

# ICES SIHD REPORT 2016

STRATEGIC INITIATIVE ON THE HUMAN DIMENSION IN  
INTEGRATED ECOSYSTEM ASSESSMENTS (SIHD)

Report of the SIHD survey of the current state  
of "human dimension" in some ICES groups



**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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## Contents

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<b>1</b>	<b>Introduction</b> .....	<b>2</b>
<b>2</b>	<b>Method</b> .....	<b>2</b>
<b>3</b>	<b>Main result</b> .....	<b>2</b>
<b>4</b>	<b>Conclusions</b> .....	<b>4</b>
	<b>Annex 1: Compilation of answers from the questionnaire</b> .....	<b>5</b>
	A. Ongoing activities to integrate “human dimension” .....	5
	B. Additionally needed expertise from social sciences.....	8
	C. Barriers to bring in other than natural scientists .....	15
	D. Support needed to facilitate integration of other scientists .....	16
	E. Advantages that can be gained and contributions to made .....	18
	F. Opinion on integrating human dimension and/or interdisciplinary work within ICES.....	26
	G. Descriptive of the respondents .....	30
	H. Comments or feedback to the questionnaire .....	32

## 1 Introduction

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ICES is developing integrated ecosystem assessments (IEAs) which are quantitative evaluations and synthesis of information on physical, chemical, ecological, and human processes. The aim is to provide the scientific understanding to deliver advice on societal trade-offs between different policy options. For ICES as an organisation – this development can be described as a voyage with many challenges.

As one step on the voyage, the Strategic Initiative on the Human Dimension in Integrated Ecosystem Assessments (SIHD) was initiated in 2015, with the aims to support the inclusion of human and social sciences in ICES IEA work. This is an extensive amount of knowledge to grasp, whereof some knowledge is probably more useful than other knowledge from ICES point of view. In the following this knowledge base is referred to as “human dimension”, which is a term vague enough to enclose what is needed although the term can definitely be questioned.

To facilitate a useful support – it was important to take stock of the current situation as well as the need for support. During the Workshop on Activity Planning of SIHD (WKAPSIHD) in February 2016 it was proposed and decided that SIHD would survey the opinions and needs expressed by the chairs of the IEA groups. In addition, all other groups would be approached with the aim to determine which human and social sciences are relevant for several purposes in the ICES organisation.

## 2 Method

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A questionnaire was developed in the spring of 2016 by the SIHD core group, tested and coordinated with the ICES secretariat as well as the ICES Ecosystem Approach coordinator. The questionnaire was distributed by mail to the chairs of all ICES groups (of any type) on the 15 June with a deadline end of July. One reminder was sent on 12 July. The chairs were encouraged to discuss with colleagues in the group before answering – but not to delay the reporting date due to that.

All chairs and co-chairs of Expert Groups and Workshops in 2015 (194 people) were invited to respond representing a bit over 100 groups and over 30 workshops.

There were 89 people who started to answer the survey, whereof 56 people from 54 groups finished the entire questionnaire.

The compiled answers are presented in the Annex 1.

## 3 Main result

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The ongoing activities to integrate human dimensions in IEA groups are rather limited according to the survey results. Only two of the IEA groups reported ongoing activities: WGIAB and WGNARS.

However, there are also other groups that report involvement of “human dimensions”, such as WGMPCZM and WGHIST.

The expertise available in the 14 groups that reported current activity are anthropology, economics, sociology, history, geography, environmental studies, political science, public administration, law, management, cultural studies, and social work. Four groups reported that they have no human dimensions expertise. There is a gap between available and need expertise.

The additional needs of expertise, within the frame of the current Terms of References of the groups, and the purpose of the demand were also reported. The IEA groups expressed a need for expertise from environmental studies, economics, cognitive science, public administration and political science.

The other group chairs reported needs for economics, information science, sociology, cultural studies, geography, philosophy, public administration, environmental studies, political science management, business studies, international studies, law and social work.

The answers regarding the purposes of the needs (Table 5) vary in how specific they are expressed: from general to very specific. However, it seems as some groups ask for researcher's to be include in the development of something new, while others would rather prefer a kind of consultant educated in social sciences that can communicate the already developed knowledge available to stakeholders and the general public. An example of the latter is the answer that the additional expertise is needed to "make results available for the public".

Looking ahead, it is also important to know how people foresee the need of expertise from social science (human dimension). In the question of additional needs within the next three years (Table 6) the IEA groups reported environmental studies, economics, cognitive science, political science and public administration. The other groups reported economics, information science, sociology, cultural studies, geography, economics, environmental studies, international studies, law, political science, education, management,, cognitive science and business studies.

Barriers that have been experienced in bringing in other than natural scientists into the ICES work, were mentioned by 14 groups (Table 7). The main barrier mentioned is the lack of funding, and the work involved in obtaining funding. Other barriers were the limited openness of the people already involved in EGs to other disciplines and a third issue is how to motivate social scientists in general to join ICES EGs. For example, why should they travel and engage when they are only asked for a specific task in a ToR of a group.

There is concrete support that would be appreciated to facilitate integration of other scientists. Many chairs report that funding is needed. Other answers focus on how the organisation functions. For example it has been suggested to have more disciplinary diversity in bodies like the Council. Second, many ask for more integration between groups by various methods. For example it would help if more people knew what is actually is going on in other groups or which expertise is available in the ICES network.

The advantages that can be gained by a group of integrating societal knowledge were reported. It is clear that not only IEA-groups can see advantages (Table 9). A very diverse list of suggestions was made how each group can contribute to future IEA work.

The opinions regarding integrating human dimension and interdisciplinary work within ICES are generally very positive among the respondents (Tables 10 and 11). The answers

were coded by us, and 34 of 54 chairs are strongly in favour, additionally 16 are positive, while only 4 express other opinions (negative or strongly against).

On the questions whether the respondents have experience on working interdisciplinary with natural, social sciences and humanities 36 people answered YES, and 22 answered NO.

The demographics of the respondents are 38 men (mean age 49 years) and 18 women (mean age 42 years). The majority of the respondents indicated a natural science background

## 4 Conclusions

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The results reveal issues of importance for the integration of human and social sciences in ICES. However, it is important that the results are not regarded as representative for the whole ICES community as one can suspect that people who answered the survey are more involved and also more in favour of including human and social sciences in ICES work.

This report can be regarded as a baseline. It can be used to guide actions in ICES. Possibly, it can also be repeated in the future to follow up on the steps that will be taken – and the directions that will be chosen.

With the ICES aim to increase involvement of human and social science in the ICES IEA work following recommendations can be made:

- **To the ICES leadership:**
  - Further promote the engagement of human and social sciences in all structural layers of ICES.
  - ICES leadership should establish and strengthen working relationships with communities, organizations and societies in the realm of social sciences and humanities.
- **To the ICES secretariat** – develop support for increased transparency between groups, to be available for all group members. For example a web-page built on a database where the work of all groups can be searched and an expert database, e.g. similar to [www.oceanexpert.net](http://www.oceanexpert.net)
- **To the SIHD group:**
  - Focus on current or future IEA groups and their needs to be able to develop the work in an integrated way.
  - Formulating specific tasks for the near future in collaboration with other groups
    - e.g. organizing a topical workshop in collaboration with WGHIST.

In general lack of funding has been mentioned by many scientist as a barrier for participating in workshops and other new activities. The SIHD is actively pursuing funding for this through a COST application.

## Annex 1: Compilation of answers from the questionnaire

### A. Ongoing activities to integrate “human dimension”

#### Tables 1, 2 and 3

**Table 1. Groups with ongoing activities and the major aims of the groups (item 4 and 3 in questionnaire).\***

	Group	Major aim of the Group	Activity
1	WGIAB ICES/HELCOM WG on Integrated Assessments of the Baltic Sea	support integrated assessments of the Baltic Sea ecosystem	we are developing case studies on how to include the human dimension in integrated assessment starting from conceptual models
2	WGNARS WG on the Northwest Atlantic Regional Sea	Expanding the capacity to conduct IEA within the Northwest Atlantic (Canadian and US waters)	The working group has had anthropologists, economists, and other social scientists involved since its inception in its work on developing IEAs
3	WGEEL Joint EIFAAC/ICES/GFCM Working Group on Eels	Stock assessment of European eel	EIFAAC has a socio-economic remit but there has been little work on this area in recent years
4	HAWG Herring Assessment Working Group for the Area South of 62° N	catch advice for herring	predicting intermediate year catch involves guessing fishing behaviour in some cases, but no social science input is used.
5	WGCEPH Working Group on Cephalopod Fisheries and Life History	Analyse trends in cephalopod fisheries and describe life-history traits and ecology	Cephalopods are increasingly important for small-scale fisheries across Europe. Data is being collected with the purpose to assess the socioeconomic importance, and dependence on, cephalopods fisheries in Europe, mainly for small-scale artisanal fisheries
6	WGHIST Working Group on the History of Fish and Fisheries	Demonstrate benefits of marine historical ecology to marine policy and management, provide quality-assured historical metadata to the science community, and address social, cultural and economic dimensions through time	ToRs specifically require us to address social, cultural and economic dimensions gleaned from historical and long-term data. Due to lack of space here, please refer to WGHIST webpage for details.
7 P1	WGMPCZM Working Group for Marine Planning and Coastal Zone Management	Looking at Maritime Spatial Planning from analytical, conceptual and practical perspectives covering approaches, tools, procedures, data and research needs, components of quality assurance and inclusion of socio-cultural aspects into planning	Yes, the group itself is transdisciplinary, covering representatives from different fields in natural and social sciences as well as representatives from public administrations responsible for MSP at national level in ICES Member States
7 P2	WGMPCZM Working Group for Marine Planning and Coastal Zone Management	Legislative and policy implementation of planning initiative.	
8	WGSEDA Working Group on Social and Economic Dimensions of Aquaculture	Identify and address central social and economic aspects of aquaculture	group consists mainly of economists, social scientist as well as biologist
9	WGVHES Working Group on the value of Coastal Habitats for Exploited Species	quantifying the value of coastal habitats for exploited species, characterising the relation between habitat, individual processes and population responses and investigating how	for now there is a focus on human impact in coastal areas on coastal dependent life stages; in the future tools for management of coastal habitat for exploited species are topic

		habitat considerations can be incorporated into tools used in the management process	
10	WKBNCS Workshop on Bayesian Belief Network Case Studies	Development and testing of Bayesian Belief Network model to evaluate the spatial management performance	Biologist, social scientists, fisheries scientists
11	WGEAWESS Working Group on Ecosystem Assessment of Western European Shelf Seas	To develop integrated ecosystem assessments of Celtic Seas and Bay of Biscay and Iberian Peninsula ecoregions.	We now have some social scientist and economist for some sub-areas in our region but are trying get more people involved from other ICES groups such as ICES WGRMES to cover all the study area
12 P1	WKDEICE Workshop on DEveloping Integrated AdvICE for Baltic Sea ecosystem-based fisheries management	Developing Integrated Advice for the Baltic	economics, communication specialists
12 P2	WKDEICE Workshop on DEveloping Integrated AdvICE for Baltic Sea ecosystem-based fisheries management	Develop operational ecosystem based fisheries advice	integration of economy (as human dimension) as a part of future integrated advice
13	WGFTFB ICES - FAO Working Group on Fishing Technology and Fish Behaviour	Understand and improve survey and commercial fishing gears	Recently we were looking at why some technological inventions in fishing technology were not readily accepted by the fishing industry
14	COUNCIL	steering of ICES	within council, discussions take place if the human dimension need be included more in ICES science and advice, and if so: how?

\*for two groups (7 and 12) there were more than one report, here represented as P1 and P2 (person x)

**Table 2. The currently available expertise from "human dimension" for each group above (item 5).**

1	None						
2	Anthropology	Economics					
3	None						
4	None						
5	Sociology						
6	History						
7 p1	Geography	Environmental Studies	Political Science	Public Administration	Sociology		
7 p2	Law	Public Administration	Management	Political Science	Sociology	Cultural Studies	Environmental Studies
8	Economics	Environmental Studies	Geography	Sociology	Political Science		
9	Management						
10	Management	Environmental Studies					
11	Economics	Sociology	Social Work				



12 p1	Economics	Media Studies					
12 p2	Environmental Studies	Economics					
13	None	None					
14	Other (please specify)	None					

**Table 3. The groups also reported the reasons to have the specific expertise in the group (item 6).**

2	Develop conceptual models and indicators of human well being						
4	stock assessment	biology	management strategy evaluation				
5	human dimension of small scale artisanal fisheries						
6	To place historical data in its appropriate context, and to ensure that different perspectives on past change are heard during working group discussions. Also, to understand social-ecological systems and the intrinsic links between humans and marine syst						
7 p 2	Implementation of marine planning initiatives is done through legislation and policy of competent authorities	Administration hold the primary accountability and responsibility for planning and implementation	Planning and implementation processes is a management construct informed by science	Planning policy priorities are established by political processes within a legislative context	Social sciences are needed to develop methods to properly assess societal values and ecosystem services	Traditional and cultural uses and values are protected by legislation and need to be properly assessed	Generally, environmental studies with a focus of socio-ecological linkage is needed
8	identification of central economic indicators of aquaculture	integrative assessment of effects of aquaculture	identification of spatial effects and outcomes of aquaculture	identification of central social indicators of aquaculture	assessment of framing conditions relevant for aquaculture		
9	fisheries mgmt						
10	Determine requirements for mgmt	ensuring broad applicability of models					
11	It is essential for developing integrated ecosystem assessments and it helps for involvement of stakeholders						
12 p 1	? to include economics	? To develop better communication strategies					

12	Propose ways to incorporate an indicator approach into the present advice	Suggest ways to incorp. human dimension (e.g. socio-economic conditions) into future integrated advice					
13	CHange management in capture fisheries						
14	This is not an expert group and I lack a good overview of my colleague delegates; I expect that few have a background other than natural science						

## B. Additionally needed expertise from social sciences

### Tables 4, 5 and 6

Table 4 reveals the needs within current ToR for 17 of the groups (from item 7).

WGIAB ICES/HELCOM. WG on Integrated Assessments of the Baltic Sea	Environmen-tal Studies	Economics	Cogni-tive Science				
WGIBAR WG on the Integrated Assessments of the Barents Sea	Public Admin.	Political Science					
WGEVO Working Group on Fisheries-Induced Evolution	Economics	Information Science	Sociology	Cultural Studie	Geogr aphy	Philoso phy	Public Admin
JWGBIRD Joint OSPAR-HELCOM/ICES WG on Seabirds	Sociology						
WGBFAS Baltic Fisheries Assessment Working Group	Environmen-tal Studies						
BEWG Benthos Ecology WG Group	Economics	Political Science					
WGCEPH WG on Cephalopod Fisheries and Life History	Economics	Sociology					
WGRECORDS WG on the Science Req. to Support Conserv., Restor. and Mgmt of Diadromous Species	Economics						
WGHIST WG on the History of Fish and Fisheries	Economics	Management	Sociology				
WGM BRED WG Marine Benthic and Renewable Energy Developments	Information Science						
WGSEDA WG on Social and Economic Dimensions of Aquaculture	Sociology	Cognitive Science	Cultural Studies				
WGMPCZM WG for Marine Planning and Coastal Zone Management	Business studies	Economics	Cogni-tive Science	Internatio-nal Studies	Law		

WGEAWESS WG on Ecosystem Assessment of Western European Shelf Seas	Economics	Sociology	Social Work	Management			
WKDEICE WS on DEveloping Integrated AdvICE for Baltic Sea ecosystem-based fisheries management	Business studies	Law	Sociology				
WGFTFB ICES - FAO WG on Fishing Technology and Fish Behaviour	Cultural Studies	Cognitive Science	Management				
WKCOSTBEN WS on cost benefit analysis of data collection in support of stock assessment and fishery mgmt	Environmental Studies	Management					
COUNCIL	)						

**Table 5. The purposes for the need of additional expertise with current ToR (item8).**

WGIAB ICES/ HELCOM	contribute to developing ecosystem based management models				
WGIAB	to make results available for the public		to make results available for the decision makers		
JWGBIRD	Advice on reduction of bycatch of seabirds in fisheries gear would benefit from sociological/anthropological expertise				
WGBFAS	Integration of ecosystem aspects				
BEWG	Assess value of the resource	social dimension to illustrate the value and seafloor functions			
WGCEPH	determine management options that would be economically and socially sustainable		determine management options that would be economically and socially sustainable		
WGRECORDS	In the future (not part of current ToRs), EGs under the umbrella of WGRECORDS would likely benefit from cooperation with economists, to approach e.g. Science Plan priority 8 about ecosystem goods and services which is an issue for many diadromous species.				
WGHIST	To provide a perspective on the role of markets and trade in the historical exploitation of marine species, and aid interpretation of such data.	We lack expertise in how human dimensions are currently used or expected to be used in ICES and marine policy more broadly.		Many of WGHIST's conversations would benefit from a social science perspective, as would our interdisciplinary work.	
WGMBRED	Network analysis				
WGEDA	gain more diverse views of social science on topic	understand rationalities for decision-making and public perceptions on aquaculture	gain insights why aquaculture set-up differs between countries		
WGMPZM	Business	Economic impacts of	Need to	Planning	Need to

	and industry will be the ones that will need to develop and implement measures to achieve planning objectives	planning objectives and management measure implementation is needed	understand the cognitive processes involved in planning and decision-making	depends on a mix of national legislation and international agreements and treaties	understand legislative requirements related to human rights and competent authority
WGEAWESS	We need more economist that bring us their expertise in other areas of this region	We need more social scientist that bring us their expertise in other areas of this region	We need more social scientist that bring us their expertise working with stakeholders in other areas of this region	Getting managers on board could help for interesting discussion about the practicalities of our work.	
WKDEICE	To evaluate consequences of Advice at fisheries/fish processing from business (enterprise) point of view		to evaluate law framework and fit in to MoU (ICES-EU)	to evaluate consequences of Advice for fisheries community	
WGFTFB ICES/ FAO	Help elaborate why fishing industry often resist to changes in technological development				
WKCOSTBEN	Define important data needs to assess effects of the environment on fish stocks			Define how management prioritize input data to stock assessment and advice	
COUNCIL	I think this question does not apply to council, although I think it would be good to have more of a diversity in council (expertise, women)				

**Table 6. Expected need of additional expertise from social sciences (item 9) within the next three years, and the purposes (10).**

GROUP	NEEDED DISCIPLINES					PURPOSE	
WGIAB ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea	Environmental Studies	Economics		Cognitive Science		contribute to developing ecosystem based management models	contribute to developing ecosystem based management models
WGIBAR Working Group on the Integrated Assessments of the Barents Sea	Political Science	Public Administration				to make the results available for the decision makers	to make the results available for the public
WGEVO WG Group on Fisheries-Induced Evolution	Economics	Information Science	Sociology	Cultural Studies	Geography	input on how to link eco-system services	how to communicate science to stakeholders
HAWG Herring Assessment WG- for the Area South of 62° N	Sociology	Economics	Environmental Studies			To provide integrated advice	
JWGBIRD Joint OSPAR/HELCOM/ICES WG on Seabirds	International Studies					Discussions on establishment of MPA in in international waters, or crossing national jurisdictions-	
WGBAST Assessment WG on Baltic Salmon and Trout	Sociology	Political Science	Sociology	Economics		Issues associated to compliance of fishing regulations including the catch reporting	Issues associated to political decision making
WBFAS Baltic Fisheries Assessment Working Group	Environmental Studies					Intergration of ecosystem aspects	
WGMME WG on Marine Mammal Ecology	Economics	Sociology	Law	Political Science		Need may be too strong a word BUT i think we miss a trick by not integrating information on costs and benefits of actions	Similarly management for conservation and sustainable exploitation implies public and stakeholder consent and we need to understand their attitudes
BEWG Benthos Ecology WG	Economics	Education	Management				
WGRECORDS WG on the Science Requir. to Support	Economics					See answer Table 5.	

Conserv. , Restor. Mgmt of Diadromous Species							
WGBOSV ICES/IOC/IMO WG on Ballast and Other Ship Vectors	Economics						
WGHIST WG on the History of Fish and Fisheries	Economics	Management	Sociology			As our current ToR. As previous response, and current ToR.	
WGMBRED WG on Marine Benthic and Renewable Energy Development	Information Science					Network analysis	
WGSAM WG on Multispecies Assessment Methods	Economics					To examine Max. Econ. Yield and MSY from a multispecies perspective-	
WGSEDA WG on Social and Economic Dimensions of Aquaculture	Sociology	Cognitive Science	Cultural Studies			critically review and reinforce findings on social indicators	understand better role of intangible values on decision-making/consumer preferences
WGVHES WG on the value of Coastal Habitats for Exploited Species	Management	Economics				when tools are to be developed the users need to be involved	when tools are to be developed the users need to be involved
WGMPZM WG for Marine Planning and Coastal Zone Management	Law					The group will likely explore this aspect more closely	
WKDEICE WS on Development. Integr. Advice for Baltic Sea ecosystem-based fisheries management	Economics	Law				to cover the expected work load more experts are needed	legal aspects need to be covered
WKDEICE WS on Development. Integrated Advice for Baltic Sea ecosystem-based fisheries management	Business studies	Law	Sociology				
WGFTFB ICES - FAO WG on Fishing Techn. & Fish	Cognitive Science	Cultural Studies	Management			As in Question 8, (here Table 5).	-

Behaviour							
COUNCIL	Other (please specify)					As in Question 8, (here Table 5)	-

Following groups reported NONE which also was the default:

- WGNARS Working Group on the Northwest Atlantic Regional Sea
- ACOM
- IBTSWG International Bottom Trawl Survey Working Group
- WGALES Working Group on Atlantic Fish Larvae and Eggs Surveys
- WGBIFS Baltic International Fish Survey Working Group
- WGBIOP Working Group on Biological Parameters
- WGCATCH Working Group on Commercial Catches
- WGCCBOCS ICES/PICES WG on Climate Change and Biologically-driven Ocean Carbon Sequestration
- WGCEPH Working Group on Cephalopod Fisheries and Life History
- WGCNAN Working Group on Crangon Fisheries and Life History (2001 C.Res)
- WGEAWESS Working Group on Ecosystem Assessment of Western European Shelf Seas
- WGEAGS2 Working Group 2 on North Sea Cod and Plaice Egg Surveys in the North Sea
- WGERAAS Working Group on Effectiveness of Recovery Actions for Atlantic Salmon
- WGEVO Working Group on Fisheries-Induced Evolution
- WGFASST Working Group on Fisheries Acoustics Science and Technology
- WGIPS Working Group of International Pelagic Surveys
- WGITMO Working Group on Introductions and Transfers of Marine Organisms
- WGMEGS Working Group on Mackerel and Horse Mackerel Egg Surveys
- WGMHM Working Group on Marine Habitat Mapping

- WGMPCZM Working Group for Marine Planning and Coastal Zone Management
- WGMS Working Group on Marine Sediments in Relation to Pollution
- WGNEPS Working Group on Nephrops Surveys
- WGOH Working Group on Oceanic Hydrography
- WGSAM Working Group on Multispecies Assessment Methods
- WGSFD Working Group on Spatial Fisheries Data
- WGZE Working Group on Zooplankton Ecology
- WKARA2 Workshop on Age reading of European anchovy (*Engraulis encrasicolus*)
- WKARGH Workshop on Age Reading of Greenland Halibut (*Reinhardtius hippoglossoides*)
- WKBNCs Workshop on Bayesian Belief Network Case Studies
- WKCOSTBEN Workshop on cost benefit analysis of data collection in support of stock assessment and fishery management
- WKFICON Workshop on Fish Condition
- WKSUREP Workshop to establish reporting guidelines from survey group



## C. Barriers to bring in other than natural scientists

**Table 7**

**Table 7. Experience in group of Barriers to bring in other than natural scientists (item 11).**

The italic-format below of the barrier is done in the work with this report.

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Not as such in that we haven't tried it yet. Do I think there will be barriers, yes. I think the majority of *biologists still see social sciences as a nice but inessential add-on, at best*. Secondly, the barriers are still there *is ICES. We have not fully embraced (possibly no at all) the idea that advice can extend beyond biology and environment*. We promote integrated ecosystem monitoring, assessment and advice but we are still a LONG way from doing it. BSG is looking at how o include marine mammal and sjhark bycatch in fishery advice but (as far as I can tell) it hasn't begun to consider management options and their possible social/economic effects

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Could be *different views on this in main countries taking part* (Norway vs. Russia)

none but we expect that the usual issues that scientists undergo (*lack of time, lack of funding*) would apply to them

We have not required help from experts other than natural scientists. The only problem that I have experienced in getting other experts involved in other working groups is obtaining *funding for their participation*. The work is rarely part of the job, so they find it difficult to get travel funding.

No we do not experience or expect any barriers. This a fundamentally interdisciplinary group. We do, however, suffer from a *lack of funding* to encourage people to attend the annual meeting. As such, we cannot guarantee that we will always have the relevant range of expertise or the same people from year to year. The Chairs are trying to address this by contacting individuals that we wish to engage with several months prior to the annual working group meeting, and to either commence email dialogues or make full use of video conferencing facilities during meetings. This has been especially useful to make contact and include experts from North America in meeting discussions.

The main barrier to involve people is the *lack of funding* for travels to Meetings. Many Research institutions (in particular those outside a fisheries specific Background and generally universities) do not have the funding ready to allow social scientists to join ICES Meetings. In addition, in many cases social sciences are significantly weaker in terms of funding than natural sciences. A second barrier is that rarely people are able and/or willing to travel to a meeting where their interest is only in one ToR, while other ToRs do not reflect their expertise. However, *for a good discussion and integration of the various expertises, a dialogue beyond specific issues is necessary in order to generate a joint problem understanding of the group and thereby develop an integrated view within the group. According to experiences this also requires openness, time and regular attendance of WG meetings rather than just getting expertise in for just one meeting*. A third barrier is that ICES in the perception of most coastal and marine scientists is *purely fisheries oriented* and not seen as an interesting network for social (and many oceaographic/marine) scientists. I observe slight changes in this perception and a slightly increasing interest by social scientists to get involved over the last years, however, I think, *ICES here still has a problem with its image*.

Yes, as *social science is generally not very aware of ICES*, so the institutional support of colleagues participating in WGs is very limited - and often already hampered by *not gaining permit to attend*. No merits seen by their peers of working for ICES.

Generally, people involved in disciplines other than the natural sciences do not have *the research funding to attend working group meetings and workshops*. In addition, most experts outside the natural sciences see ICES as a marine science organization and do not see the pertinence of their disciplines. Finally, we still have way *to much natural sciences and modelling presentation in the workshops and conferences organized by ICES*. I am even of the view that I will be curtailing my participation given the relevance of these discussions. The future implementation of marine planning and EBM will be legislative and policy issues and not a natural science or social science only issue.

*funding* is a major problem - but not only for non-natural scientists

We welcome social scientist to the group.

the biggest barrier is that without more involvement of scientists other than natural scientists, it is very difficult for ICES to be attractive to no-natural scientists: a catch-22

Focus should still be on natural scientists and my experience is that scientists with other backgrounds may try to dominate and thereby distract from the main focus

My group is a technical stock assessment working group. We mainly need expertise on population modelling and

analysis of fisheries data. The work is technical and challenging and requires expertise and experience in specific areas. There is generally no time available to consider other scientific dimensions albeit these may be interesting to pursue in the future.

None, as we do not consider this area within our ToR. If we were to consider this area, our wide membership including EIFAAC means we are well placed to co-opt appropriate expertise.

## D. Support needed to facilitate integration of other scientists

### Table 8

**Table 8. Concrete support that would be appreciated to facilitate integration of other scientists (item 12). The answers are regrouped in themes.**

A more deliberate choice by member states when it comes to appointing delegates to council: favouring diversity

possibly an ICES workshop where we can meet and discuss on how to collaborate  
exchange of ToRs / products of ToRs and thereby mixing WG participations

Specific expertise on current frameworks and approaches to integrating information into management and policy, expertise on ICES policy frameworks, especially IEAs. Funding for travel/accommodation. Also, for a part of the ICES website to list the different expertise of ICES-affiliated researchers/working group participants, and their contact details if they are interested in being approached by ICES working groups.

scoping for overlapping contents with other ICES groups and extracting targeted recommendations for scientists to engage in certain activities. WG group names do not reflect the ToRs and if one is not already involved in an initiative one can not have the overview of potential synergies or overlaps

I think that working in collaboration with other existing WG is a good practise. At this stage we are trying to learn from other groups and also presenting them our work, looking for synergies and common interests that could facilitate this integration

ICES workshops to support the integration are useful (as has already been arranged previously)

Contacts and examples of potential applications used in other ICES assessment working groups

It would be useful for other scientist to present their science to the group so that we can discuss how it could be useful to integrate with our analytical approaches and advisory products in the future.

List of contacts with expertise

A list of useful contacts, as a starting point for finding specific scientists to collaborate with

Cooperation and exchange of ideas with EG Advice Drafting Group and WGBFAS

Expertises of the fishing gear technologists are needed.

Economics and environmental studies

Feed-back with others WKs and WGs

Join the topic group on Change management in fisheries

Increased access to oceanographers/modelers to address some of the issues facing our group regarding identification of main drivers behind the temporal and geographic changes being observed with NEA mackerel during the triennial survey.

The immediate need of our group is on having more scientists with strong analytical/modelling skills involved.

I don't think specific support is needed but it would help to have a steer from the top, encouraging the broadening of ToRs to take into account the value which could be added by integrating biological/environmental and socioeconomic information into assessment and advice and thereby genuinely offering Integrated Ecosystem Assessment and Advice

This could possibly be bringing the socio-economic dimension in when doing management strategy evaluations

join workshops and joint analytical publications on current issues e.g. MPA's ( we are currently assessing the role of ecology and benthos) human dimension aspects will be useful to cascade the message.

Currently, we have no specific needs for the integration of other scientists. However, in general terms, we think that ICES Secretariat could forward to the whole ICES community specific calls for interest of Expert groups looking for some specific expertise.

In case other scientists will be involved in EGs under the umbrella of WGRECORDS in the future, it would be good to get support from ICES or help to find appropriate persons if this turns out to be problematic for national laboratories/universities to arrange.

To provide funds to the ICES working groups to facilitate the meeting between different scientists.

Travel funding

Financial support for travels and meetings. Special sessions in ICES annual meetings set up in topics that can connect natural science and social science.

Funding

Support for travel /accommodation (and not only limited to young scientists), creation of platforms for dialogue at ASCs other than formalized sessions

Any support to travel to meetings would be appreciated.

Better funding for colleagues outside the usual suspects institutions, support of joint publications so that these institutions realize the benefit of their researchers to participate in these groups

Funding is the key impediment as explained earlier. Re-branding ICES toward management and the other sciences.

More resources (financial, time for more analysis, experts)

money

Financial and logistic support of the expansion of our group towards the topic Fish and Human Health , which could include medicine (fish as a source of benefits and risks for human health in developed countries) and social sciences (fish for food in developing countries).

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## E. Advantages that can be gained and contributions to made

**Table 9**

**Table 9. The Concrete advantages that can be gained by the group by integrating societal knowledge more (item 13) and what the group can contribute with to an IEA (item 14).**

GROUP	ADVANTAGES	CONTRIBUTIONS TO IEA
WGIAB ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea	The group has recognised this as an important point for further development of integrated assessment systems and ecosystem based management	development of food web models, assessment systems, indicators, understanding of ecosystem structure and function
WGIBAR Working Group on the Integrated Assessments of the Barents Sea	WE are not at this stage of development and understanding of ecosystem	WGIBAR perform integrated analyses of more than 50 datasets (including pressures and drivers) to examine and document past and current changes in the ecosystem. WGIBAR prepare an updated annual status report of the Barents Sea ecosystem based on the integrated analysis and disseminate the results. WGIBAR develop the additional analytical tools to EIA.
WGNARS Working Group on the Northwest Atlantic Regional Sea	The group feels that linking outcomes directly to human well-being is likely to provide analysis in terms most relevant to resource managers.	We are currently contributing to IEA development in the region by exploring conceptual and qualitative models and their usage.
WGEVO Working Group on Fisheries-Induced Evolution	the work will be much more inclusive and touch many sectors of the society and will be much more closer to the needs of the public/society at large	provide the basis for merging natural sciences with environmental humanities
AFWG Arctic Fisheries Working Group	Not sure	Yes with fisheries assessments
HAWG Herring Assessment Working Group for the Area South of 62° N	top-to-bottom knowledge exchange and buildup + development and support for policy decisions	Biological knowledge on the pelagic ecosystem, expected outtakes and predator-prey interactions, to a lesser degree market value and fleet behaviour.
IBPMegrim Inter-Benchmark Workshop on Megrim ( <i>Lepidorhombus whiffiagonis</i> ) in Divisions VIIIb-k and VIIIA,b,d (West and Southwest of Ireland, Bay of Biscay)	none	This was a specific group with some specific ToRs. All of them were achieved. So this question is not applicable to the WG.
JWGBIRD Joint OSPAR/HELCOM/ICES Working Group on Seabirds	Better advice, with a greater chance of being implemented in practice	Indirect impacts on non-exploited top predators (seabirds)
NWWG North-Western Working Group	none	advice to managers on the sustainable harvest of marine resources
WGBAST Assessment Working Group on Baltic Salmon and Trout	To better understand the information needs coming from fisheries managers and also learn managers the regular concepts of fisheries science. And also	So far only in biology.

	improve the understanding on fishers behaviour (economic and social) among scientist.	
WGBFAS Baltic Fisheries Assessment Working Group	unclear	Knowledge/experience on single stock assessment
WGBYC Working Group on Bycatch of Protected Species	Nothing that I can think of in the near term. This could change if the EC were to ask WGBYC different questions that include (+/-) impacts to communities.	If social scientists were involved the group could contribute the value of ecosystem services provided by marine mammals and other charismatic species of interest to local and regional communities.
WGCSE Working Group for the Celtic Seas Ecoregion	Managing fish is about managing people . At the moment we only consider the biological dimension in the fisheries advice we provide. The economic and dimension need to be also taken into account by managers when they are making decisions. Often the information base is lacking, there is an opportunity in my view for ICES to develop economic and social indicators which can be used to track change and also to predict impacts associated with the biological advice.	Single stock assessments track changes in community structure and productivity. Fishery dependent data can be used to look at changes in fleets and fisheries. Knowledge of the fisheries can be used to inform IEA. The process would have to take place outside the normal EG in a benchmark process like WKIRISH
WGEEL Joint EIFAAC/ICES/GFCM Working Group on Eels	None at present. The assessment and stock advice are deliberately targeted towards the conservation of the stock and management of exploitation, and deliberately avoid the socio-economic arguments.	Good question. Our group deals with a single stock which is primarily exploited in targeted fisheries, with little bycatch or environmental impact because of gear types. However, we have limited knowledge of bycatch of non-target species, or of bycatch of eel in other fisheries. Also, we have limited knowledge of the role of eel in the ecosystem, either as a predator or prey, so it is difficult at present to fit it into an IEA. We would appreciate help to improve this situation.
WGMME Working Group on Marine Mammal Ecology	The working group could gain a broader view of its subject area. However the main benefit would be to ICES itself, through the potential to provide much better advice: allowing it to specify not just the best management options from a biological point of view but their social and economic implications, ease of implementation and likelihood of success - allowing those responsible for management to make more informed choices and NOT leaving them to reach a compromise between narrow science-based advice and the lobbying	(Hypothetically, if we had the expertise) Knowledge on - costs and benefits of management actions pertaining to marine mammals (and of failing to take action); quantification of Ecosystem Services provided by or impacted by marine mammals - public perceptions - legal and implementation issues with current legislation
WGNAS Working Group on North Atlantic Salmon	None	Examples of quantification of uncertainty and risk within stock assessments
AFWG Arctic Fisheries	Better legitimacy of results vs.	We do so in cooperation with WGIBAR.

Working Group	stakeholders	Our group gives a lot of background on ecosystem functioning in the report. However, most group members still consider Integrated Ecosystem Management as something very fuzzy and thus the enthusiasm for IEA is also limited. Lots of bridges to build still between people focusing on management advice and those giving IEA-status reports which have very limited practical impact at the moment.
HAWG Herring Assessment Working Group for the Area South of 62° N	better understanding of fishing behaviour, but it is not clear if social science is the key to unlocking this.	abundance and biomass of key forage species, fishing rates on same.
BEWG Benthos Ecology Working Group	Better integration and communication of scientific outputs	Benthic assessments (cause-effects relationships) benthic functions and services
WGCCBOCS ICES/PICES Working Group on Climate Change and Biologically-driven Ocean Carbon Sequestration	The main theme of our working group is to evaluate the biologically-driven ocean carbon pumps, which sequestering CO <sub>2</sub> into ocean and thus alleviate global warming effect. By including societal knowledge, we may better evaluate the economic values of the ocean carbon pumps, and more efficiently deliver our findings to the public and to the policy makers.	Our working group aims to evaluate our current understandings of biologically-driven ocean carbon pumps, and provide advice to develop protocols and new experimental and modeling methods to improve our knowledge, under background of global change. Thus we may contribute to the Integrated Ecosystem Assessment particularly with first-order estimate of the amount of carbon sequestered by the marine ecosystems, and suggestions how it may response to the climate change.
WGCEPH Working Group on Cephalopod Fisheries and Life History	Help to realize the societal importance of Cephalopod fisheries within regional context. Help developing more appropriate management measures.	Specific human activities related to the exploitation of these resources in the ecosystem and ecological importance of cephalopods.
WGERAAS Working Group on Effectiveness of Recovery Actions for Atlantic Salmon	Can't see any in the context of WGERAAS	Expertise on diadromous fish and linking marine-, fresh-, and transitional-water ecosystems
WGEVO Working Group on Fisheries-Induced Evolution	Potentially evaluating the economic utility of exploited fish stocks and thus evaluate the economic loss due to Darwinian evolution induced by fishing	Our group can contribute the genetic and evolutionary dimension of ecosystems
WGOH Working Group on Oceanic Hydrography	n/a	We can offer the best analysis of existing physical data and interpretation of physical data and its likeley quality and usefulness in any integrated assessment
WGRECORDS Working Group on the Science Requirements to Support Conservation, Restoration and Management of Diadromous Species	It would probably improve the communication with managers and decision makers, hopefully leading to improved management of individual species and ecosystems.	EGs under WGRECORDS are currently focused mainly on single species assessments. However, many diadromous fish have high habitat demands and are dependent on connectivity between different habitats, and therefore might suit as indicators for the status of e.g. riverine ecosystems. Our groups can also provide

		detailed knowledge to EGs working with IEA about abundances of diadromous species in time and space and their effects on other species etc. Status assessments and advice for diadromous fish do not only concern fishery exploitation but very often also habitat quality issues, and are therefore of significance also for ecosystem management.
ACOM	We gained the following advantages: 1. We collect data and knowledge from social scientists which are usually lacking. 2. Exchange experience and knowledge about similar topics or problems. 3. Gain understanding about what are the research priorities from natural and social sciences at the same time.	Our working group is currently developing frameworks, methods, tools to feed integrated ecosystem assessment for not only fisheries but also aquaculture.
WGZE Working Group on Zooplankton Ecology	See my comment to the question 11, please.	We may contribute to IEA in wider cooperation with other EGs and from the zooplankton community perspective.
WKTRUTTA2 Workshop on Sea Trout 2	No specific assistance with WKTRUTTA2, but other fisheries groups often consider social and economic issues surrounding fishery management but lack expertise in these fields	WKTRUTTA2 will cease to exist in August.
WGBOSV ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors	better integration between scientists and policy-makers	risk assessment for the introduction of aquatic invasive species by shipping activities
WGHIST Working Group on the History of Fish and Fisheries	A more tangible understanding of historical change in fish populations/markets, and a better interpretation of historical data to address contemporary concerns. Also, increased output of interdisciplinary publications resulting from collaborations at the working group. We are very interested in connecting historical work with contemporary needs. Many in WGHIST already work to this aim, but we hope to expand the value of WGHIST within ICES by working with those in SIHD and other WGs.	Contributing to IEAs is in our current ToRs. We can contribute understanding about long-term change in both ecological and human systems, as well as on interactions between these systems (e.g. understanding the impacts of both people and climate). We also have broad expertise in a very wide range of data resources and methodologies that we believe have value in expanding traditional approaches. However, we would welcome advice/expertise/discussion on how to practically contribute to IEAs or ways of encouraging the uptake of historical data by people working in IEAs.
WGITMO Working Group on Introductions and Transfers of Marine Organisms	N/A	knowledge and data on non-native species (spatial distributions, temporal dynamics, environmental impacts).
WGBRED Working Group on Marine Benthic and Renewable Energy Developments	More integration and societal relevance	Specific knowledge on underrepresented ecosystem component and processes and their management in relation to human activities such as energy developments
WGMHM Working Group on Marine Habitat Mapping	Practically none right now.	Yes

<p>WGMPCZM Working Group for Marine Planning and Coastal Zone Management Person 1</p>	<p>In case of WGMPCZM the focus is on a social process, which in reality MSP really is. It can only be covered meaningfully by including social science knowledge as well as including planning practitioners, in particular from public administrations (but without providing formal advice to governments, which would automatically reduce participation from administrations according to what we have been told by those participating over the years in the Group, for them it means to take up ideas and discuss outside their daily box and constraints and this is what they consider useful in the group)</p>	<p>What is an Integrated Ecosystem Assessment or better: What does ICES mean with the term aside from loose definitions? We can provide the perspective of social and administrative set ups of planning processes and how these processes deal with information, different types of knowledge etc. Furthermore WGMPCZM over the years has developed approaches to include socio-cultural perspectives in planning (and assessments), e.g. the Approach of Culturally Significant Areas in WKCES 2013.</p>
<p>WGMPCZM Working Group for Marine Planning and Coastal Zone Management Person 2</p>	<p>The integration of social knowledge is needed to develop policies and not to refine ecological models.</p>	<p>If the IEA is to include legislation, policy, economic, cultural and social impacts, then it can contribute.</p>
<p>WGMS Working Group on Marine Sediments in Relation to Pollution</p>	<p>WGMS is working for a better understanding/assessment of the impact of human activities on marine ecosystems, by focusing on sediment contamination (contamination of the sediment; contamination from the sediment through release of sediment-bound contaminants). Integrating societal knowledge could be a valuable tool: - to identify emerging issues (microplastics, renewables...) - to focus more on societal challenges/problems - to perform cost-benefit analyses of monitoring strategies (to protect sediments or to assess sediment contamination) - to help to make the link between scientific advice (e.g. monitoring strategy) and regulators, policy- and decision-makers.</p>	<p>Sediments are, literally, at the base of the ecosystem. Understanding of contaminant concentrations, fate, and behaviour is an essential component in our understanding of ecosystem health. WGMS includes experts in the fields of organic and inorganic marine geochemistry and can advise on knowledge gaps regarding fate and behaviour as well as on methodologies for monitoring and assessment of contaminants in sediments. A future ToR for the group may be to look at carbon storage in sediments, which would be of direct interest with respect to carbon cycling, ocean acidification and climate change; another could be the impacts of ocean acidification on contaminant (bio-)availability.</p>
<p>WGSAM Working Group on Multispecies Assessment Methods</p>	<p>More societal knowledge might assist with examining tradeoffs between management/societal objectives in a multispecies context. It is mainly identifying the objectives where this would be helpful.</p>	<p>Multispecies modeling methods, best practices, evaluation of management strategies.</p>
<p>WGSEDA Working Group on Social and Economic Dimensions of Aquaculture</p>	<p>Recommendations become more relevant and applicable - better understanding of the interlinkages of current complex problems and potential avenues to address these</p>	<p>Include the social and economic aspects, interests, values and drivers of ecosystem use and valuation</p>
<p>WGVHES Working Group on the value of Coastal Habitats for Exploited Species</p>	<p>when tools are to be developed the users need to be involved and a more diverse platform can be helpful</p>	<p>We have demonstrated the value of coastal habitat for ICES species by reviewing the use and the fraction of the total catch that has at least one life stage depending on coastal habitat. next steps</p>



		are scaling from life stage to population level and provide tools for management.
WKBNCs Workshop on Bayesian Belief Network Case Studies	The take up of the recommendations of the group	We aim to evaluate if pressures are managed in accordance with the management targets also counting in other factors which are currently not considered when describing the current state of human pressures. Once human pressures can be more accurately predicted their single or combined impact (pressure load) on ecosystem components can be assessed more precisely.
WGEAWESS Working Group on Ecosystem Assessment of Western European Shelf Seas	For developing IEAs, getting the human and societal knowledge as part of our work is crucial, since it is one of the main dimensions that we should account for in order to implement an ecosystem based management.	We are actually gathering information available in the area and also developing and applying methods to implement the IEA in our region
WKDEICE Workshop on DEveloping Integrated AdviCE for Baltic Sea ecosystem-based fisheries management	If you want to move towards integrated advice you will need to engage in social sciences - otherwise it is not integrated...	we try to make it operational
WKDEICE Workshop on DEveloping Integrated AdviCE for Baltic Sea ecosystem-based fisheries management	in case of WKDEICE are two main: setting the objectives for future advice , evaluation of consequences not only for fish stocks but for community and bussines	our main focus is to develop the Integrated Advice based on Integrated Ecosystems Assessment
IBTSWG International Bottom Trawl Survey Working Group	none	yes
WGALES Working Group on Atlantic Fish Larvae and Eggs Surveys	N/A	Specific survey protocols, results etc
WGBIFS Baltic International Fish Survey Working Group	None	Data delivering.
WGBIOP Working Group on Biological Parameters	No idea	by promoting improvements in quality of biological parameters from fishery and survey data underpinning the integrated ecosystem assessment approach.
WGCATCH Working Group on Commercial Catches	NA	Fisheries data products
WGEGBS2 Working Group 2 on North Sea Cod and Plaice Egg Surveys in the North Sea	none	information on principal spawning areas of fish
WGFAST Working Group on Fisheries Acoustics Science and Technology	none	survey methodology
WGFTFB ICES - FAO Working Group on Fishing Technology and Fish Behaviour	Better understand the issue from social science point of view.	This group has expertise in survey gear and technology.

WGIPS Working Group of International Pelagic Surveys	none	Highly resolved spatio-temporal distribution time series for small pelagics (herring, sprat, blue whiting, boarfish etc.) together with data on age, length, maturity etc. and habitat information (hydrography).
WGMEGS Working Group on Mackerel and Horse Mackerel Egg Surveys	I do not feel able to answer this and am not sure it is relevant. What exactly is meant by societal knowledge?	During the course of the triennial MEGS survey a vast amount of hydrographic data from the samplers is collected which would I imagine be extremely useful. There are in the region of 17 surveys that are completed over a 7 month period and cover a huge region which at its fullest extent ranges from Cadiz in the south up to Iceland in the North. There are also vast amounts of ichthyoplankton samples that are collected during these surveys that could potentially be utilised in other ways although resourcing this additional work would be the stumbling block I guess in pursuing this work. The potential would exist for the samples to be made available.
WGNEPS Working Group on Nephrops Surveys	Due to the nature of our group no immediate advantages are identified.	As part of one of our ToRs we aim to discuss the utility of UWTV and trawl Nephrops surveys as platforms for the collection of data for OSPAR and MFSD indicators. Nephrops UWTV surveys have a role in relation to benthic habitat monitoring and the collection of other environmental and ecosystem variables.
WKARA2 Workshop on Age reading of European anchovy ( <i>Engraulis encrasicolus</i> )	NONE	The aim of the group just contribute indirectly to the Integrated Ecosystem assessment by assuring quality in the demographic structure of the anchovy populations throughout European Northeast Atlantic and Mediterranean seas, which ultimately should improve the quality of the age structured assessments.
WKFICON Workshop on Fish Condition	Moving towards the multidisciplinary research on fish condition and human health, and more broadly, towards Ocean & Human Health (OHH) initiatives	Fish condition indices can provide new indicators for the integrated assesment of marine ecosystems
COUNCIL	The outside world is dealing with more complex and broader problems, that require a broader perspective from ICES, if ICES is willing to maintain its position as a relevant player. From this, enabling this broader perspective from ICES by including scientists that go beyond the traditional ICES crowd, is crucial to ICES's position.	not much, other than steering for more integrated approaches and ICES being relevant in these
WKCULEF The Workshop to address the NASCO request for advice on possible effects	Not relevant to work of group.	Not relevant

<p>of salmonid aquaculture on wild Atlantic salmon populations in the North Atlantic</p>		
<p>WGMS Working Group on Marine Sediments in Relation to Pollution</p>	<p>Not relevant</p>	<p>To answer</p>

## F. Opinion on integrating human dimension and/or interdisciplinary work within ICES

**Table 10 and 11**

**Table 10. Attitudes of integrating measured in frequency (coded by us from Table 11).**

ATTITUDES	CODE	FREQUENCY
Strongly in favor	5	34
positive	4	16
negative	3	2
Strongly against	2	1
Other:	1	1

**Table 11. Opinions reported in free text.**

CODE	REPORTED ANSWERS
4	Might be useful
5	A must!
4	Obviously this integration is needed somewhere.
4	Potentially important, but also potentially very difficult due to different traditions and language. 'Interpreters' (people with experience of such collaboration) would be useful!
3	I think considerations on economic consequences and possible social effects are best left to managers. ICES does not have the knowledge on local conditions to add this in any meaningful way.
4	I support the idea.
5	It is important start integrating interdisciplinary work within ICES!
5	I have a positive opinion of this if there are specific questions that are of scientific importance to Europe and it's coastal communities.
5	It think it would be useful provided that it is applied and not theoretical in nature.
4	Poses a challenge to the established role of providing scientific advice on the stock that is independent of the social and political considerations. If the remit changes then we would be supportive of this wider working.
5	It is essential, it has taken far too long to get to this point and it could be hugely beneficial
5	This is dependent upon the area of interest: i. The perception of the status of fish stocks/populations, the marine environment, the fishing industry and the TAC allocation process, in the eyes of management, the media and general public and at large. ii. The perception of stock status arising from those undertaking fishing activities. iii. Understanding scientific advice. iv. The 'handshake' of information from scientific advice to management advice. v. In instances of a lack of sampling data, making decisions based on expert opinion, into which subjective opinions may become incorporated.
5	Am sure it would add value to Expert Groups with a relevant need.
4	A long way to go. Important to take into account views on this also from other member countries than EU. Probably harder to bridge the gap to sociologists than to eg economists. I try to be positive to integrating what is mentioned, but there are so many important questions to answer that do not require integrating these dimensions. Can be a challenge

- 
- to convince sociologists that their issues are not the most pressing ones. To me a paper comparing how this (especially dialogue between scientists, managers and industry) is handled in ICES countries (EU, Norway, Russia, Iceland) seems to be lacking.
- 
- 4 I am unclear what the purpose would be, but am not against developments if they can assist us in our work. As with interdisciplinary work in general, I am worried about adding intellectual noise to the advice. Novel scientific disciplines should be integrated if they can help us answer our clients needs. Otherwise they are in the realm of pure science which is a worthy pursuit in itself, but should not be mixed up with the advice unnecessarily.
- 
- 5 This will be a great asset/skill to integrate and communicate better our scientific outputs
- 
- 5 It certainly would greatly benefit the public and ICES if ICES integrates the human dimension and interdisciplinary work. One of the ultimate purposes of conducting science is to give a better life to human beings and improve our society. Thus, integrate natural science and human science would better connect the two groups of scientists and then better serve the public. I believe that this is an urgent step the ICES need to take immediately.
- 
- 5 Challenging (for biologists) but important to inform advice (decrease the current gap between advice and implementation)
- 
- 4 It can play a useful role in some ICES WGs and WKs. In general I think it is important for science to reach out to the non-scientific community because we find ourselves as scientists currently in a society where scepticism regarding science is on the rise, as is anti-intellectualism. Whatever the causes for this are, we need to engage more with the public to convince them of the need for science and the role science plays in peoples everyday lives. I guess integrating the human dimension and 'the humanities' into ICES work can play a positive role in achieving this.
- 
- 5 Given the applied nature of ICES work, it is extremely important
- 
- 4 I understand that it might be very important. However we already struggle to integrate the different aspects of natural science so I fear this is a difficult issue to do well.
- 
- 4 It is probably a good strategy to develop this integration as humans obviously are part of ecosystems, and the awareness and need to quantify the value of ecosystem goods and services have increased.
- 
- 5 I think that it is a great advance in the ICES community!
- 
- 5 It is definitely needed. How can the multispecies assessment be done without social science perspective? Even on top of the 'regular' fisheries advice, social science may discuss different scenarios discussing consequences for subregions, nations, and sectors.
- 
- 4 It could be valuable, but should not be a top priority
- 
- 5 Interdisciplinary work/integration of the human dimension is fundamental if we are to address contemporary marine ecosystem pressures, and move towards IEAs. It seems that there are a number of ICES Working Groups that are reaching towards this common aim, and the creation of SIHD is an important step forward for aligning this work. WGHIST welcomes contributions/input from SIHD/other groups at our annual meetings, and in-between, either through conversations or email dialogue with Emily and Ruth, who can then communicate these discussions to the rest of the group.
- 
- 5 such integration is important. However, based on my experience on working with non-ecologists, it takes a lot of time to establish good and efficient contacts. Also, there are variety of sub-disciplines in 'human dimension', so certainly very clear focus and specialisation is needed.
- 
- 5 Good initiative, very valuable
- 
- 4 Proceed with caution. ICES already has an eye-water number of working groups. Could more be gain by generating synergies between existing groups? Clearly integrating the human element is important but this might make the ICES scope too broad.
-

- 
- 4 Needs significant improvement, but difficult to achieve and also will create a clash of cultures within ICES. It could change ICES significantly if social sciences get a more prominent role, but cannot successfully be done without changes in / overcoming some of the very old paradigms in natural sciences per se and without moving beyond fisheries and marine environmental perspectives. In the end the question might be whether ICES wants to take the view that marine areas are social as much as natural and economic spaces.
- 
- 4 Difficult to achieve but necessary
- 
- 5 This is useful and necessary.
- 
- 5 good effort, very timely!!!
- 
- 5 important as that will take science out of the Ivory tower.
- 
- 5 I think that ICES should take a lead role in integrating human dimension in its work. It is likely the most important step that ICES can take to ensure that the science generated by the organization maintains its relevance to management issues and decision-making.
- 
- 5 Current and future policy requirements require more and more complex analytical approaches and a high level synthesis. Therefore interdisciplinary is a must for many areas of work within ICES. However, the ICES core business on fisheries advice requires high skilled expertise
- 
- 5 It needs to be done, but it will take a while until it becomes a common interest issue
- 
- 5 I support this initiative and think it is of key importance to have sustainable management systems in the future
- 
- 2 No now.
- 
- 4 ICES must do more to integrate the human dimension into its work in order to ensure they are developing the most robust and applicable management advice possible.
- 
- 5 it is absolutely necessary
- 
- 5 is progressing but... at science level lots have been done, at operational level for Advice is not enough
- 
- 5 yes, the interaction exists and must be accounted.
- 
- 5 A necessity and important.
- 
- 5 Yes, it is needed however with more specialised Working Groups, e.g. WGHIST.
- 
- 1 No idea
- 
- 4 I can see that it can be useful for some of the work that ICES does, but not in all areas.
- 
- 5 it is important, if science based management is wanted
- 
- 5 good idea for relevant groups
- 
- 5 It is very important
- 
- 5 Where applicable, integrating the human dimension may benefit the outcome of working groups by incorporating a broader scope of factors that probably are neglected and lead to bias in a purely scientifically focused way. However, the scope and ToRs of many groups (such as the one I represent) do not allow or require the integration of the human dimension.
- 
- 4 I am still unclear as to what the human dimension means in this context. Is it socio-economic impacts for instance? In that case then depending on the work/objectives then I can see that there may well be groups where this would be beneficial. However, to my mind I cannot see how this would be useful within the sphere that I am involved with.
- 
- 3 I think that the human and social dimension can be merged in the formulation of advice but better outside the ICES framework of advice, because this is so far usually based on single stock status, whereas the social implications of the advice should be vehiculated at the STECF level to complete the basis of the EU advice..
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5	100% necessary
5	very important

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## G. Descriptive of the respondents

Gender and age: 38 men (mean age 49), and 18 women (42) reported the full questionnaire (item 15 and 16).

Experience working interdisciplinary: 36 answered Yes, and 22 No (item 18).

**Table 12. Scientific background of the reporting person (item 17).**

NUMBER OF PEOPLE	EXACT TEXT REPORTED
2	Fisheries biologist
1	Theoretical ecologist
1	Biologist (academic) Stock assessment scientifics
1	Ph.d. in ecology
3	Ph.d. in biology
1	Fisheries science
1	fisheries biology & stock assessment
1	Applied Research Fisheries Biologist
1	PhD in Fisheries Science
1	Zoology, ecology, marine biology
1	Within the group: ecology, marine & freshwater science, genetics, statistics & mathematics, fisheries stock assessment
2	Fishery scientist and policy advisor.
1	Masters in applied mathematics, PHD in multispecies modeling, long background in stock assessment
1	Researcher and Scientific advisor
1	Microbial Ecology, Marine Biogeochemistry and Numerical Ecosystem Modeling.
2	Biological Oceanography
1	Physical Oceanographer
	ichthyologist, oceanographer
1	Evolutionary genetics and ecology
1	evolutionary biology
1	Population biology and genetics.
2	Economist
1	Marine ecology/historical ecology
2	marine ecology
1	Academia - marine ecology and habitat mapping
1	Geography.
1	Ph.D in organic biological chemistry
1	Commercial catch sampling, Stock assessment, Ecosystem modeling, Ecosystem approaches to management
1	Social science and geography
1	theoretical ecologist, marine and freshwater, fish, population dynamics
1	M.Sc. in biology and 35 years in fisheries and environmental policy.
1	marine environmental and fisheries science
1	Ecosystem scientist



1	marine biology, ecology
1	Scientists with 30 years experience (fish biology and ecology) and 3 years experience (EIA)
1	fishery biology & part-time economist
1	Marine ecology and fisheries
1	fisheries and statistics sciences
1	Marine Biologist
1	Fisheries, Fish Biology, Assesment, Surveys
1	Fisheries science (PhD)
1	I am a zoologist (Dr. rer. nat.) working in fisheries science.
1	biology-statistics
1	Fish behavior and fishing technology
1	Fisheries biologist, Hydroacoustics
1	BSc in biological sciences.
1	Fisheries management
1	Biologist
1	Fisheries Biology and Ecology, Fish condition, Oceans and human health
1	ecology fisheries aquaculture

## H. Comments or feedback to the questionnaire

### (item 19)

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It is time that scientist work much more closer with the humanities and the arts - science alone is not the answer!

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I missed an introduction describing the meaning of 'human dimension'!

It could be useful to have a foresight exercise where experts brainstorm how the human dimension could be integrated with present day ICES advisory and science groups and products. Broadening perspective in advance of the survey might produce very different responses.

We can only manage people, not dolphins or fish, so we need to learn how to do so!

Maybe some feed back as how you see the work of SIHD supporting stock assessments?

As with interdisciplinary work in general, I am worried about adding intellectual noise to the advice. Novel scientific disciplines should be integrated if they can help us answer our clients needs. Otherwise they are in the realm of pure science which is a worthy pursuit in itself, but should not be mixed up with the advice unnecessarily. Bottom line: the advice doesn't have to be complicated.

How are you getting the results and ideas out into ICES? Maybe a plan with chairs of EG's could be discussed via Skype and then some actions on EG's could be further developed.

I have nothing add. Thanks

Thanks for the survey. I wasn't entirely sure that I understood some of the questions but I hope you find my answers useful.

Good luck with your efforts! It is not going to be a quick change but it is necessary.

WGHIST aims to demonstrate how marine historical ecology can provide benefits to current policy and management (ToR a), integrate non-traditional data sources and methods (ToR b), and especially assess the human dimensions in IEAs. While we can speak to our knowledge, data, and methods, we require experts to tell us where these can be applied and what kinds of data are needed, as well as work with us on how novel methods and sources can be useful. This includes policy and management experts working on human dimensions, as well as scientists in the humanities studying human systems today. As stated above, we would be very happy to work with other groups and SIHD to achieve these aims.

Generally neutral about including social sciences.

Looking forward to where this ends up....

Thank you for your efforts.

please keep me updated on further developments.

I think that ICES is showing valuable leadership in exploring the need for a broader set of expertise in its work.

The Working Group represented by me for this questionnaire unfortunately doesn't involve social Sciences etc, unless one considers the welfare of personnel working at sea!

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