

Science Committee Summary Report

Background

This paper is a summary report based on the full report from the Science Committee (SCICOM) to the ICES Council. The paper addresses the scope, scale and impact of ICES science and plans for future science delivery.

Request for Council

Council delegates are requested to note the ongoing work of SCICOM and especially the contents of the science plan. Council delegates are requested to consider and provide feedback on strengthening linkages between the science plan and the developing strategic plan. Council delegates are also invited to provide comments on the text of the science plan.

1 Introduction

SCICOM continues to strive to increase the scope, scale and impact of ICES science. Our general objectives 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. The focus of SCICOM activity in 2018 has been the development and sign-off of the science plan, in addition to recurrent delivery of science and the annual programme of work.

In 2019, SCICOM will focus on implementing the science plan, launching the new publication series for expert group reports, and finalising and embedding a system within which all expert groups will be parented by steering groups.

2 Science plan

A significant focus of SCICOM work in 2018 was defining and signing-off the science priorities and tasks in the science plan. The science plan describes the scientific priorities and goals of ICES, and the science and other tasks to be undertaken to meet them. The science plan will be a public document with an audience comprising the marine science community in ICES countries and beyond.

As described in our 2017 report to Council the science plan was developed through an inclusive and consultative process that drew on expertise throughout the ICES network and constituent bodies, science priorities identified by member countries and a review of national and international policy drivers and science opportunities for ICES. The science priorities and associated topics in the science plan received final review and sign-off by the Science Committee on 5 October 2018. The text of the draft plan (Annex 1) is

subject to ongoing review, with sign-off expected on the Science Committee forum after feedback from the Council meeting and finalisation of the ICES strategic plan. Subject to finalisation of the strategic plan SCICOM intend to implement the science plan from 1 January 2019.

To science plan commits the ICES community to work in seven areas of marine science, each with related objectives and purpose.

1. Understanding ecosystems

Advance and shape understanding of the structure, function and dynamics of marine ecosystems — to develop and vitalize marine science and underpin its applications

2. Impacts of human activities

Measure and project the effects of human activities on ecosystems and ecosystem services — to elucidate present and future states of natural and social systems

3. Observation and exploration

Monitor and explore the seas and oceans — to track changes in the environment and ecosystems and to identify resources for sustainable use and protection

4. Emerging techniques and technologies

Develop, evaluate and harness new techniques and technologies — to advance knowledge of marine systems, inform management and increase scope and efficiency of monitoring

5. Seafood production

Generate evidence and advice for management of wild-capture fisheries and aquaculture — to help sustain safe and sufficient seafood supplies

6. Conservation and management science

Develop tools, knowledge and evidence for conservation and management — to provide more and better options to help managers set and meet objectives

7. Sea and society

Evaluate contributions of the sea to livelihoods, cultural identities and recreation — to inform ecosystem status assessments, policy development and management

3 Implementation of the science plan

SCICOM have drafted an implementation plan that describes how the new science plan will be implemented and how progress with implementation will be monitored and reported. The implementation plan will be finalised via the SCICOM forum. The implementation plan is intended as an internal ICES working document and would not be published in the same format as the public-facing science plan. The intended audience for this implementation plan are the people and groups in ICES who are involved in implementing, monitoring and reporting on implementation of the science plan, principally members of SCICOM and associated groups and the ICES Secretariat. The implementation plan defines objectives and actions in seven areas.

1. Catalyse, shape, facilitate and promote marine science which has a high and beneficial impact on society and addresses all priorities identified in the science plan
2. Ensure expert groups have flexibility to innovate and explore new topics and encourage and support cross-cutting science activity
3. Increase the visibility of, and access to, our science, data and advice and recognise, promote and use the science outputs from expert groups
4. Provide an efficient, collaborative, respectful and rewarding working environment for all scientists, as well as the resources and infrastructure needed by ICES groups to develop and share knowledge and expertise
5. Provide more and better networking and training opportunities and encourage engagement of a new and emerging generation of scientists with ICES and expert groups
6. Exchange knowledge and expertise with regional and global partners through collaborative projects, networks and training: to shape and advance marine science and advice and meet joint scientific goals
7. Monitor and report on progress towards meeting the goals of the science plan

Specific actions supporting these objectives are tabulated in the plan and responsibility for these actions will be widely distributed throughout the ICES community. For actions involving the ICES Secretariat, the actions in this table will be transposed to the joint work plan, subject to the availability of resources needed to support them. Progress reports to SCICOM and ICES Council will summarise progress with implementation using metrics described in the implementation plan

4 Linking science and advice

SCICOM and ACOM have continued to forge closer working relationships between science and advice in 2018: by signing-off a proposal to place those expert groups previously reporting to ACOM within a new steering group(s), by running a workshop to define ways to increase the uptake of science into advice and by bringing together expert group chairs focused on science and advice at the same meetings.

In relation to the decision to establish a new steering group(s), all expert groups will now operate under the same structure, by allocating the existing ACOM-affiliated expert groups to the new steering group(s) and bringing all current and new steering groups under joint SCICOM and ACOM affiliation. The ACOM-SCICOM subgroup that put forward this plan and provided justification for the new steering group(s) is now working on a proposal for the allocation of specific expert groups to the new and existing steering groups. Approval for their proposal will be sought from SCICOM and ACOM.

5 Science impact and publication

ICES bibliography: In 2017, the science impact and publication group began developing an ICES bibliography. The purpose of the bibliography is to develop a record of all peer-reviewed publications facilitated by ICES expert groups; to improve awareness of ICES science and underpin impact assessment of ICES science. References listed in this bibliography are now available to users via the ICES website. Data for 2016 and 2017 are near complete. Future needs are to extend this bibliography back in time, at least to 2010, as well as searching for and then adding the remaining peer review publications for 2018 and 2019. The web interface will also be further developed to provide search facilities.

Authorship of expert group reports: Following a call from expert groups to identify authors on expert group reports and review of options by SCICOM and Bureau, the science impact and publication group has preceded with the option to identify chairs as editors and all attendees as authors on the cover of expert group reports, but without these people leading on the recommended citation. The justifications for identifying authors are to provide greater motivation to attend and chair expert groups by providing added visibility for contributors, and to increase the visibility of ICES science and the network in web searches and on science networking sites. The authorship option adopted was considered to provide an effective balance between visibly recognising the contributions of scientists to expert group reports and retaining a clear link between all published reports and ICES. Templates are being prepared for the new style of report and these reports will also be published in a series with ISSN and a new citation format from 2019, with the changes intended to increase use and recognition of expert group work.

6 Interaction with expert groups

Both SCICOM and ACOM have continued to focus on providing stronger, more visible and more regular support for the expert groups, by providing more opportunities for expert group chairs to meet, establishing a WGCHAIRS forum, and emphasising and recognising the central role of expert groups in generating science and advice. The annual meeting of the Chairs of ICES Working Groups (WGCHAIRS) was expanded to include items of relevance to all expert group chairs in ICES and 69 people attended the January 2018 meeting. Topics covered included the development of guidelines for ICES groups, viewpoints, science highlights, roles of chairs, communications with expert groups, mentoring, development of fisheries and ecosystem overviews, science, data and advice. Several actions to better support expert group chairs were identified during discussions of these topics and have now been taken. In addition to the WGCHAIRS meeting, we hosted a lunch gathering and an introductory meeting for expert group chairs during the 2018 Annual Science Conference in Hamburg. This renewed emphasis on the role of chairs has also increased day-to-day engagement, with chairs more openly identifying the support they need to fulfil their roles and more timely efforts by the steering groups, committees and ICES Secretariat to provide this support.

7 Guidelines for ICES groups

The original “Guidelines for ICES Expert Group Chairs” have been substantially revised in 2018 and retitled as the “Guidelines for ICES Groups”. The latest iteration of this document, to be published towards the end of 2018, now describes the working practices and membership of all groups contributing to the ICES community: expert groups, steering groups, operational groups (data and information group, science impact and publication group, training group), strategic initiatives, advisory committee, science committee and ICES secretariat, as well as the roles of Bureau and Council. The intention is for this document to contain all the essential information needed by those chairing and participating in these groups. We have increasingly solicited feedback from the community on content, through steering groups, meetings of expert group chairs and ACOM and SCICOM, and recent additions to the guidelines include job descriptions for ACOM and SCICOM members. We will release two updates of the guidelines every year. Following from decisions taken at the 2018 Council meeting we also intend to update the code of conduct and conflict of interest policy for participants in ICES work, which will clarify a number of issues raised by expert group chairs. In 2018, the Secretariat also worked with ACOM and SCICOM to produce an introductory presentation, based on the guidelines, that expert group and other chairs can use to induct new members and explain ICES work.

8 Emerging work areas

The full SCICOM report to Council provides a summary of all changes in expert groups during the last year. Two areas of marked change are aquaculture and social science. The Aquaculture steering group is increasingly well established and now parents six expert groups (an increase from three when the steering group was founded in 2017) with diverse leadership and membership, including many scientists new to the ICES community. In the social sciences, we have focused on attracting new experts with potential to contribute to future ICES products and advice. Expert groups focusing on economics and social indicators were formed and met for the first time in 2018.

9 Conferences and training

The 2018 Annual Science Conference was held in Hamburg from Monday 24 September to Thursday 27 September. The venue was the University of Hamburg. The ASC was attended by at least 650 attendees from 34 countries, and featured 18 theme sessions, 5 open sessions and three keynote presentations.

Three ICES co-sponsored symposia were/ will be run in 2018 (Symposium on Climate Change and Impacts on the World’s Oceans, Management tools and standards in support of Sustainable Development Goal 14 and Oceans Past VII).

Eight ICES training courses were planned in 2018 (Statistically sound inference for commercial catch sampling programmes, Genomics in support of fisheries and aquaculture management, Introduction to the R environment, Advanced stock assessment, Introduction to agent-based modelling for fisheries science and management, Introduction to stock assessment, Geostatistics in R for fisheries and marine ecology applications). The courses given to date were well received but, unfortunately, owing to a low number of sign-ups, three of the proposed training courses were postponed (Introduction to agent-based modelling for fisheries science and management, Introduction to the R environment, Genomics in support of fisheries and aquaculture management).

Annex 1. Draft science plan

The Science Plan will guide the conduct and delivery of science in support of the vision and mission of ICES, as described in the draft Strategic Plan. The Science Plan describes the scientific priorities and goals of ICES, their rationale, how they contribute to ICES vision and mission, and the science and other tasks to be undertaken to meet them. The Science Plan will be a public document with an audience comprising the marine science community in ICES countries and beyond.

A separate implementation plan describes how the Science Plan will be implemented and how progress with implementation will be monitored and reported. It also defines how people and groups within ICES will contribute to implementation, the tasks they will undertake and how progress will be measured and reported. Collectively, the science plan and implementation plan guide the conduct and delivery of science in support of the vision and mission of ICES. The intended audience for the implementation plan are the people and groups in ICES who are involved in implementing, monitoring and reporting on implementation of the science plan, principally the members of the Science Committee and associated groups and the ICES Secretariat.

Progress with implementation of the science plan will be reviewed and reported annually to our governing body, the ICES Council. As well as guiding future implementation of the science plan, information gleaned from annual reviews will be used to shape our future marine science priorities and to ensure we are effectively meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans.

As described in our 2017 report to Council the science plan was developed through an inclusive and consultative process that drew on expertise throughout the ICES network and constituent bodies, science priorities identified by member countries and a review of national and international policy drivers and science opportunities for ICES. The science priorities and associated topics in the science plan received final review and sign-off by the Science Committee on 5 October 2018. The texts of the draft plan, but not the scientific priorities, are subject to ongoing review, with sign-off expected on the Science Committee forum after feedback from the Council meeting and finalisation of the strategic plan.

Draft Science Plan (7 Oct 2018)

Marine ecosystem and sustainability science for the 2020s and beyond

Science Plan of the International Council for the Exploration of the Sea

Who we are:

The International Council for the Exploration of the Sea (ICES) is an intergovernmental organization dedicated to advancing and shaping marine science to support sustainable use of our seas and oceans. The ICES international network comprises more than 5,000 scientists from over 690 marine institutes in 20 member countries and beyond.

ICES Vision:

To be a world-leading marine science organization, effectively meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans.

ICES Mission:

To advance and share scientific understanding of marine ecosystems and the services they provide, and to employ this knowledge to generate state-of-the-art advice on meeting conservation, management and sustainability goals.

[opening text]

Our science plan “Marine ecosystem and sustainability science for the 2020s and beyond” describes ICES scientific priorities and objectives and a pathway to achieve them. By successfully implementing our science plan we will generate ecosystem and sustainability science with a high and beneficial impact on society. Our science will advance understanding of marine ecosystems, improve assessments of the effects of human activities, improve observations of the seas and oceans and provide evidence and solutions to support conservation and management. Supporting tasks will increase the visibility and impact of this science, provide a rewarding and efficient working environment, engage new scientists, increase training and networking opportunities, and strengthen collaboration with regional and global partners. By achieving our scientific objectives and completing the supporting tasks the ICES community will create a world-leading marine science organization, effectively meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans.

This plan was developed through an inclusive and consultative process that drew on expertise throughout the ICES network and constituent bodies, science priorities identified by member countries and a review of national and international policy drivers and science opportunities for ICES. The audience for this plan is the marine science community, in ICES countries and beyond. Many people in the audience have also helped to create this plan! We hope the plan will both resonate with and support managers, industry, funding agencies, governments, and inter-governmental and non-governmental

organisations committed to advancing marine science, conservation and management.

To deliver “Marine ecosystem and sustainability science for the 2020s and beyond”, the ICES community will work in seven priority areas of marine science, each with related objectives and purpose.

1. Understanding ecosystems

Advance and shape understanding of the structure, function and dynamics of marine ecosystems — to develop and vitalize marine science and underpin its applications

2. Impacts of human activities

Measure and project the effects of human activities on ecosystems and ecosystem services — to elucidate present and future states of natural and social systems

3. Observation and exploration

Monitor and explore the seas and oceans — to track changes in the environment and ecosystems and to identify resources for sustainable use and protection

4. Emerging techniques and technologies

Develop, evaluate and harness new techniques and technologies — to advance knowledge of marine systems, inform management and increase scope and efficiency of monitoring

5. Seafood production

Generate evidence and advice for management of wild-capture fisheries and aquaculture — to help sustain safe and sufficient seafood supplies

6. Conservation and management science

Develop tools, knowledge and evidence for conservation and management — to provide more and better options to help managers set and meet objectives

7. Sea and society

Evaluate contributions of the sea to livelihoods, cultural identities and recreation — to inform ecosystem status assessments, policy development and management

Supporting tasks will add to the scope, scale and impact of our scientific output in each of the seven priority areas. Across all areas of our science we will increase the visibility of, and access to, our science, data and advice and recognise, promote and use the science outputs. ICES values the disciplines, perspectives and expertise brought to our network by member country institutions, partners, clients and stakeholders. We will regularly and actively solicit their inputs to the development of our science at the Annual Science Conference, through other sponsored conferences and discipline and topic-specific workshops and meetings.

For all people engaging with ICES science we will seek to provide an efficient, collaborative, respectful and rewarding working environment, as well as the resources and infrastructure needed by ICES groups to develop and share knowledge and expertise. We will ensure expert groups have flexibility to innovate and explore new topics and encourage and support cross-cutting science activity. To secure our future as a world-class marine science

organisation we will provide more and better networking and training opportunities and encourage engagement of a new and emerging generation of scientists with expert groups.

We will work closely with regional and global partners. Relationships with partners extend the reach of our science into the Mediterranean, Black Sea, Arctic, North Pacific Ocean and globally. Partnerships bring mutual benefits, by strengthening the contribution of regional expertise to larger-scale and global processes and contributing to shaping and delivering marine science and advice beyond the ICES region. We will exchange knowledge and expertise with regional and global partners through collaborative projects, networks and training; to shape and advance marine science and advice. We will also engage with partners to meet joint scientific goals; by developing joint expert groups, co-sponsoring conferences and conference sessions and contributing to overviews and assessments of the state and uses of the marine environment.

[Box]

Science Plan outcomes

- Marine science with a high and beneficial impact on society
- Engaged and productive scientists from the natural and social sciences
- Increased visibility of, and access to, our science, data and advice
- Stronger and more dynamic links between science and advice
- A secure position as a world-class marine science organisation

Implementation

The scientific objectives and tasks in this science plan are to be accomplished in the period 2019-2024. But these accomplishments will also prepare us to address emerging scientific challenges in the late 2020s and beyond. Implementation of the plan will be assessed by measuring and reviewing outcomes. These include the impacts of our science and advice on conservation, management and sustainability goals, the extent of engagement with ICES and the uses of our science, data and advice. Progress with implementation will be reported to and reviewed by our governing body, the ICES Council. Information gleaned from their reviews will be used to shape our future marine science objectives and tasks and to ensure we are contributing effectively to the ICES mission. Responsibilities for implementation of the science plan are described in an implementation plan. The intended audience for the implementation plan is narrower than for the science plan and includes the people and groups in ICES who are involved in implementing, monitoring and reporting on delivery of the science plan.

1. Understanding ecosystems

Advance and shape understanding of the structure, function and dynamics of marine ecosystems — to develop and vitalize marine science and underpin its applications

Marine sustainability science is predicated on an underlying understanding of the structure, function and dynamics of marine ecosystems and their interactions with the physical and chemical environment. As this understanding evolves and increases, so does our capacity to report on the status of the marine environment and measure, describe and manage human interactions with the sea.

Tasks:

Assess and report on trends in ocean climate
Improve understanding of the oceanography of semi-enclosed and shelf seas and the wider north Atlantic ocean
Describe links between the physical and biological environment and their influence on production, biogeochemical cycles and other ecosystem functions, and their consequences for the stability and resilience of ecosystems and the services they provide
Describe connectivity within and among ecosystems, of many species and life stages at a range of spatial scales, and assess the ecological consequences
Develop methods to map and predict the distribution of seabed and pelagic habitats and biodiversity and their sensitivity to disturbance
Develop and apply molecular, taxonomic and other methods to describe and identify species
Describe life histories and their links to the environment and responses to environmental change, including phenotypic and genetic adaptation
Build on and challenge existing assumptions about population and community structures and interactions by searching for new insights using molecular methods, physiology and behavioural science
Conduct comparative analyses of the structure, function and dynamics of ecosystems in ICES regions and beyond

2. Impacts of human activities

Measure and project the effects of human activities on ecosystems and ecosystem services — to elucidate present and future states of natural and social systems

The seas provide many benefits for people but human activities pose risks as well as providing opportunities. Pressures from contaminants and pollutants, eutrophication, invasive species, litter, shipping, noise, oil and gas extraction, mining, construction, renewable energy, aquaculture, fishing, climate change, acidification and habitat loss affect ecosystems and the environment. Understanding these pressures and their impacts will provide evidence to advise on the trade-offs between benefits and risks.

Tasks:

Describe the distribution and intensity of pressures that result from contaminants and pollutants, eutrophication, invasive species, litter, shipping, noise, oil and gas extraction, mining, construction, renewable energy, aquaculture, fishing, climate change, acidification and habitat loss.

Explore how pressures on the marine environment act, independently and collectively, to modify the variety, quantity and distribution of marine life and structure, function and dynamics of food webs and marine ecosystems (including cumulative pressures and their cumulative impacts)

Develop methods to better characterise and map the sensitivity and role of seabed and pelagic habitats, from close to the coasts to the deep sea.

Describe the exposure of habitats to pressures, their vulnerability and resilience, and develop and test indicators of pressure, state and function

Develop methods and models for assessing and projecting ecological impacts of diffuse pressures (climate change, pollution, litter and acidification) spanning different levels of biological organisation and at a range of time and space scales

Model the transport of pollutants, including litter, to link sources to areas of impact, especially when these span long distances (e.g. Arctic and deep sea) or many trophic levels (e.g. impacts on predatory fishes, birds and mammals)

Assess and project implications of human activities for management systems and marine industries and advise on options for mitigation and adaption

3. Observation and exploration

Monitor and explore the seas and oceans — to track changes in the environment and ecosystems and to identify resources for sustainable use and protection

Both science and advice rely on observations of physical, chemical and biological properties of the environment and ecosystems. Monitoring provides essential inputs to status assessments, including fisheries and ecosystem overviews, as well as feedback on the effects of conservation and management measures. Since large areas of the marine environment have not been observed, exploration provides essential information on the distribution of biological resources for sustainable use and protection.

Tasks:

Develop and co-ordinate, integrated, quality assured and cost-effective monitoring programmes
Evaluate and optimise survey design and connectivity of observation systems to meet existing demands for data and to meet emerging data, science and advisory needs; with a focus on supporting fisheries assessment, integrated ecosystem assessment and ecosystem-based management
Conduct analyses and testing of techniques, sensors and the logistical and statistical aspects of survey design to increase the efficiency, scope and accuracy of monitoring and the relevance of monitoring programmes to our science and advisory needs
Conduct an ambitious co-ordinated programme to further explore and report the ecological characteristics of the ICES region, with a focus on the distribution of seabed habitats
Develop more effective mechanisms to ensure that monitoring and surveillance data (e.g. VMS, AIS) can be reused or reprocessed to support ICES needs
Identify, design and use opportunities for public participation in observation and exploration through citizen-science and opportunities for marine industries and other stakeholders to contribute to research design, data gathering and interpretation

4. Emerging techniques and technologies

Develop, evaluate and harness new techniques and technologies — to advance knowledge of marine systems, inform management and increase the scope and efficiency of monitoring

New techniques and technologies continue to transform our capacity to understand and monitor biota, marine ecosystems, human activities and pressures, to analyse data and to conduct assessments. Some emerging technologies may be so disruptive that they fundamentally challenge the accuracy and cost-effectiveness of existing approaches. It is essential to develop, identify and review emerging techniques and technologies and to support uptake when they advance capacity to improve the rigour, scope and impact of science and advice.

Tasks:

Horizon scan, test, develop and where appropriate harness new and emerging techniques and technologies that have potential to progress the ICES vision and mission: with an emphasis on data gathering, processing and interpretation

Develop more efficient ways of analysing, sharing and presenting big data from observation and monitoring; especially using data from remote sensing of the seas and monitoring of human activities

Develop and apply a wide range of analytical and statistical tools, such as machine learning, to describe the state and dynamics of the marine environment and the distribution and dynamics of human activities, and to assess their strengths and weaknesses
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Investigate the benefits and costs of techniques that may supplement or replace existing approaches to biological 'sampling', including the applications of acoustics, image analysis, molecular methods (e.g. eDNA, genetic barcoding and genetic close-kin mark-recapture methods) as well as sensors for chemical and physical sampling
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Track the emergence of new technologies in marine industries and assess how these technologies affect the interactions between those industries and the marine environment
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5. Seafood production

Generate evidence and advice for management of wild-capture fisheries and aquaculture — to help sustain safe and sufficient seafood supplies

Production of seafood and associated by-products supports livelihoods and businesses and makes an important contribution to human nutrition and health. Securing a sufficient and sustainable supply of safe seafood from wild-capture fisheries and aquaculture is an ongoing challenge for society and effective development and management of these industries relies on scientific evidence.

Tasks:

Improve methods of single-species and multi-species stock assessment, including data-limited methods. Develop and conduct management strategy evaluations, address uncertainty, and improve the transparency, robustness, efficiency and repeatability of stock assessment

Increase understanding of stock structures, migrations, life histories, natural mortality, climate and food web impacts on marine and diadromous species as well as multi-species interactions and the consequences of stock recovery to strengthen the inputs and evidence base for assessment and advice

Further understanding and operationalisation of ecosystem-based fishery management and MSY concepts and their application in mixed, multispecies and emerging (e.g. mesopelagic) fisheries

Examine fisheries spatial dynamics, performance and impact of gear, links between catch and effort, mixed fishery interactions, role and impacts of recreational and small-scale fisheries and the consequences of responses to management measures

Assess aquaculture production potential and carrying capacity, development scenarios, and methods of risk and benefits assessment; for rearing or full production systems including low trophic level and seaweed aquaculture, integrated multi-trophic aquaculture and offshore production facilities

Assess interactions between aquaculture and the environment including the risks posed by diseases and pathogens and their mitigation, harmful algal blooms and the effects of escapees and nutrient and organic loads

Develop aquaculture overviews to describe the distribution, ecosystem interactions, benefits and impacts of aquaculture production

Assess the wider role of seafood production in society, including resilience of the food system, interactions between food systems in the sea and on land, the effects of the changing expectations of seafood consumers on practices in aquaculture and fishing

6. Conservation and management science

Develop tools, knowledge and evidence for conservation and management — to provide more and better options to help managers set and meet objectives

Conservation and management measures are taken to meet the objectives of management bodies that are tasked to balance demands for use and protection of the sea. To guide and support effective conservation and management these bodies require evidence and advice based on current policies and management regimes, but also seek inputs on the performance of management, the status of the managed environment and information to develop future approaches and policies.

Tasks:

Develop an evidence base and assessment tools to support existing and potential demands for advice on conservation and management. To cover activities and pressures including fisheries and aquaculture, contaminants and pollutants, eutrophication, invasive species, litter, shipping, noise, oil and gas extraction, construction, renewable energy, climate change, acidification and habitat loss.

Develop methods to support implementation and evaluation of the suitability and effectiveness of national and international commitments and governance relating to marine spatial planning; coastal zone management; protection of species, habitats and marine ecosystems; mitigation; restoration; and the delineation, management and monitoring of marine protected areas

Develop methods to support implementation of marine policies and commitments applying to ICES member countries, including the UN Sustainable Development Goals, the Common Fisheries Policy and the Marine Strategy Framework Directive

Provide evidence to inform policy developers as they seek to set objectives and to address and reconcile use and conservation of the sea

Develop and publish integrated ecosystem assessments and ecosystem overviews to describe and report on regional status and use of the sea.

Further develop ICES capacity to provide ecosystem-based advice by adding quantitative analyses of more activities, pressures and impacts, as well as social, cultural and economic information, to fisheries and ecosystem overviews, and by developing and integrating aquaculture overviews

7. Sea and society

Evaluate contributions of the sea to livelihoods, cultural identities and recreation — to inform ecosystem status assessments, policy development and management

People and their communities, societies and cultures benefit directly from seas and oceans because people engage in aquaculture, fishing, shipping and other marine industries, or use the sea for recreation. All other humans benefit indirectly from services provided by the seas and oceans, given their role in global biogeochemical cycles and the climate system. We seek to achieve a step change in understanding and reporting of human interactions with the sea, to inform policy development, conservation and management.

Tasks:

Develop, test and apply methods and indicators to assess the social and economic status and dependence of coastal communities on aquaculture, commercial and recreational fishing, tourism and other marine industries
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Trial and improve social and economic indicators for use in fisheries and ecosystem overviews and the emerging aquaculture overviews
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Investigate the social and economic risks and opportunities provided by alternate uses of the sea.
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Investigate the social and economic consequences of human responses to management actions and the role of spatial planning in resolving conflicts and supporting co-existence of human activities and livelihoods

Assess the effects of alternate models of engagement on the success of participatory processes and the perceived salience, credibility and legitimacy of outcomes that result, as well as the practicality and performance of resulting conservation and management options

Describe alternate futures and management options for marine socio-ecological systems and assess the vulnerability and resilience of marine industries and society to climate change
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Develop understanding of how traditional and historical knowledge can inform conservation and management and how this understanding influences the effectiveness of contemporary conservation and management
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