in Stock Assessments	Zachary Radford, UK, and Martina Scanu, Italy	
FRSG	WKRRCSS2	Second Workshop on the Research Roadmap for Channel and Celtic Seas Sprat	Cormac Nolan, Ireland, and Campbell Pert, UK	
FRSG	WKRRCOD	Workshops on research needs and a roadmap for further research on cod in the southern shelf seas (including cod in the Celtic Seas)	Anna Rindorf, Denmark, and Coby Needle, UK	
FRSG	WKSIDAC2	Second Workshop on Stock Identification and allocation of catches of herring to stocks	Richard Nash, UK, and Florian Berg, Norway	
FRSG	WKTAF	Workshop on Training for the Transparent Assessment Framework	Colin Millar, ICES, and Cecilia Kvaavik, ICES	
HAPISG	WKCCCMSP	Workshop on Climate Change Considerations in Marine Spatial Planning	Ana Queiros, UK; and Caitriona Nic Aonghusa, Ireland	Postponed from 2022
HAPISG	WKLIDA	Workshop on the revision of the DOME litter data format	Hong Minh Le, Belgium; Bavo De Witte, Belgium; and Anna Osypchuk, ICES Secretariat	
HAPISG	WKOMRE	Workshop on a Research Roadmap for Offshore and Marine Renewable Energy	Jon Hare, USA; and Andrew Gill, UK	
HAPISG	WKSFGEO2	Workshop on Small Scale Fisheries and Geo-Spatial Data 2	Tania Mendos, UK, and Marta Rufino, Portugal	
IEASG	WKEOF	Workshop for the production of Ecosystem Overview of the Faroes Ecoregion	Petur Steingrund, Faroe Islands, Karin Margretha Húsgarð Larsen, Faroe Islands, Sólvá Káradóttir Eliassen, Faroe Islands	

Parent	Acronym	Workshop name	Chair	Comments
IEASG	WKFISHCAR-BON	Workshop on Assessing the Impact of Fishing on Oceanic Carbon	Dave Reid, Ireland; Emma Cavan, UK	

Expert Groups to be dissolved by the end of 2022

Parent	Acronym	Expert Group name	Outgoing chair
ASG	WKCSAO	Workshop on the Celtic Seas ecoregion Aquaculture Overview	Henn Ojaveer - Francis O'Beirn -
ASG	WGSPA	Working Group on Scenario Planning on Aquaculture	Ben Halpern
DSTSG	WKARHOM4	Workshop on age reading of Horse Mackerel, Mediterranean Horse Mackerel and Blue Jack Mackerel	Andrea Massaro - Alba Jurado Ruzafa -
DSTSG	WKRARE	Workshop on Estimation of Rare Events	Kotaro Ono - Ana Cláudia Fernandes -
DSTSG	WKRDBES-INTRO	Workshop on introduction to RDBES data submission	Henrik Kjems-Niel- sen -
DSTSG	WKRDBESRaiseTAF	Workshop on Raising Data using the RDBES and TAF	Edvin Fuglebakk - Sofie Nimmegeers -
EOSG	WKUSER2	Workshop on unavoidable survey effort reduction	Stan Kotwicki - Hans Gerritsen - Kotaro Ono -
EOSG	WKPilot NS-FIRMOG	Workshop on Pilot North Sea Fisheries Independent Regional Observation	Ingeborg de Boois
EPDSG	WKSTARGATE	Workshop on Stickleback and Round Goby in the Baltic Sea	Daniel Oesterwind - Jane Behrens -
FRSG	IBPFAR	Interbenchmark protocol on Faroese demersal stocks	Johnathan White
FRSG	IBPSOL7d	Interbenchmark protocol on eastern English Channel sole	Alessandro Orio
FRSG	WKCAPELIN	Benchmark workshop on capelin (<i>Mallotus villosus</i>)	Hannah Murphy, and Daniel Howell
FRSG	WKD3Lists2	Workshop on Lists of Commercial Fish and Shellfish species for reporting of MSFD D3	Nikolaus Probst -
FRSG	WKEELDATA4	Fourth Workshop on Designing an Eel Data Call	Tea Bašić and Hilaire Drouineau
FRSG	WKELASMO	Benchmark Workshop for selected elasmobranch stocks	Manuela Azevedo Alain Biseau
FRSG	WKEMP3	Workshop for the Technical evaluation of EU Member States' Progress Reports for submission in 2021	Jean-Jacques Maguire

Parent	Acronym	Expert Group name	Outgoing chair
FRSG	WKEVUT	Workshop to Evaluate the Utility of Industry-derived data for enhancing scientific knowledge and providing data for stock assessments	Els Torreele - Martin Pastoors -
FRSG	WKFISHDISH2	Workshop 2 on Fish Distribution	Anna Rindorf - Alan Baudron - Maria Teresa Spedicato -
FRSG	WKICEMP	Workshop on the evaluation of assessments and management plans for ling, tusk, plaice and Atlantic wolffish in Icelandic waters	Dorleta Garcia -
FRSG	WKMEGRIM	Benchmark Workshop for selected Megrin Stocks	Elliot Brown
FRSG	WKNCCCHR	Workshop on the evaluation of northern Norwegian coastal cod harvest rules	Daniel Howell -
FRSG	WKNSCS	Benchmark Workshop for fish stocks in the North Sea and Celtic Sea	Daniel Duplisea Thordarson
FRSG	WKPRAWN	Benchmark Workshop on Pandalus stocks	Colm Lordan and Johan Lövgren
FRSG	WKREF2	Workshop on guidelines for reference points	Colm Lordan - Rishi Sharma -
FRSG	WKRCCSS	Workshop on a Research Roadmap for Channel and Celtic Seas sprat	Cormac Nolan - Campbell Pert -
FRSG	WKSALMON2	NASCO Workshop 2 for North Atlantic Salmon At-Sea Mortality	Colin Bull - Glenn Nolan -
FRSG	WKSALMON2022	Salmon benchmark workshop 2022	Colin Bull - Glenn Nolan -
FRSG	WKSANDEEL 2022	Benchmark Workshop on Sandeel (<i>Ammodytes</i> spp.) in 2022	Niels Hintzen and Nicola Walker
FRSG	WKTAFF	Workshop on Training for the Transparent Assessment Framework	Colin Millar and Cecilia Kvaavik
HAPISG	WKBENTH2	Workshop on assessment methods to set threshold and assess adverse effects on seabed habitats	David Reid - Jan Geert Hiddink - Daniel van Denderen
HAPISG	WKBENTH3	Workshop on assessment methods to set threshold and assess adverse effects on seabed habitats	Ellen L. Kenchington and Sasa Raicevich
HAPISG	WKEMBYC2	Workshop on mitigation measures to reduce bycatch of short-beaked common dolphins in the Bay of Biscay	Hélène Peltier - Ailbhe Kavanagh -
HAPISG	WKVMEBM	Benchmark Workshop on the occurrence and protection of VMEs (vulnerable marine ecosystems)	Eugene Nixon - Pierre Pepin -
IEASG	WKASCAPES	Workshop on ASsessing CAPacity to supply Ecosystem Services	Andrea Belgrano - Gerjan Piet -

Cancelled Expert Groups

Parent	Acronym	Expert Group name	Chair	Comment
DSTSG	WKBIOPTIM5	Fifth Workshop on Optimization of Biological Sampling	Patrícia Gonçalves, Portugal and Isabella Bitetto, Italy	WGBIOPTIM was established instead of repeating workshops

Annex 4: Expert Group Science Highlights

Steering Group	Science highlights
Aquaculture Steering Group	<ul style="list-style-type: none"> • The current COVID-19 pandemic and the global implications of the Ukrainian war are stark examples of the vulnerability of global interconnectedness. Global societies thus have been exposed to a new degree of vulnerability, revealing social-ecological interactions and repercussions that previously have been overlooked. As cross-border investments, trade and supply chains have shrunk, deliberations on shortening, i.e., regionalizing value chains to avoid the negative repercussions of globalization pathways have intensified. Endorsing a system perspective within marine aquaculture, we identify key issues of sustainability themes that warrant consideration when refocusing marine aquaculture towards regional production systems. By exploring the sustainability consequences and trade-offs of regionalization in marine aquaculture production systems, we investigate the implications of regionalization and their related risks and benefits as a strategy in globalized economies to improve the five dimensions of sustainability: cultural, environmental, economic, governance and social. We develop a framework that will be published (WGSEDA). • The newly published paper on risk assessment methodology presented by Andersen et al. (2022), recently published in the ICES Journal of Marine Science, provided an interesting and novel approach to conducting aquaculture risk assessments using Bayesian networks. This approach adds theoretically, more clarity to the meaning of probability and uncertainty in risk assessments and contributes to better analyzing, evaluating, and communicating risk. One question that remains to be answered, is how the newly developed methodology, will couple with the existing ones i.e., GESAMP and FAO frameworks to provide short-term and long-term foresight to risk assessments conducted in other ICES member states. As a follow-up, it would be interesting to test this methodology in various aquaculture contexts and assess its validity and operability (WGREIA). <p>The citation is: Andersen, LB, ES Grefsrud, T Svåsand & N Sandlund. 2022. Risk understanding and risk acknowledgement: a new approach to environmental risk assessment in marine aquaculture. ICES Journal of Marine Science, 0: 1-10. Food for thought.</p>
Data Science and Technology Steering Group	<ul style="list-style-type: none"> • WGTIFD has grown to over 60 members representing countries in Europe, the United States, Canada, Chile, and South Africa; this has increased the communication and collaboration. The chairs have presented to a number of other ICES working groups, other organizations and networks, hosted a theme session at the 2021 ICES ASC, and generally raised the awareness of the working group and the challenges we are attempting to address. • WGSMAART have continuously worked to improve the SmartDots age reading software to ensure it functions optimally in its role as an international tool for standardisation of age reading procedures and methods. In addition, it has supported the standardisation of maturity staging procedures by developing a module in the web application. Additional requests for the development of an egg and larval identification module and a fecundity and atresia module, both outside the initial 3-year plan for WGSMAART, have been answered. These two additional modules have supported three international online workshops (WKIDCLUP2, WKMACHIS and WKAPEM) which could not take place as physical meetings due to the covid-19 pandemic. By November 2021 731 users from 36 countries are registered in SmartDots. • Within the ICES Advisory Plan quality assurance has been identified as a priority area and the work of WGQuality supports this. WGQuality will analyse the existing quality management processes within advice production and evaluate their coherence with the objectives of the advisory plan. We will create a draft ICES quality manual which will describe the overall approach to assuring the quality of assessment and advice - from data management, data integration, data analysis, and data use, to the process of translating that data into ICES advice. We're not intending to design a new system from scratch but to build on all the good work that has already been done and that is still ongoing. • one major achievement of WGMLEARN was to bring together scientists from different backgrounds, within marine sciences and across marine and computer sciences. This contributes to bridging the gap between disciplines which is a major hindrance to the application of machine learning in marine sciences. Geographically, it was also a rare

Steering Group	Science highlights
	<p>opportunity of discussion between scientists from Europe, North and South America, who are more often involved in projects at national or "continental" (European in particular) level. Furthermore, one of ICES priorities is "Emerging techniques and technologies", which completely aligns with the goal of this Working Group.</p> <ul style="list-style-type: none"> • WGMLEARN has collated a bibliographic database of published work using machine learning in the context of marine sciences: https://www.zotero.org/groups/2325748/wgmlearn/library • A biological sampling strategy review launched by WGAcousticGov. A call was sent to WG chairs for input from members regarding individual sampling strategies employed in the collection of biological data at sea. These data, along with acoustic data, are the backbone of reporting on trawl acoustic estimates of biomass and abundance. A from deck-to-database review across all the survey groups. Understanding how data are stored nationally, transformed prior to upload to the ICES trawl acoustic database and handled within sampling software programs such as StoX is of great importance in terms of transparency and repeatability. • Inter-WG collaboration was greatly increased by joint discussion among WGSMA, WGBIOP & WGALES on the application of SmartDots for multiple purposes across groups. Examples of successful applications for ichthyoplankton-ID was presented by the chair of WKIDCLUP2 and WKMACHIS. To further increase the collaboration between BIOP and ALES and to bring more ichthyoplankton-expertise into BIOP, it was agreed on a joint session within the next BIOP meeting. Aspired goals are a) a common guideline on creating SmartDots calibration events for ichthyoplankton and fecundity, and b) that the list of future ichthyoplankton and fecundity events be annually decided and recommended jointly by WGBIOP and WGALES.
Ecosystem Processes and Dynamics Steering Group	<ul style="list-style-type: none"> • WGSPF symposium (7–11 November 2022, Lisbon, Portugal): International Symposium on Small Pelagic Fish: New Frontiers in Science for Sustainable Management (ices.dk) (WGSPF) • «Ongoing ocean climate observations (ices.dk): ICES Working Group on Oceanic Hydrography publishes North Atlantic Ocean climate highlights for 2021» (WGOH) • «ICES working group uncovers <i>Crangon crangon</i> connections» (WGCRAN) • ASC2022 Network Session «Advancing the pathways for oceanography to ecosystem science and ad-vice» (organisation: WGOH, WGOOFE) • ASC2022 Theme Session «Oceanography and ecosystems in the North Atlantic: science and operational services» (organisation: WGOH, WGOOFE) • ASC2022 Theme Session «Invertebrate life in three-dimensional habitat» (co-organised by WGCRAB) • WKSTARGATE (23–25 August 2022, Copenhagen), workshop on impacts of stickle back and round goby on coastal fisheries and fish (feedback/report awaited) • Special issue: "Ecology of Marine Zooplankton" of the Journal of Marine Science and Engineering. Submission deadline: 10/10/2022 (EUROBUS) • Between 1 September 2021 and today, EPDSG EGs produced 16 publications, seven of which being journal contributions to e.g. Science of the Total Environment and Frontiers in Marine Science (with JIFs above 5). WGZE coordinated a Themed Article set on Marine Zooplankton Time Series in the ICES Journal of Marine Science (published in 2022) (Introduction: https://doi.org/10.1093/icesjms/fsac048). The EGs most actively contributing to journals (for the last three years) are WGCEPH, WGEUROBUS and WGIMT. The ambition to publish journal contributions has been expressed by many EPDSG EG Chairs during the bilateral meetings; this to maintain the groups' attractiveness particularly towards the academic EG members. It however seems not all that easy for all groups to actually get to that kind of publications. Since the new library has been launched mid-2021, EPDSG publications attracted 3,746 views and yielded 1,095 downloads. • The ICES Working Group on Oceanic Hydrography (WGOH) is looking to evaluate its products to make sure they are as useful as possible. As part of this, they are seeking views on our products from those who have used them in the past, and from the wider ICES community.

Steering Group	Science highlights
Ecosystem Observation Steering Group	<ul style="list-style-type: none"> • WGBEAM - A new hermit crab species for the North Sea was encountered (<i>Pagurus longicarpus</i>) in the German inshore survey. • WGELECTRA – The group is facing some difficulties finding sufficient input for 2022 and future meetings, the reason for low input is due to a recent ban on the fishing technique discussed by WGELECTRA. The group participants indicate that they would like to keep the group alive although only one research project remains on pulse technologies on razor clams. • WGIDEEPS - Monitoring pelagic beaked redfish is challenging. Data from the WGIDEEPS surveys are essential support for the advice on beaked redfish stocks in the Irminger Sea and adjacent waters and in the Barents and Norwegian Seas. Data from the WGIDEEPS surveys constitute the only regular information source about deep sea ecosystem status in these regions. The key difficulties include the basin-wide geographical distribution (> 650 000 NM²), seasonal and ontogenetic large-scale migrations, the occupation of demersal and benthic habitats at different stages of the life cycle and generally poor knowledge of pelagic beaked redfish interactions with the pelagic ecosystems of the Irminger and Norwegian Seas. • WGSINS - All surveys and time series have been continued. New surveys were established and additional information on ichthyoplankton became available. Quality assurances were included on index calculations (MIK) and species identification. • WGNEPS – Ongoing development of AI technology for classification of Nephrops burrows. • IBTSWG discussed the roadmap for a new survey trawl, following on from the Workshop on the Further Development of the New IBTS Gear (WKFDN). IBTSWG agreed the main aspects of the new trawl, and trials are planned to start in late 2022 with the subsequent introduction of the trawl in the North Sea over the next few years. • WGIBTS made progress in visual distinction between <i>Mustelus asterias</i> (starry smoothhound) and <i>Mustelus mustelus</i> (common smoothhound) using barcoding on some species. • More to come after communication with EOSG/WG chairs and the Q3 meeting
Human Activities, Pressures and Impacts Steering Group	<ul style="list-style-type: none"> • Attended EU LIFE Platform meeting on “strictly protected areas” in La Rochelle (22 – 23 Mar.) • A new Working Group on Marine Protected Areas (WGMPAS) has been established – (1st meeting planned Paris, 28 Nov. – 2 Dec.) • Implementation of WGCEAM framework - links with IEA and EBM. Developing cumulative effects estimate for potential inclusion in the EOs. • Seafloor assessment pipeline proposal accepted for the ICES ecosystem overviews (WGDEC, WGSFD and WGFBIT). Workshop is planned for quarter 2 in 2023. • WGSFD developing a common spatial data framework for the integration of different marine layers generated by HAPISG EGs. • Workshop on Climate Change Considerations in Marine Spatial Planning (WKCCCMSP), Oct 2022, now likely to take place in 2023. • Manual for seafloor litter data collection and reporting from demersal trawl samples (WGML). • Historical and unconventional data sources (Photos, paintings, and figures) to reconstruct past fishing practices, and changes in marine social ecological systems through time (WGHIST) and WGHIST organised Ocean Past IX conference where ICES co-sponsored the participation of early career scientists. • WKVMEBM (7 – 10 March). Successfully conducted an ICES benchmark for scientific advice on VMEs, which represents the first time a benchmark has been conducted on a non-fisheries component of the marine ecosystem. https://www.ices.dk/community/groups/Pages/WKVMEBM.aspx

Steering Group	Science highlights
	<ul style="list-style-type: none"> • Convening four Theme Sessions at the 2022 ASC - covering topics related to shipping (L), seafloor eco-system impacts (H), spatial management, climate & biodiversity (B), and offshore wind (O). • Production of TIMES (3 reports) and CRRs (2 reports), including a review of the ICES Manual for sea-floor litter data collection and reporting from WGML.
Integrated Ecosystem Assessments Steering Group	<ul style="list-style-type: none"> • Continued work of all IEASG despite the continuing pressures of COVID-19, and the ongoing war in Ukraine and suspension of activities involving the Russian Federation. • Successful improvement of integration across IEASG through shared members, presentations at IEASG meetings, workshops, and cross-group collaborations. Also reaching out to other SG Chairs to improve connections between SGs. • Publication of Cooperative Research Report: „Ecosystem assessment of the Central Arctic Ocean: Description of the ecosystem” by WGICA. • WGIPEM led on a MEPS Theme Section on Advancing dynamic modelling of marine populations and ecosystems. They have also reached over 100 members of their group! • IEASG co-chairing of ACOM/SCICOM EBM framework and progress on CRR publication on the framework for ecosystem-informed science and advice (FEISA) • WGNARS hosted a public seminar on Structured Decision Making, Risk Assessment, and understanding Fisheries Governance in IEAs and EBM • WGIBAR and WGINOR reports published with ecosystem status annexes responding to stakeholder needs • WGBESEO continued to encourage collaboration with ECRs, identifying appropriate institutional support, with mentorship and feedback from the group. This year’s ECR project focused on understanding the use and uptake of the EOs outside of ICES, with previous projects focusing on identifying ecological, social, and economic objectives, and building a social science glossary to improve communication and understanding across groups • Third International Science and Policy Conference on Implementation of the Ecosystem Approach to Management in the Arctic approved for ICES co-sponsorship. WGICA chair Lis Jørgensen will provide a key role as a lead convener for this symposium that will be held in Tromsø in 2024; good participation by the ICES network is anticipated, including members of ICES expert groups (WGICA, WGIBAR, WGINOR, WGIEAGS, WGIEANBS-CS). Funds will support participation of both ECS and indigenous knowledge holders. • WGMARS contributed substantially to the organisation and leadership of WKCCMM, along with carrying out research into IEA in ICES, behavioural economics in fisheries, and social network analysis of ICES for upcoming papers, despite facing a range of challenges. • IEASG Chair is supporting Humans Impacts on Marine Functional Connectivity Conference Spring 2023 as a member of the Scientific Steering Committee: https://www.ices.dk/events/symposia/ImpactsMFC/Pages/default.aspx • ASC: IEASG Chair is co-chairing a Network Session (The Krakens Lair). Two IEASG related sessions have been submitted for 2023. • Current library stats (since launch) for IEASG: 193 publications (59 journal contributions, 133 reports), 2,261 views, 569 downloads (as of 6/9/22)
Fisheries Resources Steering Group	<ul style="list-style-type: none"> • In 2022, 23 FRSG working groups are meeting, and 22 workshops are being held • 15 of the FRSG stock assessment groups were able to provide input to the draft advice for 113 fish stocks (January – June). • There were 7 benchmark and interbenchmark stock assessment workshops, leading to benchmarks on 21 fish stocks • One of the higher profile workshops, WKREF2 met in January to review the WKREF1 report and based on the outcome, develop updated guidelines for the ICES reference points system and recommendations for ACOM consideration. There was no consensus for a revised reference point framework, however, the main elements of such a framework were discussed. The report includes 6 recommendations for ACOM consideration.

Steering Group	Science highlights
	<ul style="list-style-type: none">• WKFISHDISH2, the second workshop on Fish Distribution met during June to review models to derive spatial distribution of fish and cephalopods from survey data with the aim of producing temporally resolved distribution maps for individual species based on data from surveys with varying in spatio-temporal coverage. The workshop discussed best practice guidance for model structure to derive distribution maps and as well how to implement these, defining and establishing an efficient and transparent approach to producing updates of these maps.

Annex 5: ICES Peer-reviewed publication overview

Cooperative Research Reports (CRR)

CRR published in 2021 and 2022 to date: 5; CRR reports in publication process (in preparation or under review): 6; cancelled CRR since the 2021 SCICOM meeting: 1; proposed CRR that have not yet submitted a resolution: 8.

CRR have a high readership and download frequency. Since the new library launch, CRR reports have been viewed 4 700 times (currently trending at 100-150 views per week) and downloaded 1 500 times. Two recent CRRs (Vol. 354 and Vol. 355) are in the top 10 most viewed publications.

Published CRR in 2021 and 2022 can be viewed in the ICES library: https://ices-library.figshare.com/search?sortBy=publication_date&sortType=desc&pubPublishDate=2021-01-01%2C2022-07-08&groups=37158

All published CRR can be viewed here:

https://ices-library.figshare.com/pubtype_publications_crr

Cancelled CRR since the 2021 SCICOM meeting:

2016/1/SSGEPD01 ICES Plankton Status Report. Cancelled for exceeding the 2-year deadline for submission. The authors plan to resubmit their publication resolution when the report is closer to completion.

Techniques in Marine Environmental Sciences (TIMES)

TIMES published in 2021 and 2022 to date: 2; TIMES reports in publication process (in preparation or under review): 6; cancelled TIMES since the 2021 SCICOM meeting: 0; proposed TIMES that have not yet submitted a resolution: 7.

TIMES has a good and fairly steady level of readership. TIMES have been viewed 1 500 times (trending at 50-80 views per week) since the library launch and downloaded 400 times.

Published TIMES in 2021 and 2022 to date can be viewed here: https://ices-library.figshare.com/search?sortBy=publication_date&sortType=desc&pubPublishDate=2021-01-01%2C2022-09-10&groups=37191

All published TIMES can be viewed here:

https://ices-library.figshare.com/pubtype_publications_times

ID Leaflets for Plankton

Leaflets published in 2021 and 2022 to date: 5; Leaflets in process (in preparation or under review): 12.

ID Plankton has a high readership considering it is a highly specialised series, with 1 800 views since the library launch (views are not steady, instead peaking strongly when a new leaflet is published) and 400 downloads.

Published Plankton ID leaflets in 2021 and 2022 to date can be viewed here: https://ices-library.figshare.com/search?sortBy=publication_date&sortType=desc&pubPublishDate=2021-01-01%2C2022-09-10&groups=37209

All Plankton ID leaflets can be viewed here:

https://ices-library.figshare.com/pubtype_publications_id-leaflets_plankton

ID Leaflets for Diseases in Fish and Shellfish

Leaflets published in 2021 and 2022 to date: 2. Leaflets in process (in preparation or under review): 9.

ID Diseases is a moderately viewed series (468 views and 158 downloads since the library was launched) with peaks of readership when new leaflets are published. It should be noted that it is a highly specialised publication, and as such will have a smaller reader base than CRR and TIMES.

Published Diseases ID leaflets in 2021 and 2022 to date can be viewed here: https://ices-library.figshare.com/search?sortBy=publication_date&sortType=desc&pubPublishDate=2021-01-01%2C2022-09-10&groups=37200

All ID Diseases leaflets can be viewed here:

https://ices-library.figshare.com/pubtype_publications_id-leaflets_disease-parasite