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25 September 2018

Hamburg, Germany



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Executive summary

The Working Group on Science to Support Conservation, Restoration and Management of Diadromous Species (WGDIAD), formerly WGRECORDS, was established to provide a forum for the coordination of work on diadromous species following the disbanding of the Diadromous Fish Committee. The role of the Group is to coordinate work on diadromous species, organise Expert Groups, Theme Sessions and Symposia, and help to deliver the ICES Science Plan. The annual meeting of WGDIAD was held on 25 September 2018 during the ICES Annual Science Conference in Hamburg, Germany, and chaired by Dennis Ensing, UK, and Johan Dannewitz, Sweden.

The Annual Meeting received reports from ICES Expert Groups and workshops working on diadromous species, and considered their progress and future requirements. During the meeting, the following areas were discussed in more detail:

- Outcomes and deliverables from ICES EGs on diadromous fish during the last year;
- International Year of the Salmon – progress report;
- The development and function of the recently established pan-regional diadromous subgroup (DSG) within the Regional Coordination Group (RCG). The subgroup has a coordinating function and identify data collection needs for diadromous species in relation to the EU data collection regulation. The group had two separate meetings in 2018, for eel and salmon, respectively, and the outcomes of these meetings were presented and discussed at the WGDIAD meeting;
- The ongoing work within ICES to evaluate the stock assessment methods used by individual countries in their national eel management plans, and the importance of co-ordination at the international level;
- A theme session proposal for ASC 2019 was produced by WGTRUTTA in collaboration with WGDAM and WGDIAD, and was submitted prior to the WGDIAD meeting. The proposed theme session focus on monitoring and assessment methods for data limited fish stocks, with particular focus on diadromous and protected species;
- A theme session proposal for ASC 2020, to be submitted in 2019. Possible focus areas of this proposal include advantages and disadvantages of stocking fish, and developments of methods and technical equipment for monitoring of migratory fish.

WGDIAD noted and discussed the completion of work by the Working Group on Data Limited Diadromous Fish (WGDAM) and by the Workshop on Tools for Eel (WKTEEL).

1 Administrative details

<p>Working Group name</p> <p>Working Group on Science to Support Conservation, Restoration and Management of Diadromous Species (WGDIAD)</p> <p>Year of Appointment within current cycle</p> <p>2018</p> <p>Reporting year within current cycle (1, 2 or 3)</p> <p>1</p> <p>Chair(s)</p> <p>Dennis Ensing, UK</p> <p>Johan Dannewitz, Sweden</p> <p>Meeting dates</p> <p>25 September 2018</p> <p>Meeting venue</p> <p>Hamburg, Germany</p>

2 Terms of Reference

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
a	Raise the profile of the group by maintaining international scientific co-operation in the study of diadromous fish species and provide a mechanism through which issues relating to these species and their environment, including also aspects connected to estuarine and fresh water habitats used by these species, can be addressed and coordinated within the ICES science plan.	There is a need to coordinate and draw the various elements of ICES work together to support the management advice provided for multiple species of diadromous fish, particularly in delivering commitments under various regulations, including the EU-Habitats and Water Framework Directives and the EU Eel Regulation.	1, 4, 11, 13, 15, 25, 26, 27, 28, 31	Year 1, 2 and 3	Report of the WG and maintenance of a previously established network of diadromous fish experts.
b	Identify scientific needs and propose activities, including experts groups, theme	ICES is well placed to coordinate scientific activities which generate	1, 4, 11, 13, 15, 25, 26, 27, 28, 31	Year 1, 2 and 3	Organise theme sessions, symposia or expert groups.

	sessions and symposia, to support the implementation of the Science Plan and the work of SCICOM and ACOM Experts Groups on diadromous species and review their outputs.	up to date information on the biology and ecology of diadromous species, threats to their status, including climate change, and advice on measures to be taken to restore habitats and ecosystems, and rebuild depleted populations.			Co-ordinate feedback from these sources for use in publications and CRR documents. Liaise with and support chairs of EGs and WKS to achieve their aims.
c	Assist EPDSG and ICES to integrate important activities with those of other Expert Groups reporting to EPDSG, other SGs and/or ACOM.	Issues relating to, for example, rare and data limited species are widely dispersed across the ICES Science plan. This group provides a focal point for both internal and external communication and reporting of new developments and concerns regarding diadromous fish.	1, 4, 11, 13, 15, 25, 26, 27, 28, 31	Year 1, 2 and 3	Keep ICES abreast of important issues relating to Diadromous fish species and ensure these issues are communicated within the ICES community to relevant EGs and SGs.

3 Summary of Work plan

Year 1	Coordinate scientific activities (theme sessions, symposia, EGs, CRRs and reports to EPDSG).
Year 2	Coordinate scientific activities (theme sessions, symposia, EGs, CRRs and reports to EPDSG).
Year 3	Coordinate scientific activities (theme sessions, symposia, EGs, CRRs and reports to EPDSG).

4 List of Outcomes and Achievements of the WG in this delivery period

Outcomes from meetings and activities during the last year include:

- Compilation and discussion of work carried out by EGs under the WGDIAD umbrella, and consideration of their progress and future requirements;
- Coordination of a proposal for a theme session at ICES ASC in 2019, focusing on data limited species with particular reference to diadromous and protected species;
- Discussions on possible focus areas for a theme session proposal for ICES ASC in 2020;
- An update on the Year of the Salmon;

- An update from the pan-regional diadromous subgroup (DSG) meetings held at 2018 Regional Coordination Group (RCG)-meetings.

5 Reviews of Expert Groups on Diadromous Species

During 2018, WGDIAD has coordinated the activities of five Expert Groups and two Workshops related to diadromous species, including three ACOM EGs, two SCICOM EGs and two ACOM Workshops. Separate summaries are presented below. At the end of some of the summaries, notes from the post-presentation discussions at the WGDIAD meeting have been added for the record.

5.1 WGEEL – Joint EIFAAC/ICES/GFCM Working Group on Eel

The Joint EIFAAC/ICES/GFCM Working Group on Eel (WGEEL), chaired by Alan Walker, UK, met in Gdańsk, Poland, 5 to 12 September 2018, to address the terms of reference set by ICES, EIFAAC and GFCM. Thirty nine experts attended the meeting, representing 19 countries, along with a representative of the EU Commission DG MARE and a representative of the ICES Workshop on Evaluating Eel Management Plans 2018 (WKEMP).

The recruitment of European eel from the ocean remained low in 2018. The glass eel recruitment compared to the 1960–1979 was only 2.1% in the North Sea and 10.1% in the Elsewhere Europe series, based on available data-series. For the yellow eel data-series, recruitment was provisionally 29% (not all series fully reported) of the level during the reference period.

Landings data were updated according to those reported to the WGEEL, either through responses to the 2018 Data call or in Country Reports, or integrated by the WGEEL using data from its previous reports. As some countries have not reported all their landings, even the raised versions reported here should be considered as minima.

Glass eel fisheries within the EU take place in France, UK, Spain, Portugal and Italy. Glass eel landings have declined sharply from 1980, when reported landings were larger than 2000 tonnes to 58.6 t in 2018.

Yellow and silver eel landings are not always reported separately, so are combined here. The total landings of yellow and silver eels decreased from 18 000–20 000 tonnes in the 1950s to 2000–3000 tonnes since 2009, and a reported 2224 tonnes in 2017 (mostly Sweden, Poland, Germany, Denmark, The Netherlands, United Kingdom, France, Italy and Tunisia).

Recreational catches and landings are poorly reported so amounts must be treated as a minimum but were estimated as 2 t for glass eel in 2018 (Spain only), and 161 t for yellow and silver eel combined in 2017 (mostly Denmark and Italy) (2018 data not available at time of writing). Overall, the impact of recreational fisheries on the eel stock remains largely unquantified although landings can be thought to be at a similar order of magnitude to those of commercial fisheries.

Aquaculture production of eel increased until the end of the 1990s but started to decline from the mid-2000s from about 8000–9000 t, and in 2017 the reported quantities of eels produced in aquaculture was 4546 t, mostly in The Netherlands and Germany. It should be noted that eel aquaculture is based on wild recruits, and part of the production is sub-

sequently released as on-grown eel for stocking (around 10 million eels, which if assuming a mean weight of 20 g would equate to about 200 t).

Restocking data for 2018 were incomplete at time of writing because some restocking programmes were ongoing. An update of the restocking amounts for 2017 suggests about 15 million glass eel, 14 million yellow eels and about 0.5 million silver eels were restocked in 2017, though these amounts include eel moved in the same river basin from where they were first caught (sometimes called assisted migration) and eel on grown in aquaculture.

The WGEEL compiled the biomass and mortality rate stock indicators reported in response to the 2018 eel data call. The ICES Workshop on Eel Management Plans (WKEMP) will examine these stock indicators in more detail. However, a preliminary analysis by the WGEEL of the data reported by EU Member States found that out of a total of 76 EMUs that most recently reported escapement biomass as a percentage of pristine biomass, 16 (21%, representing six EU countries) are reaching or exceeding the 40% target whereas 60 EMUs are below target.

The WG has made substantial progress in developing the use of the data call and database to refine data submission, checking, analyses and reporting. This was the first year of complete data reporting, and the data checking created a large but very worthwhile task. One workshop is proposed for 2019 to further improve the data call and use of the reported data, and to standardize the analytical approaches used to estimate stock indicators. The data call for 2019 will request updates for recruitment, landings, aquaculture and stocking.

An overview was made of the methods countries use to respond to the data call. Some misinterpretations, inconsistencies and incomplete reporting (life stages, habitats, geographical areas, etc.) were uncovered. The workshop in 2019 will address these issues.

The WG reviewed developments in previously specified emerging threats and opportunities, noting that most of these remained issues to address. New threats included (in no particular order) the effects of high summer water temperature/poor water quality as eel mortalities and disease outbreaks were reported across the UK, Sweden and Estonia; uncertainties over the supply of some glass eel for restocking after the UK leaves the EU; increasing reports of illegal fishing and/or eel trade; increased risk of misreading the age of restocked eel because of artificial 'annuli' and its impact on age-based cohort models; and further concern over disease transfer through restocking programmes. New opportunities included technologies to monitor eel behaviour in rivers and at sea; and a new multidisciplinary research project (Sudoang) between Spain, Portugal and France to provide tools and implement joint methods to support conservation of eel and habitats in this region.

The WG recognised that fishing impacts have received most attention in relation to quantifying impacts and effects of management measures. While this will continue, the WG will establish a standing annual activity taking forward quantification of the impacts of non-fishery factors, and to review methods for reducing these mortalities. In 2019, the WG will focus on impacts of hydropower facilities and water pumps.

The Working Group reviewed and trimmed the structure and content of the Country Report, in light of the further refined data call process.

The ToRs for 2019 were drafted according to the multiyear plan proposed in 2016.

5.2 WGBAST – Working Group on Baltic Salmon and Trout

The Baltic Salmon and Trout Assessment Working Group (WGBAST), chaired by Stefan Palm, Sweden, met in Turku, Finland, 20–28 March 2018. A total of 28 experts from all nine Baltic Sea countries attended the meeting (whereof four were via correspondence). The group was mandated to assess the status of salmon in Gulf of Bothnia and Main Basin (subdivisions 22–31), Gulf of Finland (Subdivision 32) and sea trout in subdivisions 22–32, and to propose consequent management advices for fisheries in 2019. Salmon in subdivision 22–31 were assessed using Bayesian methodology, with a stock projection model (data up to 2017) for evaluating impacts of different catch options on the wild river stocks.

Section 2 of the report covers catches and other data on salmon in the sea, and summarizes information affecting the fisheries and management of salmon. Section 3 reviews data from salmon spawning rivers, stocking statistics and health issues. Status of salmon stocks in the Baltic Sea is evaluated in Section 4. The same section covers also methodological issues of assessment as well as sampling protocols and data needs for assessment. Section 5 presents data on sea trout and stocks status.

- The total salmon catch in 2017 (including recently revised estimates of trolling catches; below) was the lowest in the time-series since the 1970s. Catch levels have decreased continuously since the 1990s, although more slowly in recent years. Efforts in several important commercial salmon fisheries remained on a historically low level.
- The total level of estimated misreporting (of salmon as sea trout) increased to 30 500 salmon in 2017, almost twice as much as estimated for 2016.
- The total share of recreational catches of Baltic salmon in the sea and rivers has increased over time. In particular, the offshore trolling fishery has developed rapidly. According to updated estimates, the total recreational catch has in recent years been about 15 000–20 000 salmon larger than previously known. The new time-series of trolling catches was included in the stock projection model.
- The natural salmon smolt production has gradually increased in the Gulf of Bothnia and Gulf of Finland rivers. For most rivers and assessment units, either increasing or stable smolt production is predicted also for 2018, as a result of good spawning runs in 2014–2016. The current (2017) total wild production in all Baltic Sea rivers is above 3.5 million smolts, corresponding to about 86% of overall potential smolt production capacity. In addition, about 4.3 million reared salmon smolts were released into the Baltic Sea in 2017.
- Over time, an increasing proportion of the wild stocks have reached the management target (75% of potential smolt production capacity) with high or very high certainty, especially in the northern Baltic Sea. At current levels of fishing pressure and natural mortality, a continued positive status development is predicted. As previously, most weak stocks are located in the Main Basin and Gulf of Finland rivers, but also in these southern areas some stocks have improved. In particular, wild Estonian (Gulf of Finland) stocks show recovery.

- The exploitation rate of Baltic salmon in the sea fisheries has been reduced to such a low level that most stocks (for which analytical projections are currently available) are predicted to recover. However, many weak stocks also need longer term stock-specific rebuilding measures, including fisheries restrictions in estuaries and rivers, habitat restoration and removal of potential migration obstacles.
- M74-related juvenile mortality increased in 2016–2017, and is expected to remain at about the same level in spring 2018. It is hard to predict if high levels of M74 will persist beyond 2018. Also, other health issues (disease outbreaks, cause still unknown) with large numbers of dead spawners and collapsed parr densities in some wild rivers are still topical and therefore of concern for the future.
- Some positive development can be seen for sea trout in the Baltic Sea region, but many populations are still considered vulnerable. Stocks in the Gulf of Bothnia are particularly weak, although spawner numbers and parr densities are improving. Stock statuses are generally higher in the Main Basin and in southern Gulf of Finland.
- In general, exploitation rates in most fisheries that catch sea trout in the Baltic Sea area should be reduced. This also holds for fisheries of other species where sea trout is caught as bycatch. In regions where stock status is good, existing fishing restrictions should be maintained in order to retain the present situation.

Notes from WGDIAD: The extent of misreporting of salmon as trout in the Polish offshore fishery is largely unknown but according to estimates from WGBAST it might be increasing and recent additional information indicates that it could be higher than previously thought. The current situation with a presumably high level of misreporting affects the development of salmon stocks, TAC and fishing possibilities for other MS, and likely introduces mistrust among stakeholders against the Common Fisheries Policy. It should be noted that the working group needs representative catch composition data from Poland for coastal and offshore fisheries separately covering all main gears (longlines and surface gillnets, see recommendation from WGBAST 2018).

Increasing health problems for salmon in the Baltic Sea have been observed in the last few years and needs to be investigated further, including increased cooperation between veterinarian authorities in countries with affected rivers. It was also noted that because no EU management plan has been decided upon, there are no time-frames decided for when weak stocks should have reached management objectives. Therefore, under current conditions with only one TAC for SD 22–31 and many stocks with variable status, any catch advice for the mixed-stock fishery on Baltic salmon will be associated with trade-offs between exploitation possibilities and time required to achieve management objectives.

5.3 WGNAS – Working Group on North Atlantic Salmon

The Working Group on North Atlantic Salmon (WGNAS), chaired by Martha Robertson, Canada, met in Woods Hole, USA, 4–13 April 2018. There were in total 27 in person participants, representing twelve countries from North America (NAC) and the Northeast

Atlantic (NEAC): Canada, USA, Iceland, Norway, Finland, Ireland, UK (England & Wales), UK (Scotland), UK (Northern Ireland), and France. Information was also provided by correspondence or by WebEx link from Greenland, Russia, Faroes, Denmark, and Spain for use by the Working Group.

WGNAS met to consider questions posed to ICES by the North Atlantic Salmon Conservation Organisation (NASCO) and also generic questions for regional and species Working Groups posed by ICES.

The terms of reference were addressed by reviewing working documents prepared prior to the meeting as well as development of analyses, documents and text during the meeting.

The report is presented in five sections, structured to the terms of reference. Sections include:

- 1) Introduction;
- 2) Catches, farming and significant developments, threats and opportunities;
- 3) The status of stocks in the Northeast Atlantic Commission area;
- 4) The status of stocks in the North American commission area; and
- 5) The status of stocks in the Atlantic salmon in the Greenland commission area.

In summary of the findings of the Working group on North Atlantic Salmon:

- In the North Atlantic, exploitation rates on Atlantic salmon continue to be among the lowest in the time-series.
- Nominal catch in 2017 was 1182 t. This was less than the previous year (1208 t in 2016) and 6% and 16% less than the previous five and ten year mean values, respectively.
- The provisional estimate of farmed Atlantic salmon production in the North Atlantic area for 2017 is 1624 kt; production of farmed Atlantic salmon in this area has been over one million tonnes since 2009 and in 2017 provisional worldwide production of 2310 kt is 1900 times the catch of wild Atlantic salmon.
- The Working Group reported on a range of new findings regarding salmon assessment and management: including tracking programmes of Atlantic salmon in the Northwest Atlantic, interactions between striped bass and Atlantic salmon in eastern Canada, impact of capture and tagging on Atlantic salmon return rates, update on bycatch of salmon in pelagic fisheries, advances in genetic stock identification for mixed-stock fisheries and progress in life cycle modelling to further opportunities for understanding salmon dynamics.
- A number of threats were discussed including disease and parasite events in wild salmon in Ireland (RVS), Norway (salmon fluke), Russia (salmon fluke and UDN) and Sweden (undetermined); introgression of farmed salmon in wild salmon populations that affect phenotype; and sea lice monitoring in Norway.
- The Working Group noted the dramatic increase, beyond previously recorded levels, in the capture of pink salmon throughout the North Atlantic area in 2017.

- Specific for the NEAC area, exploitation rates on NEAC stocks continue to decline and catches in 2017 were 1039 t, among the lowest in the time-series. Northern NEAC stock complexes, prior to the commencement of distant-water fisheries in were considered to be at full reproductive capacity. The southern NEAC maturing 1SW stock complex however, was considered to be suffering reduced reproductive capacity and the non-maturing 1SW stock complex to be at risk of suffering reduced reproductive capacity.
- Catch advice for the Faroes fishery was developed for the 2018/2019 to 2020/2021 fishing seasons. In the Northern NEAC stock complex, over the forecast period, the non-maturing 1SW component has a high probability ($\geq 95\%$) of achieving its SERs for TACs at Faroes solely for a catch option of ≤ 20 t in the 2018/2019 season. The maturing 1SW component in the Northern NEAC stock complex and both Southern NEAC stock complex components each have less than 95% probability of achieving their SERs with any TAC option in any of the forecast seasons. Therefore, there are no catch options that ensure a greater than 95% probability of each stock complex achieving its SER.
- At the individual country level, the probabilities of the non-maturing 1SW stocks (the main contributor to the catch) achieving their SERs in 2018/2019 varies between 16% and 99% with a zero TAC; these probabilities decrease for increasing TAC options at Faroes and for subsequent seasons. There are therefore, no TAC options at which all management units would have a greater than 95% probability of achieving their SERs.
- Specific for the NAC area, the 2017 provisional harvest in Canada was 111.8 t; overall, harvests remain very low relative to pre-1990 values (>1000 t). The majority of harvest fisheries on NAC stocks were directed toward small salmon. In recreational fisheries, large salmon could only be retained in 22 rivers in Québec.
- In 2017, the midpoints of the estimates of returns to rivers for all regions of NAC except Labrador, are suffering reduced reproductive capacity. The 5th percentile of the estimated returns to Labrador was below CL and for this region the stock is at risk of suffering reduced reproductive capacity.
- The continued low abundance of salmon stocks across North America, despite significant fishery reductions, strengthens the conclusions that factors acting on survival in the first and second years at sea, at both local and broad ocean scales are constraining abundance of Atlantic salmon.
- In Greenland, a total catch of 28.0 t was reported for 2017 compared to 27.1 t in 2016. North American origin salmon comprised 74.4% of the sampled catch.
- There are no mixed-stock fishery options at West Greenland in 2018, 2019 and 2020 that would be consistent with a 75% probability or greater of simultaneously meeting the management objectives for the seven stock complexes.
- The two Indicator Frameworks previously developed by the Working Group to be used to check on the status of NAC and NEAC stocks in the interim years of a multiannual catch advice cycle were updated and are available for use in any new multiyear agreements for the Greenland and Faroes fisheries, respectively.

5.4 WGDAM – Working Group on Data Limited Diadromous Fish

The Working Group on Data Limited Diadromous Fish (WGDAM), chaired by Karen Wilson, US, and Lari Veneranta, Finland, has 76 chair-invited or nominated members from 18 countries. Most of the work has been done by correspondence on emails and webinar-type meetings. However, in 2018 WGDAM organized a workshop to focus on ToR tasks where we reviewed stock assessment methodologies for key species of interest for which assessments are currently not available or difficult, and recommended approaches for systematic monitoring of key diadromous species. The other tasks (update in status & distribution of poorly understood diadromous fish species, and identification of biological knowledge gaps and their importance for diadromous species) are included in the draft of WGDAM co-operative research report (ICES CRR) that was submitted for review in September 2018. At the moment, the final ToRs (synthetization of ecosystem approach for diadromous fish and ICES strategy) are left for the future. The WGDAM aims to complete the tasks by the end of 2018.

WGDAM organized a workshop in Copenhagen in 13-15 March 2018, with 14 participants at the meeting and three additional participants via webinar. The focus of the workshop was on monitoring and stock assessment of data limited diadromous fish species, in answer to the tasks c-f listed in the WGDAM Terms of Reference. These topics were reflected in the discussions:

- Recommend species and approaches for systematic monitoring of key diadromous species
- Standardized monitoring methods, summary of methodologies
- Multi-species monitoring for cost efficiency - species composition, timing and areas
- Explore stock assessment methodologies for data limited species of interest for which assessments are currently not available or difficult
- Species examples of stock assessments with limited data
- How to proceed from species assessment to advice for fisheries management

The workshop followed a prepared schedule. During the workshop we had five presentations that gave an introduction to workshop topics. The presentations were given by:

- Kjell Leonardsson "Evaluating coastal monitoring programs for diadromous species"
- Sam Shephard: "Assessment of data-poor inland fish stocks"
- Phil Davison: "eDNA assessment"
- Pedro Morais: "Invasive diadromous fishes and implications for monitoring"
- Brad Chase: "An informal discussion on monitoring and assessment of anadromous river herring and smelt in Massachusetts and the eastern US"

The workshop was summarized in a manuscript for later publication. The overall objective of this manuscript is to give an overview and guide to monitoring data-limited species, including ages/life stages to target for monitoring, data that should be collected, brief summary of methods for assessment – and if it's possible to collect data on more

than one species at the same time if and when funding is limited. The topic of the manuscript written during the workshop was: “Finding our way out of a data-limited dilemma – options for monitoring and assessment of diadromous fishes”. The work during the workshop was intensive and produced a draft that can be submitted to a journal after editing. The work on manuscript draft continued in spring by emails and the next round of editing was done during autumn 2018.

Also during the workshop the species report of WGDAM was edited and the group decided to publish the report in ICES CRR series to ensure increased accessibility (see section 9).

Notes from WGDIAD: The completion of WGDAM was noted. The final report had not been finalised at the time for the WGDIAD meeting but was published later in the autumn 2018.

5.5 WGTRUTTA – Working Group with the Aim to Develop Assessment Models and Establish Biological Reference Points for Sea Trout (*Anadromous Salmo trutta*) Populations

Sea trout are the anadromous migratory form of the brown trout (*Salmo trutta*) which go to sea to feed and mature as adults prior to returning to spawn, usually in their natal rivers. Extensive overviews of sea trout fisheries and biology have been prepared for ICES by the Study Group on Anadromous Trout (SGAT) (ICES, 1994) and the Workshop on Sea Trout (WKTRUTTA, WKTRUTTA2); (ICES, 2013, 2016). This Working Group builds on the scene-setting work of WKTRUTTA 1 and 2.

Stock declines, e.g. in areas where marine mixed stock fisheries prevail (e.g. the Baltic) and where there is salmon farming, have raised concerns about our lack of knowledge of the complex and variable life cycle of this species. Sea trout have historically taken second place to Atlantic salmon in national fishery assessment programmes and management priorities. As a result relatively few sea trout stocks have been studied for sufficient time to allow the development of population models.

By using abundance data from different life stages, information on habitat quality and fisheries data etc, the Working Group will develop and evaluate different ways to model sea trout populations. Models taking into account e.g. habitat variation within rivers and between catchments, occurrence of lakes, migration obstacles and resident trout etc will be evaluated. Biological Reference Points (BRPs) will be developed and considered across the natural range of sea trout.

The WG is delivering through 4 sub groups (SG):

SG1: Database group

SG2: Population models, examining the effects of salmon, and resident trout

SG3: Trout recruitment versus habitat score systems

SG4: Stock recruitment relationships based on sea trout life history

The second meeting of the WGTRUTTA took place in Copenhagen, Denmark from 6 to 8 February, 2018. The meeting was chaired by Johan Höjesjö (Sweden) and Alan Walker

(UK). The meeting was attended by 22 experts from 13 countries. The sub groups presented on progress to date and their plans for the workshop and coming months.

SG1 Database

The purpose of the database (DB) is it to inform the WG what data are available, and to provide a central depository for these that the SG will use in their analyses. Two database (DB) templates have been prepared: Environmental Data and Bio-ecological Data.

The WG discussed whether the DB should provide only high quality index data, or more comprehensive data including that which is incomplete or of lower quality. It was recognised that while it would be great to have all the data, this does create resourcing challenges. The WG agreed the DB should be as encompassing as possible, including index rivers/data plus others, but also for data providers to highlight data that are available but where they don't have the time to input.

The SG are liaising with ICES and their Regional Database and Estimation System (RDBES), working towards a time when ICES will host the WGTRUTTA DB. WG will have to determine access rights and future data updates, e.g. data calls.

SG2 developing population models examining effects of resident trout and salmon

SG2 has drafted a literature review examining the relationship between resident and anadromous components in trout populations – this was developed further after the meeting and may have been submitted for publication. It remains challenging to identify resident vs anadromous origin, and to predict future life history - while growth rate is implicated it is not a simple predictor.

Regarding population models, it was recognized that some are available/being established so probably better to work with them than create new ones. A new model on climate change effects would be useful, but is unlikely in the next year (at least) because not enough is known about the explanatory relationships. The SG is planning to gather data to describe large scale patterns in the anadromy to residence ratios, with data needs to be defined, and will likely produce another paper.

SG3 developing the trout habitat scoring system (THS)

The Trout Habitat Scoring (THS) system was presented. This system based on electrofishing data is used to assess smolt production. The system was recently published in the Dundalk sea trout book. Trout habitat is categorised according to substrate, velocity, shade and riparian complexity, but the SG will continue to explore these and test them as the best descriptors. Slope (measured upstream to downstream) may be a useful predictor in some areas but the Danes have difficulty in acquiring slope data. Sweden uses trout density measured as numbers per 100m², Denmark has tested using fish per 100m (i.e. stream length instead of area) to test the influence of stream width but couldn't find a significant relationship for river length. In Northern Ireland, the method was trialled with sea trout and lake trout data - the Scandinavian descriptors gave a reasonable prediction of trout densities.

SG4 developing stock recruitment (SR) life history

The SG is aiming to produce a framework that can be applied at different regions, but that allows local managers to identify local issues. They are following two lines of inves-

tigation: (i) a Bayesian SR, and (ii) a pressure state model. An inventory of rivers with PIT arrays is being created. A paper has been published (Shephard *et al.*, 2017) exploring use of the Length-based Indicators approach (LBI) for the sea trout life history. This approach is now being applied across 6 (later 7) 'index' rivers. Trends in indicators seem similar between these rivers and these are being reviewed with local experts to seek explanations for the observed patterns.

Other issues

A proposal for a Theme Session at the ASC 2019 was developed in partnership with WGDAM and WGDIAD (see Annex 4).

One WGTRUTTA meeting is scheduled for 2019, in Dorchester, UK with dates scheduled for February 25-28. As the proposal for a theme session at the 2019 ICES ASC was accepted, albeit merged with another proposal, WG may have another meeting during that event in September 2019 – this would be a good time to draft the final report and a proposal for WGTRUTTA2.

A register of WG outputs has been created.

5.6 WKTEEL – Workshop on Tools for Eel

A Workshop on Tools for Eel (WKTEEL), chaired by Laurent Beaulaton, France, met in Rennes, France, from 2 to 6 July 2018 to develop code for data integration and analysis for the EIFAAC/ICES/GFCM WGEEL. Nine scientists representing six countries participated in this meeting.

The life cycle of the European eel is complex, with a unique spawning area in the Sargasso Sea and growth areas widely distributed across Europe and Northern Africa. The stock is genetically panmictic, but the continental eel stock shows strong local and regional differences in population dynamics and local stock structures (sex ratio, length and age distributions). Local impacts by fisheries with various gears may vary from almost nil to heavy overexploitation. Other forms of anthropogenic mortality (e.g. hydro-power, pumping stations) have an impact on eel too, and vary in distribution and local relevance. Data on stock and impacts are reported to the Working Group on Eels (WGEEL), which generates the advice. Data correspond to several different life stages, from juveniles to prespawning eels, in different habitats (from freshwater to saltwater environments).

To collect more efficiently those data, ICES and GFCM have started a process of data call in 2017. The ICES Workshop on Designing an Eel Data Call (WKEELDATA) defined the main step of this process, generated the first version of the data call and improved the WGEEL database to host the collected. During the 2017 meeting of the WGEEL, the first data were collected and integrated in the WGEEL database.

During this workshop, the database was improved to improve the integration and use of the collected data. R scripts were developed to automate: (i) the check of data collected before their integration into the database; (ii) the generation of tables and graphs for the WGEEL report. Two corresponding user-friendly web applications have been initiated to ease the use of those by all members of the WGEEL. All scripts are available through the WGEEL project on the ICES GitHub workspace. The need for improvement or development of new functionality has been identified. Finally, improvements in data call spread-

sheets have been proposed to ease the data collection and improve the guidance to the data providers.

Notes from WGDIAD: The completion of WKTEEL and its report was noted.

5.7 WKEMP – Workshop for the Review of Eel Management Plan Progress Reports

The Workshop for the Review of Eel Management Plan Progress Reports (WKEMP) held two meetings in 2018: 17–19 July and 13–16 November, both in Copenhagen, Denmark. The chair of the Workshop also attended the first and last two days of WGEEL, 5–12 September in Gdańsk, Poland. WKEMP was chaired by Jean-Jacques Maguire, Canada. There was one participant from each of Canada and the UK (as chair of WGEEL) at the July meeting. These participants also attended the November meeting which an additional participant from the EU attended.

WKEMP was convened to deliver solid estimates of stock parameters by Eel Management Unit that can be summed in terms of biomass and mortality, to reflect the state of the stock and exploitation status in Europe to answer a special request from the European Commission.

WKEMP approached this task by reviewing the national reports on implementation of Eel Management Plans, which were requested by the EC in 2018 in line with Article 9 of the Eel Regulation 1100/2007. WKEMP also sought clarifications as necessary on these reports, and extracted and collated relevant biomass and mortality estimates. WKEMP also drew on information from WGEEL 2018 and previous technical and scientific reports to understand how estimates were calculated.

The report begins with an Introduction further elaborating on the mandate of WKEMP, the approach taken, and providing context. This is followed by sections on Methodology, Results, Discussion and WKEMP's Recommendations. Annex 1 (in WKEMP report) lists the participants. Annex 2 summarises the methods used by countries to calculate biomass and mortality estimates. Annex 3 is WKEMP's comments and questions on EMPs. Annex 4 is the reporting schedule to the EC. Annexes 5 and 6 review two issues of importance in the evaluation of compliance with the Eel Regulation (eels in transitional and coastal waters; density-dependence effects on the estimation of B_0), evaluating possible shortcomings and bias in current assessments, and proposing avenues for future work. Annex 7 defines the Acronyms used and provides a glossary.

WKEMP found that, while several methods and data sources were used to estimate biomass and mortality, the results in terms of biomass per hectare fell within a relatively narrow range for most countries except B_0 for France and B_{current} for Spain, whose values were much higher than those reported by other countries. It is also of note that reaching the target in several EMUs is based on stocking. It was not possible to provide mortality estimates that could be summed to reflect the state of impacts in Europe; available values for individual EMUs are presented and described.

6 New Expert Groups

WGDIAD discussed the proposed Terms of References and meeting arrangements for existing EGs. There were no proposals for new EGs, but there is a need for establishing a workshop during 2019, see below.

6.1 Proposed for 2019

One resolution was drafted during the WGEEL meeting in September but this was not sufficiently completed for consideration during the WGDIAD meeting. Subsequently, the resolution was submitted for a workshop on eel data call: WKEELDATA 2 (see Annex 3).

7 Theme Session 2019

A proposal for a Theme Session on stock assessments of data-limited, especially diadromous and protected, species was submitted prior to the WGDIAD meeting for inclusion in the 2019 ASC programme. This proposal was liked by ICES but as it was one of two on data-limited stocks and assessment, the proposals were merged (the full merged proposal is included in Annex 4).

8 Proposals for Symposia

8.1 Symposia

There were no specific proposals for symposia.

8.2 International Year of the Salmon

The IYS is an international framework for collaborative outreach and research, and is conceived as an intensive burst of internationally coordinated, interdisciplinary, stimulating scientific research focused on salmon and their relation to people. New technologies, new observations, and new analytical methods, some developed exclusively during the IYS, will be focused on knowledge gaps that prevent a clear understanding of the future of salmon in a rapidly changing world. Activities under the IYS framework will culminate during 2019.

Further progress on developing an International Year of the Salmon was made during 2017. Primary Partners have been identified as North Pacific Anadromous Fish Commission (NPAFC) and North Atlantic Salmon Conservation Organization (NASCO) - international inter-governmental organizations established to conserve anadromous salmon in the North Pacific and Atlantic oceans respectively http://www.npafc.org/new/science_IYS.html and <http://www.nasco.int/iys.html>

An update on three specific activities under IYS relevant to the WGNAS, WGDIAD, ICES and NASCO was provided.

- 1) Progress with developing the “Likely Suspects” conceptual framework for evaluating marine mortality in Atlantic salmon.
- 2) An overview of the process being used by IYS to identify and promote signature scientific research projects (IYS Prospectus) to be considered under the

IYS banner is currently in development by a subgroup of the IYS coordinating committees. Overlapping research priorities between NASCO's International Atlantic Salmon Research Board and the NPAFC were compiled by IYS NPAFC Secretariat Staff using the IASRB Inventory of Marine Research in January 2018. The projects were categorized by the five IYS themes: status of salmon, salmon in a changing salmosphere, new frontiers, human dimension, and information systems. The IASRB projects were examined for the 'Degree of Overlap' with Pacific high priority projects. The degree of overlap was listed as 'ongoing interest in methods/results' or 'immediate interest and high degree of overlap'. There were 40 of 52 projects that were listed in the inventory as 'ongoing' or 'new entry' (not listed as completed), which were determined to be of interest to the IYS. Further development of the IYS prospectus continued and was considered at the NPAFC annual meeting and Scientific Workshop on Pacific Salmon Production in a Changing Climate in May 2018.

- 3) An update on the progress with the International Year of the Salmon, 2019 , Symposium 'Managing the Atlantic salmon in a rapidly changing environment - management challenges and possible responses' was provided to the Working Group. The symposium is expected to be comprised of three main elements:
 - 3.1) Scientific overviews and setting the scene;
 - 3.2) Management challenges under the main themes of NASCO;
 - 3.3) Outreach and responses to issues raised.

The symposium will be held alongside the NASCO Annual Meeting in June 2019 in Norway and the proceedings are expected to be published as part of the outreach programme under IYS.

- 4) A workshop to be held in Vancouver, Canada, in January 2019 focussed on identifying representative time series of data and associated meta-data to understand salmon status and trends. The aim of the Workshop is to determine how well or poorly these datasets represent salmon status and trends for reasonably broad geographic areas. The primary goal of this workshop will be to identify a series of legacy datasets and standards associated with major categories of data. Later, a separate workshop will focus on identifying the coastal and high seas climate and oceanographic data that can be linked to salmon data.

Since the WGRECORDS meeting in September 2016, Wojciech Wawrzynski and Niall Ó Maoiléidigh are the ICES representatives to IYS and will be feeding information back to WGDIAD and other WGs as becomes available.

9 Proposals for Publications

WGDAM has submitted a new report – Data-Limited Diadromous Species Report – for publication as a Cooperative Research Report (CRR). In total 65 authors have contributed with detailed information on 20 species. The report was submitted for review in September 2018.

EGs should consider the route of CRR for publishing Working Group materials. The CRR come under the ICES Publishing Committee, documents are peer-reviewed, open access, can provide a topical commentary and also be used as guides or handbooks. Publications can be from 30–200 pages but are more typically 80–100 pages. CRRs are catalogued and held in the ICES library.

10 Update from the pan-regional diadromous subgroup (DSG) meetings held at Regional Coordination Group (RCG)–meetings during 2018

The Diadromous fish Sub Group (DSG) met at the Regional Coordination Group North Sea & Eastern Arctic (RCG NSEA) in Lyngby, Denmark, 4–6 September 2018. The sub group was attended by 12 experts on Atlantic salmon and sea trout, plus one expert who joined the meeting on Wednesday September 5th via Skype. The experts represented ten countries, from both the Baltic and Atlantic areas.

Due to the scheduling of WGEEL in the same week as the RCG NSEA the RCG eel experts met at the Regional Coordination Group (RCG) Mediterranean and Black Sea (RCG Med & BS) in Kavala, Greece, 18–20 September 2018. This meeting was attended by 12 experts on European eel, representing ten countries, from the Baltic (6), Atlantic (5), North Sea (6) and Mediterranean (3) regions (some countries span 2-3 regions).

At both meetings ToRs were addressed on: 1) feedback from End-Users (ICES EGs) to the recommendations from RCG Baltic 2017; 2) development of regional work/sampling plans for data collection and quality assurance; 3) solutions to any of the difficulties found in completing National Workplan and Annual Report submissions in 2017/2018; 4) reporting on compliance for any diadromous fish data calls; 5) review the Regional Database and Estimation System (RDBES) and developments in diadromous fish data bases; and 6) considering next steps and actions.

Salmonids

Considering the feedback the group received from WGNAS and WGBAST in reply to the 2017 RCG Baltic questions it was decided that to facilitate the compilation of data required for salmon stock assessments in the Baltic and Atlantic areas, a list of suggested data needs to assess status and provide scientific advice for salmon stocks should be provided by the RCG DSG to the EGs for comments in 2019.

Furthermore WGBAST and WGNAS should be asked to define the rivers to be monitored and river selection criteria for Atlantic salmon at regional level as well as suggest a selection of stocks from which salmon variables should be collected, and advise on temporal frequency and sampling level of the collection of variables for salmon.

The RCG DSG became aware of a planned data call for Atlantic salmon in 2019 of which the group was supportive.

The RCG DSG noted that the RDBES can be tailored to species-specific end user needs and therefore it recommends that potential end users should be encouraged to consider adopting the RDBES database as their primary data resource.

To facilitate a better understanding of the unique issues in data collection related to diadromous fish the RCG recommended that a representative of the RCG DSG should be present at the Liaison Meeting between the RCGs and STECF. STECF was broadly supportive of this suggestion and RCG DSG chair Alan Walker was present at the 2018 Liaison Meeting.

Eels

Feedback received from WGEEL on the recommendations from the 2017 RCG Baltic meeting. The DSG has, on the basis of the WGEEL response, made further recommendations for Member States and End Users on data needs for eel assessments. These include maturity information from catches by commercial fisheries in Union Waters and freshwater not to be collected as it is not required by the WGEEL, assessment of mortality rates of the eels released from a fishery and incorporating this into the Fishing Mortality estimate under the EU Regulation, Member States to provide a list of eel index rivers and describe their selection process, and no change to the frequency (annually) of the collection of eel data.

With regards to quality assurance of data the DSG recommends seeing the statistically sound sampling schemes (4S) and Standard Operating Procedures (SOPs) for each MS. The countries are required to document these in this round (to 2019) of the DCF and the DSG needs to have sight of these in order to deliver this part of the work.

The DSG recognised there are still ongoing difficulties found in completing National Workplan and Annual Report submissions in 2017/2018 for all diadromous species.

Regarding the 2018 Joint ICES, EIFAAC and GFCM Eel Data Call the DSG is supportive of this endeavour and asks the RCG to make notes that not all EU Countries responded by the deadline date. Since eel data are requested in other data calls, the DSG suggests that the coordination of these calls is improved to avoid both duplication of effort and the risk of providing mismatching data sets and that the eel stock coordinator should be made aware of all data calls that feature eels.

The Regional Database and Estimation System (RDBEs) is adapted to host only a very small part of the Eel data requested by the ultimate end-user WGEEL. This is because the current focus of the RDBEs is commercial landings and commercial sampling in marine waters. Nevertheless, the DSG is supportive of the overall objective of the Regional Database and Estimation System (RDBEs) to provide a single platform for countries to produce statistical estimates. These are used as inputs for assessment by working groups producing international advice and status reports.

11 Future coordination of Science on Diadromous Species

11.1 Participation in EG CHAIRS meeting during the ASC

The Chairs of WGDIAD attended one EG Chairs lunch meeting during the ASC, where participants met the chairs of ACOM and SCICOM and had possibilities to share their experiences and raise issues they consider important to ICES work. These meetings are of particular importance for WGDIAD that coordinates activities of both ACOM and SCICOM EGs.

12 Any other business

Hugo Maxwell (Ireland) was elected unanimously by the WGDIAD members at the meeting as a co-chair of WGDIAD from 1 January 2019. Hugo will replace the outgoing co-chair Johan Dannewitz (Sweden).

13 Next meetings

The Working Group will continue to hold its annual meeting during the ASC in September and, if possible, an informal sub-meeting in the margins of the NASCO annual meetings in June each year. In addition, a meeting by correspondence may be relevant in 2019 in order to plan the agenda for the annual WGDIAD meeting and agree on a theme session proposal for ASC 2020.

Next annual meeting will take place during the 2019 ASC in September 2019, Gothenburg, Sweden. Exact date of the meeting to be confirmed.

Annex 1: List of participants

NAME	INSTITUTE	COUNTRY (OF INSTITUTE)	EMAIL
Dennis Ensing (co-chair)	Agri-Food and Biosciences Institute, Belfast	UK	dennis.ensing@afbini.gov.uk
Johan Dannewitz (co-chair)	Swedish university of agricultural sciences	Sweden	johan.dannewitz@slu.se
Henrik Sparholt	Nordic Marine Think Tank	Denmark	henrik.sparholt@gmail.com
Stefan Palm	Swedish university of agricultural sciences	Sweden	stefan.palm@slu.se
Laura Wichmann	Institute of Fisheries, Rostock	Germany	l.wichmann@uni-hamburg.de
Marko Freese	Thuenen Institute of Fisheries Ecology	Germany	marko.freese@thuenen.de
Reinhold Hanel	Thuenen Institute of Fisheries Ecology	Germany	reinhold.hanel@thuenen.de

Annex 2: Agenda

Chairs: Dennis Ensing & Johan Dannewitz

Tuesday 25th September 09.00-18.00, room 120 (west wing) at the University of Hamburg

Welcome and Introductions

Adoption of the Agenda and Appointment of a Rapporteur

WGDIAD ToRs for 2018 to 2020

Intersessional Activities, past and future

Review of current Expert Groups/Workshops on diadromous species

- **WGEEL** – EIFAAC/ICES/GFCM Joint Working Group on Eel (Chair: Alan Walker, UK)
- **WGBAST** – Working Group on Baltic Salmon and Trout (Chair: Stefan Palm, SE)
- **WGNAS** – Working Group on North Atlantic Salmon (Chair: Martha Robertson, CA)
- **WGDAM** – Working Group on Data Poor Diadromous Fish (Chairs: Lari Veneranta, FI and Karen Wilson, US)
- **WGTRUTTA** – Working Group on Sea Trout (Chairs: Johan Höjesjö, SE and Alan Walker, UK)
- **WKTEEL** – Workshop on Tools for Eel (Chair: Laurent Beaulaton, FR)

Proposals for new Expert Groups

- ?

Theme Sessions ASC 2019 & 2020

- Theme session proposal ASC 2019: Stock assessments of data-limited, especially diadromous and protected, species
- Theme session proposal ASC 2020?

Proposals for Symposia

- Update on the International Year of the Salmon

Update from the RCGs

- Short presentations from the pan-regional Diadromous fish RCG meetings (separate for salmon and eel)

The Way Forward

- WGDIAD Interim Report for 2018
- How can we increase attendance and promote work on diadromous species within ICES?
- New Chair for 2019-2021 (Johan is outgoing chair)

Annex 3: Proposed resolution for a Workshop on Eel data call

Workshop on designing eel data call (WKEELDATA2)

A **Workshop on Designing an Eel Data Call (WKEELDATA2)**, chaired by Cedric Briand (France) and Jan-Dag Pohlmann (Germany), will meet in Rennes, France, 18 March - 22 March to design a data call to all countries having natural production of European eel. To achieve this aim, the WK will:

- a) Review WGEEL data requirements and define data quality standards
- b) Define standards and guidelines for reported data, including analytical methods.
- c) Modify WGEEL data call spreadsheets to make them more efficient for data entry and analysis, in particular create automated tools for extracting data from the database and sending it back to stewards
- d) Integrate information on the public status of data. Include questions in the spreadsheet and information cover letter. Modify database and integrations scripts to ensure the storage of this information into the database.
- e) Complete the database suitable for WGEEL data and associated shiny interface
- f) Draft proposal for eel data call working with ICES (ACOM), EIFAAC and GFCM. The data call to be announced with a submission deadline suitable for the 2019 meeting of the WGEEL, and future meetings.
- g) Set up a server providing access to the database from a distance in order to facilitate the (guided) direct data integration by the reporting countries

WGEELDATA2 will report by 15 April 2019 for the attention of WGEEL, WGDIAD, ACOM, SCICOM, EIFAAC, GFCM.

Supporting information

Priority	This topic is a high priority for ICES and the countries/institutions supporting the work of the WGEEL because the present data collection procedures of WGEEL are complex and require a large resource in staff time before and during the WGEEL meetings. The refinement of data provision will save time and money, and it will facilitate the future benchmarking of the stock assessment process to support the ICES Advice. This also addresses a recommendation of WKEMP 2018.
Scientific justification	The WGEEL annually collates data on recruitment, catches and landings from commercial and recreational fisheries, restocking, aquaculture production, rates of other human-induced mortalities on eel, biological characteristics of eel, etc. These data are provided by countries attending the WGEEL in a large number of complex spreadsheets. Reporting is far from complete at present, and the reasons for failing to report data are diverse. A refinement and standardisation of the data reporting process is urgently required, and a data call hosted by ICES, EIFAAC and GFCM is considered an effective mechanism to significantly improve the situation.
Resource requirements	The host institution will resource the meeting itself. Attendees will be self-funding.
Participants	National representatives of eel data collection and provision to WGEEL; experts in developing, implementing and maintaining regional databases.

Secretariat facilities	The standard support for arranging the meeting, providing access to sharepoint, and for formatting the report. Plus access to ICES Data Centre staff to find way for the data etc to be hosted by ICES.
Financial	No financial implications.
Linkages to advisory committees	Links to ACOM as eel stocking is a significant management measure of some national eel management plans and is to be taken account of in the international stock assessment of European eel and the associated stock status advice from ICES to the European Commission.
Linkages to other committees or groups	The findings will be of direct benefit to the WGEEL, and wider to WGDIAD.
Linkages to other organizations	The findings will be of direct interest to DG MARE of the European Commission, in relation to the obligations of the Eel Regulation (EC1100/2007) and the EU MAP, and to GFCM in relation to planned eel Data Collection Framework Reference.

Annex 4: Proposal for a Theme Session at the ASC 2019

Theme Session: Advances in data-limited assessment methodologies for marine and diadromous stocks

Select ASC session type:	Theme session
Short Title:	Advances in data-limited assessment methodologies for marine and diadromous stocks
Session convener 1 (contact person):	<p>Kristen Omori Virginia Institute of Marine Science, College of William & Mary PO Box 1346 Gloucester Point, VA 23062 United States</p> <p>komori@vims.edu 1-206-375-4063</p>
Session convener 2:	<p>Liese Carleton lcarleton@vims.edu</p>
Session convener 3:	<p>Alan Walker alan.walker@cefasc.co.uk</p>
Description:	<p>The majority of the world's marine and diadromous fish stocks lack adequate data and information for conventional stock assessment methods. Such stocks are known as "data-limited". For example, many species, including protected or listed fishes, are often not commercially fished or the fishing is small scale. Lack of data can also occur in regions with long-term surveys (e.g., northeast Atlantic). Until recently, fisheries science has been unable to inform decision-makers on their status and potential as the available data were insufficient for use in stock assessment methods. The assessments of data-limited species and stocks still need to be based on robust calibration, statistical design, and data-handling. Today the global fisheries science community is innovating methodologies to take advantage of all available data to assess data-limited stocks. This session will provide an international forum where the latest advancements in data-limited method development and application are presented and discussed.</p> <p>To provide effective scientific advice to managers on the protection and sustainable use of fish stocks, it is imperative to develop innovative and practical approaches for identifying and assessing data-limited fisheries and species complexes. The number of stocks in need and the timetables of policy-makers around the world make it vital to improve methodologies. While there is an impressive selection of data-limited assessment strategies, this session will work to highlight approaches that have potential to be practical in their implementation and effective in their application.</p> <p>The objectives of this session are to:</p> <ul style="list-style-type: none"> • Discuss improvements in monitoring and data collection methods for data-limited species, including fishes with complex life history and non-targeted species • Showcase advancements in single- and multi-species data-limited assessment methods • Quantify uncertainties in stock assessment methods and identify key

	<p>challenges to method development and application to provide effective advice.</p> <p>Research, perspectives, and real-world experiences are solicited that relate to overcoming challenges in assessing and managing data-limited stocks. Submissions on the following topics are welcomed:</p> <ul style="list-style-type: none"> • Survey design and data collection methods for data-limited fisheries • New and innovative use of models to assess data-limited stocks or species complexes • Methods to determine and use life history traits to assess stock status • Stock identification techniques to identify cryptic species or determine composition of mixed stock catches • Use of meta-analysis or similar species to inform data-limited models • Development of data-limited stock harvest levels and adaptive management plans • Management strategy evaluation of data-limited approaches • Quantifying uncertainties in assessment practices with a special focus on communicating advice.
Session teaser:	In order to provide effective scientific advice to management on the sustainable use of fish stocks, it is imperative to develop innovative and practical approaches for identifying and assessing data-limited fisheries and species complexes. This session provides a global forum where the latest advancements in data-limited method development and application are presented and discussed.
Tweet text:	No data? No problem! Join our #datalimited forum #ICESASC19 Share & explore best practices and new approaches. #sustainablefisheries [link TBA]
Suggested theme session format:	The session will be divided into three sections: single- and multi-species data-limited methods and the management of data-limited stocks. An invited introductory keynote speaker will kick off each section. Accepted presentations will be given 15 minute slots and poster presenters will be given a 2 minute "teasers" succeeding each section to highlight the main message of their work. Posters will be displayed during the poster session. Social media will be updated throughout the session, with all presenters providing a tweet capturing their presentation. The session will conclude with an overview of topics and key points.
Expected participation:	International scientists with interests in data-limited method development and application, stock assessment, data collection, and fisheries management. Science advisors, resource managers, stock assessment experts, data coordinators, and members of several ICES working groups, including method development groups including: WKLIFE, WKMSYCAT34, MGWG, WGTRUTTA, WGDAM and assessment working groups.
Links to the seven ICES science priority areas as proposed by the Science Committee (see link to codes above):	Food from the sea (Code 1); Impacts of human activities (Code 3); Observation and exploration (Code 4); Emerging techniques and technologies (Code 5); Conservation and management (Code 6)
Links to ICES Steering Groups and/or Advisory Committee:	Ecosystem Observation Steering Group; Human Activities, Pressures and Impacts Steering Group; Integrated Ecosystem Assessments Steering Group; Advisory Committee
Links to ICES Strategic Initiatives (if relevant):	