

# SCICOM REPORT 2017

ICES SCIENCE COMMITTEE

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REF. COUNCIL

## SCICOM Report 2017

An annual report to the ICES Council to describe the scope, scale and impact of ICES science and plans for future science delivery



**ICES**  
**CIEM**

International Council for  
the Exploration of the Sea

Conseil International pour  
l'Exploration de la Mer

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

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

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## 1 Summary

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This annual report to the ICES Council summarises the scope, scale and impact of ICES science in 2017 and SCICOM plans for future science delivery.

To date, 2017 has been a successful year for SCICOM and for ICES science. A new Aquaculture Steering Group has been established, bringing to five the number of SCICOM Steering Groups which address broad and enduring areas of science and advice and currently 'parent' 98 Expert Groups. Four of these Steering Groups, including Aquaculture, gained new Chairs in 2017. These Chairs are working successfully in their new roles and there has been a growing focus on highlighting strong science in the network. Outputs during 2017 include reports, books and papers from the 98 SCICOM Expert Groups, attended to date by 1035 scientists, a successful Annual Science Conference attended by 556 attendees from 33 countries, and more active and visible links between science, data and advice. Four ICES co-sponsored symposia were run in 2017 and two further symposia will take place before the end of the year. Our Strategic Initiatives on Climate Change effects on Marine Ecosystems and the Human Dimension have also been actively running and supporting workshops and symposia. Five ICES training courses were run in 2017, with two more to be completed. ICES has published six Co-operative Research Reports (CRR), two ICES Techniques in Marine Environmental Science (TIMES) and three Identification Leaflets in 2017.

Descriptions of progress in relation to the Science Plan in 2017, as well as an in-depth analysis of SCICOM activity in 2017 are presented in this report. These focus on activity in the Steering Groups, Expert Groups, Strategic Initiatives and Operational Groups and outcomes from the Annual Science Conference. Consequently, this report also serves as a compiled reference document for the use of SCICOM members and the Secretariat.

SCICOM continues to strive to increase the scope, scale and impact of ICES science. Our general objectives for 2017 and beyond are 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. In 2018, in addition to recurrent delivery of science and the annual programme of work, SCICOM will focus on setting clear science priorities to inform the development of the next ICES Strategic Plan.

The science prioritisation process, as described in detail in the report, is currently being informed by three elements; (1) an ongoing review of emerging marine 'opportunities' for ICES, (2) a review of marine science priorities in member countries and an assessment of where ICES can 'add value' and (3) an existing draft list of SCICOM science priorities, along with further bottom-up input from ASC Sessions and discussions. The emerging science priorities are intended to (1) support the ICES vision and mission; (2) increase the scale, scope and impact of our science and ensure ICES science is valued and influential; (3) address emerging opportunities and issues for member countries and provide clear added value to national science and advice; (4) increase capacity to address contemporary and future issues in marine science and to maintain and build strong and enduring links with regional and global partners; (5) build stronger and enduring links between science, data and advice; (6) prepare ICES to address future challenges for users of marine ecosystems that resonate as relevant with member countries, and current and future clients for advice; and (7) to inspire our network, by balancing elements of vision and discovery with delivery of excellent applied science.

## **2 Introduction**

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### **2.1 Structure of the report**

This report summarises the scope, scale and impact of ICES science in 2017 and Science Committee (SCICOM) plans for future science delivery.

The review of scope, scale and impact describes the delivery of science and supporting activity in the SCICOM Steering Groups, Expert Groups, Strategic Initiatives and Operational Groups and outcomes of the Annual Science Conference (ASC).

The plans for future science delivery describe the process SCICOM is running to develop science priorities that will inform the next ICES Strategic Planning cycle.

The main forward looking and strategic issues for discussion with Council at the October 2017 meeting are covered in Sections 1 to 4 of this report, but detailed summaries of the activity of Steering Groups, Expert Groups, Strategic Initiatives and Operational Groups in 2017, as well as other topics of interest, can be accessed directly from the contents list.

To date, 2017 has been a successful year for SCICOM. But despite this good progress (Section 2.3), there is, of course, more to be done to increase the scope, scale and impact of ICES science. Section 3 describes key SCICOM priorities and the SCICOM workplan for 2018 and beyond.

Descriptions of progress in relation to the Science Plan in 2017, and a deeper analysis of SCICOM activity in 2017, are provided in Sections 5-10 of this report. These focus on activity in the Steering Groups, Expert Groups, Strategic Initiatives and Operational Groups and the outcomes from the ASC. Sections 5 to 10 and the Annexes of this report will also serve as a compiled reference document for the use of SCICOM members, the Secretariat and the ICES network more widely.

To minimise the overall length of this report the texts of Theme Sessions and Open Session summaries from the 2017 ASC have been placed on the ICES website. But, for convenience, they are linked directly from Sections 9.1. and 9.2. respectively.

### **2.2 Requests to Council**

Council are invited to review this report, with a focus on Sections 1-4 and, in addition to any matters they wish to raise:

To comment on opportunities for ICES which should be considered when identifying science priorities (Section 3.1.)

To comment on approaches to developing science priorities that maximise the value of ICES engagement for member countries (Section 3.1.)

To consider how Delegates will work most effectively with SCICOM members to guide and support SCICOM efforts to identify science priorities (Section 3.1.)

To review the completeness of the SCICOM work plan for 2018 and to recommend any modifications or additions for consideration by SCICOM (Section 3.2.)

## 2.3 Role of the Science Committee

The Science Committee (SCICOM) is working to increase the scope, scale and impact of ICES science.

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 interrogatable formats and develop and publicise metrics of impact. Ensure Expert Group (EG) outputs acknowledge ICES contributions.
- (3) Develop and regularly update website text relating to Science, SCICOM, Steering Groups (SG) and personnel to increase awareness, visibility and impact of our people and work
- (4) 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
- (5) Promote and support frequent and effective communication between EG, SG, SCICOM and SCICOM Chair to increase network engagement and efficiency in all activities relevant to SCICOM
- (6) Promote science activity and collaboration within and beyond the ICES network in ICES Action Areas
- (7) Ensure effective communication and seamless links between science, data collection, storage and processing, and advice
- (8) Lead development of ICES viewpoints to highlight ICES capacity to advise on new and emerging issues and to capitalize on the science done in ICES (2017-18: large fish stocks, Arctic fish production, invasive species).

It is a continuing role of SCICOM to ensure that science conducted by EG and other operational structures aligns with the Science Plan. Progress in relation to the Science Plan was evaluated in detail by SCICOM in 2016. This evaluation was performed by the (then) SSG chairs for the 31 priority areas in the Science Plan and, in general, this evaluation suggested a strong mapping of activity onto the priorities identified in the Science Plan. Section 5 of this report describes, in detail, the ongoing work of Steering Groups in support of the Science Plan. In relation to the main areas of weakness identified in 2016 (Science Plan Areas 2, 7, 8, 12, 14, 21, 23, 27) additional actions have been taken to address them. Area 7 (Develop end to end modelling capability to fully integrate natural and anthropogenic forcing factors affecting ecosystem functioning) has seen least direct progress, but SICCME have markedly increased engagement with projects where these topics are being addressed, so ICES is linked into a network with appropriate expertise even if not leading on the development of such models.

## 2.4 Summary of SCICOM science and operational structures in 2017

To date, 2017 has been a successful year for SCICOM, with four new Steering Group Chairs bedding successfully into their roles and a growing focus on highlighting strong science in the network, impressive outputs including books and papers from the Expert Groups (EG), a successful ASC, more active links between science, data and advice and an increasingly engaged, collective and urgent focus on identifying our future science priorities.

There are currently five SCICOM Steering Groups (SG) each of which addresses a broad and enduring area of science and advice. Collectively they currently 'parent' 98 EG. These EG were attended by 1035 scientists in 2017 (to date; for full details see Annex 2).

The Aquaculture Steering Group is responsible for guiding and supporting EG that are working on science and advisory topics contributing to the sustainable development of aquaculture.

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

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

The Integrated Ecosystem Assessments Steering Group is responsible for guiding and supporting EG that develop ecosystem modelling and assessment methods, contribute to state of the environment reporting and underpin guidance on meeting ecological, social and economic objectives.

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

In 2017, SCICOM agreed a common set of Terms of Reference (ToR) for all Steering Groups, to try to harmonise their approaches and thus increase opportunities for co-ordination of work. In addition to these common ToR, the Groups also have additional ToR specific to their subject remit.

Some high priority, dynamic and topical science areas, often those involving collaboration outside our member countries, are developed and co-ordinated by the Strategic Initiatives, currently the ICES/PICES Strategic Initiative on Climate Change effects on Marine Ecosystems (SICCME) and the Strategic Initiative on the Human Dimension (SIHD). SICCME has catalysed and led a wide-range of international activity and contributed to organising a range of workshops and conferences in 2017.

SCICOM oversees three Operational Groups: the Data and Information Group, the Training Group and the Science Impact and Publication Group.

The Data and Information Group (DIG) exchanges data-related knowledge and advice between the ICES network and the ICES Data Centre and, in 2017, DIG has focused on raising awareness of, and communicating information on, the data held by ICES and also on the governance of data.

The Training Group (TG) oversees the ICES Training Programme which was founded to build capacity in ICES and to support the scientists involved in the advisory process.

Five courses have been run in 2017, with an additional two to be completed. The Training Group also developed a roadmap outlining the directions and goals for the training programme until 2022, which included plans to increase online training.

The Science Impact and Publication Group (SIPG) was formed this year and will be charged with monitoring ICES science output and impact, developing and recommending policies on publication, reviewing Category 1 resolutions and providing guidance on the evolution of science publication and communication and the opportunities and risks it presents for ICES.

Four ICES co-sponsored symposia were run in 2017 (ICES/PICES Symposium on *Drivers of Dynamics of Small Pelagic Fish Resources*, Victoria; *Oceans Past VI*, Sesimbra; *3rd ICES/PICES Early Career Scientist Conference*, Busan and *Ecosystem Studies of Subarctic and Arctic Seas Program International Open Science Meeting*, Tromsø) and two further symposia will take place before the end of the year (*Science delivery for sustainable use of the Baltic Sea living resources*, Tallinn and *Ten International Flatfish Symposia and more than 30 years of advanced research: flatfish ecology in 2017*, St Malo).

The Annual Science Conference in Fort Lauderdale attracted 556 attendees from 33 countries. There was wide engagement of attendees in the meeting with 264 platform presentations in 18 Theme Sessions, as well as 14 open sessions and 30 ICES business and related meetings. Planning of Theme Sessions and keynotes for the 2018 ASC in Hamburg is well advanced with Theme Sessions selected and keynote speakers identified.

ICES published six Co-operative Research Reports (CRR), two ICES Techniques in Marine Environmental Science (TIMES) and three Identification Leaflets in 2017. In addition to the standard Expert Group reports, EG also provided a focus for the writing of at least three books and numerous peer reviewed publications. The new Science Impact and Publication Group will be trying to get gather much more comprehensive data on the outputs catalysed by collaborations in ICES EG in coming years.

### 3 SCICOM priorities

#### 3.1 Setting science priorities

Setting clear science priorities that can inform the development of the next ICES Strategic Plan is the top priority for SCICOM in 2017-2018. The purpose of setting the Science Priorities will be to guide ICES science in a direction which:

- (1) Supports the ICES vision and mission
- (2) Substantially increases the scale, scope and impact of our science, ensuring ICES science is valued and influential in 5 years, 10 years and beyond
- (3) Ensures our science addresses emerging opportunities and issues for member countries and provides clear added value to their own marine science and advisory programmes
- (4) Increases capacity to address contemporary and future issues in marine science and to maintain and build strong and enduring links with regional and global partners
- (5) Further builds strong and enduring links between science, data and advice
- (6) Prepares us to address future challenges for users of marine ecosystems and resonates as relevant with member countries, and current and future clients for advice
- (7) Inspires our network, by balancing elements of vision and discovery with delivery of excellent applied science

SCICOM began to work on the development of science priorities at the March 2017 meeting, informed by an opening presentation from the First Vice-President. Members were asked to consult nationally prior to the meeting and to bring forward priorities which were discussed and developed by SCICOM. SCICOM generated a list of priorities as an output of this exercise and this was revisited in the September 2017 SCICOM ASC meeting. A short summary is provided below and the full analysis is on the Sharepoint [here](#).

Advanced genetic methods
Big data and their uses
Biotechnology
Climate change: forecasting changes and impacts
Climate change: impacts and mitigation
Connectivity, dispersal and movement of organisms
Design, implementation and evaluation of ecosystem monitoring
Dynamic habitat modelling
Ecosystem forecasting and primary production: links to food webs and fishery yields
Emerging human pressures and their interactions
Future scenarios for the sea and society
Implications of more abundant fish stocks
Linking pressure and state
Monitoring of the future
Sensitivity and role of seabed ecosystems
Sensors: development and application
Tools to support integrated advice

SCICOM continues with an active science prioritisation process, which will be informed by three elements

(1) A review of emerging marine 'opportunities' for ICES (action from SCICOM meeting at 2017 ASC)

(2) A review of marine science priorities in member countries and an assessment of where ICES can 'add value' (action from SCICOM meeting at 2017 ASC)

(3) The existing draft list of SCICOM science priorities, along with further bottom-up input (e.g. recent outputs from ASC 2017 Theme and Open Sessions)

Going forward from the ASC meeting and into 2018, we are encouraging SCICOM members to represent national science priorities in the SCICOM process and to work with their ICES Delegates to do this.

### Timetable

The SCICOM timetable for this work will be as follows (with tentative links to the timing of the wider ICES Strategic Planning Process also proposed)

**Oct-Dec 2017:** Review of 'opportunities' for ICES (Responsible: Secretariat, SCICOM (incl DIG and OG), ACOM, Council)

**Oct-Dec 2017:** Review of high-level science priorities in member countries (Responsible: Secretariat, SCICOM, Council)

**Jan 2018:** Amalgamate outcomes of existing SCICOM review, the review of 'opportunities' and 'national priorities' with outputs from network to define preliminary areas of ICES science priorities (Responsible: SCICOM, initially led by subgroup, likely SG Chairs and Secretariat)

**Feb-Mar 2018:** Move towards finalising priorities, justification, costings with SCICOM 'sign-off' at spring meeting (Responsible: SCICOM)

**Mar-May 2018:** Amalgamate Science Priorities into wider planning process (Responsible: Bureau, Council)

**Mar-May 2018:** Start to identify and propose EG and ToR and processes/ structures to support delivery of science priorities (Responsible: SCICOM, ACOM)

**Sept 2018:** ASC. Present ICES draft Strategic Plan (Responsible: Bureau, SCICOM, ACOM)

**Oct 2018:** Formal adoption of ICES Strategic Plan by Council (Responsible: Council)

### Further considerations

SCICOM are also taking account of some wider issues when developing science priorities. A preliminary listing of these issues includes the need to:

(1) Develop the profile and use of regional science, expertise and kudos as an approach to add significant value to marine science at national and global scales;

(2) Recognise and address interconnectedness of systems, both natural and social;

(3) Create links between our ongoing science and advice and a vibrant training culture and strong network for early career scientists;

(4) Contribute to technological developments in marine science and make best use of emerging and available technologies;

(5) Maintain and increase quality, transparency and high ethical standards in our approach to science.

### 3.2 SCICOM work plans for 2018

In addition to the recurrent work of SCICOM, our actions for the coming year (including the setting of science priorities) are summarised in the following table. Several of these will focus on how to measure science delivery in terms of impact and output, to develop mechanisms to capture metrics of output and impact in a more consistent way and to show how ICES science is adding value for member countries. Although these actions are led by SCICOM, they will be delivered jointly with the ACOM, Secretariat, Science Programme, Advice Programme and DATA.

Table. Science actions for delivery in 2017-18 to be led by SCICOM.

Action	Delivery date
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 Ph.D/Post.doc, and exploring options for accreditation of the ICES Training Programme)	Q3 2018 (with Secretariat, Science Programme)
Update and make available revised Guidance for EG Chairs	Q1 2018 (with ACOM, Secretariat, Science Programme, Advice Programme)
Evaluate with strategic partners (PICES, UN agencies, Regional Sea Conventions and Programmes, LME governing bodies) possibilities of scientific input by the ICES science community to on-going international processes like: the World Ocean Assessment, SDG14 implementation, IOC Decade of Ocean Science, International Year of the Salmon, UN instruments for law of the sea of marine conservation	Ongoing (with ACOM, Secretariat, Science Programme, Advice Programme)
Identify and promote science priorities for post 2018 planning cycle	Q1 2018 (with Secretariat, Science Programme)
Bibliographic analysis of ICES publication output and impact	Q3 2018 (with Secretariat, Science Programme)
Adopt topic focused SG names approved by SCICOM on web and in working practices	Q4 2017 (with Secretariat, Science Programme)
Conduct annual analyses of ICES science impact for reporting to SCICOM ASC meeting and October Council meeting	Q3 2018 (with Secretariat, Science Programme)
Publish ICES viewpoints on three topics	Q3 2018 (with ACOM, Secretariat, Science Programme, Advice Programme)
Develop and publish web text highlighting SCICOM role and personnel, including front page link into Science	Q1 2018 (with DATA, Secretariat, Science Programme)



## **4 Updates to SCICOM structures and processes**

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This section summarises some of the main changes to SCICOM structures and processes in 2017. This is complemented by a complete review of changes at the Expert Group level in Annex 1.

### **Steering Groups**

SCICOM founded a new 'Aquaculture' Steering Group in 2017.

'Steering Group' or SG is the name that has now been proposed and adopted by SCICOM to replace 'Science Steering Groups' or SSG; with the topic of each group preceding this designation.

SCICOM members also recommended, and SCICOM approved, changes to the subject-related names of these SG to better describe the range of science they conduct.

The name changes are already in use during day to day operation of the SG and the description of the SG on the website has been updated. The name changes will be fully implemented on ICES systems by the end of 2017. These changes are a step towards increasing the transparency and subject-oriented focus of ICES scientific activity.

The current Steering Groups, their Chairs and the numbers of EG they 'parent' are:

- Aquaculture SG (Chair: Mike Rust; 3 EG)
- Human Activities, Pressures and Impacts SG (Chair: Henn Ojaveer; 25 EG)
- Ecosystem Processes and Dynamics SG (Chair: Silvana Birchenough; 17 EG)
- Integrated Ecosystem Assessments SG (Chair: Mette Skerne-Mauritzen; 16 EG)
- Ecosystem Observation SG (Chair: Sven Kupschus; 37 EG)

### **Benchmark Steering Group**

Following a review of the Benchmark Steering Group, the ACOM and SCICOM Chairs proposed to the March 2017 SCICOM meeting that the group should be dissolved. This was agreed by SCICOM at the March meeting and by ACOM via the Forum. The functions of the group have been passed to the ACOM and SCICOM leadership to provide ongoing management of the benchmarking process: with approaches adopted to suit circumstances.

### **Publication and Communications Group**

This Operational Group was dissolved in 2017.

### **Science Impact and Publication Group**

The Science Impact and Publication Group was formed following the March 2017 meeting of SCICOM and Terms of Reference have also been developed and agreed by SCICOM. Three members have been now been appointed by SCICOM and a call for Chair nominations is live on the SCICOM Forum (for decision by 10 November 2017).

The SIPG will monitor publication output and provide advice to SCICOM, ACOM, the ICES Secretariat and network on increasing the reach and impact of ICES publications and science, including grey literature. It will also develop and recommend policies governing scientific publications as requested by SCICOM, review and provide guidance on the evolution of science publication and communication, and review and provide recommendations on Category 1 requests for ICES publications.

### **Proposals for future improvements**

The SCICOM and ACOM Chairs are continuing to pursue a proposal to allocate all EG in ICES to a Steering Group. This approach would ensure that all EG would be effectively represented at the SCICOM Business Group/ACOM Leadership meetings and create more active links between science and advice. This will mainly affect the Expert Groups currently referring to ACOM and will require the establishment of another Steering Group.

The proposal to parent all EG with a Steering Group was supported by the SCICOM Business Group/ACOM Leadership meeting. SCICOM are supportive but ACOM require further information. Consequently, a more comprehensive paper on the topic than was originally circulated is now being developed.

As part of developing this proposal, the SCICOM and ACOM Chairs will also consult on an approach that does not constrain the affiliation of SG and hence EG to SCICOM or ACOM. This would involve linking individual ToR to SCICOM or ACOM rather than the SG. For any group with only SCICOM ToR, approval would be sought from SCICOM, for any group with SCICOM and ACOM ToR approval would be sought from both Committees and for any group with ACOM ToR approval would be sought solely from ACOM: but all ToR would be visible to both Committees for comment. This more flexible approach would simplify the allocation of advisory requests to the wider network, better engage both Committees in the process of developing ToR and ensure they were better sighted on them as well as helping create more equitable roles for SG Chairs. Group membership rules could still be linked to the EG with ToR linked to ACOM as required.

## 5 Steering Groups

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This Section presents progress reports from the five SCICOM Steering Groups.

The current Steering Groups are:

- Aquaculture SG (Chair: Mike Rust)
- Human Activities, Pressures and Impacts SG (Chair: Henn Ojaveer)
- Ecosystem Processes and Dynamics SG (Chair: Silvana Birchenough)
- Integrated Ecosystem Assessments SG (Chair: Mette Skerne-Mauritzen)
- Ecosystem Observation SG (Chair: Sven Kupschus)

### 5.1 Aquaculture SG (Mike Rust, USA, term started in June 2017)

#### 5.1.1 Introduction

Aquaculture is making an increasing contribution to global fish and shellfish production and is a growing and visible industry in many ICES countries. The Aquaculture Steering Group is responsible for guiding and supporting Expert Groups that are working on science and advisory topics contributing to the sustainable development of aquaculture.

Topics covered include:

- evaluating the social and economic consequences of aquaculture operations;
- types, transmission and prevalence of diseases affecting cultured species and actions that can be taken to address them;
- environmental impacts of aquaculture, approaches to monitor and mitigate them and methods of aquaculture risk assessment;
- carrying capacity and relative efficiencies of alternate aquaculture systems;
- genetics of cultured species;
- projecting the future development of aquaculture and its implications for the food system and food security.

### 5.1.2 Summary of progress in relation to Terms of Reference

Initial set of ToR from recommendations by CSIAQUA scoping meeting in Gdynia

Terms of reference	Progress (From June 2017)
1. Help establish the three EG proposed by CSIAQUA and assess whether the remits of the proposed EGs will effectively support delivery of aquaculture science in ICES and whether any additional EGs or splits of proposed EGs would improve delivery (e.g. fish vs shellfish splits in relation to environmental interactions)	Prior to and during the ASM, contacted CSIAQUA Chair and other EG members to determine motivation for recommendations, issues and general understanding of aquaculture science at ICES and needs for science advice by member states. ASG is formulating revised ToR for three proposed working groups from CSIAQUA based on background information from Gdynia. The SG Chair is working with current EG Chairs in the Aquaculture SG to refine ToR.
2. Build effective interactions with those existing EGs which address ToR related to aquaculture	All EG Chairs have been contacted by the SG Chair and are onboard
3. Consider the viability of establishing EGs focusing primarily on freshwater fish aquaculture (aquaculture of freshwater fishes was considered within ICES scope at the CSIAQUA scoping meeting in Gdynia)	Not yet addressed. Brief discussion with interested attendees at the 2017 ASC.
4. Identify Chairs for the proposed EGs	Not yet addressed.
5. Finalize the ToR of the proposed EGs	Not yet addressed.

Terms of Reference approved by SCICOM.

Terms of Reference	Progress
ToR a) Engage with and work with Chairs of EG to ensure that EG work supports and meets the science objectives and advisory needs of ICES	All existing EG Chairs have been contacted. The SG Chair is working with them to establish additional recommended EGs and other deliverables
ToR b) Help EG formulate and prepare their draft terms of reference and resolutions	EG ToR were already formulated prior to establishment of SG. The process of drafting ToR's for additional EGs is underway and EG Chairs will be engaged in the development of all new ToR.
ToR c) Review and report on the science being undertaken within EG to SCICOM, with a focus on identifying science highlights and priorities and demonstrating the impact of their science	First meeting at 2017 ASC, September 2017.
ToR d) Review scientific products/deliverables of the EG and provide feedback on ways to improve the impact and influence of their work	Not yet addressed. Going forward, SG Chair will work with EG Chairs to identify highlights and other opportunities to create impactful science products
ToR e) Provide feedback to SCICOM on research priorities and implementation of ICES strategy	SG Chair is completing due diligence to understand needs of ICES, appropriate ways to work within ICES structure and potentials for EGs to support strategy
ToR f) Identify shortfalls in skills and knowledge needed to achieve ICES objectives within the SGs area and work	On-going. Follows ToR g.

within the SG and through SCICOM and operational groups to develop capability	
ToR g) Identify gaps and overlaps in the work of EG, and propose consolidation, rationalization or forming of new EG to SCICOM as appropriate	SG Chair is working on formulation of three new EGs in the short term, and strategy for ICES aquaculture science and advice longer term.
ToR h) Help EG Chairs to adopt practices which ensure scientific information generated by EG is receiving adequate quality control consistent with scientific norms	Not yet addressed.
ToR i) Facilitate active horizontal and vertical communication, collaboration and co-ordination between EG and all other relevant ICES groups and identify, in cooperation with EG Chairs, opportunities for internal and external collaboration	SG Chair held aquaculture “office hours” at ASC 2017 to begin communication within SG and among others interested in topic. Held one on one conversations with two other SG Chairs and other SCICOM members.
ToR j) Represent the SG at SCICOM meetings and SCICOM/ACOM leadership meetings in spring and at the ASC	SG Chair attended meetings at ASC 2017.
ToR k) Establish a core group of ASG Expert Group Chairs who, together with the ASG Chair, will share responsibility for implementing the work of ASG;	SG Chair opened communication with and among current EG Chairs. As above, the SG Chair is also building additional EGs who will contribute to the core group.
ToR l) Generate a position paper on the contribution of ASG to ICES science, data and advice;	Still in conceptual stage. SG Chair will work with SG members to crystalize.

### 5.1.3 List of EGs

A full list of expert groups under this Steering Group is provided in Annex 2.

Following discussions among the Aquaculture SG Chair, the SCICOM Chair and the Chairs of three existing EGs, all EGs elected to take the Aquaculture SG as their parent. The change was supported by Henn Ojaveer as Chair of the Human Activities, Pressures and Impacts Steering Group, which previously provided support for the three Expert Groups. The relevant changes to accommodate the change of parentage have now been completed in the Secretariat. The Expert Groups moved to the Aquaculture SG are:

- Working Group on Application of Genetics in Fisheries and Mariculture (WGAGFM) (Chair: Gary Carvalho transitioning to Jann Martinsohn)
- Working Group on Pathology and Diseases of Marine Organisms (WGPDMO; Chair: Ryan Carnegie)
- Working Group on Social and Economic Dimensions of Aquaculture (WGS-EDA; Chair: Gesche Krause)

#### 5.1.4 Science highlights

None to report for ASG. The SG are in the process of identifying and listing specific work products related to aquaculture from all ICES EG.

#### 5.1.5 Communication with EG

The SG Chair has contacted each EG Chair and begun the dialogue needed to focus EG ToR on issues of greatest potential impact for ICES countries. EG Chairs are all supportive of developing an aquaculture science capacity focused on key needs for science based development and management of north Atlantic aquaculture. The next steps will be to get all EG Chairs and the SG Chair together electronically to develop action items followed by an in-person meeting (tentatively in January 2018 in Copenhagen) to sharpen strategic vision and identify tactics to set ICES aquaculture research on a productive and sustainable path.

#### 5.1.6 Summary of new EG proposals and EG closing

This overview is complemented by a complete review of changes as tabulated in Annex 1.

None of the three existing EGs are closing however there are some changes. The Genetics working group (WGAGFM) has recently submitted a proposal for an ICES training course, to consider the role and impact of genomics in fisheries and aquaculture. Such an opportunity will hopefully foster improved integration of their ideas and approaches. This working group also put forward a recommendation from their meeting in Faro in May 2017, to change the name of the group, to *Working Group on the Application of Genetics in Fisheries and Aquaculture* (WGAGFA). This has been approved. The Chair of this EG has transitioned from Gary Carvalho to Jann Martinsohn.

At the March 2017 SCICOM meeting, the Committee supported the proposal by CSIA-QUA to establish three new working groups under the Aquaculture SG to take on:

- Scenario foresight, future projections / eco-forecasting
- Environmental interactions, risk assessment, data collection, methodologies
- Aspects of carrying capacity, efficiencies, IMTA, modelling

The Aquaculture SG will be keeping the intent of these three groups but modifying the ToR and names to align with ICES vision and goals, and to enhance team building. The ASG will also attempt to focus ToR on management needs and target peer reviewed publications, management tools (e.g. models, synthesis documents) and “Viewpoints” as deliverables.

The future projections group will have ToR to include identification of current advice needs by member countries (including identifying the process for permitting and management of aquaculture by governments and key information needs for informed decision making), current social and economic drivers of ICES country aquaculture industries, and current science capabilities in the ICES region that will impact future growth and development of the aquaculture sector in a north Atlantic context. It is important to understand the current state prior to any futurecasting activities. It is desirable to have all SG members (Chair and EG Chairs) participate in this EG due to its anticipated central role in developing a vision and tactical approach to aquaculture science in ICES going forward.

The environmental interactions group will have minimal modifications to the proposed ToR but the focus will be in both improving ecosystem services as well as mitigation of impacts.

The proposed ToR of the carrying capacity group will be modified to include marine space analysis of aspects of carrying capacity, modeling, trophic interactions, and risk. This is because location is the key driver in determining the relevance, size of impact, and potential of the other ToR. An additional ToR linking sustainable aquaculture development in a defined location to economic and social impacts will be added.

A resolution(s) to establish these groups will be forthcoming quickly so that a EG Chairs can be chosen and can join the SG meetings this fall and winter.

#### **5.1.7 Forward look (actions for SG and SCICOM/ ACOM)**

Approval of resolutions to form aquaculture focused Expert Groups.

Development of the Aquaculture Theme Session which has been proposed and accepted for the ASC 2018 in Hamburg.

## **5.2 Human Activities, Pressures and Impacts SG (Henn Ojaveer, term started in January 2015)**

### **5.2.1 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.

### 5.2.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
ToR a) Engage with and work with Chairs of EG to ensure that EG work supports and meets the science objectives and advisory needs of ICES	Work conducted on routine basis.
ToR b) Help EG formulate and prepare their draft terms of reference and resolutions	None of the EG finishing their 3-years terms in 2017 have submitted their draft resolutions (two of them will hold their last meetings in Autumn), so the related work will be mostly undertaken towards the end of this year. Reviewed draft resolutions for two newly proposed workshops (WKVCSA, WKCSMP) and assisted WGSFD in formulating additional ToR.
ToR c) Review and report on the science being undertaken within EG to SCICOM, with a focus on identifying science highlights and priorities and demonstrating the impact of their science	Communicated with selected EG Chairs and encouraging them to submit candidate ideas for viewpoints (as discussed at SCICOM/ACOM leadership meeting in March 2017). The proposed topics included: i) bioinvasions, ii) potential impacts of deep sea mining, iii) microplastics and marine litter, iv) passive sampling, v) moving towards information rich monitoring of marine renewable energy environmental impacts. Reviewed EG reports and proposed candidate science highlights as requested by SCICOM chair
ToR d) Review scientific products/deliverables of the EG and provide feedback on ways to improve the impact and influence of their work	This ToR was achieved through communication with EG Chairs during finalisation of EG resolutions and with the aim to have “manuscripts submitted to peer-reviewed scientific journals” as outputs linked to as many ToR as possible.
ToR e) Provide feedback to SCICOM on research priorities and implementation of ICES strategy	Feedback provided as requested.
ToR f) Identify shortfalls in skills and knowledge needed to achieve ICES objectives within the SGs area and work within the SG and through SCICOM and operational groups to develop capability	Examples included: i) encouraging all EG Chairs to add ToR on cumulative impacts of at least two pressures in EG new Resolutions: ii) assisting WGMABS Chairs to design the work (geographic coverage, methodological aspects) for the next 3-years, and iii) discussions with WGHIST Chairs on arranging the previously planned modelling workshop (likely in 2018).
ToR g) Identify gaps and overlaps in the work of EG, and propose consolidation, rationalization or forming of new EG to SCICOM as appropriate	No overlaps detected. Information on new EG provided in 4.1.6. and Annex. In connection with forming the new Aquaculture SG, three EG were moved from EPISG to ASG.



ToR h) Help EG Chairs to adopt practices which ensure scientific information generated by EG is receiving adequate quality control consistent with scientific norms	The mechanisms to achieve this still need to be developed.
ToR i) Facilitate active horizontal and vertical communication, collaboration and co-ordination between EG and all other relevant ICES groups and identify, in cooperation with EG Chairs, opportunities for internal and external collaboration	Related activities undertaken include: invitation of EGs under EPISG working on broadly similar topics (e.g., bioinvasions; chemistry/pollution, renewable energy) to jointly submit candidate items for ICES viewpoints; arranging/proposing (2017/2018) open sessions at ASC jointly with EPDSG.
ToR j) Represent the SG at SCICOM meetings and SCICOM/ACOM leadership meetings in spring and at the ASC	Physical attendance at all SCICOM and SCICOM/ACOM meetings.

### 5.2.3 List of Expert Groups under Human Activities, Pressures and Impacts SG

A full list of expert groups under this Steering Group is provided in Annex 2.

### 5.2.4 Science highlights

**Book: Stock Identification Methods** (2nd Ed): Applications in Fishery Science (Steven Cadrin, Lisa A. Kerr and Stefano Mariani)

Provides a comprehensive review of the various disciplines used to study the population structure of fishery resources;

Represents the worldwide experience and perspectives of experts on each method;

Describes 18 distinct approaches to stock identification grouped into sections on life history traits, environmental signals, genetic analyses, and applied marks;

Features experts' reviews of benchmark case studies, general protocols, and the strengths and weaknesses of each identification method;

Reviews statistical techniques for exploring stock patterns, testing for differences among putative stocks, stock discrimination, and stock composition analysis;

Focuses on the challenges of interpreting data and managing mixed-stock fisheries.

**Book: Perspectives on Oceans Past** (Editors: Kathleen Schwerdtner Máñez, Bo Poulsen)

First book dealing with theoretical backgrounds of marine environmental history;

Analyses the changing relationships between human societies and marine natural resources over time;

Seeks to encapsulate some of the major novelties of this fascinating new discipline and its contribution to the management, conservation and restoration of marine and coastal

ecosystems as well as the cultural heritages of coastal communities in different parts of the world;

Equips readers with broad understanding of the major concepts and methods from science and history used in and applied to marine environmental history

Includes and summarizes topics on modelling approaches, gendered perspectives, and more;

Looks at possible future developments in marine environmental history.

**Special issue in Marine Environmental Research** on 'The ICON Project (the trans-European research project on field studies related to a large-scale sampling and monitoring)', edited by Ketil Hylland and Matt Gubbins.

This special issue comprises a series of studies, describing how environmental chemistry and a range of health-related responses in mussels, gastropods and different fish species may be usefully combined in an assessing contaminant impacts in coastal and offshore areas.

#### **5.2.5 Communication with EG**

Communication with EG Chairs over e-mail, phone and Skype/Webex has proven sufficient and efficient. As most EG Chairs are extremely time-limited, the content of most e-mail communications initiated by the EPISG Chair is to encourage submission of reports/resolutions.

#### **5.2.6 Summary of new EG proposals and EG closing**

This overview is complemented by a complete review of changes as tabulated in Annex 1.

New EGs:

Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT)

Working Group on Methods for Estimating Discards Survival (WGMEDS)

Workshop on Vulnerabilities and Risks to Culturally Significant Areas (WKVCSA)

Workshop on Co-existence and Synergies in Marine Spatial Planning (WKCSMP)

Workshop on Microplastics in the Marine Environment (WKMP)

Working Group on Marine Litter (to be submitted after ASC)

EG with changes of SG affiliation:

2015/MA2/SSGEPI01	Working Group on Pathology and Diseases of Marine Organisms (WGPDMO)	Transferred to Aquaculture Steering Group (ASG)
2014/MA2/SSGEPI07	Working Group on Social and Economic Dimensions of Aquaculture (WGSEDA)	Transferred to Aquaculture Steering Group (ASG)
2014/MA2/SSGEPI08	Working Group on Application of Genetics in Fisheries and Mariculture (WGAGFM)	Transferred to Aquaculture Steering Group (ASG)

### 5.2.7 Forward look (actions for SG and SCICOM/ ACOM)

For the SG (in addition to the routine work): to i) continue efforts to draft/finalise resolutions for historical fisheries modelling (relates to WGHIST) and microplastics workshops, ii) assist Chairs of EGs, which end their 3-years period in 2017, to draft/finalise new Resolutions (relates to WGMS, WGMHM, WGHIST and WGMABS).

For SCICOM/ACOM: continue to organise required competence/expertise on hazardous substances in relation to the 2017 OSPAR request on this matter (relates to WGMS and MCWG)

Embed the name change for this EG as agreed by SCICOM 10 October 2017, with changeover completed by 1 January 2018. From this date this SG will be known as the "Human activities, pressures and impacts" SG.

## 5.3 Ecosystem Processes and Dynamics SG (Silvana Birchenough, term started January 2017)

### 5.3.1 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, phytoplankton, zooplankton, benthic invertebrates, crustaceans and fish;
- ecosystem services;
- ecosystem resilience.

### 5.3.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
ToR a) Engage with and work with Chairs of EG to ensure that EG work supports and meets the science objectives and advisory needs of ICES	On track: regular e-mails correspondence with EG Chairs to discuss and support production of deliverables (e.g. dealines and production of annual reports, self-evaluations documents, setting new ToR) and agreeing work priorities.
ToR b) Help EG formulate and prepare their draft terms of reference and resolutions	On track: regular e-mail discussions with EG Chairs on ToR and deliverables associated with ICES priorities.
ToR c) Review and report on the science being undertaken within EG to SCICOM, with a focus on identifying science highlights and priorities and demonstrating the impact of their science	Ongoing: regular correspondence with EG Chairs to alert, inform on the recent products and highlights. SG Chair has communicated with EG Chairs, mainly to inform and encourage the use of ICES Communication department, Twitter and press releases for wider publicity of scientific outputs.
ToR d) Review scientific products/deliverables of the EG and provide feedback on ways to improve the impact and influence of their work	Ongoing: regular feedback provided on annual reports, ToR and self-evaluation documents to improve visibility, influence, realistic delivery and products.
ToR e) Provide feedback to SCICOM on research priorities and implementation of ICES strategy	Attended the SCICOM meeting in March and on-line e-mail and Skype discussions with SCICOM Chair on potential strategies for integration between and within EGs.
ToR f) Identify shortfalls in skills and knowledge needed to achieve ICES objectives within the SGs area and work within the SG and through SCICOM and operational groups to develop capability	Ongoing: there are clearly more opportunities for integration between EGs across ongoing initiatives ( e.g. ecosystems overviews), joint open sessions and viewpoints and dedicated.
ToR g) Identify gaps and overlaps in the work of EG, and propose consolidation, rationalization or forming of new EG to SCICOM as appropriate	Ongoing: new ideas for working with Aquaculture SG and EPDSG will be discussed. Several ideas were provided from EGs Chairs on 'potential topics for "viewpoints" but these were not selected during the first round.
ToR h) Help EG Chairs to adopt practices which ensure scientific information generated by EG is receiving adequate quality control consistent with scientific norms	As requested by EGs: several queries have been dealt with among EGs (e.g. contributions to external meetings, proposal participation and development).
ToR i) Facilitate active horizontal and vertical communication, collaboration and co-ordination between EG and all other relevant ICES groups and identify, in cooperation with EG Chairs, opportunities for internal and external collaboration	Several meetings have been planned for 2017 and 2018 and included in the budget of the EPD SG Chair to support EGs and represent ICES across several activities.
ToR j) Represent the SG at SCICOM meetings and SCICOM/ACOM leadership meetings in spring and at the ASC	Completed at the March and September meetings in 2017.
ToR k) Establish a core group of EPDSG Expert Group Chairs who, together with the EPDSG Chair, will share	On track: there is a core of 5-6 EG Chairs that are always supportive, active and engage on dedicated requests, correspondence and feedback.

responsibility for implementing the work of EPDSG	
ToR I) Generate a position paper on the contribution of EPD to ICES science, data and advice	Task not started yet, but may be developed and scoped following discussion during the joint EPI and EPD Open Session during ASC 2017.

### 5.3.3 List of Expert Groups under Ecosystem Processes and Dynamics SG

A full list of expert groups under this Steering Group is provided in Annex 2.

### 5.3.4 Science highlights

All EGs have been working towards their ToR and have successfully generated several products or catalysed new activities in addition to the standard reports. Some examples of highlights are summarised (e.g. peer reviewed publications, organising and chairing symposiums and external invitations to several scientific events). A summary of key outputs are provided below:

#### WGREMS:

A very active group, working closely on EU projects. Several doctoral students supervised and post-docs, EU proposals and papers. The most recent contributions are highlighted below:

Carpenter, G., Villasante S., O'Leary B. 2016. Europe: Keep allowable fish catches sustainable. *Nature* 531 (7595): 448.

Rivero-Rodriguez, S., Villasante, S. 2016. What are the research priorities for marine ecosystem services. *Marine Policy* 66: 104–113.

Selig, E., Kleisner, K., Ahoobim, O., Arocha, F., Cruz-Trinidad, A., Fujita, R., Hara, M., Laure Katz, McConney, P., Ratner, B., Saavedra-Díaz, L., Schwarz, AM., Thiao, D., Torell, E., Troëng, S., Villasante, S. 2016. A typology of fisheries management tools: using experience to catalyse greater success. *Fish and Fisheries*. DOI: 10.1111/faf.12192.

Villasante, S., Pita, C., Pierce, G., Pazos Guimeráns, C., Garcia Rodrigues, J., Antelo, M., Da Rocha, JM., García Cutrín, J., Hastie, L., Sumaila, R., Coll, M. 2016. To land or not to land: How do stakeholders perceive the zero discard policy in European small-scale fisheries? *Marine Policy* 71: 166–174.

Villasante, S., Pazos Guimerans, C., Rodrigues, J., Antelo, M., Rivero Rodríguez, S., Pita, C., Pierce, G., Lee, H., Garcia, D., Da Rocha, J.M., Sumaila, R., Coll, M. 2016. Fishers' perceptions about the EU discards policy and its economic impact on small-scale fisheries in Galicia (North West Spain). *Ecological Economics* 130: 130–138.

#### WGCRAB:

A very active group which concentrates on evaluating assessment methodologies, the use of indicators and reference points for management. A peer-review paper was produced:

Haig, J. A., S. Bakke, M. C. Bell, I. S. M. Bloor, M. Cohen, M. Coleman, S. Dignan, M. J. Kaiser, J. R. Pantin, M. Roach, H. Salomonsen and O. Tully (2016). "Reproductive traits and factors affecting the size at maturity of *Cancer pagurus* across Northern Europe." *ICES Journal of Marine Science* 73 (10): 2572–2585, <https://doi.org/10.1093/icesjms/fsw081>

### ICES-IOC WGHABD:

Clear progress with development of the IOC-ICES-PICES Harmful Algal Event (HAE-DAT) database which holds data about harmful algal events across the globe. ICES-IOC WGHABD delegates enter data from the countries on an annual basis. The first ICES HAB status report to be produced during 2018 and will be based on the HAE-DAT data. This report will form the ICES contribution to the IOC Global HAB Status Report which is in preparation.

A paper was also published by this group:

Berdalet, E., R. Kudela, E. Urban, H. Enevoldsen, N.S. Banas, E. Bresnan, M. Burford, K. Davidson, C.J. Gobler, B. Karlson, P.T. Lim, L. Mackenzie, M. Montresor, V.L. Trainer, G. Usup, and K. Yin. 2017. GlobalHAB: A new program to promote international research, observations, and modeling of harmful algal blooms in aquatic systems. *Oceanography* 30(1): 70–81.

Pablo Diaz (early career scientist and member of the WGHABD) submitted in 2015, a proposal entitled “Can pelagic gastropods be used to assess the impacts of ocean acidification?” This work was supported by the ICES Science Fund. The work showed promising results, the work was then invited to be presented at a workshop sponsored by the California Ocean Protection Council, to develop biologically-relevant management thresholds to help to interpret the monitoring and modelling data on ocean acidification on the US west coast.

### WGZE:

Contribution to the ICES/PICES 6th Zooplankton Production Symposium (9–13 May 2016, Bergen, Norway) resulting from close collaboration between by WGZE/WGIMT members

Contribution to the North Atlantic time-series in the IOC/UNESCO International Group for Marine Ecological Time-series (IGMETS) global analysis and status report (<http://igmets.net/report>). IGMETS has compiled a global collection of over 300 time-series, covering the open-ocean, coastal areas, and estuaries. Of all the oceanographic regions, the best coverage within IGMETS is for the North Atlantic, with the WGZE and WGPME time-series being the largest contributor to this region.

A book led by a WGZE member Claudia Castellanni; the book is entitled “Marine Plankton: A practical guide to ecology, methodology, and taxonomy” (Castellani & Edwards, Oxford University Press) published in 2017. The book is a modern plankton identification and reference manual.

A [workshop](#) is planned by PME and WGZE groups in November, entitled Symposium: high throughput methods for application in marine biodiversity time series: Addressing their challenges to fulfil their promises.

### WGREF:

Several papers in production and submitted. Some examples are included below:

Johnson, K.F., E. Councill, J.T. Thorson, E.N. Brooks, R.D. Methot, A.E. Punt. 2016. Can autocorrelation be estimated using integrated assessment models and how does it affect population forecasts? *Fisheries Research* 183: 222–232.

Paper submitted to *Journal of Mathematical Biology* on ‘Emergent properties of a multi-stage population dynamic model’, Ute A. Schaarschmidt; Sam Subbey; Richard D.M. Nash; Anna S. Frank.

### 5.3.5 Communication with EG

The EGs under EPD have been actively working and achieving their proposed ToR. There are no major issues relating to the work delivered by the EGs. Some aspects to consider are associated with the numbers of attendees, although this has only been flagged by some EGs. The following EGs have completed their 3-year cycle, therefore self-evaluations, annual reports and new multi-annual ToR for SCICOM consideration are being discussed. These EGs are:

- BEWG: The EG is progressing well, according to the set ToR. There are several case studies and advisory requests delivered. Members of the EG have group have chaired and participated at drafting advisory workshop and organised and chaired several ICES Theme sessions. Several draft papers are in preparation. The group shows a large number of attendees and new members have joined the EG.
- WGZE: A very active EG. All the multi-annual ToR were completed. The group encompasses a wide range of topics including zooplankton taxonomy, spatial and temporal distribution dynamics, knowledge of marine ecosystem structure and function, zooplankton community response to climate change and impact of microlitter on zooplankton, addressing numerous priorities of the ICES Science Plan. This EG has a very strong dissemination strategy via papers, symposiums and books.
- WGHABD: Progress on track with all ToR. Excellent progress against the proposed plan of work. Clear input to the HAE-DAT data base, participated at several advisory meetings and published in reports and documents.
- WGOH: Progress on track with all ToR. This EGs contributes to the objective 1 of the Science Plan, mainly with oceanographic and climatic data. The main WGOH contribution was the production of the Ocean Climate Report in September 2017. Members contribute to national and international climate advice (via IROC).
- WGREF: The work has covered all ToR. The EG produced several products (e.g. papers, collaborations and proposals). The Chairs have requested 1-year extension into 2017, but after this period this EG will not continue.
- WGRMES: Four ToR are being tackled by the group will each lead to a publication. The group is active in dissemination, production of papers, joint supervision of doctoral and post-doctoral students and collaboration in production of research proposals.
- WGScallop: This group was allocated to EPDSG and SCICOM from ACOM. Changes to expected ways of reporting (e.g. multi-annual ToR) will be discussed in the next cycle.
- WGRECORDS: The last meeting of this EG was during the ASC 2017. Thus self-evaluation + new Draft ToR were postponed for presentation on the SCICOM Forum.
- WGEVO: This EG submitted a Resolution for an ICES Internal Publication and it was approved at the 2017 ASC (see Section 5.3.3.). The CRR will be edited by members of WGEVO and other colleagues, comprising a comprehensive survey of evidence for the incidence and consequence of fisheries-induced evolution across a wide range of fish stocks, and will be published in the ICES Cooperative Research Report series. The editors (Ulf

Dieckmann, Bruno Ernande, and Mikko Heino) agree to submit the final draft of the proposed publication by 31 December 2018.

- **WKSICCME-CVA:** The Workshop on “Regional climate change vulnerability assessment for the large marine ecosystems of the northern hemisphere”, chaired by Myron Peck (Germany, ICES SICCME), Elliott Hazen (USA, PICES: (S-MBM, co-Chair SG-CERP)) and Kathy Mills (USA, ICES) was hosted at ICES HQ, Denmark, 19–21 July 2017. The report is being compiled at present. The verbal feedback received by attendees highlighted the excellent quality of the event. Myron Peck provided feedback to SCICOM during the 2017 ASC.
- **WGCEPH:** The annual report was delayed due to H2020 application deadline. Some initial feedback was provided by e-mail and work now progressing as agreed.
- **WGCRAB:** This EG doesn’t contribute to advisory requests, but has conducted analysis on existing data sets (mostly brown crab and European lobster), contributing to Aim 2 of the Science plan.
- **WGOOFE:** Combined their 2015 and 2016 annual meeting into a single annual report.

### 5.3.6 Summary of new EG proposals and EG closing

This overview is complemented by a complete review of changes as tabulated in Annex 1.

The Working Group on Recruitment and Forecasting in a Variable Environment (WGRFE) has met its ToR and will not pursue a new 3 year term.

### 5.3.7 Forward look (actions for SG and SCICOM/ ACOM)

There are several activities planned to support EGs under EPD, for the SG Chair to represent ICES and to strengthen links between EG and SG Chairs. These activities were submitted for approval using the budget available for 2017, these are:

- **Workshop** on ‘*Novel approaches to determining benthic community dynamics at different scales*’. The EPD Chair represented ICES at this meeting chairing a dedicated topic session. This workshop helped to foster integration of EGs (e.g. WGMRED and BEWG) working across topics on ecological scales and variability of benthic systems (24-27th September hosted at Cape Eleuthera Institute, Rock Salt Bahamas);
- **Symposium** on “*High throughput methods in marine long-term observations*”. The EPD Chair attended on behalf of ICES. This workshop is organised by WGPME and WGZE (11-13 October at Schloß Herrenhausen near Hannover);
- **Meeting** on “*Global ecological and economic connections in Arctic and sub-Arctic crab fisheries*”? The EPD Chair will represent ICES at the workshop, helping to set the scene by presenting ICES priorities on Arctic research and help to foster further collaboration on Arctic fisheries research (8-12 December at ICES HQ Copenhagen);
- **EG Chairs and EPD Chair get together.** The aim of this activity is to foster integration and discuss avenues for better integration across EPD EGs, the data centre and SCICOM. The meeting will be at ICES HQ (~6 experts attending and others via WebEx) (TBC, likely to be in January 2018);



- **EMODNET Biology Annual Meeting.** The EPD Chair attended and helped to develop products in support research and advice on behalf of ICES (9-10th October in London);
- **Joint Open Session for the 2018 ASC** was submitted with EPI SG Chair entitled: *"Methodological advances to evaluate ecosystem impacts of human activities"*;
- **ICES-PICES Workshop** on "Political, Economic, Social, Technological, Legal and Environmental scenarios used in climate projection modelling (WKPESTLE)". A workshop associated with the 4<sup>th</sup> International Climate Change Symposium in Washington D.C. (4-8<sup>th</sup> June, 2018) proposed by jointly by SICCME and SIHD, (John Pinnegar, UK; Jörn Schmidt, Germany; Alan Haynie, USA; and Tyler Eddy, Canada);
- **Further collaborations** discussion to explore potential integration opportunities with Aquaculture SG Chair and EPD EGs (still to be organised with Mike Rust via Skype).

## 5.4 Integrated Ecosystem Assessments SG (Mette Skern-Mauritzen, term started January 2017)

### 5.4.1 Introduction

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, northwest Atlantic and Norwegian seas;
- 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.

Over the last years the focus of the IEA EG work have expanded, and together the IEA EGs now cover all elements in the IEA process from scoping, identifying indicators, assessing ecosystem state, running Management Strategy Evaluations and defining frameworks for providing integrated advice. The toolbox used in the IEAs is increasing, but there is still a limited use of ecosystem models, socioeconomic models and socioeconomic indicators. There is much cross-fertilization among EGs, and among EGs and the Strategic Initiative for Human Dimension.

### 5.4.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
ToR a) Engage with and work with Chairs of EG to ensure that EG work supports and meets the science objectives and advisory needs of ICES	The IEASG Chair has engaged in defining EG ToR, participated in EG meetings, and discussed EG output and reports with EG Chairs and ICES Secretariat. The SG Chair was also involved in arranging 2 open sessions at the 2017 ASC focusing on science objectives and monitoring needs, and has also been engaged in the development of one session for the 2018 ASC on IEA objectives and inclusion of the human dimension in IEA.
ToR b) Help EG formulate and prepare their draft terms of reference and resolutions	The IEASG Chair has been engaged in the drafting ToR for one EG to be approved in 2017.
ToR c) Review and report on the science being undertaken within EG to SCICOM, with a focus on identifying science highlights and priorities and demonstrating the impact of their science	The IEASG Chair has communicated with EG Chairs regarding science highlights, and discussed these with both EG Chairs and the ICES Secretariat, and presented some of these in an opening keynote presentation at the Ecosystem Studies of Sub-Arctic and Arctic Seas (ESSAS) Open Science Meeting.
ToR d) Review scientific products/deliverables of the EG and provide feedback on ways to improve the impact and influence of their work	The SG Chair organised an Open Session on IEASG EGs achievements, future plans and challenges during the ASC 2017. This has helped to facilitate interactions between the SG Chair and EG Chairs
ToR e) Provide feedback to SCICOM on research priorities and implementation of ICES strategy	The IEASG Chair has engaged in several discussions with the ICES Ecosystem Approach Coordinator and SCICOM Chair on both research priorities and scientific and management objectives relevant for the work in IEASG EGs
ToR f) Identify shortfalls in skills and knowledge needed to achieve ICES objectives within the SGs area and work within the SG and through SCICOM and operational groups to develop capability	This ToR was addressed during two open sessions at the ASC 2017; on the challenges for the IEASG groups, and on the data and monitoring needs and how to support them (shared session with EOSG).
ToR g) Identify gaps and overlaps in the work of EG, and propose consolidation, rationalization or forming of new EG to SCICOM as appropriate	This ToR was addressed in the IEA Open Session at ASC 2017.
ToR h) Help EG Chairs to adopt practices which ensure scientific information generated by EG is receiving adequate quality control consistent with scientific norms	The IEASG Chair participated in WKIDEA on IEA approaches and will take part in writing a CRR on best practices of IEA analyses.
ToR i) Facilitate active horizontal and vertical communication, collaboration and co-ordination between EG and all other relevant ICES groups and identify, in cooperation with EG Chairs, opportunities for internal and external collaboration	This ToR is addressed more or less continuously in discussions with EG Chairs, and was also be addressed more specifically by the IEA Open Session at the ASC 2017.
ToR j) Represent the SG at SCICOM meetings and SCICOM/ACOM leadership meetings in spring and at the ASC	The IEASG Chair participated in the 2017 SCICOM and leadership meeting in spring, and in the SCICOM meeting during the 2017 ASC.

ToR k) Map the EGs and their ToR against the information and data that ICES needs to deliver the Science Plan and its advisory work, suitably prioritized	A mapping exercise will be performed that takes into consideration planned activity, suggestions for collaboration between EG, and challenges raised by EG.
ToR l) Promote the development of the Regional Ecosystem Descriptions in standardized formats along the lines proposed by WKECOVER, and WKDECOVER. Propose additions and improvements to those guidelines in collaboration with constituent EG	The IEASG Chairs have discussed the engagement of IEA groups in the development of Ecosystem Overviews, both with the ICES Secretariat and with EG Chairs. The IEASG Chair will assist in identifying persons in the IEA network to assist the development of the Ecosystem Overviews
ToR m) Promote the development of outline Integrated Ecosystem Assessments with the IEA EG. It is recognized that a variety of approaches to IEA exist, and different approaches will be appropriate to the different IEA EG based on skill sets and local conditions. IEASG will promote innovative approaches including using partial component based analyses, and use of combination quantitative and expert judgement approaches	The planned CRR on best practices of IEA analyses will serve as a reference document for currently used analyses. Several of the IEASG groups are now focusing on scoping and identifying management objectives, trade-offs among sectors and cumulative impacts, as well as indicators reflecting system vulnerability and resilience. It is anticipated that a focus on these objectives will require the use of new qualitative and quantitative approaches. This development is also supported by the collaboration between SIHD and IEASG groups, strengthening the focus on inclusion of the human dimension in the IEA. Several IEASG groups are in the process of developing indicators relevant for IEA, and including multispecies and ecosystem modelling in the assessments, to e.g. test indicators, address climate change scenarios and impact on ecosystem vulnerability and resilience. The IEASG Chair is strongly supporting these developments.
ToR n) Maintain a watching brief over initiatives in IEA in the wider community beyond ICES. This should include new approaches or methods for IEA, and broadening of the IEA concept to potentially include economic and social drivers and impacts	The IEASG Chair will participate in a planned ICES/PICES/PAME (Arctic Council) workshop on developing guidelines for EA and IEA of the Arctic, based on experiences on IEAs from ICES regions and other regions.
ToR o) Promote the development within EGs of standards and guidelines for good practice and Quality Assurance in the collation and use of data. This should extend to the maintenance of archived data used in the IEAs, and documentation of all the steps taken to arrive at a conclusion for a given IEA, and the possible involvement of the ICES Data centre	The IEASG Chair has discussed the use of ICES Data Center with some of the IEA groups. This will be further discussed during the IEA Open Session at the 2017 ASC to address some of the data related challenges. The CRR on IEA methods will be important in securing the quality of IEA analyses and conclusions. Also, the IEASG Chair has reviewed EG reports before publication.

#### 5.4.3 List of Expert Groups under Integrated Ecosystem Assessments SG

A full list of expert groups under this Steering Group is provided in Annex 2.

#### 5.4.4 Science highlights

These highlights are a limited selection of publications from the EGs in IEASG and in no way diminish the importance and value of all the work not mentioned here.

De Piper et al. (2017, references below) describe how physical and social scientists have engaged in the transdisciplinary and collaborative process in the Working Group on the Northwest Atlantic Regional Sea (WGNARS) to develop IEA. Much effort was put into scoping and defining objectives by reviewing existing regulations and policies spanning the region. A semi-quantitative conceptual model of the ecosystem was constructed, representing a transdisciplinary representation of the system, efficiently allowing cross-disciplinary integration and standardization of expert knowledge and data into one, unifying framework. Importantly, the focus on objectives from an external source, helped the EG to effectively bridging disciplines by overcoming barriers related to individual discipline's priorities, communication and culture, bringing the group dynamics from negotiation to considering how collective disciplines contribute to solving the problem. The same approaches are now being tested for the North Sea IEA.

Voss et al. (2017) introduce a new way of estimating fisheries management advice referred to as an "ecologically-constrained Maximum Economic Yield" (eMEY) strategy, which takes into account ecological criteria as well as short- to medium-term economic costs. Using an age-structured optimization model parameterized for the Eastern Baltic cod, they found that application of eMEY advice results in more stability in catch advice. Also, quantification and visualization of the costs of deviating from eMEY advice offers a transparent basis for evaluating decision-making outcomes. The paper is based on work performed in the Workshop on DEveloping Integrated AdvICE for the Baltic Sea (WKDEICE).

Nielsen et al. (2017) report on a global review of 35 integrated ecological-economic fisheries models, performed by the Working Group for Integrated Management Modelling (WGIMM). Integrated ecological-economic fisheries models of marine systems are needed to evaluate impacts and sustainability of potential management actions and understand, and anticipate ecological, economic and social dynamics at a range of scales from local to national and regional. The paper identifies the characteristics that determine their usefulness, effectiveness and implementation.

Pecuchet et al. (2017) and the Working Group on Comparative Analyses between European Atlantic and Mediterranean Marine Ecosystems to Move Towards an Ecosystem-based Approach to Fisheries (WGCOMEDA) investigate whether the composition of marine fish communities can be understood in terms of a set of life-history strategies and whether the prevalence of the strategies follows specific spatial patterns that can be related to the environment. Their results support a theoretical framework outlining three dominant life-history strategies of fish, and that the life-history strategies provide a suitable approach for monitoring and understanding community changes in response to natural and anthropogenic stressors, including fishing and climate change. Such trait-based and life-history approaches are now being implemented in the Baltic and Barents Sea IEAs.

## References

De Piper et al. (2017) Operationalizing integrated ecosystem assessments within a multidisciplinary team: lessons learned from a worked example. *ICES Journal of Marine Science*, doi:10.1093/icesjms/fsx038.

Voss et al. (2017) Ecological-Economic Fisheries Management Advice—Quantification of Potential Benefits for the Case of the Eastern Baltic COD Fishery. *Frontiers in marine Science*, doi:10.3389/fmars.2017.00209

Nielsen et al. (2017) Integrated ecological–economic fisheries models—Evaluation, review and challenges for implementation. *Fish and Fisheries*, doi: 10.1111/faf.12232

Pecuhcet et al. (2017) From traits to life-history strategies: Deconstructing fish community composition across European seas. *Global Ecology and Biogeography*, doi: 10.1111/geb.12587.

### 5.4.5 Communication with EG

The IEASG Chair has communicated with EG Chairs on defining ToR, reviewing and commenting on EG reports. She has also held discussions on the formation of new EGs, to develop a session for ASC 2018, and on inviting EG Chairs and EG members to two Open Sessions on the ICES ASC 2017 on (a) IEA and monitoring and (b) IEA EGs achievements, future plans and challenges.

### 5.4.6 Summary of new EG proposals and EG closing

This overview is complemented by a complete review of changes as tabulated in Annex 1.

Dissolved EG in 2017

WKDEICE2 - Workshop on Developing Integrated Advice for Baltic Sea Ecosystem-Based Fisheries Management 2. This EG has explored how multispecies interactions and advice can be added to single species advice to fisheries management and has expanded on the ecological and economic context of the single species advice.

WGMASFDemo - Working Group to Demonstrate a Celtic Seas wide approach to the application of fisheries related science to the implementation of the Marine Strategy Framework Directive. The EG focused on monitoring and research requirements to follow up the MSFD in Celtic waters.

WKINWA – Workshop on IEA in the Northwest Atlantic. The focus of WKINWA was to review and analyse the IEA work in the Northwest Atlantic; particularly with regards to the process employed to identify management objectives and to use conceptual modelling as a tool address objectives.

WKINTERACT – Workshop on “Integrated assessment of socio- ecological interactions of two North Sea strata using Bayesian belief networks”. The workshop was cancelled.

### 5.4.7 New EGs in 2017

WKSIED-BESIO: SIHD Workshop on Balancing Economic, Social, and Institutional Objectives in Integrated Assessments. This interdisciplinary workshop will summarize and synthesize a list of strategic and operational social/cultural, economic, and institutional marine management objectives for the North Sea, derived from existing legal texts and relevant project reports. The output of the workshop will feed into a WGMARS-WGINOSE stakeholder meeting scheduled for February 2018.

#### **5.4.8 Forward look (actions for SG and SCICOM/ ACOM)**

The current focus among IEA EGs on scoping and identifying management objectives, and on identifying approaches and indicators to assess community and ecosystem vulnerability, is expected to result in development of both qualitative and quantitative approaches relevant for IEAs.

Several IEASG groups are also in the process of including quantitative multispecies and ecosystem modelling in ecosystem assessments, to test e.g. multispecies harvesting strategies, indicators, address climate change scenarios and impact on ecosystem vulnerability and resilience. A stronger collaboration between IEA EGs and modelling EGs may facilitate this development.

### **5.5 Ecosystem Observation SG (Sven Kupschus, UK, term started January 2017)**

#### **5.5.1 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 co-ordinated, 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 co-ordination 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.

The EG in the steering group have been satisfactorily conducting their routine tasks (Topics 2–5) in support of the Science Plan, while continuing to improve the data quality assurance and transparency of process (WGBEAM, IBTSWG, WGBITS, WGMEGS, WGIDEEPS). Progress in topic areas 1 and 6 has been made and could be further improved by supporting communication among EG within EOSG and other SGs. The EGs are developing methods to evaluate the effects of potential improvements to survey designs in line with the broader scope of advisory data needs. Once there is greater clarity on future ecosystem data requirements such tools can be used to improve data collection efficiency (WGISUR, WGISDAA, WGCATCH). Groups are also examining advances in technology to collect information on processes more efficiently or to collect information relevant on processes not currently assessed (WGFTFB, WGIBTS, WGFAST).

### 5.5.2 Summary of progress in relation to Terms of Reference

Terms of Reference	Progress
ToR a) Engage with and work with Chairs of EG to ensure that EG work supports and meets the science objectives and advisory needs of ICES	Several webex meetings were conducted and open to all EG Chairs under EOSG. The meetings concluded that there was significant enthusiasm for improving communication. The opportunity has been recognised previously but implementation is complex, with both structural and resource issues needing consideration. The SG is investigating some new initiatives related to both issues.
ToR b) Help EG formulate and prepare their draft terms of reference and resolutions	EG have been developing their own draft ToR relatively independently based on their interests (although a number of groups have struggled with this procedurally). The SG Chair has tried to make connections between EG and to generalise ToR. He has ensured better communication between groups, by identifying areas of common interest and topics consistent with the science plan. Delivering to the science plan is important, but the SG Chair is now developing a strategy that better ensures delivery of the science plan.
ToR c) Review and report on the science being undertaken within EG to SCICOM, with a focus on identifying science highlights and priorities and demonstrating the impact of their science	<p>WGFTFB and WGFASST had another joint meeting in 2017, based on a symposium style session. WGIDEEPS developed a new method for the estimation of abundance and biomass in the Irminger Sea. WGEAGS2, though not its primary task, discussed a short presentation on marine litter sampling for the Danish MIK survey. WGNIPS carried out a review of the latest developments on video enhancement, video mosaicking, and automatic burrow detection. WGBIOP forged links with WKIDEA to develop more useful products for IEAs. WGIPS harmonized the abundance estimation methods for herring surveys in the North Sea and adjacent waters adopting design and analysis methods common to other internationally coordinated WGIPS surveys. WGELECTRA reported on the differences in environmental impact between tickler and pulse beam trawls. WGACEGG reported that accounting for egg mortality provided a more reasonable representation of the biomass trajectories of Atlanto-Iberian Sardine. WGALES hosted presentation sessions focused on sampling methods and results concerning ichthyoplankton spatial and temporal distribution estimates.</p> <p>Looking through the reports and speaking to Chairs suggests that a substantial proportion of the WGs view themselves purely as data collectors, despite the fact that much of ICES science is based on those very collections. Not only the collections, but the knowledge and experience that went into survey design and sampling methodology is important in making scientific progress. At present, it seems that the integration</p>

	<p>of knowledge occurs at the institute level and there is a desire for a more regional integration at the ICES level. The SG intends to support the EOSG EGs in developing a broader approach, developing their own analytical skills and providing them with additional opportunities to feed into the advisory process.</p>
<p>ToR d) Review scientific products/deliverables of the EG and provide feedback on ways to improve the impact and influence of their work</p>	<p>A critical deliverable for survey EGs is the development and update of survey manuals (SISP). Since March 2017, two manuals have been externally reviewed (SISP 8 IBAS and SISP 7 BITS from WGBIFS) and one with minor revisions internally (SISP 13 MIKeyM from WGEGBS). Two further manuals have recently been submitted for review (SISP 10 NeAtl IBTS North Eastern Atlantic Surveys and SISP 14 Offshore Beam Trawl Surveys from WGBEAM). Two draft revisions for WGNPS (SISP 12) and WGMES (SISP 6) are yet to be received.</p> <p>All survey WGs with deliverable data products have quality checked and provided these to the relevant data user groups (where the data were available from National Laboratories) and ensured the data is available on the respective survey databases.</p> <p>The “USA-Norway EK80 Workshop Report: Evaluation of a wideband echosounder for fisheries and marine ecosystem science” has been published as a CRR.</p> <p>The “WGTC Report on the Target Classification” is under external review to be published as a CRR.</p> <p>Three further CRRs on surveys are currently awaiting completion by the end of the year.</p>
<p>ToR e) Provide feedback to SCICOM on research priorities and implementation of ICES strategy</p>	<p>EG have provided feedback on research priorities directly through their ToR and when setting up workshops. There have also been Webex meetings and the outcomes of these have fed through to the strategy sessions at the SCICOM meetings.</p>
<p>ToR f) Identify shortfalls in skills and knowledge needed to achieve ICES objectives within the SGs area and work within the SG and through SCICOM and operational groups to develop capability</p>	<p>In practice, it has been difficult to distinguish skills shortfall from resource shortfall in many EGs. Among the demersal survey EG there is a shortfall of analytical skills, as these EG are being asked more and more to do their own data evaluation. Comments from EG Chairs suggest that shortages are obscured by the large number of nominated members that rarely or never participate.</p>
<p>ToR g) Identify gaps and overlaps in the work of EG, and propose consolidation, rationalization or forming of new EG to SCICOM as appropriate</p>	<p>For data EG there is relatively little overlap because surveys / catch / recreational sampling etc are usually overseen by single EGs. In the cases of methodological elements there is also independent development. It is difficult to judge whether the difference in methods is inherent to the particular</p>



	<p>data source or linked to the skills available to the EG.</p> <p>For the other EG there are frequently overlaps in data use, usually because these data are being used for different purposes. Better communication would help to make better use of the data for these different purposes. The need for better communication applies to EG within EOSG as well as to the wider ICES community. Several suggestions have been made for joint sessions at the 2018 ASC, where a similar topic could be considered from several perspectives.</p>
ToR h) Help EG Chairs to adopt practices which ensure scientific information generated by EG is receiving adequate quality control consistent with scientific norms	<p>This is an area where the SG has made significant progress under the previous Chair and the new SG Chair has sought to maintain and improve those procedures. A significant part of this work, the documentation of survey protocols, is reported under ToR 'd'. Quality assurance of data post national data checks is also provided in the form of database upload checks and scrutinizing outputs for EG reports.</p>
ToR i) Facilitate active horizontal and vertical communication, collaboration and co-ordination between EG and all other relevant ICES groups and identify, in cooperation with EG Chairs, opportunities for internal and external collaboration	<p>Horizontal and vertical communication has been facilitated by the SG Chair by communicating directly with the EG Chairs and representing their opinions at SCICOM. He has found this time intensive and not necessarily desirable when there are many perspectives on a single issue. The SG Chair plans to 'naturally grow' a communication structure within the SG but without the additional layers of authority which were suggested by PGDATA at the March meeting.</p> <p>The SG strategy aims to achieve communication by active bottom up information flow from the EG and coordinating these information streams. This process has been initiated by advocating and suggesting joint WK and deliverables.</p> <p>The Chair attended the RCG to identify how support and opportunities within and between working groups can be provided, with an aim to improve cost efficiency of data collections.</p>
ToR j) Represent the SG at SCICOM meetings and SCICOM/ACOM leadership meetings in spring and at the ASC	<p>The SG Chair attended both meetings and chaired a joint open session with IEASG to effect better information flow and a wider understanding of the data collection and application. The open session identified the key elements that are preventing more rapid progress towards developing aspects of the ICES science plan linked to monitoring.</p>
ToR k) Map the EGs and their ToR against the information and data that ICES needs to deliver the Science Plan and its advisory work, suitably prioritised (SP1.1).	<p>All EOSG EG work is currently assigned to topics in the ICES Science Plan. What is less clear is which bits of work in the plan are not progressing and what impacts this has on the overall delivery of the Science Plan. This work is beyond the scope of the individual SG and has been raised at SCICOM.</p>

ToR l) Promote continued improvements and innovation in the design and technology of surveys and other data collection schemes implemented in support of stock assessments and ecosystem studies, leading to gains in survey efficiency, increased diversity and resolution of data collected, and improvements in the interpretation, quality, utility and impact of the data in ICES advice (SP2.1, 2.2).	The SG is supporting a number of WK this year that are looking at improving efficiency of data collection analytically as well as technologically, and also improving ease of access of data or data products.
ToR m) Determine how at-sea surveys can be adapted in the most cost-effective way to collect key information on ecosystem states and processes in support of the EAM, whilst maintaining the integrity of existing time-series of abundance estimates or indices used for stock assessments and advice." (SP1.2,SP3.1)	WGISUR and WGISDAA have been highly active in this area, developing options and making suggestions. Both groups have proposed new 3-year ToR that attempt to get better feedback from data users at joint annual workshops with data user groups. Although this does require extra resources it is intended that the benefits will outweigh the costs.
ToR n) Evaluate methods to mitigate the impacts of fishing on marine ecosystems through innovative gear design and technology, with a particular focus on by-catch reduction and development of fishing and survey gears which minimise fuel consumption and habitat damage; (SP2.1)	WGFTFB and WGELECTRA primarily deal with this topic. In most instances, the gear developments are guided by national requirements / policy needs complicating the comparison. Impacts considered are the direct impacts on fisheries, sometimes qualitative evaluation of habitat impacts and rarely recovery or indirect impacts. Closer collaboration of these groups with WGCATCH and the multispecies fisheries modelers will be encouraged in future: to evaluate the impact of potential changes. A joint WK and an ASC Theme Session has been proposed to achieve this.
ToR o) Encourage cooperation and collaboration with the fishing industry and other stakeholders in addressing ToR l), m), and n) and develop specific ToR as appropriate	WGFTFB is currently the only EG that interacts directly with the fishing industry. They are considering how to get industry further involved with the scientific process (WK proposal). There are other groups (WGCATCH) that could likely improve data outputs and efficiency by interacting more with industry. The main problem is that it is frequently at the industry expense (a resource issue). WGBITS has attempted to work with industry and WGFTFB to examine the potential to develop a standard gear that would allow better quantification of acoustic data.
ToR p) Promote the development within EGs of standards and guidelines for good practice in data collection covering the design and implementation of surveys, fishery and other related data collection programmes, the archiving and interpretation of data and samples, the analysis of data, provision of data quality indicators, and the documentation of procedures." (SP3.1)	This is covered under ToR 'd' and 'h'.
ToR q) Organize SG meetings which will take place during the ASC and WebEx's, as appropriate, to discuss EG accomplishments and plans, with a focus on the overarching ToR specified above.	The SG Chair attended WGCHAIRS alongside EG Chairs from the data collection groups. The SG Chair organised several cross SG Webex and is attempting to arrange a physical SG meeting.

### 5.5.3 List of Expert Groups under Ecosystem Observation SG

A full list of EG under this Steering Group is provided in Annex 2.

### 5.5.4 Science highlights

WGFAST published a CRR setting the standards for the use of the new EK80 echo sounder in order to maintain time series consistency for acoustic surveys traditionally operating the now obsolete EK60. The workshop to complete the CRR was co-sponsored by NOAA.

Having caused a bit of a storm last year by reducing tow duration in one of the tows in each rectangle in the NS, the IBTSWG and WGISDAA spent some time reviewing the results of the experiment. It seems that there are pros and cons in terms of bias and variance and these depended on the objectives, (ecosystem / fisheries). It was concluded that there was no fundamental reason to assume 15-minute tows were worse than 30-minute ones. Their analysis highlights the complexity and challenges of multi-objective monitoring and a greater need for prioritisation of objectives.

### 5.5.5 Communication with EG

Communication with EG Chairs regarding their specific EGs has been fluent. But it has also become apparent that we need to establish a common approach to this communication to ensure that nothing is overlooked (e.g. because information is sent to the wrong individual). Also, we need clarification on the responsibility of co-Chairs and responsibility of incoming and outgoing Chairs. To achieve this, the SG aims to set up a sharepoint to keep track of proposed changes to ToR, deliverables and SISP as well as links to forms and revised instructions to EG Chairs.

Several webexes were held for EG Chairs but it is difficult to get large number of Chairs to attend at any one time. Consequently, it was not straight forward to develop a clear strategy for developing the community feeling among the EOSG EG Chairs. This question is being addressed by the SG Chair and EG Chairs and the SG Chair intends to run an EOSG session at the WGCHAIRS meeting in 2018 to discuss how we can develop an informal internal support structure for EG within EOSG.

### 5.5.6 Summary of new EG proposals and EG closing

This overview is complemented by a complete review of changes as tabulated in Annex 1.

WGISDAA, PGDATA, WGBIFS, WGMEGS and WGACEGG proposed further multi-annual ToR this year. A number of EGs also submitted proposals for workshops to deal with specific topics.

No EGs were closed this year.

### 5.5.7 Forward look (actions for SG and SCICOM/ ACOM)

It is encouraging that there is significant enthusiasm amongst EG Chairs to make progress both in terms of the science and the communication within EOSG. The group has started to consider some of the necessary tasks (see Section 5.5.5.) and will start to implement some changes going forward. If adopted, the proposal to allocate ACOM EG to the SG structure will provide an important opportunity for EOSG to link up with the advisory and benchmark processes more easily and to initiate joint activities which will improve the science and increase the scientific credentials of the monitoring EG.

The ASC 2017 Open Session on linking ecosystem monitoring and assessment demonstrated there was still a very wide range of perception as to what integration was in ICES and how one might achieve it. This means coherent objectives for designing monitoring programs are not going to come from the wider community without clear scientific guidance as to what different sorts of monitoring can and cannot support advice. There is a clear role for EOSG, and the wider ICES community, in establishing a sound scientific basis for future monitoring recommendations.

Input is needed from the SG to the Datras governance group to ensure scientific rigour of the data products being delivered, including the need to specify metadata and caveats to report. SCICOM assigned an action to the SG Chair to report back to the 2018 spring SCICOM meeting on this topic.

## 5.6 Steering Group Budgets

The primary purposes of the annual budgets allocated to SG are (1) to help SG Chairs to engage more actively with each other and with the EG network to identify synergies and reduce duplication in ICES science and (2) to help SG Chairs engage with the wider marine science community to increase the impact of ICES science.

Experience in 2017 demonstrated that it was not possible to agree detailed allocation of SG budgets in advance for the full year, with some meetings and other activities of high relevance to the SG being planned within year and uncertainty about advance costs.

When seeking to develop budgets there were also many case by case questions from SG Chairs, to SCICOM and the Secretariat, about legitimate allocation of funds. This is because there were no agreed guidelines for SG spend. These case by case discussions were time-consuming for all concerned and, in some cases, led to missed opportunities.

In dealing with case by case requests SCICOM and the Secretariat identified risks of inequitable treatment of EG attendees and Chairs if SG budgets were allocated by different SG in different ways. In an EG network where input is based primarily on goodwill, the provision of funding to some individuals and not others in the network was seen as potentially divisive. This is especially the case when funds are proposed to support one or two individual members in EG where other members attending the same EG are not supported.

Given these challenges, SCICOM proposed that SG would be provided with some general guidelines for future SG spend, and a cap on total spend, but do not require detailed budgets at the start of each year.

It is proposed that SG budgets are allocated to SG Chairs to contribute to their own travel and subsistence costs in support of activity that:

- (1) helps SG Chairs to engage more actively with each other and with the EG network to identify synergies and reduce duplication in ICES science
- (2) helps SG Chairs to engage with the wider marine science community to increase the impact of ICES science.

The maximum budget available in 2018 will be 80,000 DKK per SG Chair.

As a guide this would support at least four 4-5 day regional trips (e.g. within Europe, North America) and one trans-regional trip per year.

In practice, SG Chairs can identify the best balance of regional and trans-regional trips, provided their total costs remain within budget.

SG Chairs would then seek approval for each individual trip, in advance, from the SCICOM Chair and Head of Science Support (with a response from one or other assumed to be sufficient to authorise the trip). A short email to show purpose is consistent with the stated rationales (1) or (2) would be required.

SG Chairs would receive economy-class travel and (if requested) per-diem at the standard ICES rates for the location of the meetings.

Each expense will be reimbursed after the mission is completed, based on a reimbursement request submitted to the secretariat . Once the 80,000 DKK limit is reached then further travel would be at national expense.

SG Chairs would not need to draw on their SG budgets for attendance at the March SCICOM meeting, as this attendance is supported from another budget.

At year-end SG Chairs would be expected to provide a short 1-2 page report on their use of the budget for the attention of SCICOM. This should highlight the contribution of the meetings they attended to the work of the SG and the ICES network. This document would be included in SG reports to the ASC and to Council.

## 6 Operational Groups

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### 6.1 Data and Information Group (DIG; Jens Rasmussen, UK)

The Data and Information Group meets in ICES headquarters once per year to exchange knowledge and advice between members and the ICES Data Centre. The full report from the DIG 2017 meeting is available.

The key issues that DIG is addressing this year, and likely in coming years, centre on the general awareness and communication of data held in ICES, and the governance mechanisms that surround these data collections. The two issues are not mutually exclusive, and will overlap with each other and more generic data management discussions.

#### 6.1.1 Awareness and outreach

The overarching aim is related to the ICES strategic plan to “Catalyse best practises in marine data management and promote ICES data nodes as a global resource”

DIG has already engaged in awareness raising around ICES data before by establishing a LinkedIn Group. In the meantime, ICES communications have become much wider and enabled on Social media platforms, so there is now much more open and wide dissemination around a wide range of topics.

The next stages of awareness and promotion proposed by DIG are to reach different audiences in terms of technical insights and capabilities. In particular, two DIG activities seek to target the engaged user community (scientists and advisors) and the more technically involved user base of developers and data managers.

To achieve this DIG has submitted a proposal for a session at the 2018 ASC. The proposed format is looser than formal presentations and is proposed to include rapid pitches of ideas for new or enhanced data products. It is suggested as an informal session in the format of the TV programme “Dragons Den” where a panel receives pitches and asks follow up questions.

The second proposal is a resolution to address a more technical audience in a Workshop (Resolution for WKINVITED). The proposal is a 2 day workshop that takes the format of a hackathon, presenting tools and services from the ICES data nodes to create graphical presentations of data that makes analyses more immediately accessible and understandable to scientists.

The two proposed activities are complementary and expose the ICES data solutions to a wider audience with interests in utilising or improving the data and access to it.

Summary of these activities:

- DIG proposal for an ASC Open Session to open a dialogue on data and data products. If accepted, the session would benefit from a panel member from SCICOM (and ideally ACOM also).
- DIG has sought approval of a resolution to host the WKINVITED workshop in the format of a hackathon. This is accepted by SCICOM pending minor changes.

#### 6.1.2 Governance mechanisms

The most basic definition of governance is to define expectations and measure progress. This is in part done with the ICES request system, but there is not currently a

method for gathering and aligning requests for data nodes although there is often commonality among requests. Further, a pure request based system runs the risk of only addressing specific pressure points rather than any underlying root causes.

DIG is working on defining and trialling a governance framework whereby both specific requests and broader issues can be mapped out for data nodes. This allows a comparable structure for each data node/collection and provides an overview of the key actions and issues associated with certain products. It is still the job of the ICES Data Centre to prioritise and evaluate the work to be done, but putting it into a broader governance context allows a more structured discussion and overview.

This year, DIG trialled discussions on two data nodes/products (Fisheries – mainly DATRAS, and environmental data). The ability to structure the issues into a set of governance categories was overall found to be productive and allowed for some broader issues and questions to emerge.

Some data nodes cover a huge range of activities and data, and it was recognised that it is not feasible for DIG to cover all aspects of governance for each data product. So it has been decided to establish an interim governance group for fisheries, chaired by Ingeborg de Boois. The group will elaborate the governance framework for DATRAS as well as collate experts and representatives from the expert and advice groups that are the most invested users. The group will only meet via Webex and will report to DIG to allow collation of findings.

DIG will subsequently focus on fine tuning categories and the presentation of the “measure progress” part of governance in collaboration with the ICES data Centre. This is intended to provide a dashboard style approach to reporting data activities and issues to science and advisory bodies.

Summary of these activities:

- DIG is establishing a standardised framework for governance that can be applied to each data node/product in ICES. It can be used to gather requirements, shape discussions, and present progress in a structured and compatible way for different data products.
- DIG is establishing an interim Governance group for DATRAS to start applying this approach (Annex 9 of the DIG report for all aims and tasks)

During the September meeting in SCICOM, comments were received that consultation with SG Chair on the membership and ToR was requested. DIG will follow this up before the spring 2018 SCICOM meeting as inter sessional work.

### **6.1.3 Future challenges of Marine Data Management**

A document on the future challenges for marine data management in ICES will be drafted in collaboration between DIG and the data centre for the spring 2018 SCICOM meeting. The document will be drafted by Jens Rasmussen and Neil Holdsworth, and circulated to DIG for comment before submission.

## **6.2 ICES Training Programme (Daniel Duplisea, Canada)**

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 scientists whose work is related

to the advisory process, have the necessary skills. The objective of ICES training is quality assurance in the advisory process.

The ICES Training Programme has been successful in meeting its objectives of increasing the scientific capacity of the ICES community and promoting best practices in marine science. Thirty-five ICES courses and several co-sponsored courses have been offered on a wide diversity of skills, 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, analysing and visualization of Vessel Monitoring Systems, communication of science and advice, and how to lead an effective technical meeting. Each course was taught within the context of the ICES science and advisory system to demonstrate best practices as well as state-of-the-art technical skills. More than 800 students have attended ICES courses from over 30 countries. Most students have been from ICES member countries, representing all member countries but one. Many students and several instructors are from other countries and cooperating organizations.

### **6.2.1 Training courses in 2017**

In 2017, the ICES Training Programme offered 7 courses (two still to be completed at time of reporting):

- ICES methods for setting proxy MSY reference points, 25–26 January 2017 and 14–15 February.
- Introduction to stock assessment, 5 - 9 June 2017.
- Introduction to abundance estimation from fisheries acoustic surveys. 12–16 June 2017.
- Introduction to the R environment, 21–25 August 2017.
- Introduction to Management Strategy Evaluation, 28 August–1 September 2017.
- Bayesian network analysis including the socio-cultural dimension, 27 November–1 December
- Principles and methods of Broadband/wideband technologies, 8–12 December 2017.

Completed course reports are available on the ICES website

### **6.2.2 Training courses in 2018**

Proposals for new and repeated courses are being considered:

- Stock assessment introduction
- Introduction to the R environment
- Uses of Genomics and Genetics in Fisheries
- Agent based modelling
- Online course in oceanography (in conjunction with DTU)

Several of the courses being considered for 2018 are new courses. If accepted, these would broaden the ICES training program. Proposals for these courses are currently under consideration so the 2018 program is not yet finalised.

### **6.2.3 Online Training Initiatives**

In response to SCICOM encouragement to develop online training, several initiatives were undertaken. The Training Group recognizes that participation in courses has decreased, and online training could provide a cost-effective method for reaching a wider audience and for meeting the programme objectives.



ICES has recently hired staff who are adept at the technicalities of organising online training. The TG is now fully involved in an online training course in Oceanography in conjunction with DTU. The course is planned to be of the Massive Open Online Course (MOOC) type. This course could be offered on some of the common MOOC providers such as Coursera. The present course is the first full attempt to offer online training by ICES and the TG considers it an excellent precursor to further offerings. With lessons learned from this training, the TG hopes to offer some of its core courses this way in the future.

#### **6.2.4 Budget and roadmap**

The TG looks to be cost neutral in 2017. This follows two years of surplus in the training program. The overall goal for the training program is to be cost neutral over say a five year period. A roadmap has been developed for the training program for the next five years and was presented to SCICOM in September 2017. This roadmap outlines the tactical and strategic directions and goals for the training program until 2022 as well as the tools available to the TG in order to achieve these goals with an overall cost neutral objective.

### **6.3 Science Impact and Publication Group (Secretariat)**

#### **6.3.1 Update on status of Science Impact and Publication Group**

The Science Impact and Publication Group was formed following the March 2017 meeting of SCICOM and Terms of Reference (below) have also been developed and agreed by SCICOM. Three members have been now been appointed by SCICOM and a call for Chair nominations is live on the SCICOM Forum (for decision by 10 November 2017).

SIPG Terms of Reference

- a) Monitor publication output and provide advice to SCICOM, ACOM, the ICES Secretariat and network on increasing the reach and impact of ICES publications and science, including grey literature (EG reports).
  - Catalogue and report on the types and quantity of published outputs facilitated by the ICES network
  - Develop and apply methods to assess the impact of all types of publications generated by the ICES network
  - Develop descriptions of the societal impact of ICES science for reporting and outreach
  - Propose approaches for increasing the impact of ICES publications and identify target audiences for communicating science, advice, data and training products
- b) Develop and recommend policies governing scientific publications as requested by SCICOM.
- c) Review and provide recommendations on Category 1 requests for ICES publications prior to SCICOM meetings and intersessionally.
- d) Review and provide guidance (to SCICOM, ACOM, the ICES Secretariat and network) on the evolution of Science publication and communication and the opportunities and risks it presents for ICES.

### 6.3.2 Review of ICES publications

Six CRRs were published in the past 12 months:

- 2013/1/SSGEF05 No. 331 ICES Report on Ocean Climate
- 20152012/1/SSGHIE03 No. 333 Multidisciplinary perspectives in the use (and misuse) of science and scientific advice in marine spatial planning
- 2011/1/ACOM04 No. 334 Status of introductions of non-indigenous marine species to the North Atlantic and adjacent waters 2003–2007
- 2014/1/SSGEPI05 No. 335 Alien species alert: *Didemnum vexillum* Kott, 2002: Invasion, impact, and control
- 2016/1/SSGIEOM03 No. 336 USA–Norway EK80 Workshop Report: Evaluation of a wideband echosounder for fisheries and marine ecosystem science
- 2013/1/SSGHIE06 No. 337 New Trends in Important Diseases Affecting the Culture of Fish and Molluscs in the ICES Area 2002–2015

Two TIMES were published in the past 12 months:

- 2012/1/SSGHIE08 TIMES 58 Biological effects of contaminants: Assessing DNA damage in marine species through single-cell alkaline gel electrophoresis (comet) assay
- 2012/1/SSGHIE09 TIMES 60 Supporting variables for biological effects measurements in fish and blue mussel

Three new ID leaflets were published:

- No. 65: Brown ring disease: a vibriosis affecting clams *Ruditapes philippinarum* and *R. decussatus*
- No. 66: Bonamiosis of oysters caused by *Bonamia exitiosa*
- No. 67: Disseminated neoplasms in bivalves

One leaflet was revised and published:

- No. 42: Infection with *Exophiala salmonis*

A full report from each of the Series Editors can be found on SharePoint in the [Background documents](#) folder for the September 2017 SCICOM meeting.

### 6.3.3 Review of Category 1 resolutions

Due to the dissolution of PUBCOM and the proposed start date for the Science Impact and Publications Group (SIPG) not being until 10 November 2017, the Series Editors reviewed this year's proposed Category 1 resolutions through correspondence. Their comments were presented to [SCICOM](#).

Three Category 1 resolutions for CRRs were submitted (2017/1/EPISG01 Passive sampling for the monitoring of contaminants in sediments, 2017/1/EPDSG02 Report on Fisheries-Induced Evolution, and 2017/1/EOSG03 The SONAR-netCDF4 file format for omni-sonar data).

The CRR Series Editor questioned the inclusion of the CRR on passive sampling when there were also two proposed TIMES on the subject. However, the TIMES Series Editor pointed out that the proposed CRR differed in that it would be an updated discussion on the utility of passive sampling and its relevance to the purpose of monitoring contaminants in sediments as a measure of environmental health. He pointed out that it

could be used to make a case for the use of passive sampling as part of the MSFD monitoring and assessment protocols.

A discussion on 2017/1/EOSG03, which questioned whether its multidimensional content qualified it to be published as a CRR, led to SCICOM asking DIG if it could investigate ways of documenting data in the future. It was noted that this proposed CRR is a promotional tool and not a data product.

The Series Editors recommended SCICOM to accept all three Category 1 resolutions for CRRs.

Three Category 1 resolutions for TIMES were submitted (2017/1/EPISG04 Paper on Chlorophyll analysis and reporting, 2017/1/EPISG05 Paper on Passive sampling for the determination of hydrophobic organic contaminants in sediments, and 2017/1/EPISG06 Paper on Passive sampling for the determination of metals in sediments).

The Series Editors recommended SCICOM to accept all three Category 1 resolutions for TIMES.

There was one request for a resolution to be cancelled (2015/1/SSGEPI01). This has been resubmitted as a joint TIMES between MCWG and WGPME (2017/1/EPISG04).

All proposals were approved.

#### **6.3.4 Update on Series Editors contracts**

Due to a lack of clear guidelines on reappointment, three Series Editors contracts were awarded a one-year extension in 2016. Bureau updated the guidelines on the appointment/reappointment of Series editors in 2017 (Bureau Document 2049 February 2017). The new guidelines state that an initial contract is awarded for three years. Successful applicants can be reappointed twice, and following that must reapply through an open and competitive recruitment process. A recruitment process has now been put in place for the position of CRR Series Editor, TIMES Series Editor and Identifications Leaflets Series Editor with an application deadline of October 20.

## 7 Strategic Initiatives

### 7.1 ICES/PICES Strategic Initiative on Climate Change effects on Marine Ecosystems (SICCME; Myron Peck, Germany, John Pinnegar, UK, Anne Hollowed, USA, PICES, and Shin-ichi Ito, Japan, PICES)

SICCME activities are contributing significantly to both the ICES and PICES Science Plans. This strategic initiative is co-chaired by Drs. Anne Hollowed (USA, PICES), Shin-ichi Ito (Japan, PICES), Myron Peck (DE, ICES) and John Pinnegar (UK, ICES). A detailed, 3-year (Phase 3 – 2018–2020) plan was submitted at the end of March 2017. The plan included modifications and additions to the SICCME mission and activities in light of the success of Phase 2 (2015–2017) including identifying and aligning (to the fullest extent possible) climate change research activities in regional nodes across the northern hemisphere and elsewhere.

#### 7.1.1 Activities 2016/17 (since March 2016)

- March 2017: The International Symposium “Drivers of Dynamics of Small Pelagic Fish Resources” SICCME contributed two workshops; Workshop 4 “Modeling migratory fish behavior and distribution” convened by Shin-ichi Ito (Japan) and Enrique Curchitser (USA) and Workshop 5 “Recent advances in the life stage ecophysiology of small pelagic fish: Linking laboratory, field and modeling studies” convened by Myron Peck (Germany), Kirstin Holsman (USA), Shin-ichi Ito (Japan) and Laure Pecquerie (France). In addition, a SICCME side-event (March 5th) was organized to allow ICES and PICES participants to review accomplishments, and to discuss and update the ongoing SICCME implementation plan.
- May 2017: Wakefield Symposium. ‘Impacts of a Changing Environment on the Dynamics of High-latitude Fish and Fisheries’. This symposium examined the impacts of change and variability on the dynamics of arctic and subarctic species of commercial, subsistence, and ecological importance. SICCME were represented on the steering committee (Anne Hollowed (USA); Mark Payne (Denmark); Franz Mueter (USA)).
- 11–15 June 2017: ESSAS Open Science Meeting (OSM) was held in Tromsø, Norway. The Ecosystem Studies of Subarctic and Arctic Seas (ESSAS) programme is a regional initiative of the Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) project. Its objectives are to understand how climate variability and climate change affect the marine ecosystems, and in turn, how changes in these marine ecosystems affect humans. The title of the OSM was “Moving in, out and across the Subarctic and Arctic marine ecosystems: shifting boundaries of water, ice, flora, fauna, people and institutions”. SICCME was represented on the steering committee (Ken Drinkwater (Norway), Alan Haynie (USA), Shin-ichi Ito (Japan), Franz Mueter (USA)).
- 28–29 June 2017: SICCME was requested to participate in Planning Meeting to update an FAO Fisheries and Aquaculture Technical Paper on “Climate change implications for fisheries and aquaculture. Overview of current knowledge and responses”, held in Rome, Italy. John Pinnegar (UK) and Myron Peck (Germany) attended the meeting and were requested to draft the section on ‘North Atlantic and Atlantic-Arctic Fisheries’, Anne Hollowed, Kirstin Holsman (USA) and Shin-ichi Ito (Japan) were requested to draft the section on ‘North Pacific and Pacific-Arctic Fisheries’.

- 19–21 July 2017: Three-day SICCME workshop on regional climate change vulnerability assessment for the large marine ecosystems of the northern hemisphere (WKSICCME-CVA) held at ICES HQ, Copenhagen. Workshop specially requested by ICES secretariat. Attended by 19 experts from 8 nations around the world (USA, Canada, Australia, Germany, UK, Faroe Islands, Denmark, Spain). The workshop comprised a mixture of short presentations, small group discussions and writing. An additional task (ToRe) involved drafting short statements for inclusion as part of 'ICES Ecosystem Overviews'. The final report for this workshop is currently being completed.
- 30–31 August 2017: SICCME co-chairs were invited by the European Defense Fund (EDF) to participate in a workshop on "Climate-related impacts on fisheries governance" hosted at ICES Headquarters in Copenhagen. The workshop discussed changes to fish stock distribution and abundance, and present current trends from recent research and literature the North East Atlantic region (or FAO area 27). Myron Peck (UoH) attended the meeting on behalf of SICCME, where he reported back on recent SICCME activities.

#### **7.1.2 SICCME Activities at the ICES ASC 2017**

- SICCME organised an open session (Tuesday, 19 September) to discuss progress on modelling nodes and to get general updates from both ICES and PICES partners. Another important element was the development of a common set of political, social and economic scenarios based on the IPCC Shared Socio-economic Pathways (SSP) approach, that can be tested alongside Representative Concentration Pathways (RCPs) in various modelling programs around the world.
- Theme session A "Projected impacts of climate change on marine ecosystems, wild captured and cultured fisheries, and fishery dependent communities" Conveners: Jon Hare (USA); John Pinnegar (UK), Shin-ichi Ito (Japan) and Myron Peck (Germany). 33 oral contributions were selected, for presentation on Wednesday 20 September (16:00–17:00), Thursday 21 September (10:30–12:00 and 14:00–16:00).

#### **7.1.3 Planned Activities (looking forward)**

- September 2017: PICES ASC Topic session (S6: POC/FIS), Vladivostok, Russia. "Can short-term forecasts inform long-term climate projections and visa-versa?" This session sought to explore two aspects of inter-annual scale variability. First, the mechanisms responsible for year-to-year variability in marine ecosystems including fisheries. Second, to engage the climate, ocean and ecosystem modeling communities that are working on inter-annual to decadal-scales to (1) provide the empirical evidence underlying the assumptions for mechanisms of functional linkages between climate variability and ecosystem response at these temporal scales, (2) to assess the retrospective skill of coupled bio-physical models at multiple temporal scales, and (3) to identify how parameter uncertainty can be transferred from shorter forecasting frameworks to longer term projection models. Jackie King (Canada) co-convened from SICCME.
- 4–8 June 2018: The "Fourth International Symposium on the Effects of climate change on the world's oceans" will be held in Washington D.C. (USA) (2013/3/SSGHIE04) with the support of IOC, FAO, PICES and ICES. Jason Link, USA (ICES), Shin-Ichi Ito, Japan (PICES - SICCME), Manuel Barange (FAO), and Veronique Garcon (CNRS) are lead conveners. SICCME is

represented on the scientific steering committee including Anne Hollowed (USA), Myron Peck (Germany), John Pinnegar (UK), Angelica Pena (USA), Kirstin Holsman (USA). The deadline for submitting proposals for Session and Workshop topics was June 23, 2017. 95 submissions were received for theme sessions, plus 20 suggestions for associated workshops. These suggestions were fully assessed by the scientific steering committee and 18 theme sessions were subsequently selected, as well as 10 workshops.

- An ICES-PICES SICCME and ICES SIHD 'Workshop on Political, Economic, Social, Technological, Legal and Environmental (PESTLE) scenarios to be used in climate projection modelling will take place on June 9th in Washington D.C., USA directly proceeding the 4th International Symposium on the Effects of Climate Change on the World's Oceans. The workshop will be chaired by John Pinnegar (UK), Jörn Schmidt (Germany), Alan Haynie (USA) and Tyler Eddy (Canada).

## **7.2 Strategic Initiative on the Human Dimension (SIHD; Jörn Schmidt, Germany, Eva-Lotta Sundberg, Sweden, Alan Haynie, USA)**

SIHD had its inaugural meeting at the ASC 2015. Eight concrete actions were agreed upon at the Workshop on Activity Planning of SIHD (WKAPSIHD) in Ijmuiden, January 2016. A ninth action was added in June 2016 in Brest (at the MSEAS meeting). SIHD also met at the ASC on Riga 2016.

In July 2017 Alan Haynie, NOAA, was officially selected by SCICOM to replace David Goldsborough who had resigned as co-Chair.

### **7.2.1 Update on the activities during this second year of the Strategic Initiative**

#### **Integration in the context of Integrated Ecosystem Assessments (SIHD Action 3) and Demonstration advice (SIHD Action 8)**

The ACOM/SCICOM Workshop on Integrated Ecosystem Assessment methods, WKIDEA in October 2016 reported strong convergence of process and methods used in IEA groups. Although the workshop did not discuss the human dimension in detail, one major outcome was the conclusion that network, mental and conceptual models are a good way to develop a holistic system understanding including social, economic and institutional components.

In May 2017, the Working Group on Maritime Systems (WGMARS) and the Working Group on the Northwest Atlantic Regional Sea (WGNARS) held the Workshop on IEA in the Northwest Atlantic (WKINWA). A major outcome of the workshop was that objectives embedded within the conceptual model as done by WGNARS can be a good way to set the context for the IEA and acknowledge the needs of stakeholders. In addition, it showed that there is a clear need to have feedback loops explicitly incorporated into the modelling process to understand relationships between system components.

SIHD has continued to work with WGMARS (Working Groups on Maritime Systems) and drafted the proposal for the Workshop on Balancing Economic, Social, and Institutional Objectives in Integrated Assessments (WKSIED-BESIO).

#### **Outreach to other organisations (SIHD Action 5)**

- The MSEAS conference in Brest May/June 2016, to which SIHD contributed, was very successful and led to many new collaborations during 2017 among both individuals and organizations.
- The Centre for Marine Research (MARE) held its biannual social science conference in July 2017 in Amsterdam, The Netherlands. SIHD used this occasion to interact with the international marine oriented community from various social science disciplines. Two sessions were held:
  - Linking Ecosystem Service Assessments and Fisheries Management – How to modify current fisheries advice taking ecosystem services into account. One major outcome of this session was that the idea of ecosystem services (ES) as a conceptual tool is very helpful to contextualize and visualize potential trade-offs and that ES can facilitate communication between different science disciplines and ecosystem actors.
  - Transdisciplinary Research to assess marine socio-ecological systems. This session was a round-table discussion including participants from disciplines ranging from natural sciences, arts, linguistics, economics and anthropology, including early career scientists and senior scientists. One major outcome was that the concept of transdisciplinarity is not necessarily well defined and often action research is the actual approach of doing the research. The role of art, specifically in engagement and communication was emphasized. A challenge for early career scientists in engaging in inter- and transdisciplinarity is that they often feel without a (disciplinary) home and future careers are not easy to define (missing acceptance of expertise in universities and institutes).

#### **Network of networks (SIHD Action 9)**

Based on the success of MSEAS 2016 a second symposium is planned for 2020. To keep the momentum and increase collaboration, an “MSEAS network” has been proposed and will be set up between core partners of the MSEAS 2016 symposium with active participation from the SIHD.

#### **7.2.2 Activities planned from now until the 2018 ICES ASC**

- WKSIED-BESIO (Workshop on Balancing Economic, Social, and institutional objectives in Integrated Assessments) in November 2017.
- ASLO/AGU/TOS Ocean Sciences Meeting 2018 Portland: SIHD co-Chair Jörn Schmidt is chair of the session ‘Transdisciplinary research to assess marine socio-ecological systems’.
- IIFET (International Institute of Fisheries Economics & Trade) 2018 Seattle: SIHD co-Chair Alan Haynie is a conference organizer and a major focus will be making the conference valuable to other marine scientists and building new connections between fisheries economists and researchers from other disciplines.
- ICES/PICES Climate and Oceans meeting 2018, Washington, D.C.: Several sessions have been proposed with SIHD Chairs as co-conveners and there will be significant interdisciplinary interactions at the core of this meeting.
- ICES ASC 2018, Hamburg: SIHD co-Chairs are proposing a session based on WKSIED-BESIO.

Working independently and as part of the SIHD community, over the next year SIHD will integrate a better understanding of diverse policy objectives with the available

data and tools that will help address these questions. This will be an ongoing and challenging process where some of the answers from the work will present new questions and challenges that will need to be addressed over coming years.



## 8 ICES Viewpoints

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An outcome of the ACOM-SCICOM meeting on 15 March 2017 and subsequently agreed by SCICOM was a decision to develop a few examples of advice that ICES could give on topics where paid advice has not previously been requested.

This advice would be developed through the normal ICES process to ensure quality control, and would be relevant to a known or potential management issue of potentially high importance to managers and society. However, it would not be referred to as ICES advice, as it was not requested directly by a client, but would be given the title of an “ICES Viewpoint”.

It was agreed that an ideal topic would meet many of the following criteria:

- a. Relevant to a known or potential management issue of potentially high importance to managers and society
- b. Not replicative of a topic for which we already give advice
- c. Based on maturing science and data (ie. science not narrow, speculative or lacking peer and expert group review)
- d. Be linked to a point of contact in the ICES network who would be keen to engage in the process of developing advice
- e. Linked to an ICES action area, such as the Arctic or ecosystem overviews
- f. Based on a topic of likely interest to potential clients
- g. Based on a topic sufficiently focused that it can be succinctly and unambiguously described

SCICOM and ACOM developed a call for proposals and selected three topics following a review of the proposals received (May 2017). One of these topics was dropped in September 2017 because the authors could not progress the work and a new topic was substituted.

Viewpoints are currently (October 2017) being developed on the following topics:

### **Future fish production in the Arctic** (lead Hein Rune Skjoldal)

What are the expected trends in potential fish production in Arctic waters over the next 10-20 years and how are these influenced by physical, chemical and biological changes in the Arctic ecosystem?

What are the expected sustainable yields from any fisheries that develop for these species and what is the likely distribution of the productive area?

### **Consequences of large fish stocks** (lead Anna Rindorf)

Which stocks are at or close to their highest recorded biomass levels in the ICES region and what changes have been observed in biology (e.g. growth, maturity, role of density dependence) and ecology (e.g. interactions with other species, distribution)?

What are the implications of observed and predicted increases in biomass for the stock assessment process and setting of reference points?

### **Vectors and management of invasive species** (lead Cynthia McKenzie, Bella Galil, provisionally with PICES and CIESM)

The provisional questions to be addressed in this viewpoint are:

What are the risks of unregulated biofouled vessels?

What causes and drives these vectors and how will they change in the next 20 years?

What actions can be recommended to prevent/minimize biofouling on vessels to control this vector of introduction and spread?

But the details are still being refined.

SCICOM are also considering development of a Viewpoint of an Aquaculture topic.

Several other Viewpoint proposals were put forward and these are being retained on a 'long list' for future development if the first tranche can be progressed successfully. Topics on this list include: micro-plastics and marine litter, metagenetic biodiversity, passive sampling and monitoring marine renewable energy impacts.

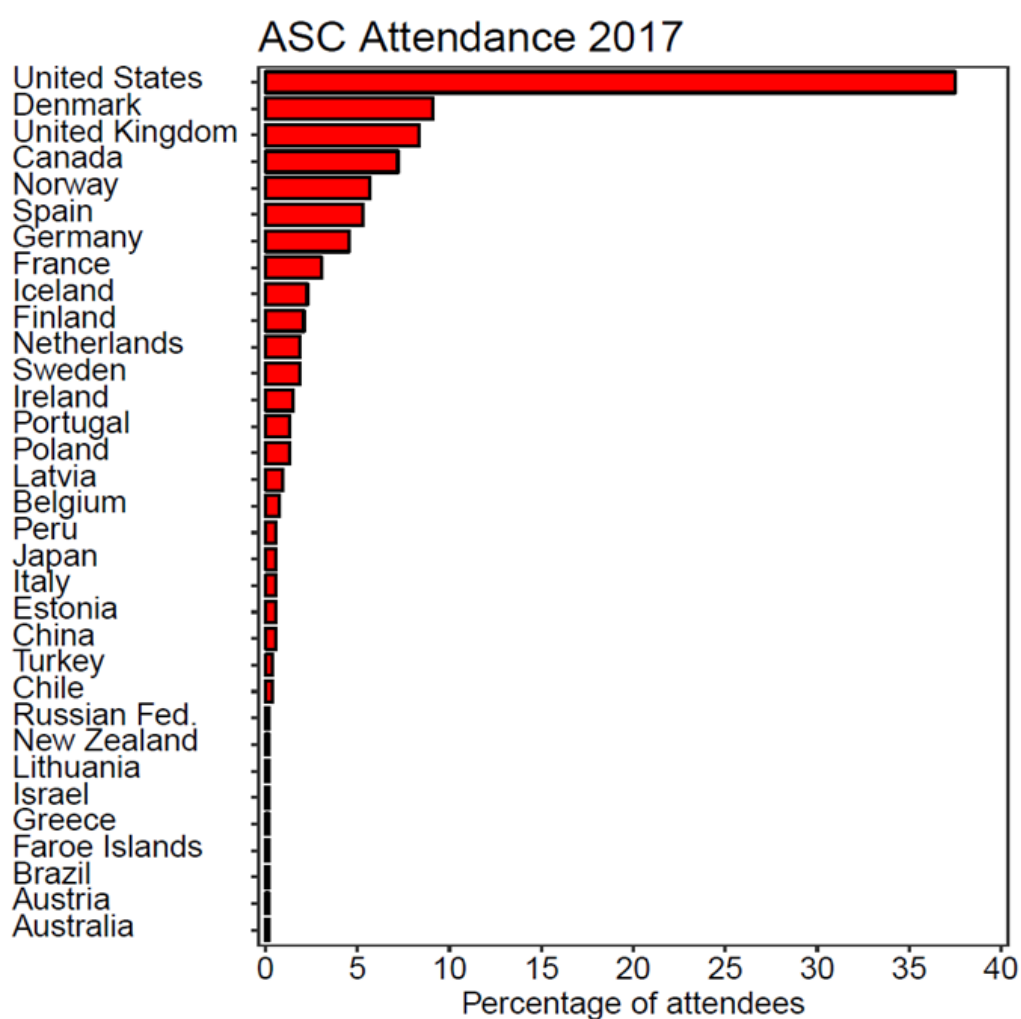
## 9 Annual Science Conference

### Participants

By 13 September, 525 participants had registered for the 2017 ASC (611 at the same date in 2016). On the last day of the conference, the final registration count was 556 registered participants with 38 having registered on-site. Thirty-two countries were represented and there were ~78 cancellations/ no-shows. The early registration fee had been closed on 1 August to encourage participants to register early.

Our NOAA colleagues were not granted travel approvals until Thursday 14 September, and consequently 39 NOAA employees registered after this date.

The following Figure indicates the percentage of attendees from different locations.



## Oral and poster presentations

In May ICES had received 521 abstracts, submitted to 19 theme sessions. One theme session was cancelled, due to meeting dates colliding with a PICES meeting in Russia. For comparison, there were 616 submissions in 2016.

### Theme session A

**ICES - PICES session: Projected impacts of climate change on marine ecosystems, wild captured and cultured fisheries, and fishery dependent communities**

Conveners:

Jon Hare (USA)

John Pinnegar (UK)

Myron Peck (Germany)

Shin-ichi Ito (Japan)

**23 oral + 7 posters**

### Theme session B

**ICES-PICES-CIESM session: Bioinvasion trajectories and impacts in contrasting marine environments**

Conveners:

Henn Ojaveer (Estonia)

Cynthia McKenzie (Canada)

Thomas Therriault (Canada)

**10 oral + 7 posters**

### Theme session C

**Microbes to mammals: metabarcoding of the marine pelagic assemblage**

Conveners:

Ann Bucklin (USA)

Rowena Stern (UK)

Katja Metfies (Germany)

**11 oral**

### Theme session D

**From iconic to overlooked species: How (electronic) tags improve our understanding of marine ecosystems and their inhabitants**

Conveners:

Matthias Schaber (Germany)

Derke Snodgrass (USA)

**13 oral + 2 posters**

### Theme session E

**Poleward shifts and ecological changes of Arctic and Subarctic zooplankton and fish in response to climate variability and global climate change**

Conveners:

Hein Rune Skjoldal (Norway)

Carin Ashijan (USA)

Louis Forter (Canada)

**5 oral + 1 poster**

### Theme session F

**Linkages between spatial ecology and sustainable fisheries**

Conveners:

Susan Lowerre-Barbieri (USA)

Christian Jørgensen (Norway)

Ignacio Catalán (Spain)

Anders Opdal (Norway)

**20 oral + 29 posters**

### Theme session G

**Marine foodwebs from end-to-end and back again, a theme session in honor of John Steele**

Conveners:

Jeremy Collie (USA)

Manuel Barange (Italy)

Mariano Koen-Alonso (Canada)

**11 oral + 2 posters**

### Theme session H

**The practical use of ecosystem indicators for decision-making**

Conveners:

Jamie C. Tam (Canada)

Alida Bundy (Canada)

Annukka Lehtikoinen (Finland)

Laura Uusitalo (Finland)

**12 oral + 3 posters**

**Theme session I**

ICES - PICES session: Anthropogenic effects on biogeochemical processes, carbon export and sequestration: Impact on ocean ecosystem services

**(cancelled)**

**Theme session J**

**Assessing and promoting the survival of re-leased catches and the implications of modified survival rates on aquatic systems**

Conveners:

Mike Breen (Norway)

Tom Catchpole (UK)

Steven Cooke (Canada)

**10 oral + 3 posters**

**Theme session K**

**Introducing man-made structures in marine systems: assessing ecological effects, knowledge gaps and management implications**

Conveners:

Silvana Birchenough (UK)

Jennifer Dannheim (Germany)

Furu Mienis (the Netherlands)

**12 oral + 9 posters**

**Theme session L**

**Ecosystem monitoring in practice**

Conveners:

Sophie Pitois (UK)

Mark Benfield (USA)

Christopher Zimmermann (Germany)

**13 oral + 10 posters**

**Theme session M**

**Modelling social-ecological systems: methods and tools for scenario development and prediction**

Conveners:

Olivier Thebaud (France)

Jan Jaap Poos (the Netherlands)

Jörn Schmidt (Germany)

**18 oral + 6 poster**

**Theme session N**

**Population status, life histories, ecology, assessment, and management of diadromous fishes**

Conveners:

Karen Wilson (USA)

Lari Veneranta (Finland)

**14 oral + 8 poster**

**Theme session O**

**Patterns, sources, and consequences of intra-specific variation in responses of marine fauna to environmental stressors**

Conveners:

R Christopher Chambers (USA)

Hannes Baumann (USA)

Ian Bradbury (Canada)

**9 oral + 4 poster**

**Theme session P**

**Recruitment dynamics in a changing environment: integrating spatial and temporal variability into stock assessment and management strategies**

Conveners:

Fabian Zimmermann (Norway)

LaTrese Denson (USA)

Katja Enberg (Norway)

**19 oral + 8 poster**

**Theme session Q****Integrating economic and social sciences in marine ecosystem services research**

## Conveners:

Cristina Pita (Portugal)

Tony Charles (Canada)

Maria Grazia Pennino (Spain)

Sebastian Villasante (Spain)

**14 oral + 8 poster****Theme session R****Addressing social and ecological challenges to advance marine aquaculture in rapidly changing environments**

## Conveners:

Gesche Krause (Germany)

Thomas Noji (USA)

Robert Rheault (USA)

Wojciech Wawrzynski (ICES)

**9 oral + 8 poster****Theme session S****Stock assessment methods, model complexity, and uncertainty**

## Conveners:

Arni Magnusson (ICES)

Patrick Lynch (USA)

Erik Olsen (Norway)

**46 oral + 10 poster****Registration**

The registration fee included morning and afternoon coffee. Lunches were not included. This model was tested and has been deemed successful since 2014.

This year, the standard registration fee was 190 EUR (260 EUR after 1 August). Student registration remained at 70 EUR.

**Travel funds**

20 successful candidates received travel funds of 500 EUR each from ICES. Most of them were first time participants. In total, funds amounting to 10,000 EUR were distributed this year.

**Conference programme**

The conference opened with the Opening ceremony. This is a change from previous years, where Monday morning was reserved for Open sessions.

Delegates were welcomed by ICES General Secretary Anne Christine Brusendorff, and ICES President, Cornelius Hammer. Cisco Werner, NOAA Fisheries Director of Scientific Programs and Chief Science Advisor, provided a welcome address. This was followed by an exceptional piece of music, composed especially for the ICES ASC by Zachary Friedland.

The Outstanding Achievement Award was awarded by Carl O'Brien to Christian Möllmann, and the Prix D' Excellence was awarded to William Cheung.

There were three keynote speakers, presenting the following keynotes in the plenary sessions:

Multi-disciplinary team science and engaged stakeholders: two often neglected aspects of coupled human-natural systems, Kenneth Rose, University of Maryland, Center for Environmental Science, Horn Point Laboratory

Promoting uptake of marine science in management both on the supply and demand side, Tundi Agardy, Forest Trends

The planktonic social network of the biological carbon pump, Lionel Guidi, Sorbonne Universités, UPMC Université Paris We had an extra open session on “what do we mean by ICES science”, on Tuesday lunchtime, chaired by Tammo Bult and Pierre Petitgas.

Fourteen Open Sessions were primarily held in the two hour lunch time slots:

Monday 18 September

- Open plenary: Marine science in 2017 and beyond
- Trans-Atlantic science to do ecosystem-based management
- Processes for the peer review of science products that support fisheries management advice
- Functional links between pressure and state indicators

Tuesday 19 September

- What does integration mean for ICES? Current practices and new ideas towards a philosophy of integrated evidence-based advice
- Physical, economic and societal impacts of climate change: testing common scenarios for future impact
- Marine litter and the role of fisheries surveys: Current practices and new ideas for marine litter monitoring

Wednesday 20 September

- Ecosystem data collection, integrated assessments and advice, can we make it one coherent process?
- Emerging science topics relevant for ICES
- Transition from ICES Strategic Initiative on Stock Assessment Methods to a more global expert group

Thursday 21 September

- Integrated Ecosystem Assessments: highlights, challenges and ambitions
- Everything you ever wanted to know about FLR but were afraid to ask
- Help plan the future of ICES – what do you want your organisation to be?
- A sea change for ICES: integrating human dimensions

30 meetings were held throughout the week, including those Business Meetings on the Saturday and Sunday before/after the main conference.

### **Social arrangements**

The hosts kindly invited all conference participants to a lavish conference opening reception on the evening of Monday, 18 September. Two drinks tickets per person, and cash bar were available.

Tuesday night was a big success, with the “Beer game” systems dynamics board game, producing and shipping beer in a dynamic supply chain system.

The poster session was held on Wednesday 20 September, in the Floridian ballroom of the conference centre. There were 135 posters on the programme. Two drinks tickets per person were distributed, and cash bar was available.

The poster session was combined with a social reception, with food, drinks and fantastic musical entertainment by the Florida Atlantic University Wind Symphony, as well as the addition of the ICES choir.

### **Conference material**

The ASC information booklet was available at the conference registration desk. The ASC website has been remodeled to be 100% mobile friendly, and includes the programme, theme session timetables and practical information. Given the mobile friendliness of the site, it was decided not to invest in an app this year.

Abstracts will be made available online, to the public, with ISBN numbers, in a few weeks. Presentations are not made available publicly.

### **Hotel Accommodation**

Lists of hotels in various price categories were published early in the year on the conference website and participants were urged to make their bookings as early as possible. ICES officials and Secretariat staff had room reservations at Hilton Fort Lauderdale Marina, not far from the convention centre.

Following Hurricane Irma, several hotels had delays in reopening and communications with their guests. Most hotels were able to open on time for the start of the ASC. However Hyatt Pier 66 has still not opened, and approximately 50 ASC participants were rebooked into other hotels, by the Greater Fort Lauderdale Visitors

Bureau housing service. An additional shuttle bus was also arranged, to transport participants the further distance.



## 9.1 ASC Theme Session Reports

Theme Session reports are linked to the titles listed below:

9.1.1 [Theme session A: ICES - PICES session: Projected impacts of climate change on marine ecosystems, wild captured and cultured fisheries, and fishery dependent communities](#)

9.1.2 [Theme session B: ICES-PICES-CIESM session: Bioinvasion trajectories and impacts in contrasting marine environments](#)

9.1.3 [Theme session C: Microbes to mammals: metabarcoding of the marine pelagic assemblage](#)

9.1.4 [Theme session D: From iconic to overlooked species: How \(electronic\) tags improve our understanding of marine ecosystems and their inhabitants](#)

9.1.5 [Theme session E: Poleward shifts and ecological changes of Arctic and Subarctic zooplankton and fish in response to climate variability and global climate change](#)

9.1.6 [Theme session F: Linkages between spatial ecology and sustainable fisheries](#)

9.1.7 [Theme session G: Marine foodwebs from end-to-end and back again, a theme session in honor of John Steele](#)

9.1.8 [Theme session H: The practical use of ecosystem indicators for decision-making](#)

9.1.9 [Theme session J: Assessing and promoting the survival of released catches and the implications of modified survival rates on aquatic systems](#)

9.1.10 [Theme session K: Introducing man-made structures in marine systems: assessing ecological effects, knowledge gaps and management implications](#)

9.1.11 [Theme session L: Ecosystem monitoring in practice](#)

9.1.12 [Theme session M: Modelling social-ecological systems: methods and tools for scenario development and prediction](#)

9.1.13 [Theme session N: Population status, life histories, ecology, assessment, and management of diadromous fishes](#)

9.1.14 [Theme session O: Patterns, sources, and consequences of intra-specific variation in responses of marine fauna to environmental stressors](#)

9.1.15 [Theme session P: Recruitment dynamics in a changing environment: integrating spatial and temporal variability into stock assessment and management strategies](#)

9.1.16 [Theme session Q: Integrating economic and social sciences in marine ecosystem services research](#)

9.1.17 [Theme session R: Addressing social and ecological challenges to advance marine aquaculture in rapidly changing environments](#)

9.1.18 [Theme session S: Stock assessment methods, model complexity, and uncertainty](#)

## 9.2 ASC Open Session Reports

Open Session reports are linked to the titles listed below:

- 9.2.1 [Marine science in 2017 and beyond](#)
- 9.2.2 [Trans-Atlantic science to do ecosystem-based management](#)
- 9.2.3 [Processes for the peer review of science products that support fisheries management advice](#)
- 9.2.4 [Functional links between pressure and state indicators](#)
- 9.2.5 [What does integration mean for ICES? Current practices and new ideas towards a philosophy of integrated evidence-based advice](#)
- 9.2.6 [Physical, economic and societal impacts of climate change: testing common scenarios for future impact](#)
- 9.2.7 [Marine litter and the role of fisheries surveys: Current practices and new ideas for marine litter monitoring](#)
- 9.2.8 [Ecosystem data collection, integrated assessments and advice, can we make it one coherent process?](#)
- 9.2.9 [Emerging science topics relevant for ICES](#)
- 9.2.10 [Transition from ICES Strategic Initiative on Stock Assessment Methods to a more global expert group](#)
- 9.2.11 [Integrated Ecosystem Assessments: highlights, challenges and ambitions](#)
- 9.2.12 [Everything you ever wanted to know about FLR but were afraid to ask](#)
- 9.2.13 [Help plan the future of ICES – what do you want your organisation to be?](#)
- 9.2.14 [A sea change for ICES: integrating human dimensions](#)

### **9.3 ASC 2018 Hamburg, Germany**

The 2018 Annual Science Conference will be held at Hamburg University, in Hamburg Germany, Monday 24 September to Thursday 28 September.

A site visit took place in July 2017 with participation from ICES Secretariat (Anna Davies) and German representatives, Jörn Schmidt, Chris Zimmermann and Gerd Kraus. A contract for the venue has been finalised.

The conference centre is located very close to the centre of Hamburg, in a very green, lush part of the city, surrounded by grand university buildings.

When the university students are away for summer holidays, the building is used for conferences and meetings.

Transport to Hamburg is very easy. There is an international airport, with flights coming in from all over the world. Train and bus connections are excellent from all over Europe, and the conference center is very close to a central train station.

The opening ceremony for the conference will be held in the large lecture theatre, and four parallel theme sessions in the smaller lecture theatres surrounding. There is a definite limitation of space for the poster exhibit, so a variety of options are being explored to present these (a SCICOM sub-group has been identified to help the local organisers with this). Final decisions on the location of the social events are still pending.

Hamburg is a wonderful, lively city (even in the pouring rain!). There is a wide variety of accommodation, for all budgets, and eating and drinking for all tastes.

## 10 Symposia

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### ICES co-sponsored symposia held in 2017

- 'ICES/PICES Symposium on Drivers of Dynamics of Small Pelagic Fish Resources', Victoria, Canada, 6–11 March 2017
- 'Oceans Past VI', Sesimbra, Portugal, 16–18 May 2017
- '3rd ICES/PICES Early Career Scientist Conference', Busan, Korea, 30 May – 2 June 2017
- 'ESSAS International Open Science Meeting', Tromsø, Norway, 11–15 June 2017

The [Symposia Report for 2017](#) is available on the ICES website. It will be updated in December to include the summary reports for the two remaining symposia to be held in 2017.

### ICES co-sponsored symposia still to be held in 2017

- 'Science delivery for sustainable use of the Baltic Sea living resources', 17–19 October, Tallinn, Estonia
- 'Ten International Flatfish Symposia and more than 30 years of advanced research: flatfish ecology in 2017', 11–16 November, St. Malo, France

### ICES co-sponsored symposia to be held in 2018:

- '4th ICES/PICES/IOC Symposium on Climate Change and Impacts on the World's Oceans', 4–8 June, Washington D.C.
- 'Conference on "Oceans Past VII", 22–26 October, Bremerhaven, Germany – approved by SCICOM in September
- 'Management tools and standards in support of Sustainable Development Goal 14', October 2018, Reykjavik, Iceland

### ICES co-sponsored symposia to be held in 2019

- 'The International Year of the Salmon Symposium' (running title, location uncertain), by NPAFC and NASCO
- 'Challenging the scientific legacy of Johan Hjort: Is it time for a new paradigm shift in marine research? symposium', 2–14 June 2019, Bergen, Norway
- 'Shell-fish - Resources and Invaders of the North' symposium, 4th quarter 2019, Tromsø, Norway – approved by SCICOM in September

### ICES co-sponsored symposia to be held in 2020

- Symposium on 'Marine Socio-Ecological Systems - MSEAS 2020: Navigating global change in the marine environment with socioecological knowledge', Yokohama, Japan

### **Annex 1: List of ICES SCICOM Expert Groups that were dissolved, established, changed committee or were renamed in 2017**

<i>Change of Chairs</i>	<i>Steering Groups (SG)/Operational Groups (OG)/Strategic Initiatives (SI)</i>	<i>Outgoing Chair</i>	<i>Incoming Chair</i>
SCICOM OG	Data and Information Group (DIG)	Ingeborg de Boois, the Netherlands	Jens Rasmussen, UK
SCICOM SI	Strategic Initiative on the Human Dimension in Integrated Ecosystem Assessments (SIHD)	David Goldsborough, the Netherlands	Alan Haynie, USA
SCICOM SI	Strategic Initiative on Climate Change (SICCME)	Anne Hollowed, USA, PICES	Jacquelynne R. King, Canada
<i>SG renamed</i>			
ACOM/SCICOM SG	Steering Group on Integrated Ecosystem Assessments (SSGIEA) has been renamed to Integrated Ecosystem Assessments Steering Group (IEASG)		
ACOM/SCICOM SG	Steering Group on Integrated Ecosystem Observation and Monitoring (SSGIEOM) Resolutions has been renamed Ecosystem Observation Steering Group (EOSG)		
SCICOM SG	Steering Group on Ecosystem Processes and Dynamics (SSGEPD) has been renamed Ecosystem Processes and Dynamics Steering Group (EPDSG)		
SCICOM SG	Steering Group on Ecosystem Pressures and Impacts (SSGEPI) has been renamed Human Activities, Pressures and Impacts Steering Group (HAPISG)		
<i>OG and SG established</i>			
SCICOM	Science Impact and Publication Group (SIPG)		To be decided (final resolution therefore pending)
ACOM/SCICOM	Aquaculture Steering Group (ASG)	-	Mike Rust, USA
<i>OG dissolved</i>			
	Publications and Communications Group (PUBCOM)		

<i>Change of affiliation</i>	<i>Expert Groups</i>	<i>Old parent Committee/ SSG</i>	<i>New parent Committee/ SG</i>
	Working Group on Pathology and Diseases of Marine Organisms (WGPDMO)	SSGEPI	ASG
	Working Group on Social and Economic Dimensions of Aquaculture (WGSEDA)	SSGEPI	ASG
	Working Group on Application of Genetics in Fisheries and Mariculture (WGAGFM)	SSGEPI	ASG
	Scallop Assessment Working Group (WGScallop)	ACOM	EPDSG
<i>Established</i>	<i>Expert Groups</i>		
EPISG	Working Group on Methods for Estimating Discard Survival (WGMEDS)		Tom Catchpole, UK, and Sebastian Uhlmann, Belgium
EPISG	Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT)		Tobias van Kooten, Netherlands; Ole Ritzau Eigaard, Denmark; and Gert van Hoeij, Belgium
EPISG	<b>Placeholder:</b> Working Group on Marine Litter ( <i>to be submitted</i> )		
<i>Change of Chairs</i>	<i>Expert Groups</i>	<i>Outgoing Chair</i>	<i>Incoming Chair</i>
ACOM	Herring Assessment Working Group for the Area South of 62°N (HAWG)	Niels Hintzen, NL	Valerio Bartolini, Sweden and Susan Mærsk Lusseau, UK,
ACOM	Joint ICES/OSPAR Expert Group on Sea-birds	Ian Mitchell, UK	TBD. JWGBIRD is meeting in October
ACOM	Working Group on Bycatch of Protected Species (WGBYC)	Marjorie C. Lyssikatos, USA	TBD.
ACOM	Working Group on the Celtic Sea Ecosystem (WGCSE)	Helen Dobby, UK (Co-Chair)	WGCSE is requesting that a new co-Chair is nominated
ACOM	Working Group on Marine Mammal Ecology (WGMME)	Begoña Santos (Spain) and Graham Pierce (UK)	Anders Galatius (Denmark) and Anita Gilles (Germany)
ACOM	Working Group on Southern Horse Mackerel, Anchovy, and Sardine (WGHANSA)	Lionel Pawlowski, France	Alexandra (Xana) Silva, Portugal,
ACOM	Working Group on North Atlantic Salmon (WGNAS)	Gérald Chaput, Canada	Martha Robertson, Canada,
EPDSG	Working Group on Zooplankton Ecology (WGZE)	Piotr Margonski, Poland	Sophie Pitois, UK, and Lidia Yebra, Spain,
EPDSG	Working Group on Oceanic Hydrography (WGOH)	Sarah Hughes, UK, and Karin M. Larsen, FO, Denmark	Paula Fratantoni, USA, and César González-Pola, Spain

<i>Change of Chairs</i>	<i>Expert Groups</i>	<i>Outgoing Chair</i>	<i>Incoming Chair</i>
EPDSG	Working Group on Integrated Morphological and Molecular Taxonomy (WGIMT)	Ann Bucklin, USA	Naiara Rodriguez-Ezpeleta, Spain, and Elaine Fileman, UK
EPISG	Working Group on Marine Sediments with respect to pollution (WGMS)	Celine Tixier, France, and Craig Robinson, UK	Els Monteyne, Belgium and Maria Belzunce, Spain
ASG	Working Group on the Application of Genetics in Fisheries and Aquaculture (WGAGFA)	Gary Carvalho, UK	Jann Martinsohn, Italy/ European Commission
IEASG	ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea	Laura Uusitalo, Finland, Lena Bergström, Sweden	Lauréne Pécuchet, Denmark, and Matilda Valman, Sweden (pending approval from HELCOM)
IEASG	ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean (WGICA)		Sei-Ichi Saitoh (PICES), Japan
IEASG	Working Group on Integrative, Physical-biological, and Ecosystem Modelling (WGIPEM)		Marie Maar, Denmark
IEASG	Working Group on Maritime Systems (WGMARS)		Patricia M. Clay, USA
EOSG	Working Group on Mackerel and Horse mackerel Egg Surveys (WGMEGS)	Finlay Burns, UK, Cindy van Damme, NL	Matthias Kloppmann, Germany, and Gersom Costas, Spain
EOSG	Baltic International Fish Survey Working Group (WGBIFS)	Włodzimierz Grygiel, Poland	Olavi Kaljuste, Sweden
EOSG	Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES areas VII, VIII and IX (WGACEGG)	Pablo Carrera, Spain, Maria Manuel Angelico, Portugal	Maria Santos, Spain and Mathieu Doray, France
EOSG	Working Group on Integrating Surveys for the Ecosystem Approach (WGISUR)	Ingeborg, de Boois, NL	Ralf van Hal, NL
EOSG	Working Group on Fishing Technology and Fish Behaviour (WGFTFB)	Petri Suuronen, FAO	FAO Chair (TBD)
EOSG	Working Group on Recreational Fisheries Surveys (WGRFS)	Harry V. Strehlow, Germany	Keno Ferter, Norway
EOSG	Working Group on Commercial Catches (WGCATCH)	Hans Gerritsen, Ireland	Ana Ribeiro Santos, United Kingdom
EOSG	Working Group on <i>Nephrops</i> Surveys (WGNEPS)	Ana Leocadio, UK	Adrian Weetman, Scotland, and Kai Wieland, Denmark
EOSG	Working Group on Biological Parameters (WGBIOP)	Loote Worsøe Clausen, Denmark	Francesca Vitale, Sweden

<i>Dissolved</i>	<i>Expert Groups</i>	<i>Outgoing Chair</i>
ACOM	Inter-benchmark process (IBP) on North-east Arctic cod (IBPArcticCod)	Daniel Howell, Norway
ACOM	Benchmark of Baltic Stocks (WKBALT)	External Chair Verena Trenkel, France and ICES Chairs Margit Eero, Denmark
ACOM	Benchmark of Baltic Salmon (WKBaltSalmon)	Tapani Pakarinen, Finland
ACOM	Benchmark on Sea Bass (WKBASS)	External Chair Vladlena Gertseva, USA and ICES Chair Massimiliano Cardinale, Sweden
ACOM	Benchmark of Faroese Stocks (WKFAROE)	Höskuldur Björnsson, Iceland
ACOM	Benchmark of North Sea Stocks (WKNSEA)	External Chair Liz Brooks, US and ICES Chair Jennifer Devine, Norway
ACOM	Benchmark of Pelagic Stocks (WKPELA)	External Chair Dankert Skagen, Norway and ICES Chair Andrés Uriarte, Spain
ACOM	Benchmark of Widely Distributed Stocks (WKWIDE)	External Chair Jon Deroba, US and ICES Chair Andrew Campbell, Ireland
ACOM	Workshop on Stock Identification and allocation of catches of herring to stocks (WKSIDAC) (in October 2017)	Martin Pastoors, NL, and Richard Nash, Norway
ACOM	Workshop to compile and refine catch and landings of elasmobranchs [WKSHARK3]	Pascal Lorange (France) and Jan Jaap Poos (Netherlands)
ACOM	Workshop on Potential Impacts of Climate Change on Atlantic Salmon Stock Dynamics (WKCCISAL),	Dennis Ensing, UK and James Irvine, Canada
ACOM	Workshop to evaluate regional benthic pressure and impact indicator(s) from bottom fishing (WKBENTH)	Adriaan Rijnsdorp, The Netherlands
ACOM	Workshop on scoping stakeholders on production of operational guidance on regional management and assessment of benthic pressure and impact from bottom fishing. (WKSTAKE)	Mark Dickey-Collas, ICES Secretariat
ACOM	Workshop to evaluate trade-offs between the proportion of impact on seafloor habitats and provisions of catch/value (WKTRADE)	Josefine Egekvist, Denmark and Adriaan Rijnsdorp, The Netherlands



<i>Dissolved</i>	<i>Expert Groups</i>	<i>Outgoing Chair</i>
ACOM	Workshop on the Development of Quantitative Assessment Methodologies based on Life-history traits, exploitation characteristics, and other relevant parameters for stocks in categories 3-6 (WKLIFE VII) (in October 2017)	Carl O'Brien (UK) and Manuela Azevedo (Portugal) will meet in Lisbon, Portugal
ACOM	Workshop to scope the ICES framework for ecosystem advice (WKECOFRAME)	Lisette Enserink (The Netherlands) and Carl O'Brien (UK)
ACOM	Workshop to review the ICES advisory framework for short lived species, including detailed exploration of the use of escapement strategies and forecast methods [WKMSYREF5]	Knut Korsbrekke, Norway, Jose De Oliveira, UK
ACOM	Workshop on the impact of marine catches on the recovery of eel (WKMAREEL)	Alan Walker, UK
ACOM	Inter-Benchmark Protocol for turbot in the North Sea (IBPTurbot4a)	Alexander Kempf, Germany
ACOM	Workshop on stakeholder input to and parameterization of, ecosystem and food web models in the Irish Sea aimed at a holistic approach to the management of the main fish stocks (WKIrish4) (in October 2017)	David Reid, and Francis O'Donnell (Ireland)
EPDSG	Working Group on Recruitment Forecasting in a Variable Environment (WGRFE)	Liz Brooks, USA, and Samuel Subbey, Norway
EPDSG	Workshop on Predator-prey Interactions between Grey Seals and other marine mammals (WKPIGS)	Andrew Brownlow, UK; Nora Hanson, UK; Jan Haelters, Belgium; and Abbo van Neer, Germany
EPDSG	Workshop on Biological Input to Eastern Baltic Cod Assessment (WKBEBCA)	Michele Casini, Sweden, and Margit Eero, Denmark
EPDSG	Workshop on Regional climate change vulnerability assessment for the large marine ecosystems of the northern hemisphere (WKSICCME-CVA)	Myron Peck (Germany, ICES SIC-CME), Elliott Hazen (USA, PICES) and Kathy Mills (USA, ICES)
EPDSG	Workshop on global ecological and economic connections in Arctic and sub-Arctic crab fisheries (WKCRAABCON) (in December 2017)	Brooks Kaiser (Denmark)
EOSG	Working Group on Target Classification (WGTC) (after CRR Publication)	Rolf Korneliussen, Norway
EOSG	WKSEATEC – Workshop on Technical Development to Support Fisheries Data Collection (WKSEATEC) (in October 2017)	Dave Stokes and Marcellus Rödiger, Germany

<i>Dissolved</i>	<i>Expert Groups</i>	<i>Outgoing Chair</i>
EOSG	Workshop on Collecting Quality Underwater Acoustic Data in Inclement Weather (WKQUAD)	Matthias Schaber, Germany, and Mike Jech, USA
EOSG	Joint Workshop of WGFTFB and WGFAST (JFATB)	Paul Winger, Canada, and Alex de Robertis, USA
EOSG	Workshop on monitoring technologies for the mesopelagic zone (WKMESO) (in December 2017&	Kristjan Kristinnsson, Iceland, Norway, and Dave Reid, Ireland
EOSG	Workshop on designing eel data call (WKEELDATA)	Caroline Durif, Norway
EOSG	Workshop on Optimization of Biological Sampling at Sample Level (WKBIOPTIM)	Ana Cláudia Fernandes, Portugal and Julie Coad Davies, Denmark
EOSG	Workshop on Sampling Design and Estimation of Commercial Catches: Cod.27.21 and sol.27.4 (WKSDECC I)	Katja Ringdahl, Sweden and Kirsten Håkansson, Denmark
EOSG	Workshop on Sexual Maturity staging from histological tools (WKMATHIS) (in October 2017)	Cindy Van Damme, The Netherlands and Maria Cristina Follesa, Italy
EOSG	Workshop on Elasmobranchs maturity (WKSEL3) (in October 2017)	Maria Cristina Follesa, Italy and Pierluigi Carbonara, Italy
EOSG	A Workshop on Ageing Validation methodology of <i>Mullus</i> species (WKVALMU)	Kélig Mahé, France, Pierluigi Carbonara, Italy and Chryssi Mytilineou, Greece
EOSG	Workshop on Age estimation of Blue Whiting ( <i>Micromesistius poutassou</i> ) (WKARBLUE2)	Patrícia Gonçalves, Portugal, and Jane A. Godiksen, Norway
EOSG	Workshop on Micro increment daily growth in European Anchovy ( <i>Engraulis encrasicolus</i> ) and Sardine ( <i>Sardina pilchardus</i> ) (WKMIAS2) (in November 2017)	Carmen Piñeiro, Spain
EOSG	Workshop on Sexual Maturity Staging of Herring ( <i>Clupea harengus</i> ) and Sprat ( <i>Sprattus sprattus</i> ) (WKMSHS2) (in November 2017)	Cindy van Damme, The Netherlands and Joanne Smith, United Kingdom
IEASG	Workshop on Spatial Analyses for the Baltic Sea 2 (WKSPATIAL2) (dissolves when report is published)	Michele Casini, Sweden, and Stefan Neuenfeldt, Denmark
IEASG	Workshop on IEA in the Northwest Atlantic (WKINWA)	David Goldsborough, the Netherlands

<i>Dissolved</i>	<i>Expert Groups</i>	<i>Outgoing Chair</i>
IEASG	Workshop on Developing Integrated Advice for Baltic Sea Ecosystem-Based Fisheries Management 2 (WKDEICE2)	Maciej Tomczak, Sweden, Rudi Voss, and Christian Möllmann, Germany
IEASG	Workshop on “Integrated assessment of socio- ecological interactions of two North Sea strata using Bayesian belief networks (WKINTERACT) (workshop was cancelled)	Vanessa Steltzenmuller and Rabea Diekmann, Germany
<i>New Workshops</i>		
ACOM	Inter-benchmark of Greenland cod (IBPGCod)	ICES Chair Marie Storr-Paulsen, Denmark, and external Chair Bjarki Elvarsson, Iceland
ACOM	Benchmark of Anglerfish (WKAanglerfish)	ICES Chair Lisa Readdy, UK, and External Chair Larry Alade, US
ACOM	Benchmark on pelagic stocks (WKPELA2018)	External Chair Katja Enberg*, Norway, and ICES Chair Pieter-Jan Schon*, UK
ACOM	Benchmark Workshop for North Sea Stocks (WKNSEA)	External Chair (tbc), and ICES Chair Jennifer Devine, Norway
ACOM	Benchmark of Redfish in NorthEast Arctic waters (WKREDFISH)	External Chair Paul Spencer, US, and ICES Chair Gudmundur Thordarson*, Iceland
ACOM	Benchmark of Sprat (WKSPRAT)	ICES Chair (tbc), and External (tbc)
ACOM	Workshop on Evaluation of Input data to Eastern Baltic Cod Assessment (WKIDEBCA)	Michele Casini*, Sweden
EPISG	Workshop on Vulnerabilities and Risks to Culturally Significant Areas (WKVCSA)	Andreas Kannen, Germany, and Kira Gee, Germany
EPISG	Workshop on Co-existence and Synergies in Marine Spatial Planning (WKCSMP)	Kira Gee, Germany, and Eirik Mikkelsen, Norway
EPISG	Workshop on Microplastics in the Marine Environment (WKMP)	Andy Booth, Norway
EPDSG	ICES-PICES Workshop on Political, Economic, Social, Technological, Legal and Environmental scenarios used in climate projection modelling (WKPESTLE)	John Pinnegar, UK; Jörn Schmidt, Germany; Alan Haynie, USA; and Tyler Eddy, Canada

<i>New Workshops</i>		
IEASG	SIHD Workshop on Balancing Economic, Social, and Institutional Objectives in Integrated Assessments (approved on ACOM-SCICOM Forum) (WKSIED-BESIO)	Christine Röckmann, The Netherlands, Alan Haynie, USA, and Jörn Schmidt, Germany
IEASG	PAME (Joint EA-EG) / ICES Workshop on the development of guidelines for Ecosystem Approach to management (EAM) in the Arctic (WKEAMA)	Hein Rune Skjoldal, Norway and Phil Mundy, USA
EOSG	Workshop on Impacts of planned changes in the North Sea IBTS (WKMSIMP)	Kai Wieland, Denmark
EOSG	WKNEPS – Workshop on Nephrops burrow counting (WKNEPS)	TBC
EOSG	Workshop on unavoidable survey effort reduction (WKUSER)	Stan Kotwicki, USA
EOSG	Workshop on evaluating survey information Celtic Sea gadoids (WKESIG)	David Stokes, Ireland
<i>EGs Renamed</i>		
ASG	Working Group on Application of Genetics in Fisheries and Mariculture (WGAGFM) will be renamed Working Group on Application of Genetics in Fisheries and Aquaculture (WGAGFA)	

## Annex 2: List of ICES Expert Groups by Steering Group

### Expert Groups under Aquaculture Steering Group

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
1	Working Group on Pathology and Diseases of Marine Organisms	WGPDMO	Ryan Carnegie, USA	2016	2018	7	7
2	Working Group on Social and Economic Dimensions of Aquaculture	WGSEDA	Gesche Krause, Germany	2015	2017	7	5
3	Working Group on Application of Genetics in Fisheries and Mariculture	WGAGFM	Gary R. Carvalho, UK	2015	2017	19	11

### Expert Groups under Human Activities, Pressures and Impacts Steering Group

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
1	Working Group on Biodiversity Science	WGBIODIV	W. Nikolaus Probst, Germany and Oscar Bos, the Netherlands	2016	2018	19	9
2	Working Group on Integrated Morphological and Molecular Taxonomy	WGIMT	Ann Bucklin, USA	2017	2019	19	12
3	Benthos Ecology Working Group	BEWG	Silvana Birchenough, UK	2015	2017	37	14
4	Working Group on Small Pelagic Fishes, their Ecosystems and Climate Impact	WGSPEC	Priscilla Licandro, UK, and Athanassios Tsikliras, Greece	2016	2018	16	3

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
5	Working Group on Phytoplankton and Microbial Ecology	WGPME	Alexandra Kraberg, Germany, and Marie Johansen, Sweden	2016	2018	15	9
6	Working Group on Crangon fisheries and life history	WGCRAN	Josien Steenbergen, the Netherlands	2016	2018		
7	Working Group on Zooplankton Ecology	WGZE	Piotr Margonski, Poland	2015	2017	29	12
8	Working Group on Oceanic Hydrography	WGOH	Sarah Hughes, UK, and Karin M. Larsen, FO	2015	2017	19	13
9	Working Group on the Biology and Life History of Crabs	WGCRAB	Martial Laurent, France	2017	2019		
10	Working Group on Resilience and Marine Ecosystem Services	WGRMES	Sebastian Villasante, Spain, and Gonzalo Macho Rivero, Spain	2015	2017	12	4
11	ICES IOC Working Group on Harmful Algal Bloom Dynamics	WGHABD	Eileen Bresnan, UK	2015	2017	21	12
12	Working Group on Cephalopod Biology and Life History	WGCEPH	Graham Pierce, Spain, and Jean-Paul Robin, France	2017	2019		
13	Working Group on Recruitment Forecasting in a Variable Environment	WGRFE	Samuel Subbey, Norway & Elizabeth Brooks, USA	2014	2017 (1-year ext.)		
14	ICES/PICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration	WGCCBOCS	Nianzhi Jiao, China, Louis Legendre, France, and Richard Rivkin, Canada	2016	2018		

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
15	Working Group on Fisheries-Induced Evolution	WGEVO	Bruno Ernande, France	2016	2018	9	7
16	Working Group on Operational Oceanographic Products for Fisheries and the Environment	WGOOFE	Dominique Obaton, France, and Rodney Forster, UK	2015	2017/2018		
17	Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species	WGRECORDS	Russell Poole, Ireland & Johan Dannewitz, Sweden	2015	2017		
18	Workshop on Predator-prey Interactions between Grey Seals and other marine mammals	WKPIGS	Andrew Brownlow, UK; Nora Hanson, UK; Jan Haelters, Belgium; and Abbo van Neer, Germ.				
19	Workshop on Biological Input to Eastern Baltic Cod Assessment	WKBEBCA	Michele Casini, Sweden, and Margit Eero, Denmark			26	7
20	Working Group on data poor diadromous fish	WGDAM	Lari Veneranta, Finland, and Karen Wilson, USA	2016	2018		
21	Working Group with the Aim to Develop Assessment Models and Establish Biological Reference Points for Sea Trout (Anadromous <i>Salmo trutta</i> ) Populations	WGTRUTTA	Johan Höjesjö, Sweden, and Alan Walker, UK	2017	2019		
22	Working Group on Seasonal-to-Decadal Prediction of Marine Ecosystems	WGS2D	Mark Payne, Denmark	2017	2019	4	2

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
23	Workshop on Regional climate change vulnerability assessment for the large marine ecosystems of the northern hemisphere	WKSICCME-CVA	Myron Peck (Germany, ICES SIC-CME), Elliott Hazen (USA, PICES) and Kathy Mills (USA, ICES)			18	7
24	Scallop Assessment Working Group	WGScallop	Kevin Stokesbury	2018 (annual in 2017)	2020		
25	Workshop on global ecological and economic connections in Arctic and sub-Arctic crab fisheries	WKCRCABCON	Brooks Kaiser, Denmark				

#### Expert Groups under Ecosystem Processes and Dynamics Steering Group

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
1	Working Group on Marine Benthic and Renewable Energy Developments	WGMBRED	Jennifer Dannheim, Germany, and Andrew B. Gill, UK	2016	2018	18	8
2	Working Group on Marine Renewable Energy	WGMRE	Finlay Bennet, UK	2017	2019	7	4
3	Working Group for Marine Planning and Coastal Zone Management	WGMPCCZM	Matthew Gubbins, UK, and Andrea Morf, Sweden	2017	2019		
4	Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem	WGEXT	Ad Stolk, The Netherlands	2017	2019		



	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
5	Working Group on Biological Effect of Contaminants	WGBEC	Bjørn Einar Grøsvik, Norway, and Ketil Hylland, Norway	2016	2018	13	7
6	Marine Chemistry Working Group	MCWG	Koen Parmentier, Belgium	2016	2018		
7	Working Group on Marine Sediments in Relation to Pollution	WGMS	Celine Tixier, France, and Craig Robinson, UK	2015	2017		
8	ICES Working Group on Introduction and Transfers of Marine Organisms	WGITMO	Cynthia McKenzie, Canada	2017	2019	33	17
9	ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors	WGBOSV	Sarah Bailey, Canada	2016	2018	30	13
10	Working Group on Risks of Maritime Activities in the Baltic Sea	WGMABS	Sakari Kuikka, Finland; and Robert Aps, Estonia	2015	2017		
11	Stock Identification Methods Working Group	SIMWG	Lisa Kerr, USA	2017	2019	10	5
12	Working Group on the value of Coastal Habitats for Exploited Species	WGVHES	Josianne Støttrup, Denmark, Rochelle Seitz, USA, and Karen van de Wolfshaar, the Netherlands	2016	2018	15	7
13	Working Group on Spatial Fisheries Data	WGSFD	Niels Hintzen, the Netherlands, and Christian von Dorrien, Germany	2016	2018	21	12
14	Working Group on Marine Habitat Mapping	WGMHM	James Strong, UK	2015	2017	10	6

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
15	Methods Working Group	MGWG	Arni Magnusson, ICES	2017	2019		
16	Working Group on the History of Fish and Fisheries	WGHIST	Ruth Thurstan, Australia and Emily Klein, USA	2015	2017		
17	Working Group on Multispecies Assessment Methods	WGSAM	Sarah Gaichas, USA, and Alexander Kempf, Germany	2016	2018		

#### Expert Groups under Integrated Ecosystem Assessments Steering Group

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
1	Working Group on Comparative Analyses between European Atlantic and Mediterranean marine ecosystems to move towards an Ecosystem-based Approach to Fisheries	WGCOMEDA	Marta Coll, Spain, Manuel Hidalgo, Spain, Hilmar Hinz, Spain and Christian Mollmann, Germany	2017	2019	20	9
2	Working Group on Ecosystem Assessment of Western European Shelf Seas	WGEAWESS	Steven Beggs, UK and Eider Andon-egi, Spain	2017	2019	9	4
3	ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea	WGIAB	Laura Uusitalo, Finland, Lena Bergström, Saskia Otto, Germany and Martin Lindegren, Denmark	2016	2018	31	tbc

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
4	Working Group on the Integrated Assessments of the Barents Sea	WGIBAR	Elena Eriksen, Norway and Anatoly Filin, Russia	2017	2019	26	2
5	ICES/PICES/PAME Working Group on Integrated Ecosystem Assessment (IEA) for the Central Arctic Ocean	WGICA	John Bengtson (ICES), USA, Sei-Ichi Saitoh (PICES), Japan, and Hein Rune Skjoldal (PAME), Norway	2016	2018	23	4
6	Working Group on Integrating Ecological and Economic Models	WGIMM	Jörn Schmidt, Germany, J. Rasmus Nielsen, Denmark, and Eric Thunberg, USA	2015	2017		
7	Working Group on the Integrated Assessments of the Norwegian Sea	WGINOR	J. Óskarsson, Iceland, and Per Arneberg, Norway	2016	2018		
8	Working Group on Integrated Assessments of the North Sea	WGINOSE	Andy Kenny, UK and Erik Olsen, Norway	2017	2020	11	4
9	Working Group on Integrative, Physical-biological, and Ecosystem Modelling	WGIPEM	Morgane Travers-Trolet, France and Marie Maar, Denmark	2016	2018	11	6
10	Working Group on Large Marine Ecosystem Programme Best Practices	WGLMEBP	Hein Rune Skjoldal, Norway, and Rudolf Hermes, Thailand	2014	?		
11	Working Group on Maritime Systems	WGMARS	Christine Röckmann, the Netherlands, Patricia M. Clay, USA	2016	2018	13	5
12	Working Group to Demonstrate a Celtic Seas wide approach to the application of fisheries related science to the implementation of the Marine Strategy Framework Directive	WGMSFDemo	Dissolved				

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
13	Working Group on the Northwest Atlantic Regional Sea	WGNARS	Robert Gregory, Canada and Geret DePiper, USA	2017	2019	18	2
14	Workshop on Developing Integrated Advice for Baltic Sea Ecosystem-Based Fisheries Management 2	WKDEICE2	Maciej Tomczak, Sweden, Rudi Voss, and Christian Möllmann	2017	2017		
15	Workshop on IEA in the Northwest Atlantic	WKINWA	Christine Röckmann, the Netherlands and Geret De Piper, USA	2017	2017	19	5
16	Workshop on “Integrated assessment of socio- ecological interactions of two North Sea strata using Bayesian belief networks”	WKINTERACT	Vanessa Steltzenmuller, Rabea Diekmann, Germany	2017	2017	CANCELLED	

#### Expert Groups under Ecosystem Observation Steering Group

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
1	International Bottom Trawl Survey Working Group	IBTSWG	Kai Wieland, Denmark, Corina Chaves, Portugal	2016	2018	22	10
2	Joint Workshop of the ICES-FAO Working Group on Fishing Technology and Fish Behaviour [WGFTFB] and the Working Group on Fisheries Acoustics Science and Technology [WGFAST]	JFATB	Paul Winger, Canada, Alex de Robertis, USA	2017	2017	68	16

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
3	Planning Group on Data Needs for Assessments and Advice	PGDATA	Joel Vigneau, France, Marie-Storr-Paulsen, DK	2015	2017		
4	Working Group on Acoustic and Egg Surveys for Sardine and Anchovy in ICES Areas VII, VIII and IX	WGACEGG	Maria Manuel Angelico, Portugal, Pablo Carrera, Spain	2014	2016		
5	Working Group on Atlantic Fish Larvae and Eggs Surveys	WGALES	Maria Manuel Angélico, Portugal, Richard D.M. Nash, Norway	2013	2018		
6	Working Group on Beam Trawl Surveys	WGBEAM	Holger Haslob, Germany	2017	2019		
7	Baltic International Fish Survey Working Group	WGBIFS	Wlodzimierz Grygiel, Poland (outgoing Chair)	2015	2017	25	11
8	Working Group on Biological Parameters	WGBIOP	Pedro Torres, Spain, Francesca Vitale, Sweden	2015	2017		
9	Working Group on Commercial Catches	WGCATCH	Ana Ribeiro Santos, UK, Nuno Prista, Portugal	2017	2019		
10	Working Group 2 on North Sea Cod and Plaice Egg Surveys in the North Sea	WGEGBS2	Matthias Kloppmann, Germany	2016	2018		
11	Working Group on Electrical Trawling	WGELECTRA	Adriaan Rijnsdorp, NL, Maarten Soetaert, Belgium	End 2017/2018	2020		
12	Working Group on Fisheries Acoustics, Science and Technology	WGFAST	Richard O'Driscoll, NZ	2017	2019	63	16

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
13	ICES-FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB)	WGFTFB	Haraldur A. Einarsson, Iceland, and FAO Chair (TBD),	2017	2019	73	15
14	Working Group on International Deep Pelagic Ecosystem Surveys	WGIDEEPS	Kristjan Kristinsson, Iceland and Benjamin Planque, Norway	2017	2019	5	3
15	Working Group of International Pelagic Surveys	WGIPS	Matthias Schaber, Germany	2016	2018	17	8
16	Working Group on Improving use of Survey Data for Assessment and Advice	WGISDAA	Sven Kupschus, UK	2015	2017		
17	Working Group on Integrating Surveys for the Ecosystem Approach	WGISUR	Ralf van Hal, NL	2018	2020	8	7
18	Working Group on Mackerel and Horse Mackerel Egg Surveys	WGMEGS	Cindy van Damme, NL & Finlay Burns, UK	2015	2017	19	9
19	Working Group on <i>Nephrops</i> Surveys	WGNEPS	Adrian Weetman, Scotland, and Kai Wieland, Denmark (to be approved)	2016	2018		
20	Working Group on Recreational Fisheries Surveys	WGRFS	Harry Vincent Strehlow, Germany, Kieran Hyder, UK	2017	2019	31	17
21	Working Group on target classification	WGTC	Rolf Korneliussen, Norway	Extension until 2017			

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
22	Workshop on Age estimation of Blue Whiting ( <i>Micromesistius poutassou</i> )	WKARBLUE2	Patricia Gonçalves, Portugal, Jane A. Godiksen, Norway	2017	2017	21	9
23	Workshop on age estimation of Atlantic mackerel ( <i>Scomber scombrus</i> )	WKARMAC2	Mark Etherton, UK	2017	2017		
24	Workshop on Age estimation of Norwegian spring spawning herring ( <i>Clupea harengus</i> )	WKARNSSH	Jane A. Godiksen, Norway and TBD	2017	2017		
25	Workshop on monitoring technologies for the mesopelagic zone	WKMESO	Kristjan Kristinsson, Iceland, Dave Reid, Ireland	2017	2017		
26	Workshop on Micro increment daily growth in European anchovy ( <i>Engraulis encrasicolus</i> ) and Sardine ( <i>Sardina pilchardus</i> )	WKMIAS2	Carmen Piñeiro, Spain and TBD	2017	2017		
27	Workshop on Sexual maturity staging of herring ( <i>Clupea harengus</i> ) and sprat ( <i>Sprattus sprattus</i> )	WKMSHS2	Cindy van Damme, NL & Joanne Smith, UK	2017	2017		
28	Workshop on Collecting Quality Underwater Acoustic Data in Inclement Weather	WKQUAD	Matthias Schaber, Germany, and Mike Jech, USA	2017	2017	17	7
29	Workshop on Technical Development to Support Fisheries Data Collection	WKSEATEC	Dave Stokes and Marcellus Rodiger	2017	2017		

	EG name	EG Acronym	EG Chair	Year start	Year end	Number attending (2017)	Number of countries (2017)
30	Workshop on Designing an Eel Data Call	WKEELDATA	Caroline Durif, Norway	2017	2017	13	9
31	Workshop on Optimization of Biological Sampling at Sample Level	WKBIOPTIM	Cláudia Fernandes, Portugal and Julie Coad Davies, Denmark	2017	2017	22	12
32	Workshop on Sampling Design and Estimation of Commercial Catches: Cod.27.21 and sol.27.4	WKSDECC I	Katja Ringdahl, Sweden and Kirsten Håkansson, Denmark	2017	2017		
33	Workshop on Age Estimation Methods of Deep Water Species	WKAMDEEP2	Gróa Pétursdóttir, Iceland, and Kélig Mahé, France	2018	2018		
34	Workshop on Age reading of Horse Mackerel, Mediterranean Horse Mackerel and Blue Jack Mackerel	WKARHOM3	Alba Jurado, Spain and Kélig Mahé, France	2018	2018		
35	Workshop on Sexual Maturity staging from histological tools	WKMATHIS	Cindy Van Damme, The Netherlands, Maria Cristina Follesa, Italy	2017	2017		
36	Workshop on Elasmobranchs maturity	WKSEL3	Maria Cristina Follesa, Italy, Pierluigi Carbonara, Italy	2017	2017		
37	Workshop on Ageing Validation methodology of Mullus	WKVALMU	Kélig Mahé, France, Pierluigi Carbonara, Italy, Chryssi Mytilineou, Greece,	2017	2017	16	5



The proportions of EG attendees in 2017 (to date), by ICES member country, for all EG parented by a SCICOM SG, are shown in the Figure below.

