ICES PGDATA REPORT 2018

ECOSYSTEM OBSERVATION STEERING GROUP

ICES CM 2018/EOSG: 02

REF. ACOM AND SCICOM

Report of the Planning Group on Data Needs for Assessments and Advice (PGDATA)

13 – 16 February 2018

Nantes, France

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
info@ices.dk

Recommended format for purposes of citation:

ICES. 2018. Report of the Planning Group on Data Needs for Assessments and Advice (PGDATA), 13 – 16 February 2018, Nantes, France. ICES CM 2018/EOSG:02. 77 pp.

Contents

1 Executive summary

In 2018, PGDATA started a second 3-year programme with renewed terms of reference. After having achieved some practical and concrete objectives in its first 3-year programme, PGDATA entered a round of discussion with ICES on its future, and considered some of the weaknesses appeared in the first years. The new objectives assigned to PGDATA are to focus on the development of the Quality Assurance Framework (QAF) for both fishery dependent and fishery independent data, create links between the different expert groups, promote for implementation the statistical improvements and good practices and make them easily accessible to the public.

The renewed terms of reference are very ambitious, especially the development of a QAF, and in its 2018 session, PGDATA has initiated the reflection and set up the stage for a full resolution of all its ToRs within the 3 year period.

An ICES structured approach for a Quality Assurance Framework is proposed, taking into account all ICES initiatives in the field of collection, processing and storage of fisheries dependent and independent data, and the work done in other forum such as STECF July 2017 (EWG-17-04). This framework, also compliant with the principles developed in the European Statistical Standard, will need to be presented to ICES, discussed and commented in order to come up with a more complete proposal in 2019.

The accessibility to recommendations and good practices has been addressed through a restructuring of the ICES Quality assurance repository. The proposal makes use of the ICES website development and search facilities, and will need the implication of several ICES working groups to come up with an agreed proposal in 2019. PGDATA is slightly more ambitious and would like to set the stage for a longer term achievement with living documents classified by topics – this would include all recommendations and good practices produced by the wealth of ICES technical workshops and working groups.

The communication and feedback on data issues with assessment working group was given a special focus, acknowledging the previous difficulties, and trying to learn from this experience. A large scan of exploratory figures produced by the assessment working groups in their reports has been undertaken, and have been classified by topics in annex of this document. The objective was to demonstrate the large creativity undergoing in this field, propose a catalogue of what is done for every end-user, and set the stage for a forum like WGCATCH and WGISDAA to take over some ideas and develop generic figures capturing the main information needed for the end users. It is the belief of PGDATA that the exploratory figures used on the entry data for assessment models are the link between the data collection and processing world, the QAF and the assessment and advice world.

PGDATA also wished to propose an ICES ASC 2019 session on data collection and using the same name as during the 2016 ASC to ensure a continuity of work: "When is enough, enough?" Methods for optimising, evaluating, and prioritising of marine data collection. The idea is to prepare the edition of a special issue in a journal (IJMR) on the findings.

This PGDATA report is to be seen as an interim report preparing the elements for a full report addressing all the the terms of reference in 2020.

2 Background

2.1 Summary of the precedent 3-year programme (2015–2017)

PGDATA evolved from the ICES Planning Group on Commercial Catches, Discards and Biological sampling (PGCCDBS) following the shift of the practical work into two separate expert groups, one dealing with collection, interpretation and quality assurance of data on commercial catches (WGCATCH: ICES, 2014) and the other on biological parameters (WGBIOP: ICES, 2015). The remaining work was given to PGDATA, which was tasked, over the period 2015–2017, to **improve the effectiveness of the ICES benchmarking process and the quality of ICES advice**, and to **ensure the best use of available resources for data collection**.

The main objectives of PGDATA were:

i) Design a Quality Assurance Framework to ensure that information on data quality is adequately documented and applied in assessments, particularly benchmarks.
ii) Develop and test analytical methods for identifying improvements in data quality, or collections of new data, that have the greatest impacts on the quality of advice;
iii) Engage with end users, including managers, to raise awareness of what types and resolution of management decisions (e.g. by fleet or area) can realistically be supported by present or proposed data collections;
iv) Advise on objective methods to apply criteria (e.g. as proposed by STECF) for evaluating requests by end-users for new or amended data collections;
v) Plan workshops and studies focused on specific methods development.

2.2 Lessons learned from the 3-year period

At the end of the 3-year period (2015–2017), PGDATA achieved some practical and concrete objectives e.g. guidelines for evaluating the quality of data during a benchmark process (2016), reviewed the ICES annual data call (2017), launched expected statistical analyses regarding cost-benefits of fisheries dependent data collection (2016, 2017), and developed guidelines and advice on best practice, e.g. issue list for stock assessment (2015), guidelines on how to define recreational fisheries data to be collected (2016), data quality questionnaires for discards estimates (2015). PGDATA understood at the earliest stage the benefits of developing the Regional Data Base (RDB) as a fundamental tool for data quality evaluation and transparency of estimation procedures. PGDATA has contributed to the progress in data submission to the RDB observed in recent years and has provided comments on the format to the RDB steering group (2017).

The weaknesses of PGDATA came from a certain vagueness on its scope and remits, both in relation to its end-user groups and their needs, and to the inclusion of fisheries independent information. It is therefore not surprising that the guidelines developed are not entirely appropriated by the assessment groups and that PGDATA could never address survey issues. The difficulties encountered were also linked to the lack of memory of the quantity of work done by skilled statisticians in the past. Indeed, most of their reports are available on the PGCCDBS Data Quality Assurance repository webpage, but the uncountable number of reports make it extremely tedious for anyone to dig out a precise information. Taking into account initiatives from outside ICES world (EU-MAP RCGs, STECF, DG-MARE projects) in the field of data quality proved to be complex, and is essentially linked to the availability of key experts to PGDATA. How ICES should take advantage and progress in coherence with these initiatives is a challenge, but the relatively low number of European experts in the data collection world make it possible to achieve, provided some high level pan European guidance.

2.3 Agreement on the new 3-year programme 2018–2020

The focus should be made on the development of the Quality Assurance Framework (QAF) for both fishery dependent and fishery independent data, and on creating links between the different expert groups. The statistical improvements and good practices should be put in context, promoted for implementation, and easily accessible to the public.

i) Design a Quality Assurance Framework to ensure that information on data quality is adequately documented and applied in assessments;
ii) Ensure consistency of approach for fishery dependent and fishery independent data quality framework, and complementarity with approaches developed in other fora such as STECF, EU-MAP…;
iii) Identifying improvements in data quality, or collections of new data, that have the greatest impacts on the quality of advice;
iv) Improve or create communication routes between data collectors, data managers and end-users, and advise on new approaches to ease the implementation of the QAF (through publication, RDB-development and, cooperation with other WG including shared workshops)

The terms of reference developed below were meant to focus on methods and their evaluation rather than providing solutions to a specific data issue or recommending a single method to be used in all cases. The reason for this is that many assessments and data collections follow different methodologies and have different assumptions so that a universal answer is unlikely to be appropriate. The aim is to gather the existing information on data quality in a structured way, develop expertise and tools where gaps are identified, develop communication with end-users, and maintain knowledge of the work done.

2.4 ToRs for PGDATA 2018

a) Implement and maintain Quality Assurance Framework for assessment EGs to evaluate data quality and its impact on assessments;

i) Propose a structured approach for agreement within ICES, including the development of the ICES/RDB for detailed fisheries data, and develop a "best practice SISP" for data collection in support of stock assessment;
ii) Collaborate with EOSG expert groups to identify problems and prioritize actions to progress and improve quality data collection.;
iii) Provide a service to EOSG expert groups for statistical advice and guidance on sampling design to promote good practice seeking to establish effective two-way communication.

   iv) Cooperate with assessment expert groups to show and demonstrate the effects of data collection methodology on the advisory assessments to underline the relevance of good practice to the advisory process

b) Review the outcomes on methodological procedures and quality estimates from past ICES technical workshops and working groups, and advise on ways forward.

   i) Maintain knowledge of the work done and organize accessibility to any recommendation or good practice provided by the variety of technical workshops and propose changes to SISP as necessary
   ii) Review the work done in other fora such as STECF and EU-MAP in order to integrate the initiatives and propose complementary work;
   iii) Identify gaps and needs for statistical and/or tools developments, and initiate workshops as needed;

c) Propose ways to improve the communication and feedbacks on data issues

   i) Review and comment on ICES data call
   ii) Organize participation to end-user meetings to seek for mutually beneficial improvements
   iii) Promote publication on findings, likely in the form of peer-reviewed publication (e.g. CRR) that documents the development of methodologies in the field of data collection and the state of scientific knowledge on the topic at the end of the 3-year TOR period

In its first year of the 3-year programme (2018) PGDATA elaborated on each of the ToRs with the idea of agreeing on goals to be achieved within 3 years and the associated roadmap.

3 Development of a quality assurance framework on data collection and data processing

3.1 Proposal for an ICES structured approach

Although a Quality Assurance Framework (QAF) is generic by principle, PGDATA was tasked to develop a QAF on collection and processing of data needed for assessment and advice, i.e. issued from scientific surveys, commercial and recreational catches and exploited species.

The expected benefits of developing a QAF are:

- quality improvement by reducing errors, developing coordinated tools,
- transparency in data flow from the collection on the field to the submission of data to end-user,
- better value for money with optimized and fit-for-purpose sampling plans, following dedicated analyses like e.g. sensitivity of data variability to assessment precision,
- better accessibility to guidelines and good practices,
- capacity building and assistance to data collectors,
- standardisation of tools which can enable analyses that are currently impossible/impractical,
- address the needs of the Transparent Assessment Framework (data and input)

Other fields of science may also benefit from the QAF for data collection for assessment and advice, such as transparency of assessment framework (items model and outputs), data collected for MSFD, and regional coordination.

The STECF-EWG-17-04 report provided generic principles underlying data quality which could be used to in the field of fisheries data collection and estimation procedures. Principles at the basis of ISO 9001 were discussed and although they are relevant in the long run would be difficult to structure a QAF. It remains that the general principles including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement, should definitely be the norm. PGDATA also highlighted the fact that the main client for data providers are the assessment working groups, which will often be unsatisfied with the quality and require better accuracy. It was mentioned that CEFAS and ILVO are ISO certified for age reading (to be verified). From the different possibilities to structure a QAF, PGDATA proposed a general framework which follows the principles developed in the European Statistical Standard and its Standard for Quality Reports Structure (release 2, December 2014).

The main property of the proposed framework should be to structure all ICES initiatives on the field of data collection and estimation procedures of the past decades into an overall coherence of approach. The proposal is as follows (see also figure 1 for a schematic view):

1. Sound methodology
    a. Guidelines and good practises for data collection
2. Appropriate statistical procedure
    a. Guidelines and good practises for data processing
    b. Tools and software available
3. Relevance

a. Data calls detailing the demand for data and quality based on end-user needs
b. Communication with end-users to ensure a feedback on data issues
c. Database on stock information for a 2-way communication between data collectors and end-users
d. Data Compilation Workshops

4. Accuracy and reliability
    a. Review of sampling design and estimation procedures
    b. Quality indicators
5. Timeliness and punctuality
    a. Data calls include a timeline for providing data and data has a fixed timeline for being processed
6. Coherence and comparability
    a. Otoliths exchange and maturity agreements
    b. Survey intercalibration
    c. Reference tables (ICES vocabularies)
7. Accessibility and clarity
    a. Storage facilities (DATRAS, RDBES, InterCatch, SmartDots)
    b. Repository and library
    c. Documentation (SISP, CRR, SOP, …)
    d. Transparent Assessment Framework
    e. Web services
    f. Data publication (DOI)

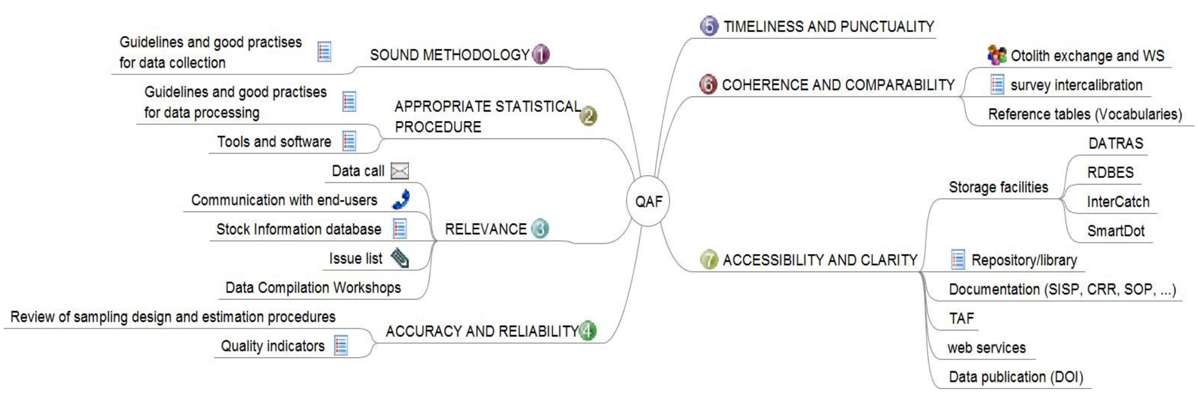


Figure 1: Schematic representation of the proposed ICES QAF

Roadmap : This proposal is to be seen as a first proposal to be circulated and amended for a broad appropriation. At this stage, it has the merit of being able to present all ICES initiatives in a structured way and start the further detailing of each of the sub-items.

3.2 Development of SISP

PGDATA agreed with the idea of developing SISP for fisheries dependent data, with the aim of providing good practice for each sampling type regarded as following Statistical Sound Sampling Schemes. Following WKPICS3, it would come one SISP for :

- At-sea sampling with trips as primary sampling units
- At-sea sampling with vessels as primary sampling units
- On shore sampling with site-days as primary sampling units
- On shore sampling with sites as primary sampling units

For fisheries independent data, PGDATA acknowledged the existence of SISPs already developed, and was of the opinion that all SISPs should follow the same structure and refer to relevant documents proposed in the QAF repository (see section 4.1). The scientific survey SISP reviewed in plenary were not all structured the same way, although they convey the same type of information (description of the survey, survey sampling design, sampling protocols, data analysis, etc). The expected benefits of having the same structure is that it will be more easy to (i) reach a specific information in different SISPs, (ii) develop a new one and (iii) point at missing parts to be completed if any.

PGDATA proposed the following generic structure, with a first suggestion of contents

1. Description of the survey
2. Survey sampling design
    a. Sampled population vs total population
    b. Description of sampling units
    c. Stratification
    d. Allocation procedure
3. Sampling procedure
4. Data storage
    a. National, International
5. Data quality checks and validation
    a. National, International, Quality indicators
6. Estimation procedure
    a. For each parameters, including variance estimators

Roadmap : WGCATCH and WGISDAA to critically review the proposed SISP template in their 2018 sessions and advise on the first sampling scheme/survey which should use the new template. PGDATA 2019 will evaluate the feedback and make any changes required to the template and also evaluate whether a workshop to start filling the SISP template is required.

3.3 Communication and cooperation with expert groups

ToR c.ii is about participation to end-user meetings to seek for mutually beneficial improvements. This reminds of different initiatives undertaken in a recent past :

- Data contact person to AWG (PGCCDBS)
- Questionnaires to AWG (WGCATCH)
- Data issues list (PGDATA)
- Data recommendation database (ICES)

Lessons have to be learned from the past, and it seems difficult for a stock coordinator/assessor to have a deep understanding on how data has been processed in each country. The question remains, do they need to know how data have been processed when preparing a stock assessment? The previous PGDATA 3-year period focused on feeding the benchmarks and Data Compilation Workshops with this type of information. PGDATA initiated a new approach to investigate the plots developed within the AWG which explore the input data to their models, and thus what type of information they would be interested in. From the AWG reports investigated (see annex III) the review showed clearly that stock assessors are interested in the stability of the time series and how the last addition of year evolves from the time series. Data submitters did not perform these type of analyses so far, although these are possible at national level, and would enable to spot unexpected changes to be investigated well in advance of the AWG. There's a lot of benefits to perform these analyses at the time of submission, in order to detect potential errors in the sampling and be able to do the corrections, if possible, before the AWG starts. The issue of the amount of work added to data submitters should not be overlooked in this process. Communication with AWG could start with the meta-analysis of their own production (annex)

Roadmap : WGCATCH and WGISDAA to review these diagnostics plots, with the objective of proposing standard plots and initiate a continuous improvement process. See also the section on publication where improvement of diagnostics plots during the theme session

PGDATA recommended some of the participants to visit AWG in 2018 to present the PGDATA ongoing work and interact with the end user. This can be achieved either by PGDATA members of an AWG (WGBFAS, WGNSSK), participation to the first two days of an AWG or by a webex session. A Powerpoint presentation will be developed to this aim in the weeks following the release of the final report.

3.4 Statistical advice and guidance

When exploring the data from InterCatch, stock assessors have to evaluate means to impute data to unsampled strata. Borrowing information from relevant and well informed strata suppose that the later are of sufficient quality to support a widening of their scope. In this situation, the stock assessors would need mapping in the likes of the one below (fig. 2) which could be run from the output of IC, the idea being to detect quickly areas where the informed strata are not qualified to be used for imputation.

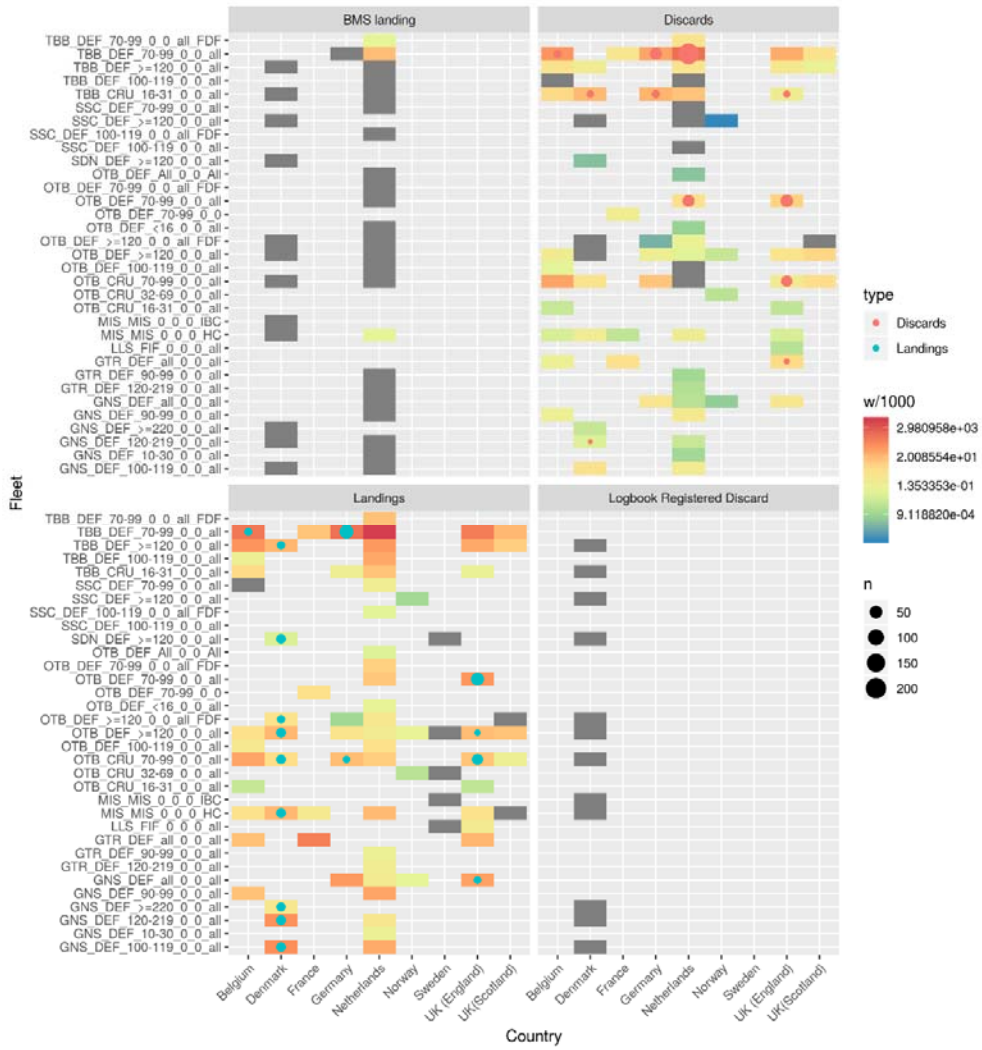


Figure 2: mapping of catches fractions and related sampling (grey cells relates to Non Available information)

This map, together with a graph on cohort tracking should give a first set of information on the quality of the data used and such tools could be developed in a separate forum (WGCATCH, fishPi-like project…) for the use of ICES stock assessors. Potential analyses can be further explored based on all the graphs scanned in assessment reports (Annex III).

4 Methodological procedures and quality estimates from past ICES technical workshops and working groups

4.1 Accessibility to recommendation or good practice

There are two aspects on the accessibility to any relevant information provided by previous expert groups. The first is about finding easily a desired report, and the second is about organising the information in order to provide directly the excerpts of an expert group related to the domain of interest. The first is about better organising the ICES web page on QAF repository[1] which, year after year, has accumulated more than 200 links to workshops and expert group reports. This means that, a large number of issues have found answers, examples of good practices, recommendations for practical implementation, and as it is, only a few experts in each of these fields are able to dig out this information. The second is about data mining and will necessitate developments that PGDATA agreed to coordinate.

The presentation of more than 200 links to reports could be done manually (as now) or dynamically, and PGDATA recommended exploring this latter option. The first step is to attach agreed tags to each of the reports (past and future), this would enable to present the keywords on a tabulated form. Following the presentation by Ifremer on the QAF for their fisheries Information System based on the life cycle of the data (from the survey design to the transmission of the data to end user), PGDATA proposed a similar approach for the presentation of the links. A first proposal would be as follows:

	Survey design	Control and calibration	Sampling protocols	Recording systems	Quality Guidelines and indicators	Data processing	Data Storage and transmission
Catch	[5], [6]				[3]		
Length	[4], [5], [6]				[3]		
Discards	[5], [6]				[3]		
Age	[5], [6]				[1], [3]		
Maturity					[2], [3]	[2]	
Recreational							
Fish condition							
By-catch							
Stomach contents							
Survey indices							
CPUE/LPUE							
….							

For age and maturity calibration, there is a third dimension with the years where the calibration took place, it would then become :

[1] http://www.ices.dk/community/Pages/PGCCDBS-doc-repository.aspx

	Species	Stock(s)	Year	Document
Age	Anchovy	ATL + MED	2016	[7]
Maturity	Herring	NSSH	2010	[9]
Egg staging	Horse mackerel		2015	[8]
Egg staging	Mackerel		2015	[8]

A first attempt to fill the cells was done to illustrate the idea with the following 9 reports

[1] WGBIOP 2017 Guidelines for Exchanges And Workshops on Age Reading
[2] WGBIOP 2017 Guidelines for Workshops on Maturity Staging
[3] Updated guidelines for the ICES benchmark data evaluation process
[4] Report of the Workshop on implementation studies on concurrent length sampling (WKISCON2)
[5] Report of the third Workshop on practical implementation of statistical sound catch sampling programmes (WKPICS3)
[6] Report of the second Workshop on Practical Implementation of Statistical Sound Catch Sampling Programmes (WKPICS2)
[7] Report of the Workshop on Age estimation ofEuropean anchovy (Engraulis encrasicolus) (WKARA2)
[8] Report of the Workshop on Egg staging,Fecundity and Atresia in Horse mackerel and Mackerel (WKFATHOM)
[9] Report of the Workshop on estimation of maturity ogive in Norwegian spring spawning herring (WKHERMAT)

From this exercise PGDATA demonstrated that a fixed list of tags (headers of lines and columns of the tables above) attached to all documents in the repository would enable presenting the documents dynamically, and this would greatly ease the search for relevant documents.

PGDATA explored the possibility to use the library search facilities of ICES but found that the results of the research were too broad and not accurate enough for the expected usage. The restriction of the search engine to the only documents present in the Quality assurance repository could help and be a supplementary option for the user. Moreover, other applications exist on the ICES website but are either not accessible to public (i.e. held in private sharepoint folders) or accessible only on demand (age-reader forum). For the later, PGDATA was of the opinion that there were no reason to restrict access (although the restriction is a simple form to fill) and that a sampling design forum would make sense given the many questions from the people in charge of sampling in the field.

Roadmap : WGBIOP and WGCATCH 2018 to add their expertise to this issue for consideration by PGDATA 2019

ICES to extract all tags which are attached to the documents in the repository, if any, and inform on the possibility to add/modify tags

PGDATA 2019 to finalise a proposal for ICES to update the QAF repository web page

Objective 2020: being able to extract relevant Expert groups excerpts relevant to the different topics in the Frequently Asked Question or any form alike

4.2 Work done in other fora such as STECF and EU-MAP

fishPi² project

the fishPi² was proposed in response to the DG-MARE call for project (MARE/16/22). The project gathers 50 scientists from 14 institutes and 10 Member States (13 countries and autonomous regions). It started in January 2018 for a duration of 15 months. The strategic objective of the project is to build on the work achieved in the former fishPi project, for further strengthening regional cooperation, provide clear guidance on the implementation phase of regional sampling, and work to build both within region expertise and pan regional cooperation

The relation to the development of ICES QAF is multiple, in the likes of the different work packages (WP). WP1 will advise on better efficiency of the Regional Coordination Groups, including the work of thematic sub-groups, among which one will deal with the ICES RDB. WP2 will develop objective criteria for defining fisheries fit for a regional sampling plan. These sampling plan are meant to improve the robustness and fit-for-purpose of the actual addition of national sampling plans and help moving through statistical sound sampling schemes. The sampling plans will be about practicality of two test fisheries (WP3), the collection of by-catches and stomach contents (WP4), the collection of data on recreational fisheries and small scale fisheries (WP5). WP6 will address issues of data quality, data control and validation and reporting from the RDB, and training sessions will be held as part of WP7.

Marine Institute (Ireland) Data Quality Manual

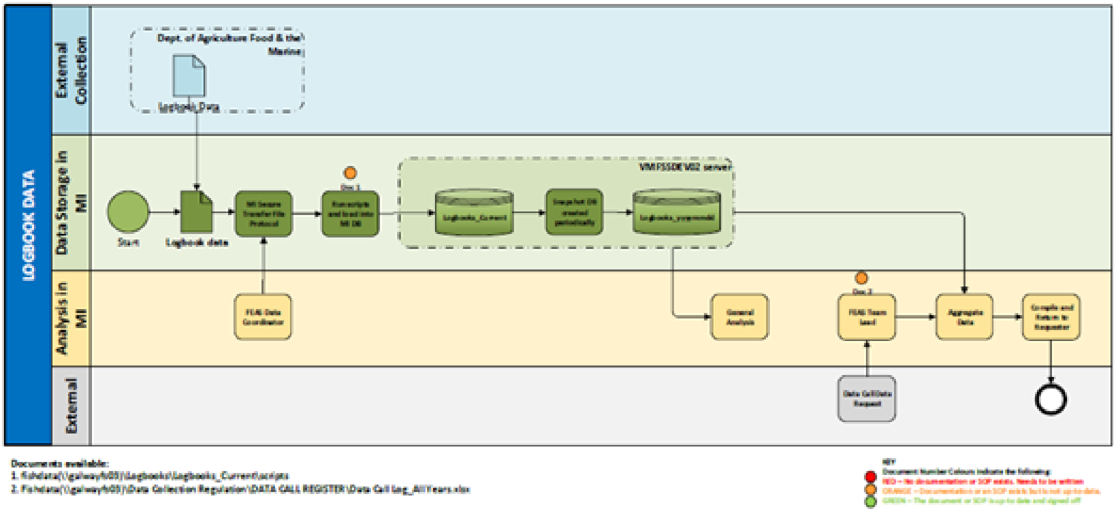
The Marine Institute (MI) aims to become an IODE accredited data centre - it needs to produce a Data Quality manual to achieve this. The framework for this manual is provided by the "IODE Quality Management Framework for National Oceanographic Data Centres" (https://www.iode.org/index.php?option=com_oe&task=viewDocumentRecord&docID=12661).

The purpose of the manual is to define the MI's Data Quality Policy, Data Quality Management System and the management responsibility for quality fulfilment at Marine Institute.

For each directorate, for each team the MI must:

- List the data processes that are within scope
- For each process, describe it using BPMN diagrams (http://www.bpmn.org/). An example is shown below.
- Identify where Standard Operating Procedures (SOPs) do or don't exist
- (If the process involves personal data there will also be some further GDPR diagrams produced)

The MI will submit the completed manual for accreditation around August 2018.



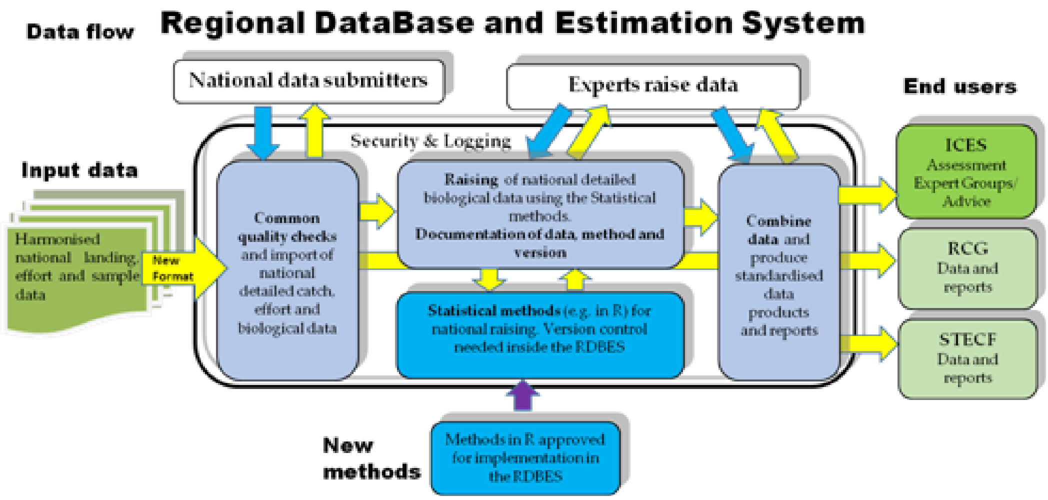
Regional Database and Estimation System (RDBES)

The future advantages of using the RDBES are:

- Support the Regional Coordination Groups, RCG with data for coordination
- Ensure approved standardised statistical methods are used for estimating the detailed data for the stock assessment
- Document data used for the stock assessment at detailed level (reproducible, recurrent uploads)
- Higher data quality by using common quality checks across all countries' data
- Reduces the workload for the countries in estimating data because the RDBES contains all needed methods
- One data call for upload of data to the RDBES for the RCGs and estimated for the ICES stock assessment WGs

The RDBES data model should be seen as part of the movements towards:

- Statistically Sound Sampling Schemes (4S),
- Greater regional coordination,
- Transparent Assessment Framework (TAF),
- Improved estimates to ICES assessments.



RDBES Status

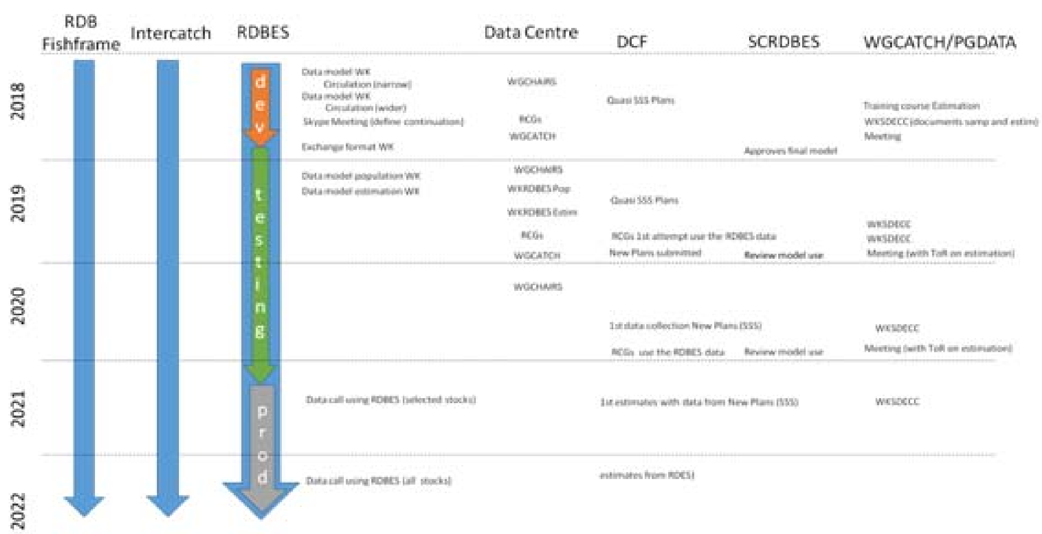
The RDBES Core Support Group have just specified the data model for the RDBES.

The RDBES data model has just been sent to the countries for feedback. Can the countries use it? Is a change is need?

The Data Model of the RDBES should be ready in April but it is more complex than the RDB.

The significant difference is that it provides a common structure to describe **both the disaggregated sampling data and how it was sampled.**

The plan is still that the RDBES is ready around summer 2019.



4.3 Identify gaps and needs for statistical and/or tools developments

Work to be done when the AQ repository is restructured (see section above). Work for 2019–2020.

5 Communication and feedbacks on data issues

5.1 Review and comment on ICES data call

The group reviewed the 2018 ICES EWG data call for and provided feedback to ensure that the content is clear from the data submitters' perspective. The 2018 ICES data call contains the general data call from expert groups NIPAG, NWWG, WGBFAS, WGBIE, WGCSE, WGDEEP, WGHANSA, WGMIXFISH-ADVICE, WGNSSK and WGWIDE. The data call is very similar to the 2017 data call, but discussions continued on how to handle the different fractions (Landings, Discards observed and reported, Below Minimum Size), and the section of the data call was clarified during the session.

PGDATA expressed the view that all ICES AWG data calls should be channeled through a single data call.

Data issues section:

Stock information database: http://sid.ices.dk is on test for 2018 to be implemented in 2019, this will allow the knowledge in advance on which data will be required in the next data call.

PGDATA requested the possibility for stock submitters to select multiple AWG (or all) and multiple stocks (or all), since accessing these one by one is anticipated to be extremely tedious. ICES proposed to test the system

PGDATA pointed the need to have a feedback on which data has been formally received by ICES. The proposal is for ICES to be able to update the SID with the information transmitted by submitters, e.g. color code or fixed list of code (S = Data submitted?)

5.2 Publication and communication on findings

ICES ASC 2019 - session on data collection and processing. The idea is to take the same name as during the 2016 ASC to ensure a continuity of work: "When is enough, enough?" Methods for optimising, evaluating, and prioritising of marine data collection

The objective is to edit a special issue in a journal (IJMR)

CRR (objective 2020) on

- ICES QAF
- Guidelines and good practices
- Alert on a CRR on age determination which proves difficult to finalise after several years in the making

6 AOB

For the next meeting, PGDATA proposed to contact JRC for a meeting in Ispra, with the objective of improving the link with the DC-MAP initiatives (quality checks, data issues, databases structures and outputs, data calls, exploratory analysis, dissemination).

Proposed date: 15–18 January 2019

Annex 1: List of participant

Name	Institute	Country	E-mail
Joel Vigneau *chair*	Ifremer Port-en-Bessin Station	France	joel.vigneau@ifremer.fr
Laurent Dubroca	Ifremer Port-en-Bessin Station	France	laurent.dubroca@ifremer.fr
Josefina Teruel	Insituto Español de Oceanografía, Vigo	Spain	josefina.teruel@ieo.es
Tiit Raid	Estonian Marine Institute, University of Tartu	Estonia	tiit.raid@gmail.com
Christoph Stransky	Thünen Institute of Sea Fisheries, Hamburg	Germany	christoph.stransky@thuenen.de
Rui Catarino	ICES	Denmark	rui.catarino@ices.dk
Perttu Rantanen	Natural Resources Institute, Turku	Finland	Perttu.Rantanen@luke.fi
Maksims Kovsars	BIOR, Fish Resources Research Dpt, Riga.	Latvia	Maksims.Kovsars@bior.gov.lv
Edvin Fuglebakk	Institute of Marine Research, Bergen	Norway	edvin.fuglebakk@imr.no
Chun Chen	University of Wageningen	Netherland	chun.chen@wur.nl
David Currie	Marine Institute Galway	Ireland	David.Currie@Marine.ie
Jukka Ponni	Natural Resources and Bioproduction, Helsinki	Finland	jukka.ponni@luke.fi
Jon Helge Vølstad	Institute of Marine Research, Bergen	Norway	jon.helge.voelstad@hi.no

Annex 2: Agenda

Meeting Start: 10:00 am Tuesday 13 February 2018 Meeting End: 14:00 Friday 16 February 2018

Venue: IFREMER, Nantes, France. Address; Ifremer centre, rue de l'Ile d'Yeu

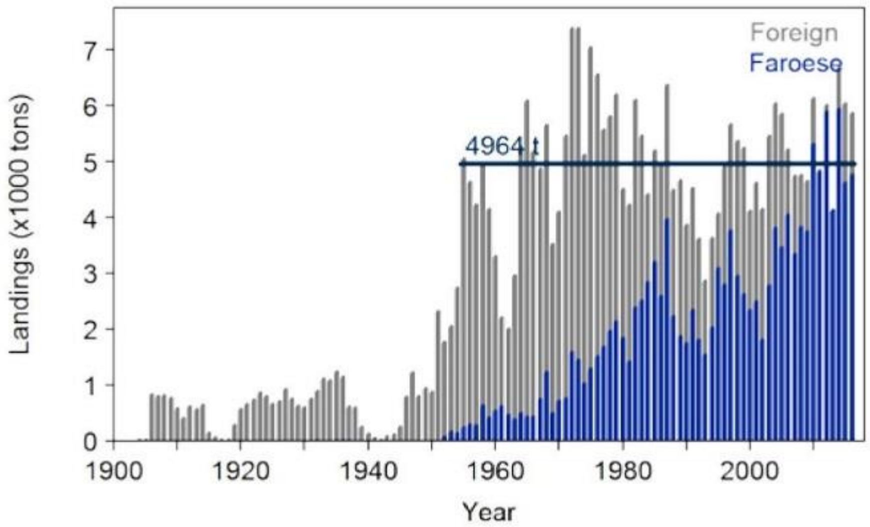
Day	Tuesday	Wednesday	Thursday	Friday
09:00-10:30	Welcome participants 10:00 : Introduction on the new PGDATA PGDATA so far, what was achieved, what's the plan	Work on ToR	Summarising where we are	Review text written.
10:30-10:50	Coffee break			
10:50 – 13:00	Revised ToRs in detail, Provide guidance on how to progress on each ToR Do we need to break into subgroup?	Work on ToR	Drafting of report text	Review text written.
13:00-14:15	Lunch			End of Meeting
14:15 – 16:00	**Presentations** FishPi II – overview STECF QAF meeting Review outputs from technical WS reports RDBES progress	ToR c)i) Review of ICES data-call	Drafting of report text	
16:00 – 16:15	Coffee break			
17:00 – 18:00	End of presentations	Work on ToR	Review text written	
Evening			Social dinner	

Notes – please read and consider how you can contribute and what you need to bring to the meeting

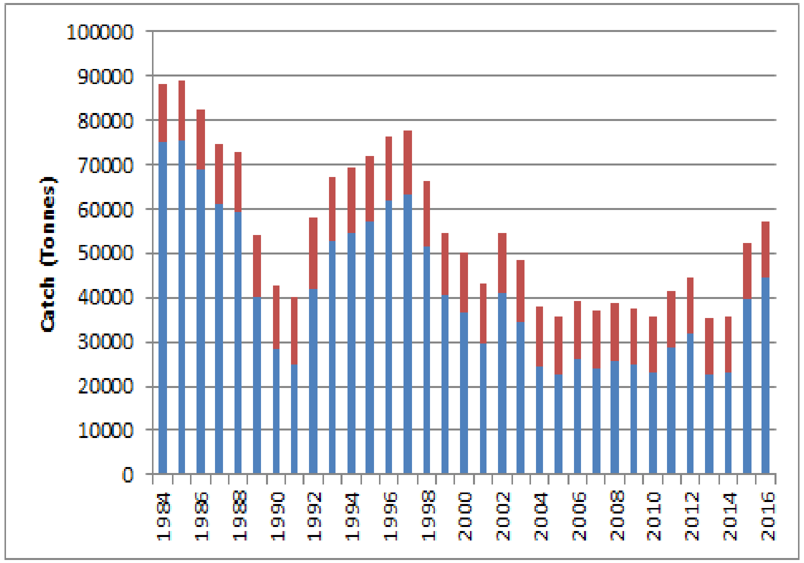
Annex 3: Overview of AWG diagnostics plots regarding input data

III.1 – Catches and landings

Historical series of catches and landings



WGDEEP 2017; Figure 4.2.3. Ling in 5.b. Total international landings since 1904. The mean catches from 1955 to present were around 5000 tons



AFWG (2017). Figure 2.3. Estimated catch of Norwegian coastal cod. Commercial catch in blue and recreational catches in red

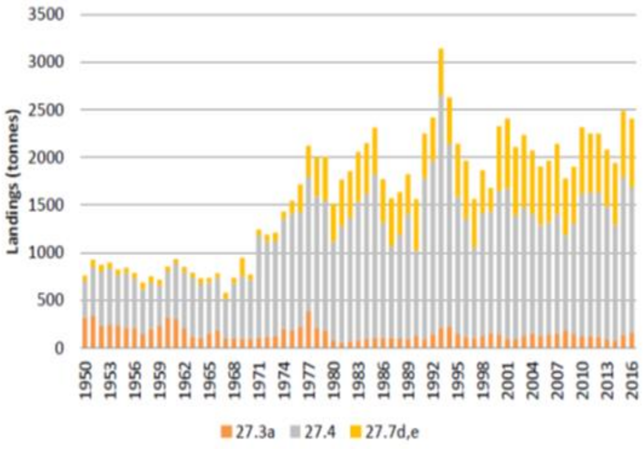
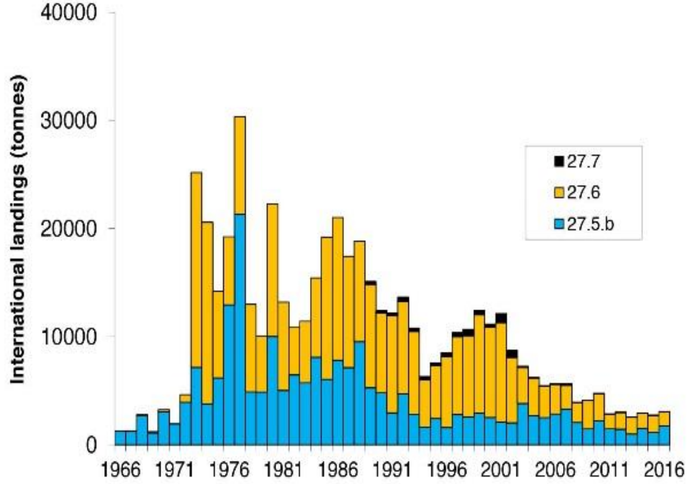


Figure 3.1. BLL 27.3a47de: Official landings (tons) over the period 1950–2016, as officially reported (Rec 12; ICES Fishstat).

WGNSSK 2017. Landings per subdivision



WGDEEP 2017. Figure 5.3.1. Trends in total international landings for bli-5b67

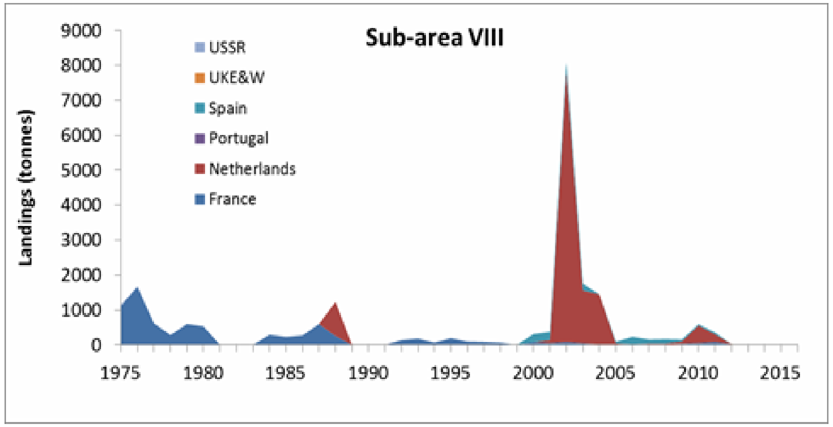
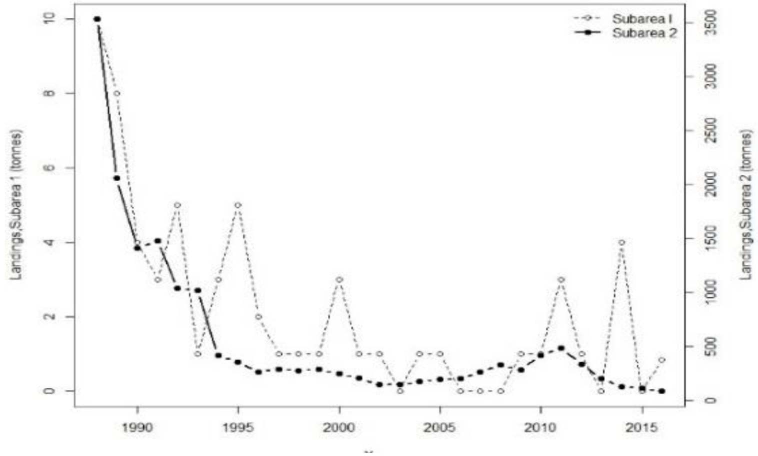


Figure 12.2. Stocks with limited data. Landings over time of herring in Sub-area 8.

HAWG 2017



WGDEEP 2017. Figure 5.4.2. Landings of blue ling in Subareas 1 and 2.

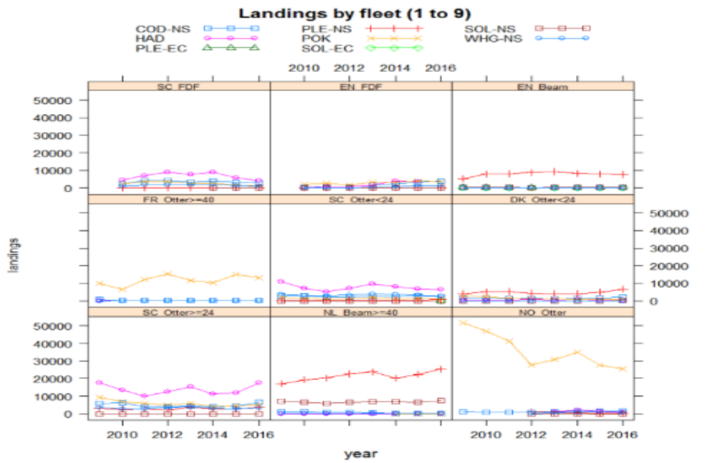


Figure 2.4.3.d Landings by fleet, stock and year. Fleets are shown in decreasing groups of total landings and with different scales.

WGMIXFISH (2017)

314 | ICES HAWG REPORT 2017

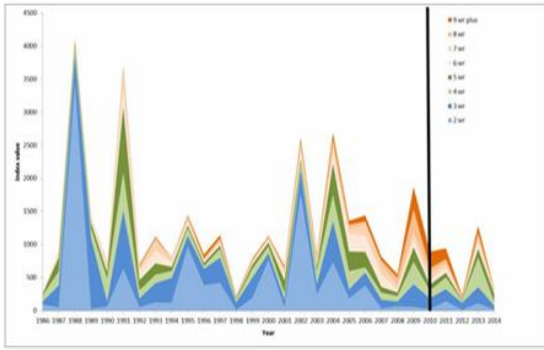


Figure 4.3.2.3. Herring in 6.a (combined) and 7.b and 7.c. Trends in stock composition from abundance at age index from Scottish ground fish survey in Quarter 1. The time series is only used in the assessment up to and including 2010 (black vertical line).

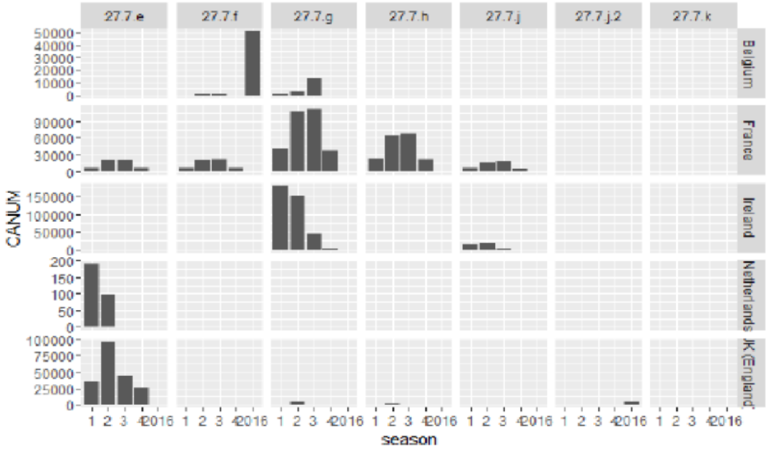
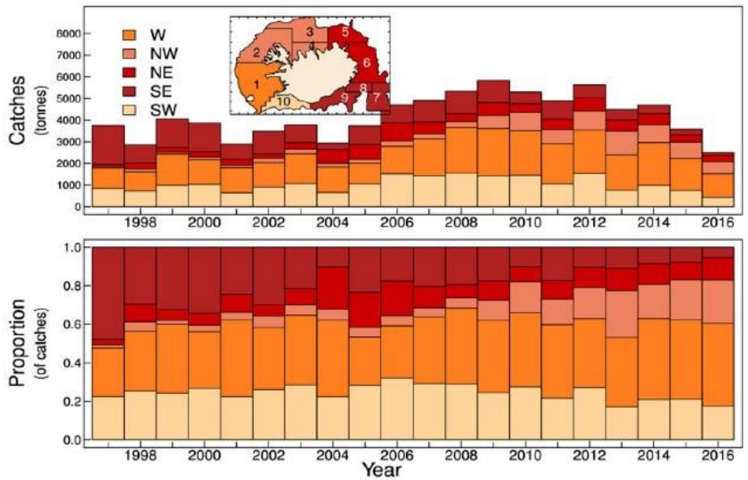


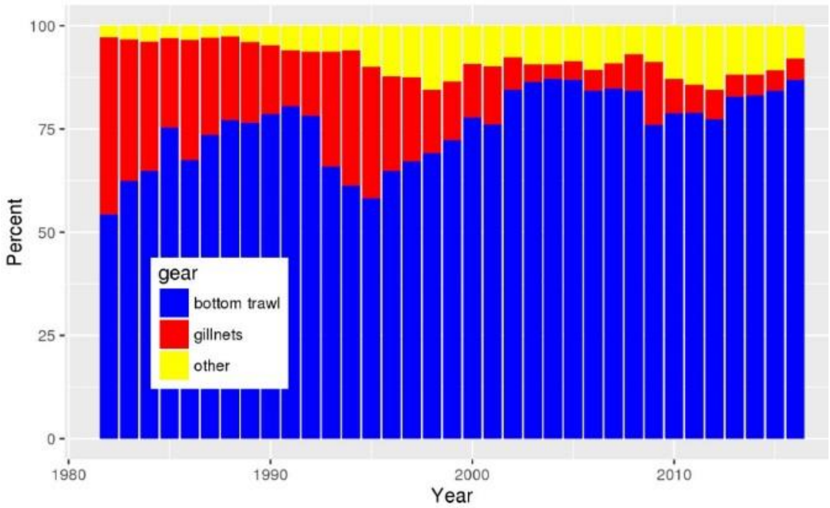
Figure 9.2. Cod in Divisions 7.e–k 2016. 2016 landings by area, season and country.

WGCSE 2017

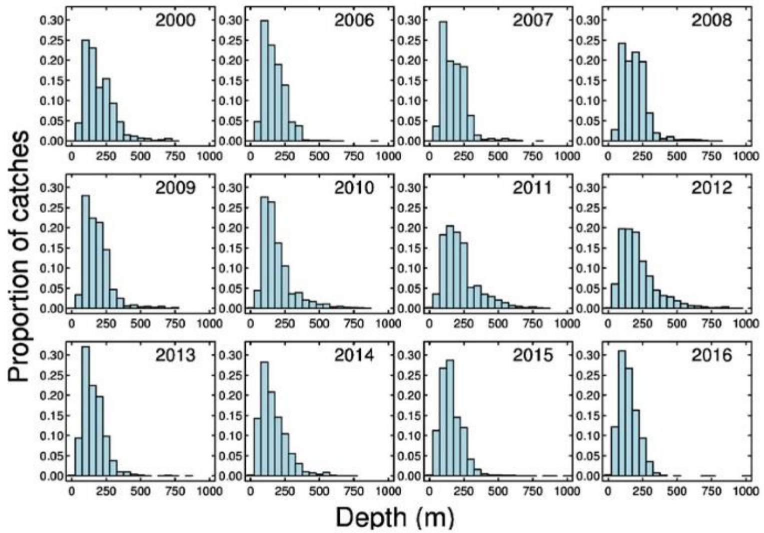
HAWG (2017)



WGDEEP 2017. Figure 6.2.3. Tusk in 5.a and 14. Changes in spatial distribution of the Icelandic fishery from 1996 as reported in logbooks. All gears combined.



NWWG 2017. Figure 5.3. Faroe haddock. Contribution (%) by fleet to the total Faroese landings 2016.



WGDEEP 2017. Figure 6.2.1. Tusk in 5.a and 14. Depth distribution of longline catches in 5.a according to log-books.

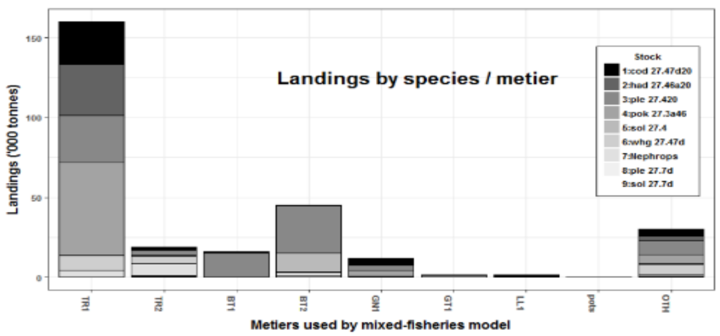


Figure 2.4.2.a Landings distribution of species by métier with landings consisting of ≥ 1% of any of the stocks 1–10 in 2014 Note: The "other" (OTH) displayed here is a mixed category consisting of (i) landings without corresponding effort and (ii) landings of any combination of fleet and métier with landings < 1% of any of the stocks 1–10 in 2014. The "non-allocated" is the differences between total landings used in single stock advice and mixed-fisheries advice, such as saithe and haddock landings in Subarea 6 and 6.a respectively.

WGMIXFISH (2017)

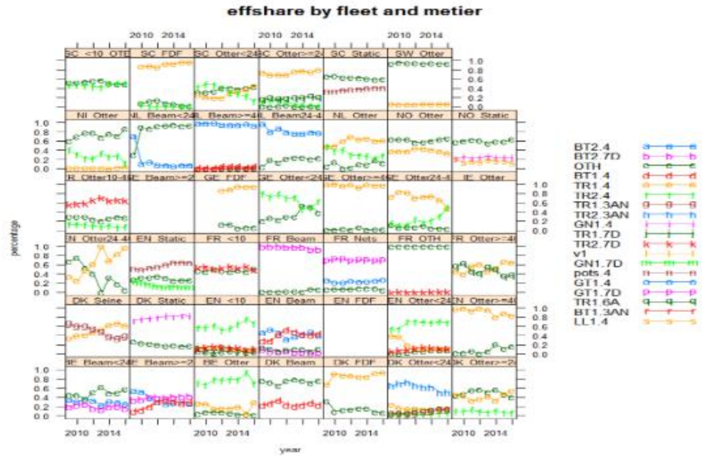


Figure 2.4.3.c Effort share (in proportion) by métier for each fleet.

WMIXFISH (2017)

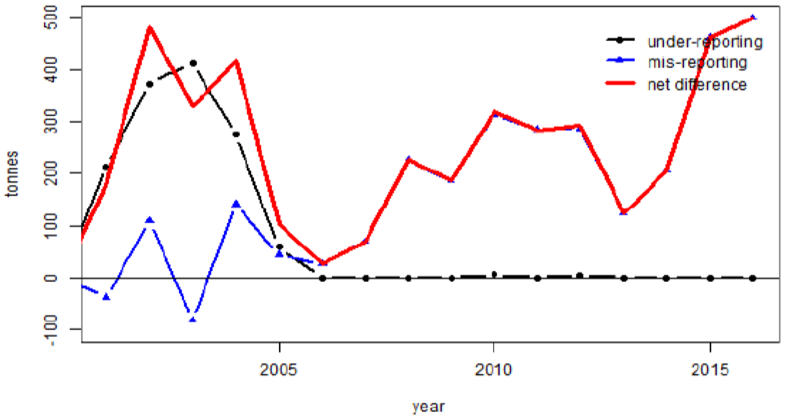
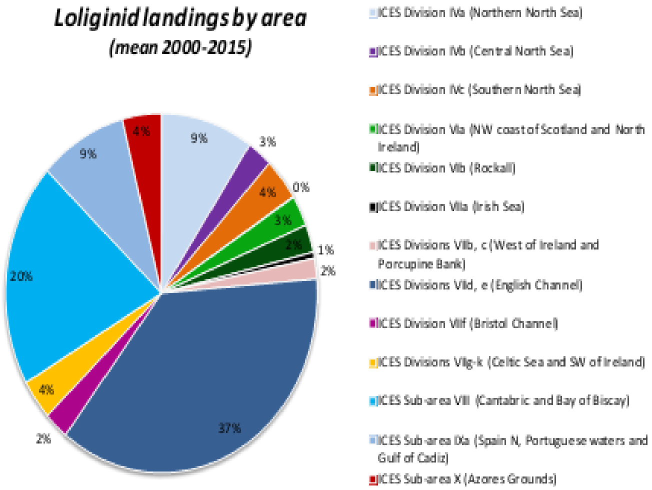
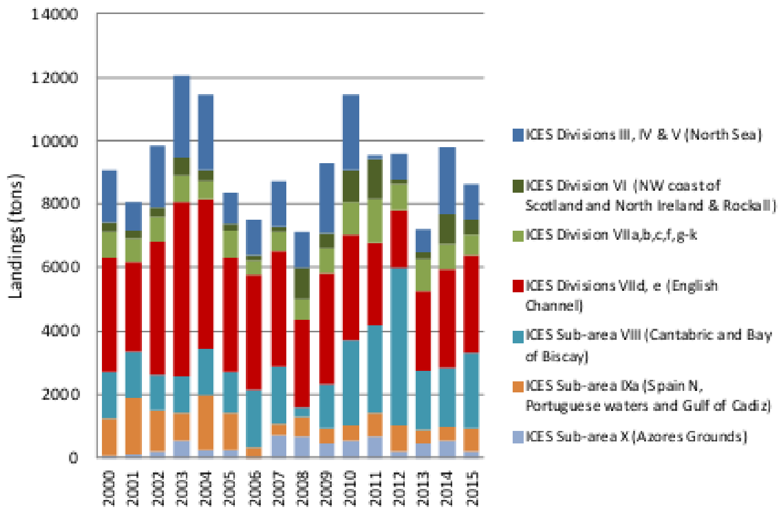


Figure 5.2. Cod in Division 6.a. Estimates of underreporting and area misreporting of cod caught in ICES Division 6.a by Scottish vessels. Negative values of area misreporting indicate a net balance of misreporting into Division 6.a from other areas.

WGCSE 2017



WGCEPH 2016


14000
12000
10000
8000
6000
4000
2000
0
Landings (tons)
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
ICES Divisions III, IV & V (North Sea)
ICES Division VI (NW coast of Scotland and North Ireland & Rockall)
ICES Division VIIa,b,c,f,g-k
ICES Divisions VIId, e (English Channel)
ICES Sub-area VIII (Cantabric and Bay of Biscay)
ICES Sub-area IXa (Spain N, Portuguese waters and Gulf of Cadiz)
ICES Sub-area X (Azores Grounds)

WGCEPH 2016

Mapping the catches and landings

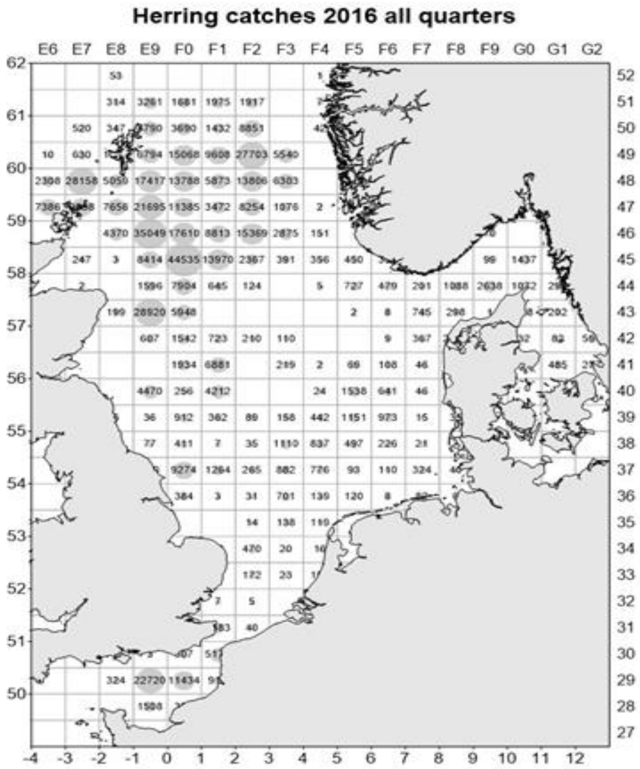


Figure 3.1.1e: Herring catches in the North Sea in all quarters of 2016 (in tonnes) by statistical rectangle.

HAWG (2017)

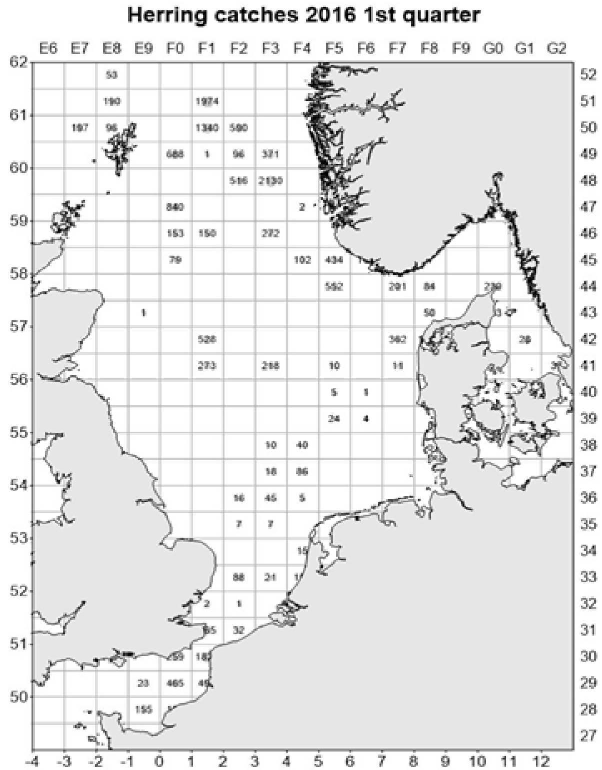


Figure 3.1.1a: Herring catches in the North Sea in the 1st quarter of 2016 (in tonnes) by statistical rectangle.

HAWG (2017)

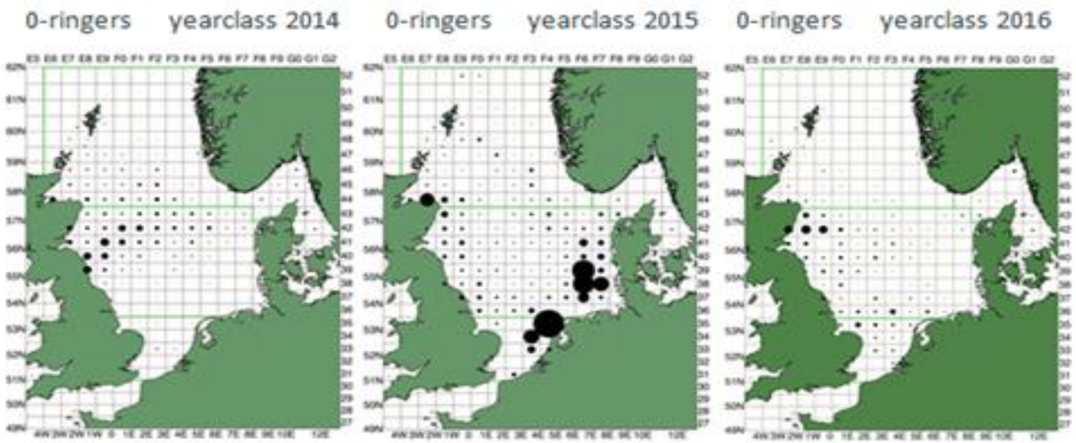


Figure 3.3.3.2. North Sea herring. Distribution of 0-wr herring, year classes 2014-2016. Density estimates of 0-ringers within each statistical rectangle are based on MIK catches during IBTS in January/February 2015-2017. Areas of filled circles illustrate densities in no m^{-2}, the area of the largest circle represents a density of 7.59 m^{-2}. All circles are scaled to the same order of magnitude of the square root transformed densities.

HAWG 2017

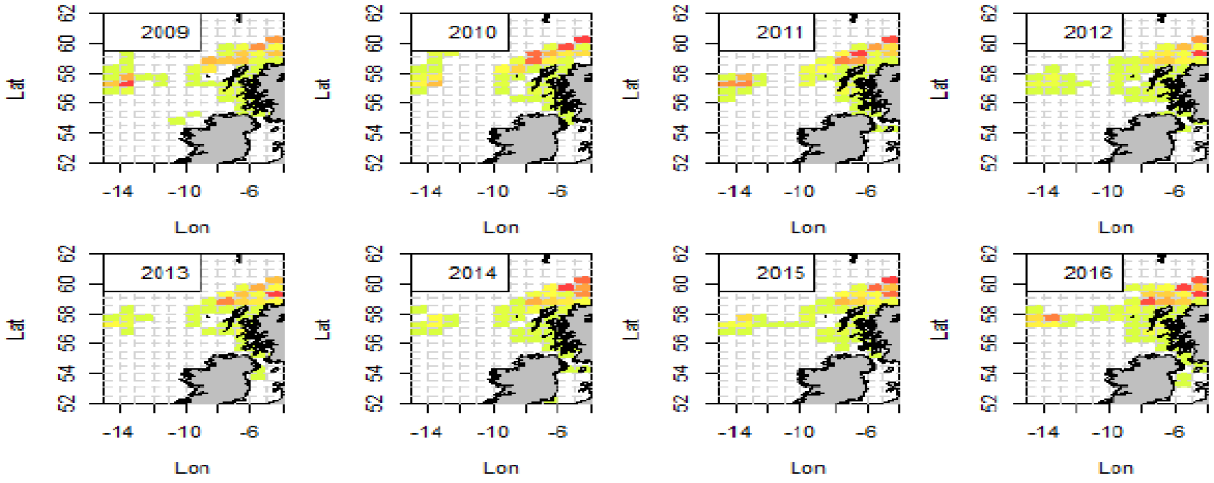


Figure 5.1. Distribution of Scottish reported landings by statistical rectangle by year.

WGCSE 2017

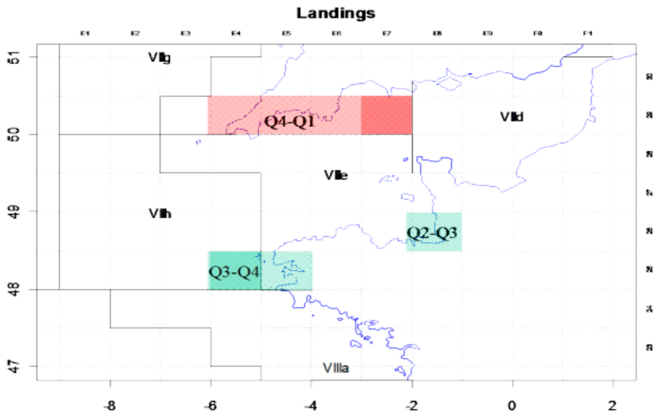
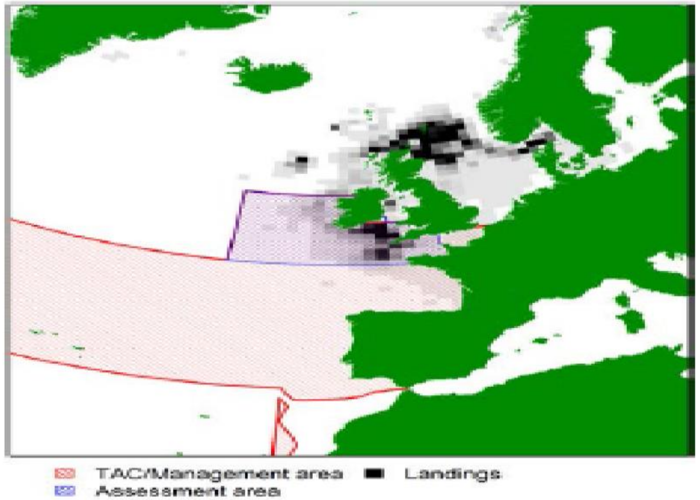
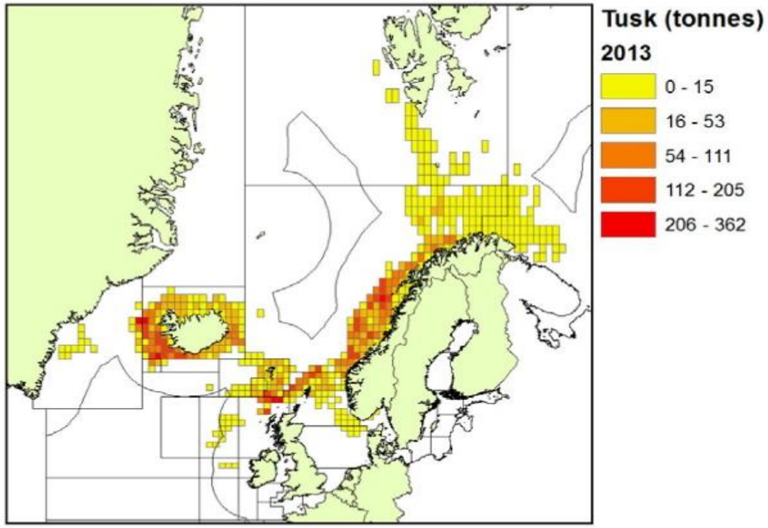


Figure 2.2.1. Map of the statistical rectangles where most of the catches of anchovy occur in ICES Division 7 for France (Green) and UK (Red).

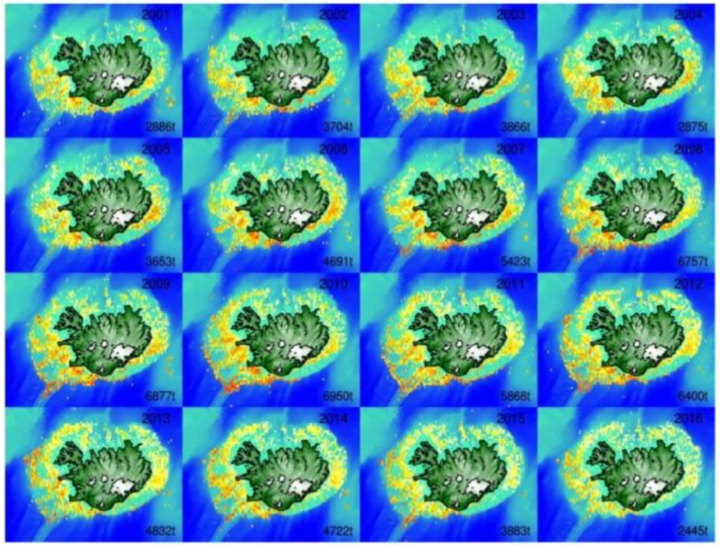
WGANSA 2017



WGCSE 2017



WGDEEP 2017. Figure 6.1. Reported landings of tusk in the ICES area by statistical rectangle, 2013. Data from Norway, Faroes, Iceland, France, UK (England and Wales) and Spain. Landings shown in this figure account for 99% of all reported landings in the ICES area.



WGDEEP 2017. Figure 6.2.2. Tusk in 5.a and 14. Geographical distribution of the Icelandic fishery since 1999 as reported in logbooks. All gears combined

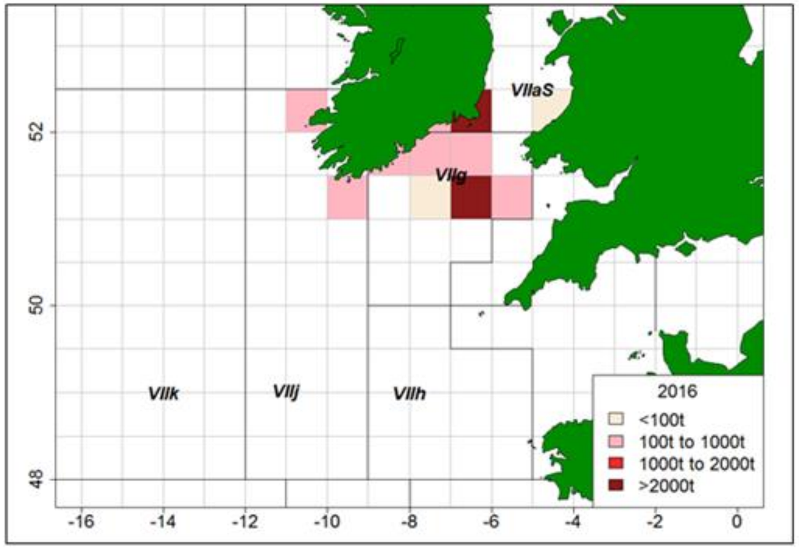


Figure 6.1.2.1. Herring in the Celtic Sea. Irish official herring catches by statistical rectangle in 2015/2016.

HAWG 2017

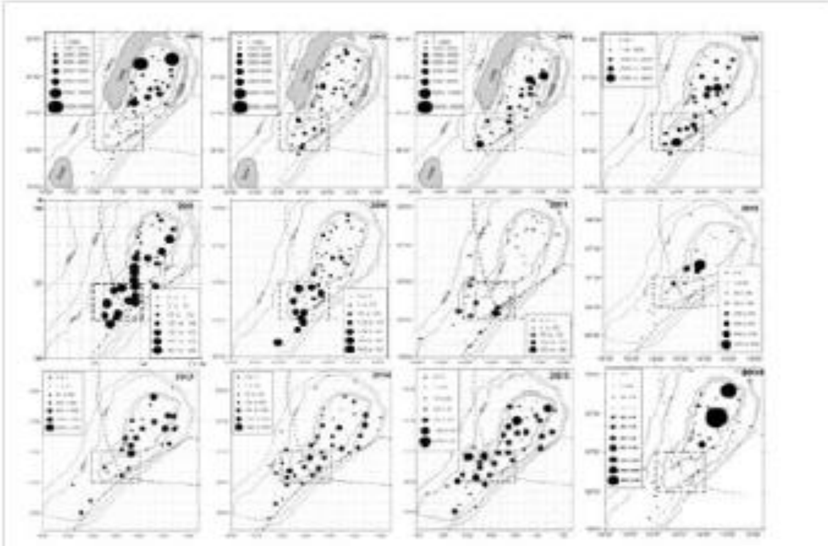
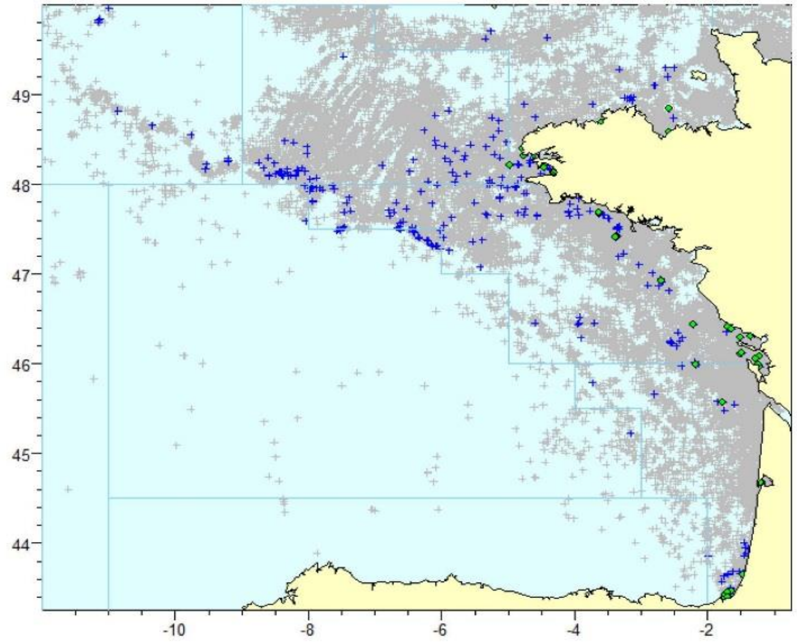


Figure 4.3.1. Distribution of haddock (catch N per 30 minutes) on the Rockall Bank in 2001–2016 from the Scottish trawl survey (Scottish Rock-IBTS-Q3).

WGCSE 2017

Figure 9.1.2 Sandeel in ICES div 4 and 3.a. Catch by ICES rectangles 2001-2016. Area of the circles is proportional to catch by rectangle.

HAWG 2017



WGDEEP 2017. Figure 13.2.8. Geographical distribution on catch of the Red blackspot sea bream in French on-board observations .

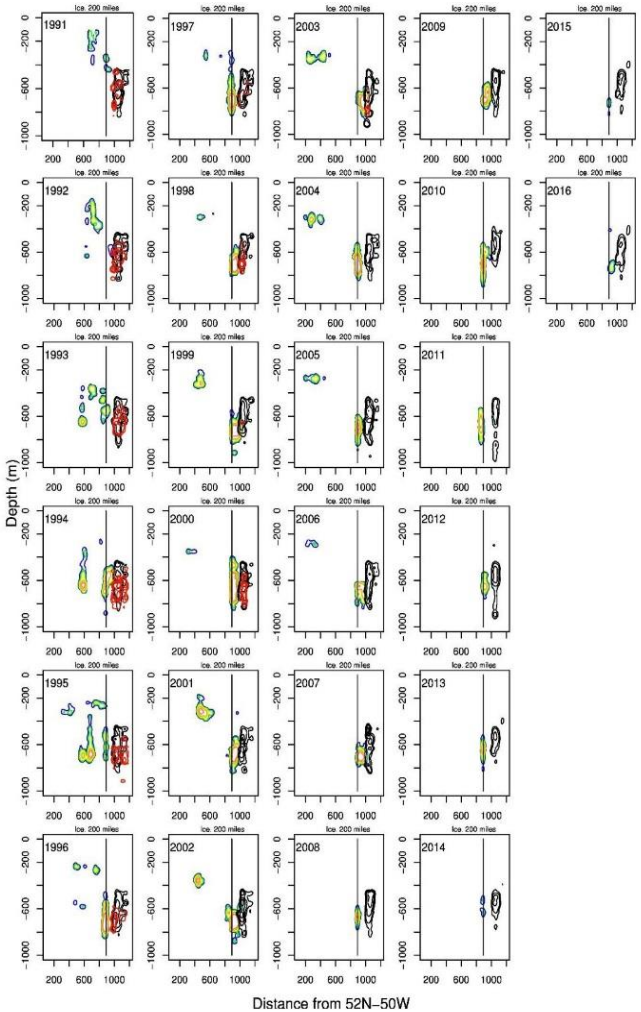


Figure 18.4.2 Distance-depth plot for Icelandic *S. mentella* catches, where distance (in NM) from a fixed position (52°N 50°W) is given. The contour lines indicate catches in a given area and distance. The colored contours represent the fishery on pelagic *S. mentella*, the black contours indicate bottom trawl catches of demersal *S. mentella*, and the red contours represent catches of demersal *S. mentella* taken with pelagic trawls

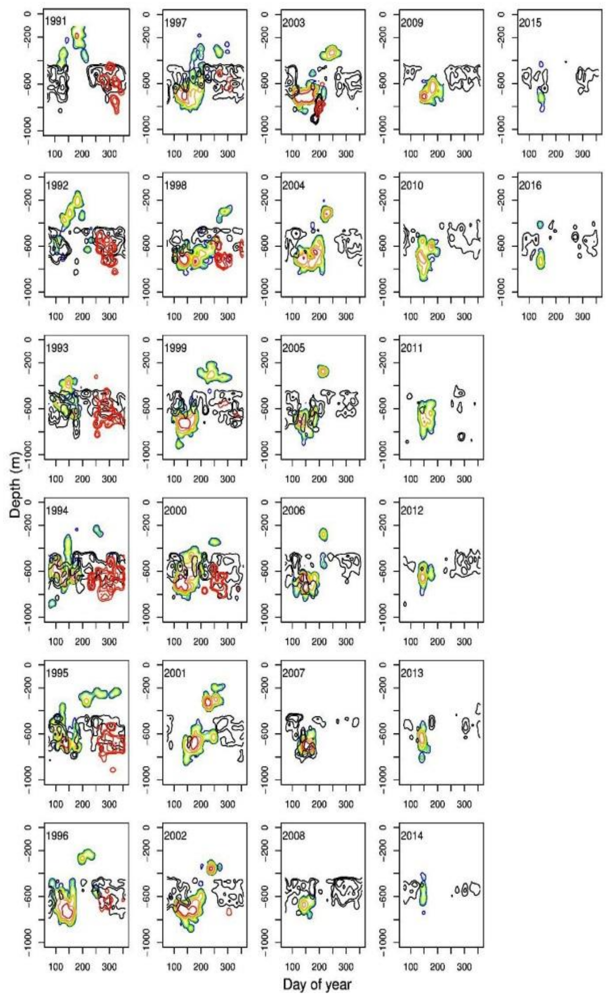


Figure 18.4.3 Depth-time plot for Icelandic *S. mentella* catches 1991-2016 where the y-axis is depth, the x-axis is day of the year and the color indicates the catches. The colored contours represent the fishery on pelagic *S. mentella*, the black contours indicate bottom trawl catches of demersal *S. mentella*, and the red contours represent catches of demersal *S. mentella* taken with pelagic trawls.

Landings and discards

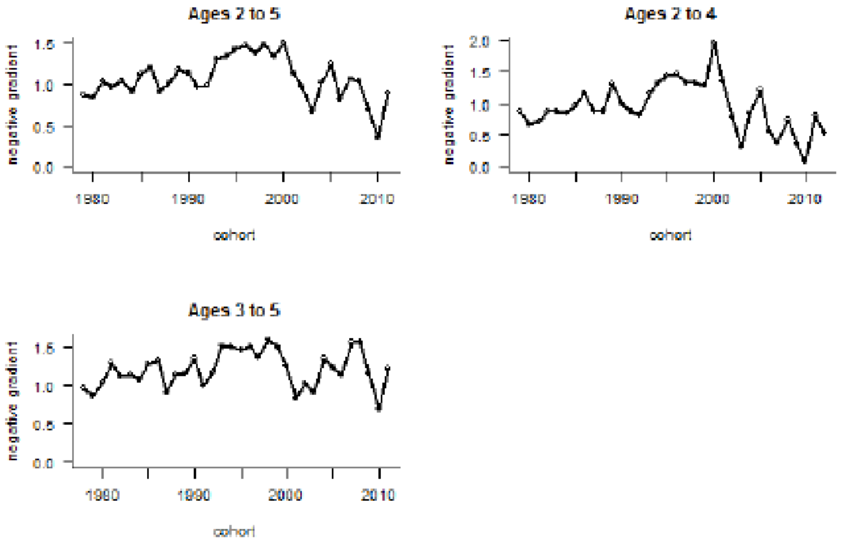


Figure 5.17. Cod in Division 6.a. Log catch (landings + discards) curve gradient plot using WG commercial catch-at-age data over different age ranges.

WGCSE 2017

Landings by métier/fleet/fishery

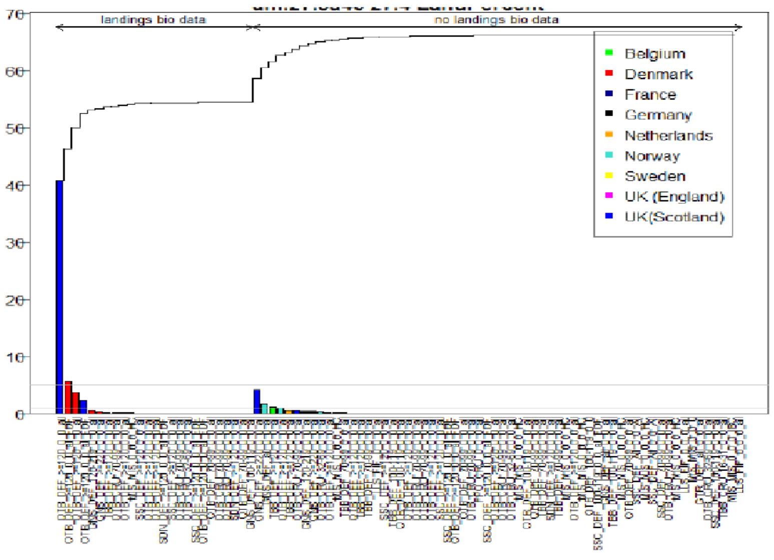


Figure 4.3a. Percentage of total landings weight by fleet and country in 2016; Subarea 4.

WGCSE 2017

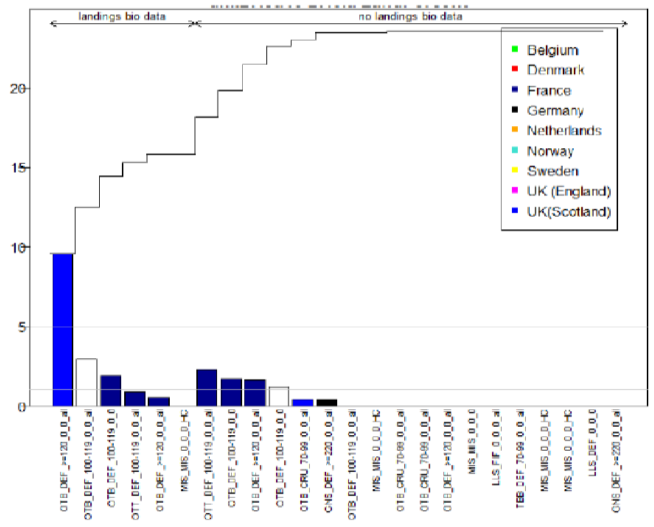


Figure 4.3b. Percentage of total landings weight by fleet and country in 2016; Division 6.a.

WGCSE 2017

III.2 – Effort and LPUE

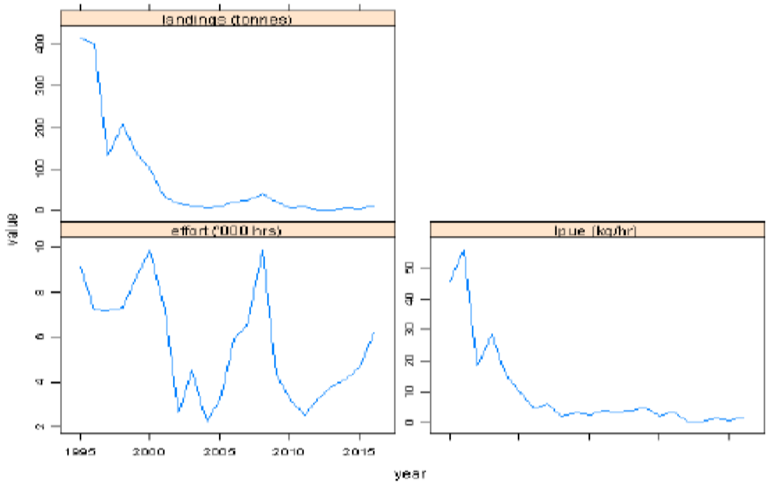


Figure 6.2. Cod in Division 6.b. Landings, effort and lpue (kg/hr) from the Irish Otter-trawl fleet.

WGCSE 2017

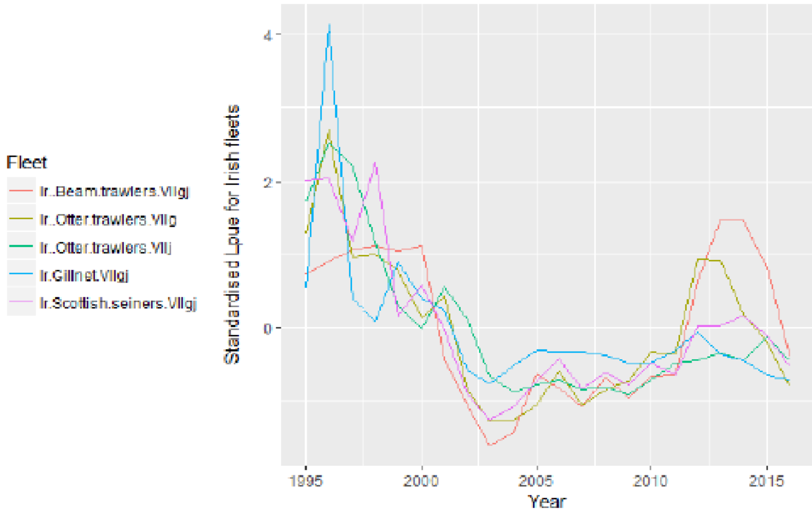


Figure 9.5b. Cod in Divisions 7.e–k. Time-series of landings, effort, lpue for the Irish fleets. Units in tonnes live weight, Effort in 000s hours fished, lpue in Kg/hour fished.

WGCSE 2017

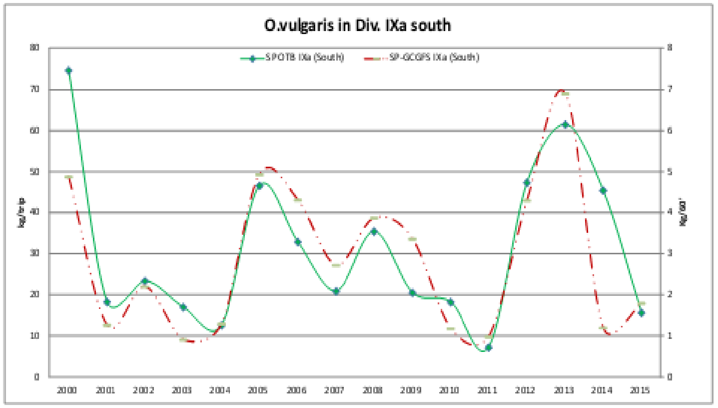


Figure 4.4.9. Comparison of commercial LPUE trends of the Spanish (kg/trip) fleets and Spanish scientific survey (kg/h) in Div. IXa south, for *Octopus vulgaris*.

WGCEPH 2016

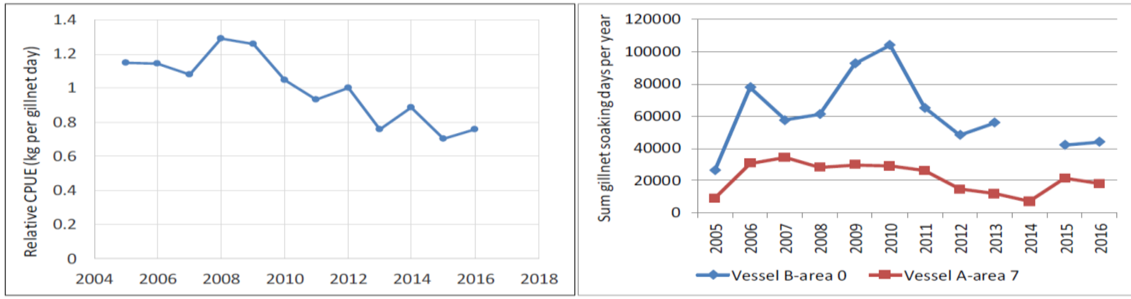
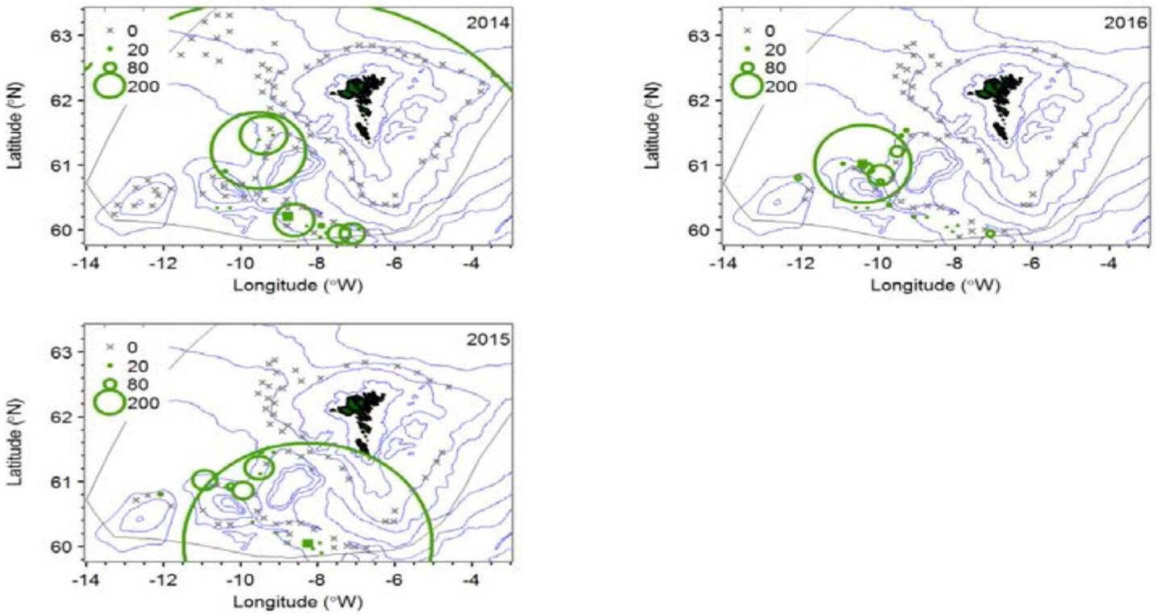


Figure 10.7. Relative (to the 2005-2010 average) CPUE (kg per gillnet day) of anglerfish for two vessels (A and B) in the Norwegian reference fleet in ICES Subarea IIa, and the corresponding fishing effort (right panel). Note that vessel B (northern area) stopped fishing in 2014 due to low catch rates.

AFWG 2017



WGDEEP 2017 Figure 10.2.8. bsf.27.nea Northern component. Spatial distribution of cpue (kg/h) from the Faroese deep-water surveys from 2014 to 2016 in Division 5.b. The size green bubbles is associated to the relative importance of the high catches.

III.3 – Tuning series

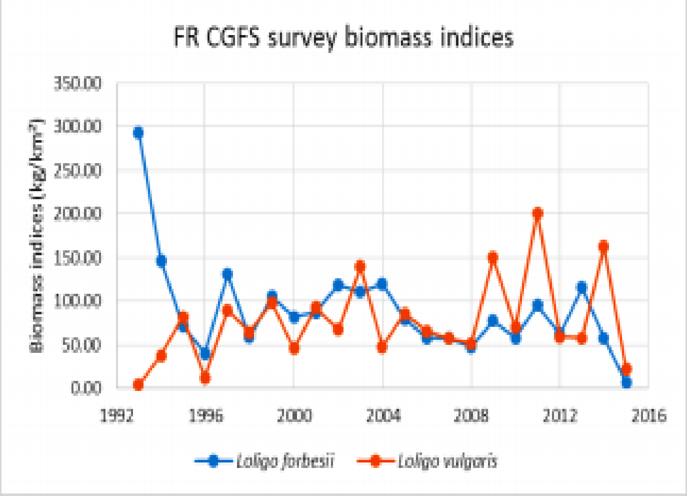


Figure 4.2.2.1. Time-series of France CGFS survey Biomass indices (kg/km²).

WGCEPH 2016

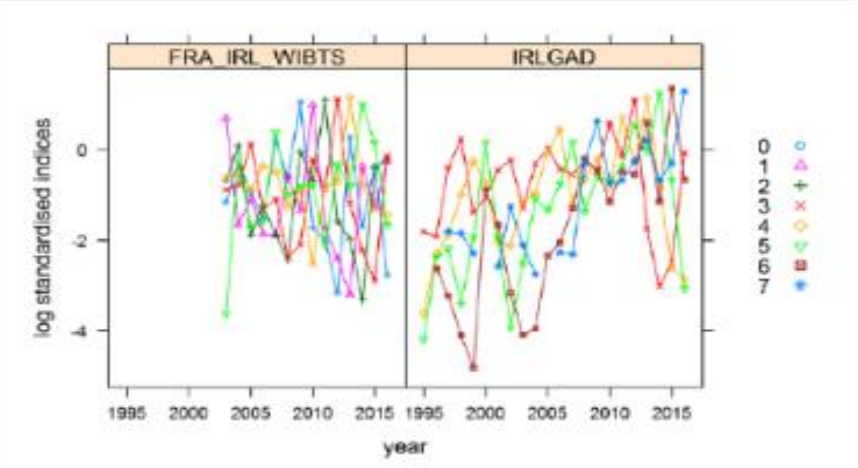


Figure 7.4.9a. Haddock in 7.bc–ek. Log standardised indices of tuning fleets by year. The FRA-IRL-IBTS survey is the combined French EVHOE Q4 WIBTS and Irish IGFS Q4 WIBTS survey. The IRL-GAD commercial tuning fleet is the Irish gadoid fleet in 7.gj.

WGCSE 2017

III.4 – Age and length information

Catches and landings

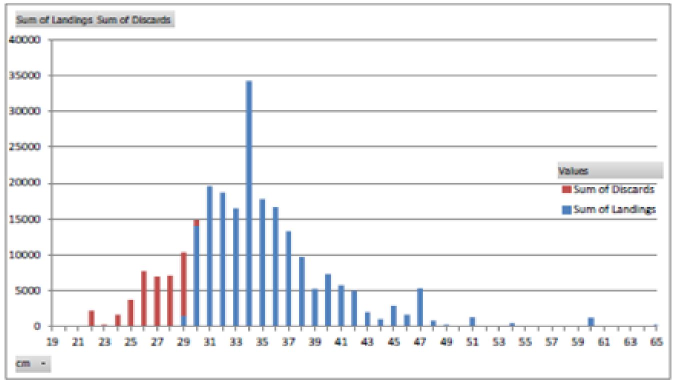


Figure 21.3. Turbot in 27.3a: Length distribution in landings and discards in 2016, after raising in InterCatch.

WGNSSK 2017

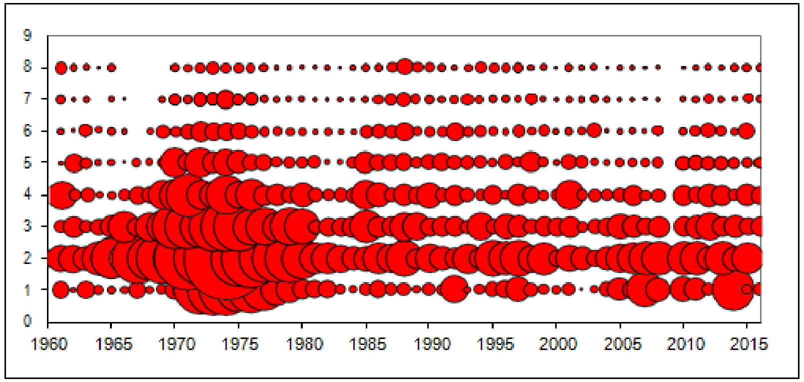


Figure 7.2.1. Herring in Division 7.a North (Irish Sea). Landings (catch-at-age) of herring from 7.a(N) from 1961 to 2016. No 2009 commercial samples.

HAWG (2017)

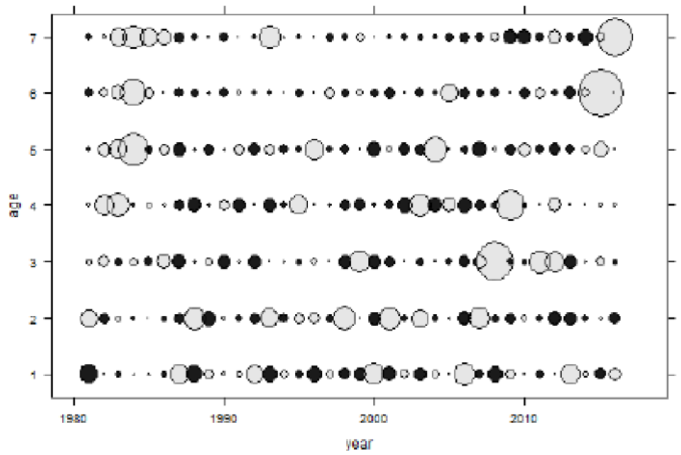


Figure 5.18. Cod in Division 6.a. Mean standardised catch-at-age proportions by number.

WGCSE 2017

WGNSSK 2017

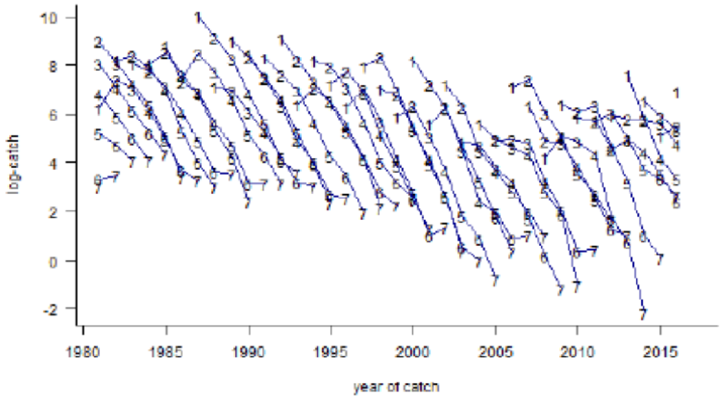


Figure 5.16. Cod in Division 6.a. Catch curves from commercial catch-at-age data.

WGCSE 2017

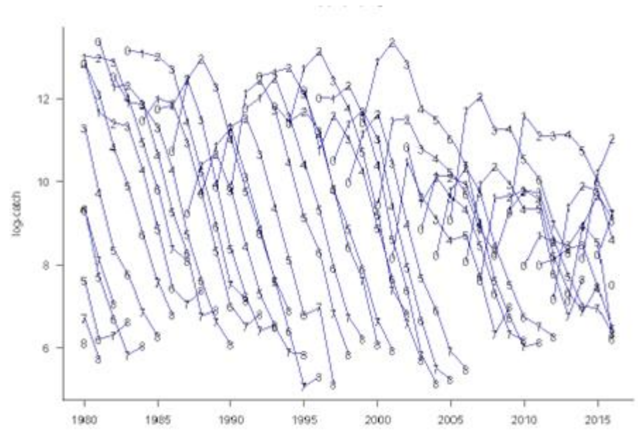


Figure 8.3.1. Haddock in Subarea 4, Division 6.a and Subdivision 20. Log-catch curves by cohort for total catches.

WGNSSK 2017

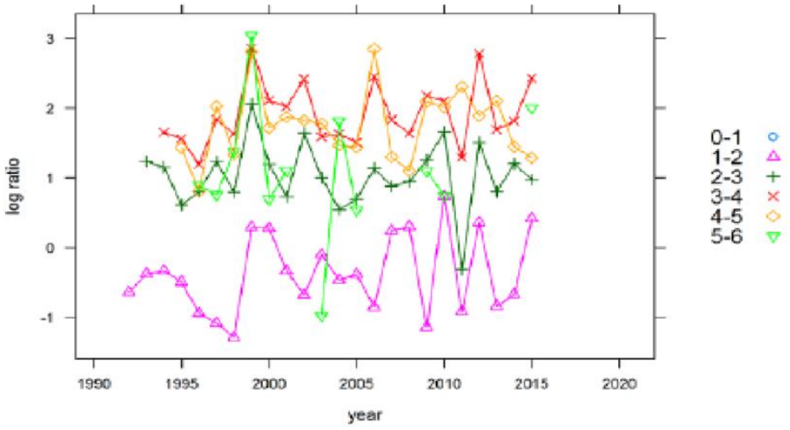


Figure 7.4. Log ratio of ages in commercial catches.

WGCSE 2017

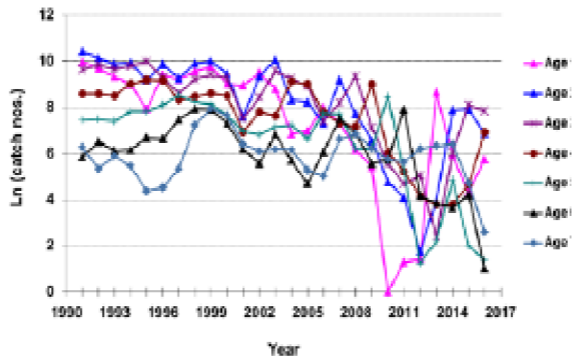


Figure 4.3.14. Haddock in 6.b. Log catch-(with discards in numbers) at-age by y

WGCSE 2017

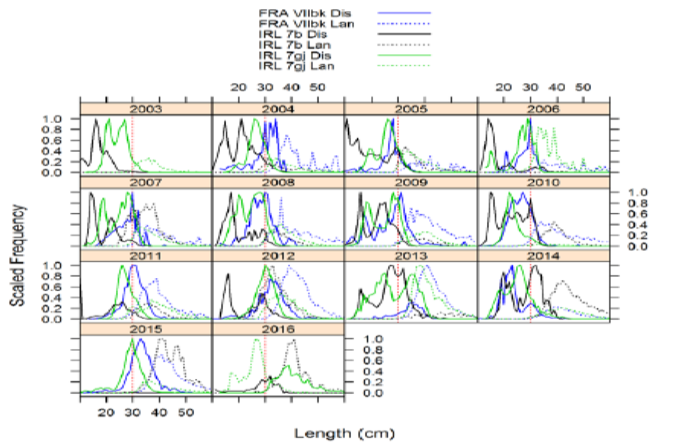
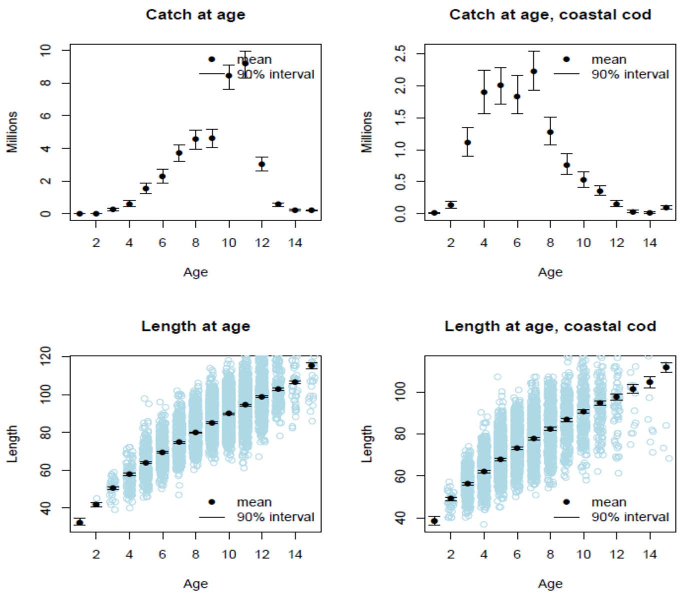


Figure 7.4.5a. Haddock in 7.bc–ek. Time-series of the cumulative scaled length distributions of total catch and the retained catch of haddock in 7.b–k. The minimum landing size (30 cm) is indicated by the dotted red line.

WGCSE 2017

Figure 9.3.1 Sandeel Area-2r. Catch numbers, proportion at age.

HAWG 2017



AWG 2017

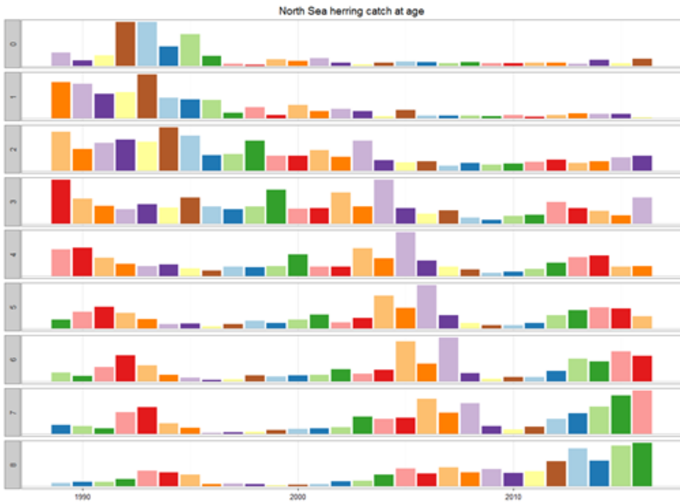
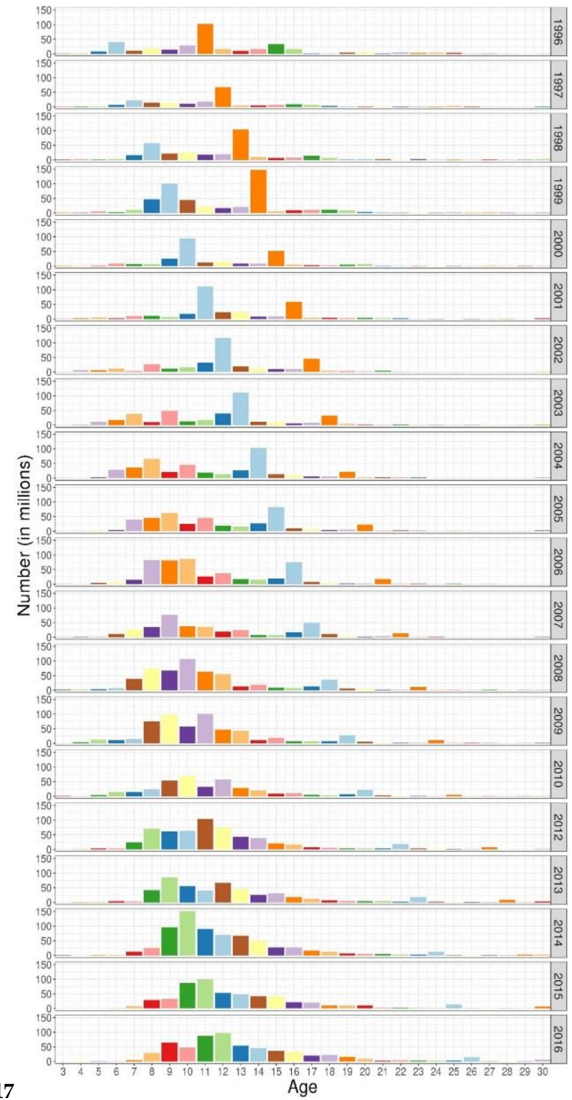


Figure 3.6.1.2. North Sea Herring. Time series of catch-at-age proportion at ages 0-8+ as used in th North Sea herring assessment. Colours indicate year-classes. All ages are scaled independently an therefore the size of the bars can only be compared within an age.

HAWG 2017



NWWG 2017

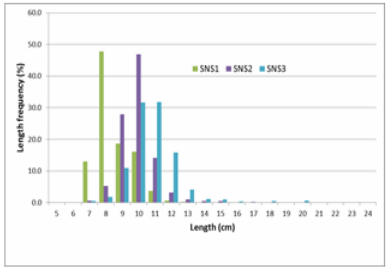


Figure 3.3.2.3: North Sea herring – Length frequency distribution of all herring larvae caught during the three separate surveys in the Southern North Sea (SNS1, SNS2,SNS3).

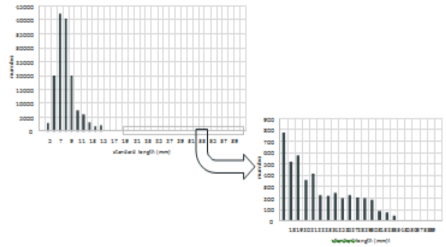


Figure 3.3.3.1. North Sea herring. Length distribution of all herring larvae caught during the 2017 Q1 IBTS.

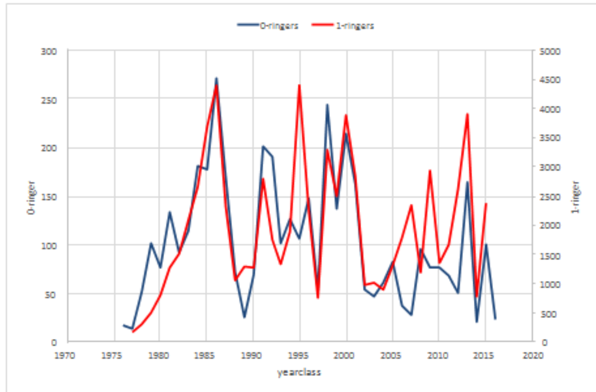
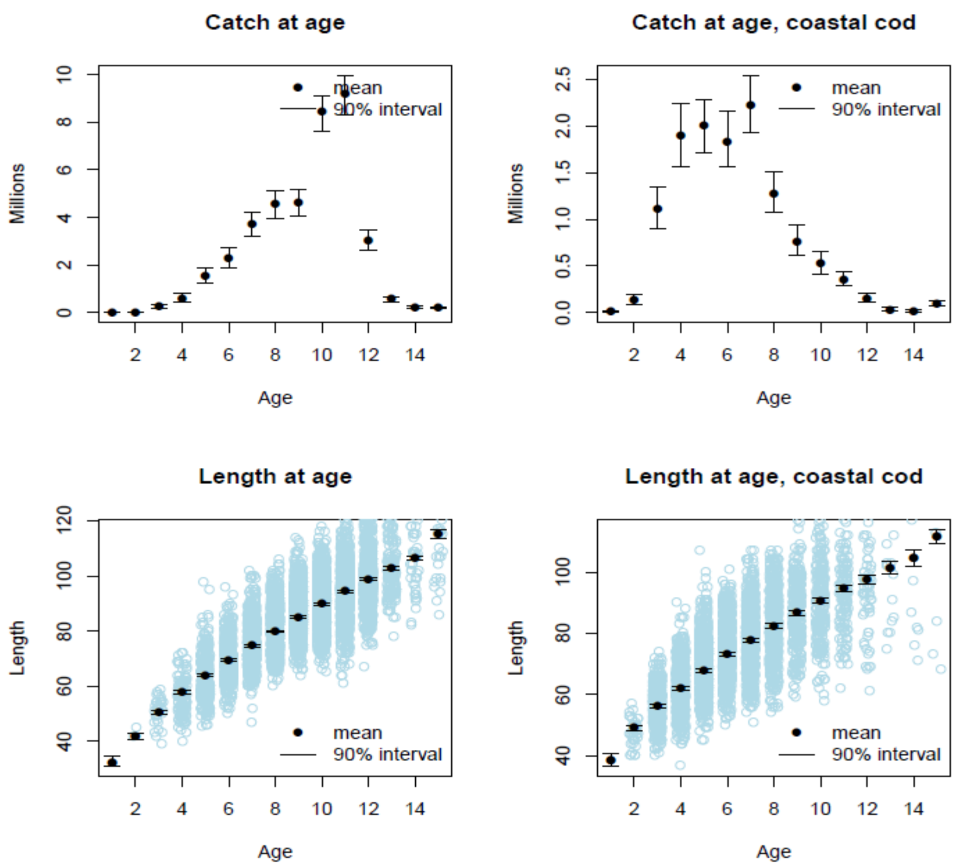


Figure 3.5.2 North Sea herring. Time series of 0-wr and 1-wr indices. Year classes 1976 to 2016 for 0-wr fish, year classes 1977-2015 for 1-wr fish.

HAWG 2017


Catch at age
Millions
mean
90% interval
Age
Catch at age, coastal cod
Millions
mean
90% interval
Age
Length at age
Length
mean
90% interval
Age
Length at age, coastal cod
Length
mean
90% interval
Age

AWG 2017

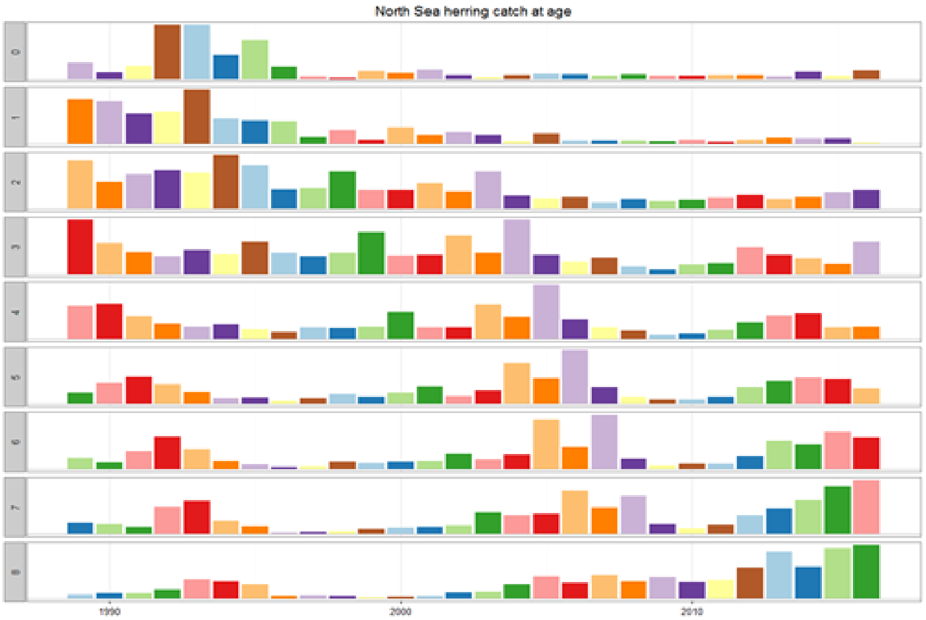


Figure 3.6.1.2. North Sea Herring. Time series of catch-at-age proportion at ages 0-8+ as used in the North Sea herring assessment. Colours indicate year-classes. All ages are scaled independently and therefore the size of the bars can only be compared within an age.

HAWG 2017

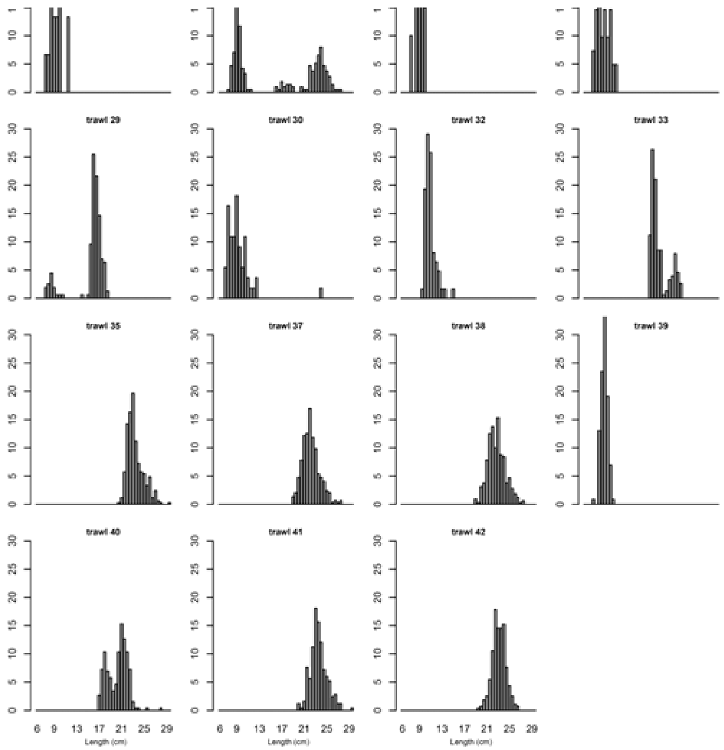


Figure 7.3.2. Herring in Division 7.a North (Irish Sea). Percentage length compositions of herring in each trawl sample in the September 2016 acoustic survey.

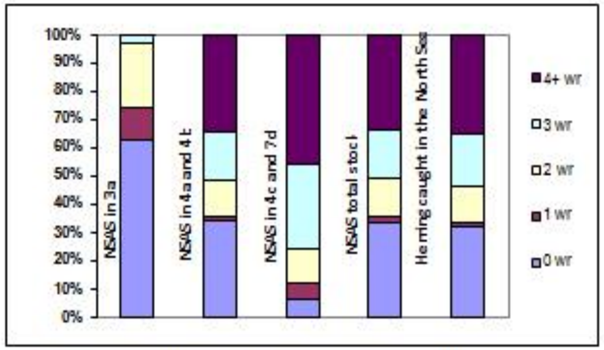


Figure 3.2.2: Proportion of age groups (numbers) in the total catch of NSAS and herring caught in the North Sea in 2016.

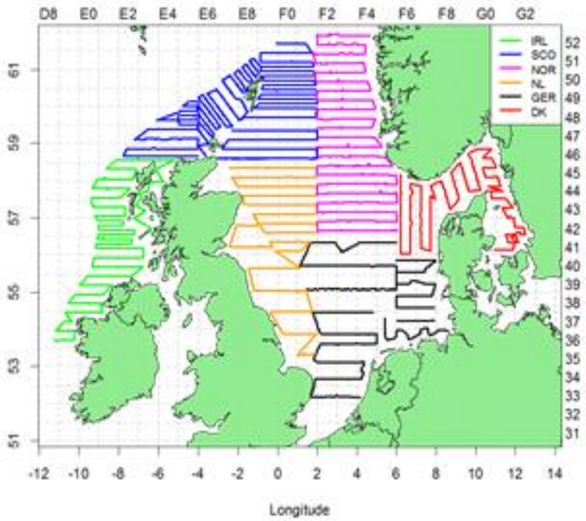


Figure 3.3.1.1. Cruise tracks and survey area coverage in the HERAS acoustic surveys in 2016 by nation.

HAWG 2017

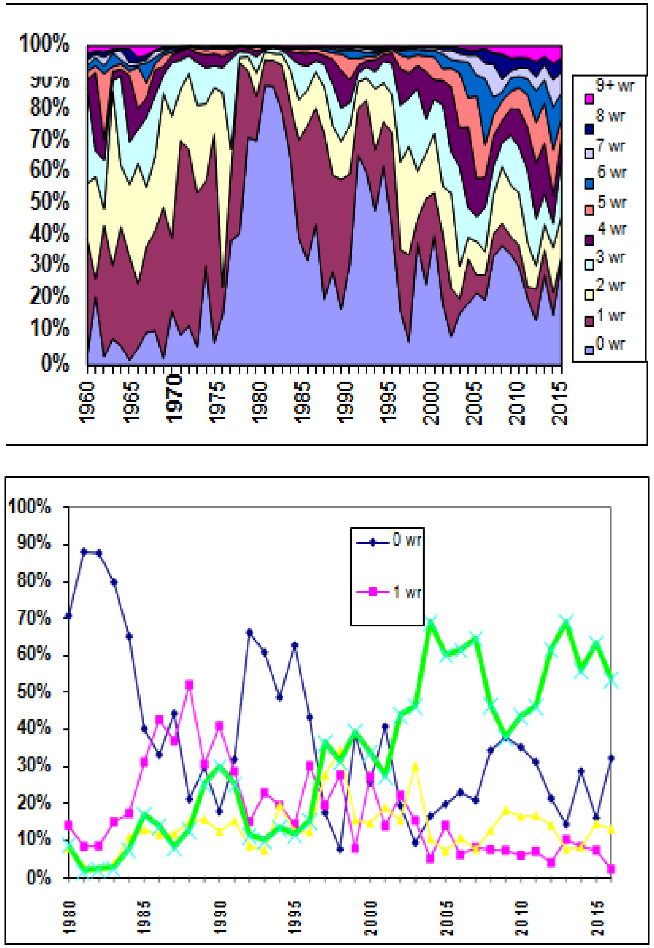


Figure 3.2.1: Proportions of age groups (numbers) in the total catch of herring caught in the North Sea (upper, 1960–2015, and lower panel, 1980–2016).

HAWG 2017

Discards

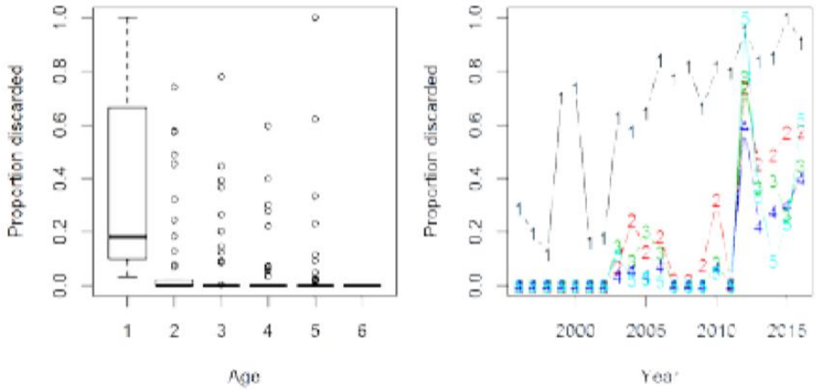


Figure 7.2. Discard proportions-at-age 1995–2016.

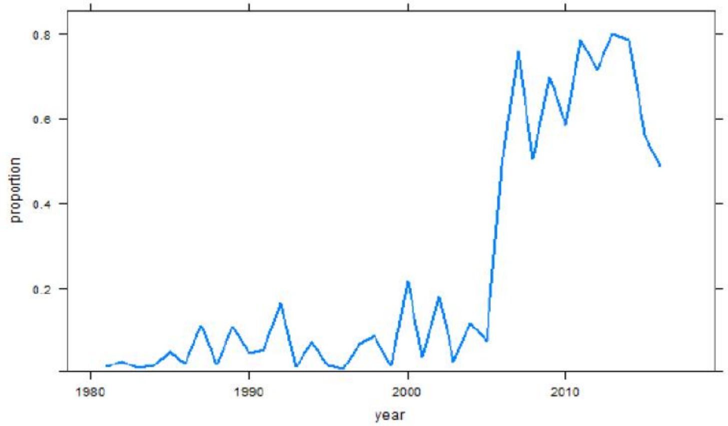


Figure 5.9. Cod in Division 6.a. Discard proportion (of total catch) by weight. Includes fish aged 1 to 7+.

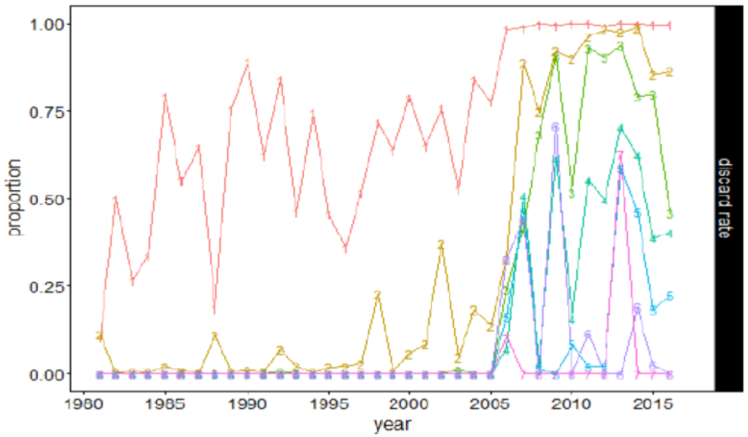


Figure 5.10. Cod in Division 6.a. Discard proportion by number.

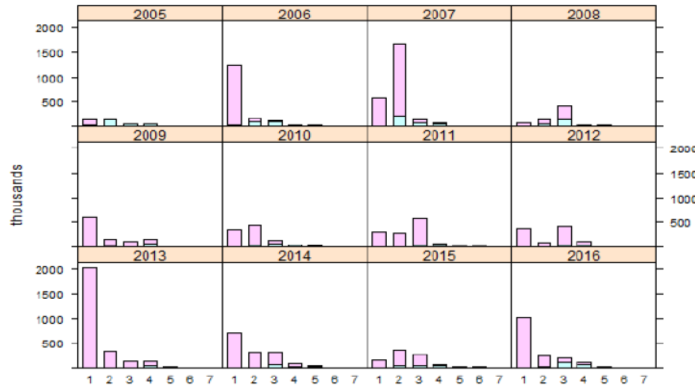


Figure 5.11. Cod in Division 6.a. Catch-at-age in numbers by year. Pink: discards, blue: landings.

WGCSE 2017

Individual weights

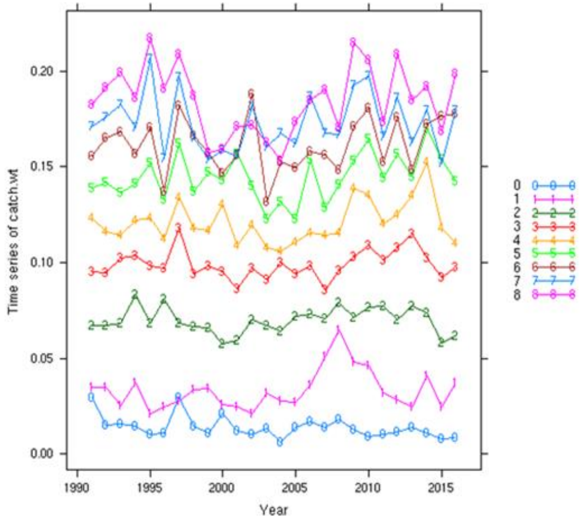
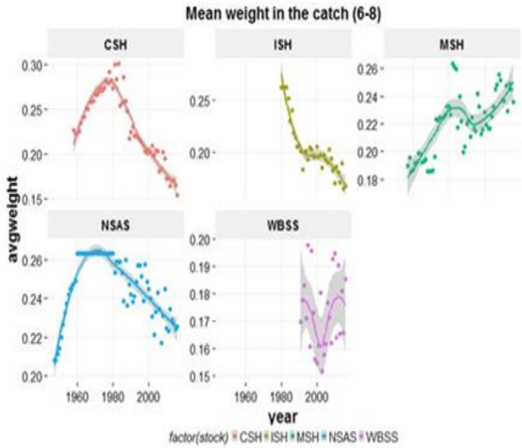


Figure 2.6.1.1 Western Baltic Spring Spawning Herring.

Weight at age as W-ringers (kg) in the catch (WECA).

HAWG 2017



HAWG 2017

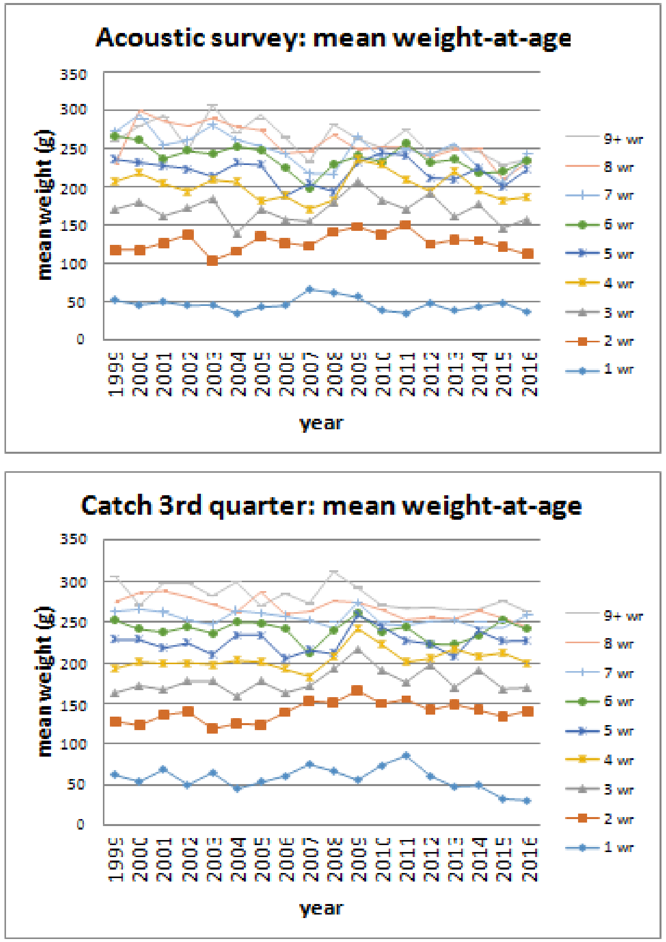


Figure 3.4.1.1. North Sea Herring. Mean weights-at-age for the 3rd quarter in Divisions 4 and 3.a from the acoustic survey (upper panel) and mean weights-in-the-catch (lower panel) for comparison.

HAWG 2017

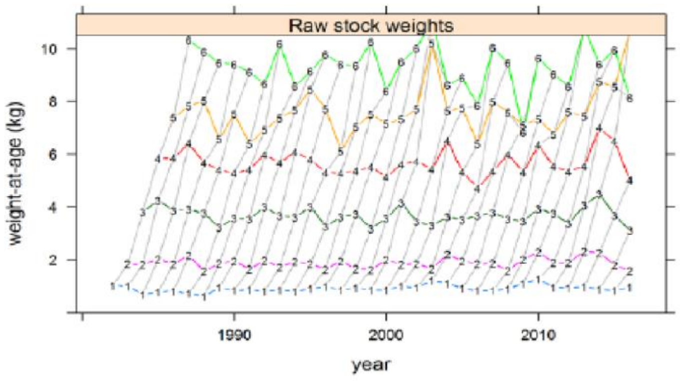


Figure 7.3. Weight-at-age, ages 1–6.

WGCSE 2017

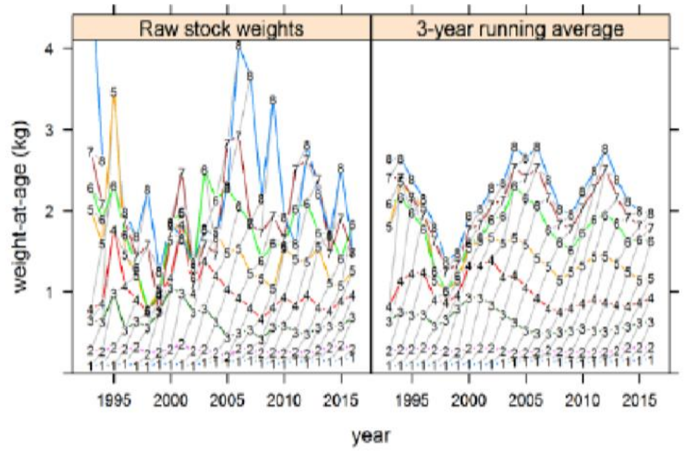


Figure7.4.8. Haddock in 7.bc–ek. Raw stock weights-at-age (left) and the three-year running avera stock weights (right).

WGCSE 2017

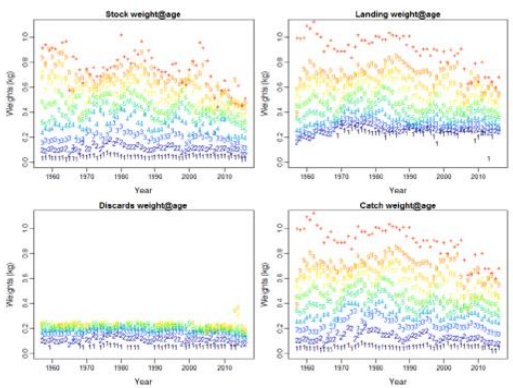
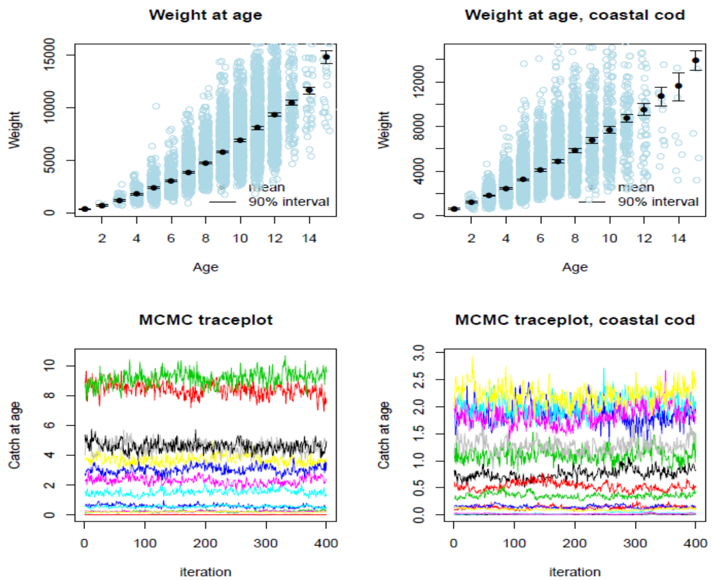


Figure 14.2.4. Plaice in Subarea 4 and Subdivision 20: Stock weight-at-age (top left), landings weight-at-age (top right), discards weight-at-age (bottom left) and catch weight-at-age (bottom right).

WGNSSK 2017



III.5 – Quality of datasets

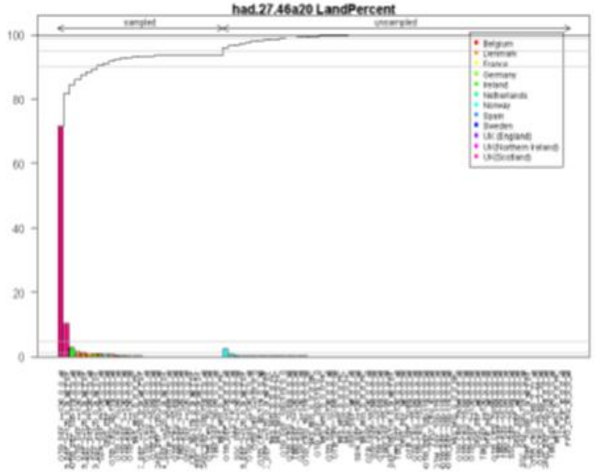


Figure 8.2.1. Haddock in Subarea 4, Division 6.a and Subdivision 20: Reported landings for each sampled and unsampled fleet in the full stock area, along with cumulative landings for fleets in descending order of yield.

WGNSSK 2017

AFWG (2017). Figure 2.5b. ECA-output for 2016 commercial catches by Norway in the coastal statistical areas. Left panels NEA cod. Right panels coastal cod.

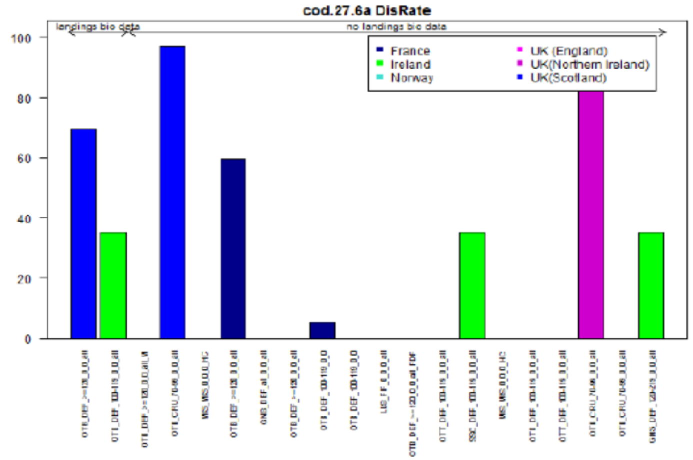


Figure 5.5. Cod in Division 6.a. Discard rates before allocations within InterCatch.

WGCSE 2017

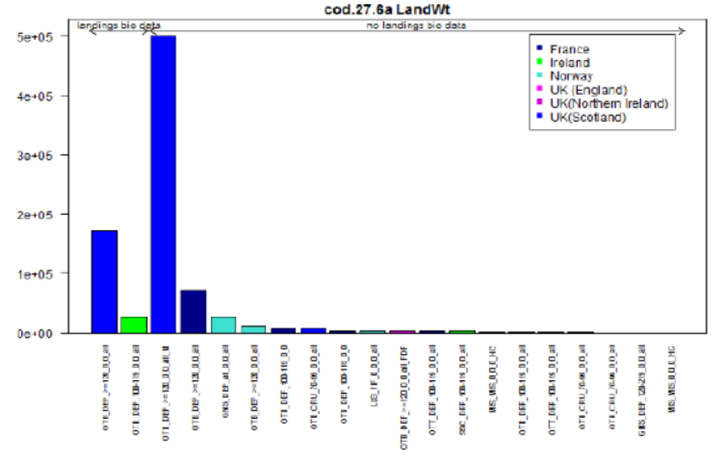


Figure 5.3. Cod in Division 6.a. Amounts landed by métier (kg) in 2016 as entered into InterCatch.

WGCSE 2017

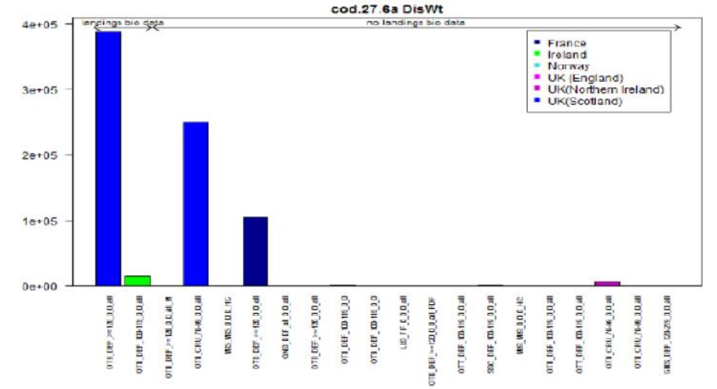
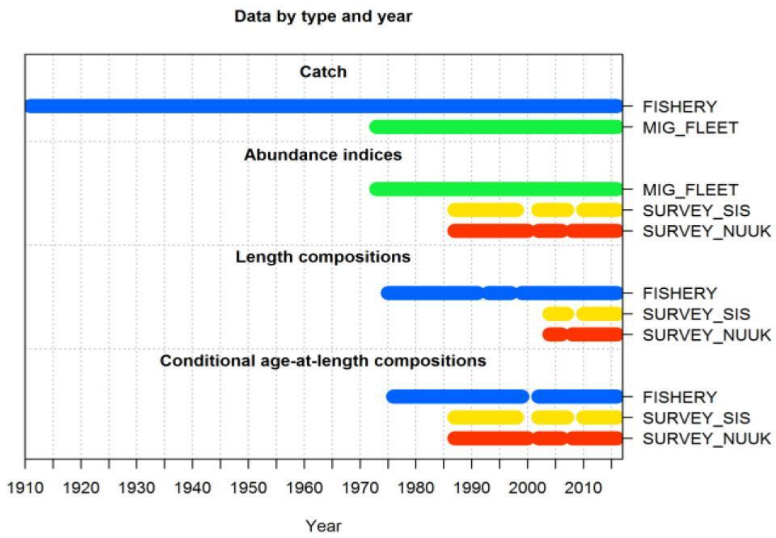


Figure 5.4. Cod in Division 6.a. Amounts discarded by métier (kg) in 2016 as entered into InterCatch.

WGCSE 2017



NWWG 2017. Fig 1: West Greenland inshore cod. Data by type and year.

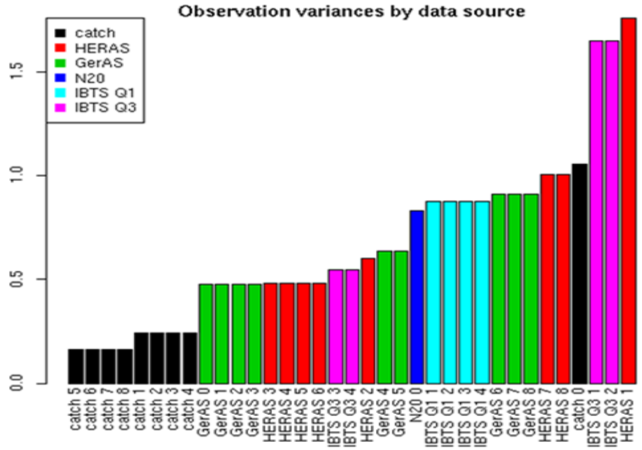
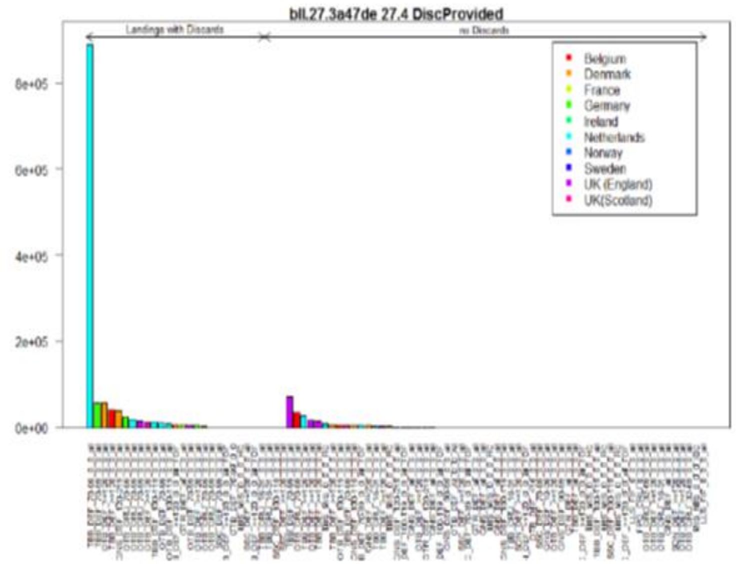


Figure 2.6.4.3 WESTERN BALTIC SPRING SPAWNING HERRING.

Estimated observation variance for the WBSS assessment.

HAWG (2017)



WGNSSK 2017

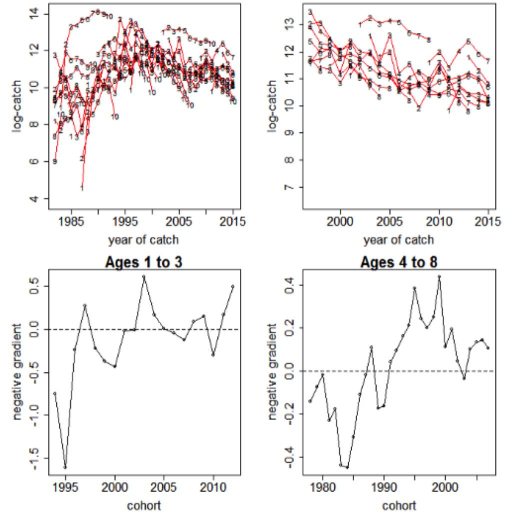


Figure 7.2.9.2: Western horse mackerel. Data exploration. Log-catch cohort curves (top row shows the full time series on the left, and the most recent period for ages 1-8 on the right) and the associated negative gradients for each cohort across the reference fishing mortality of ages 1-3 (bottom left) and 4-8 (bottom right).

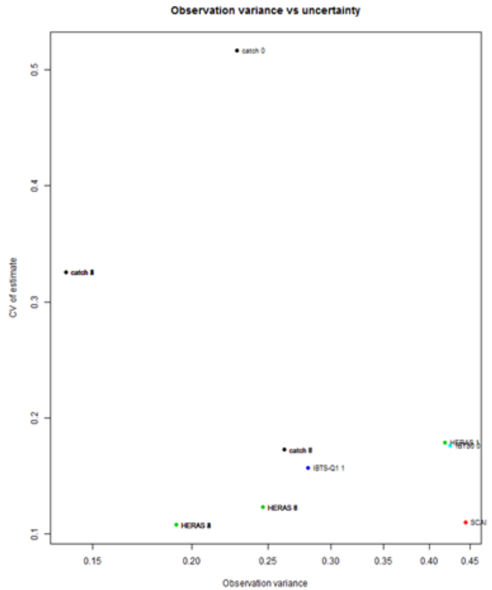


Figure 3.6.1.29. North Sea herring. Observation variance by data source as estimated by the assessment model plotted against the CV estimate of the observation variance parameter.

HAWG (2017)

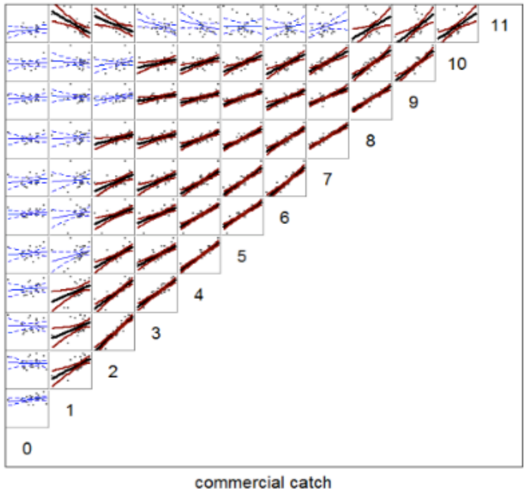


Figure 7.2.9.1: Western horse mackerel. Data exploration. Within-cohort consistency in the catch-at-age matrix, shown by plotting the log-catch of a cohort at a particular age against the log-catch of the same cohort at subsequent ages. Thick lines represent a significant ($p<0.05$) regression and the curved lines are approximate 95% confidence intervals.

WGWIDE 2016

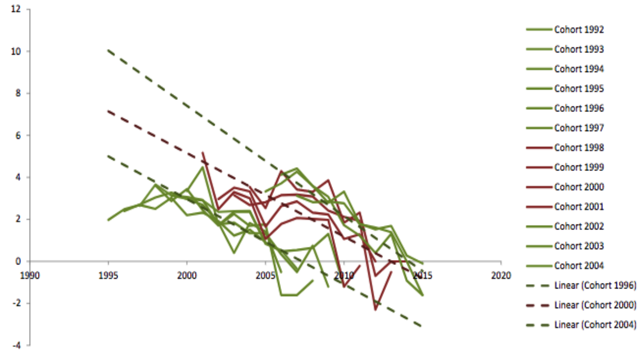


Figure 6.4.1. North Sea Horse Mackerel. Catch curves for the 1994 to 2004 cohorts, ages from 3 to 11. Values plotted are the log(catch) values for each cohort in each year. The negative slope of these curves estimates total mortality (Z) in the cohort.

WGWIDE 2016

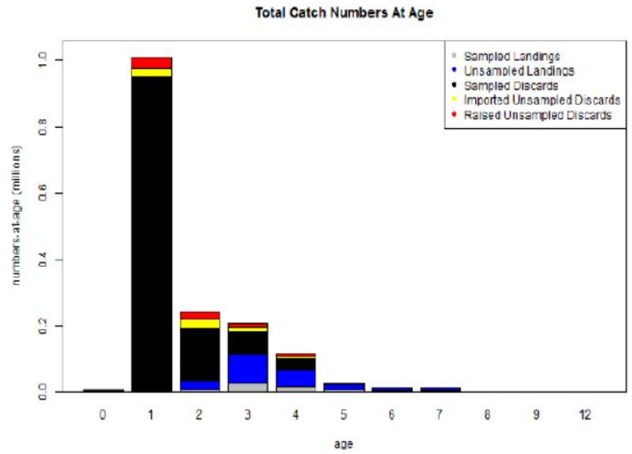


Figure 5.7. Cod in Division 6.a. Number-at-age constituted by sampled and unsampled landings and sampled and raised (unsampled) discards after allocations within InterCatch.

WGCSE 2017

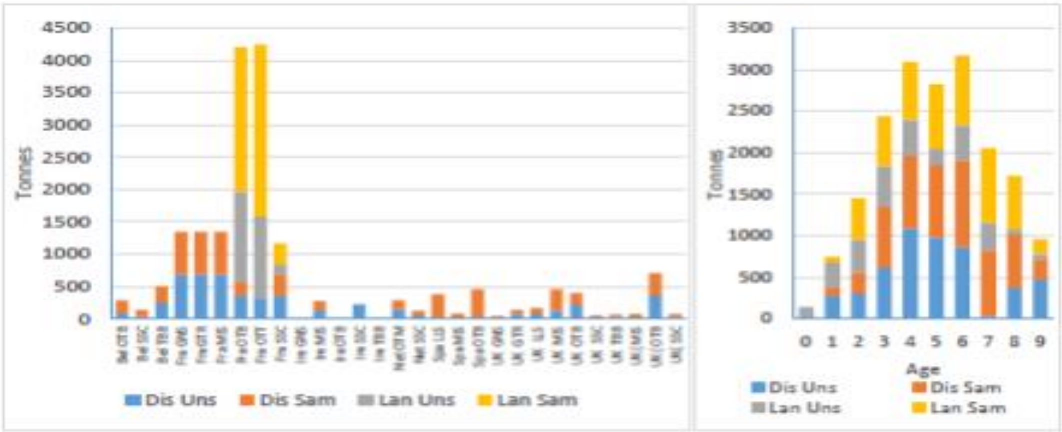
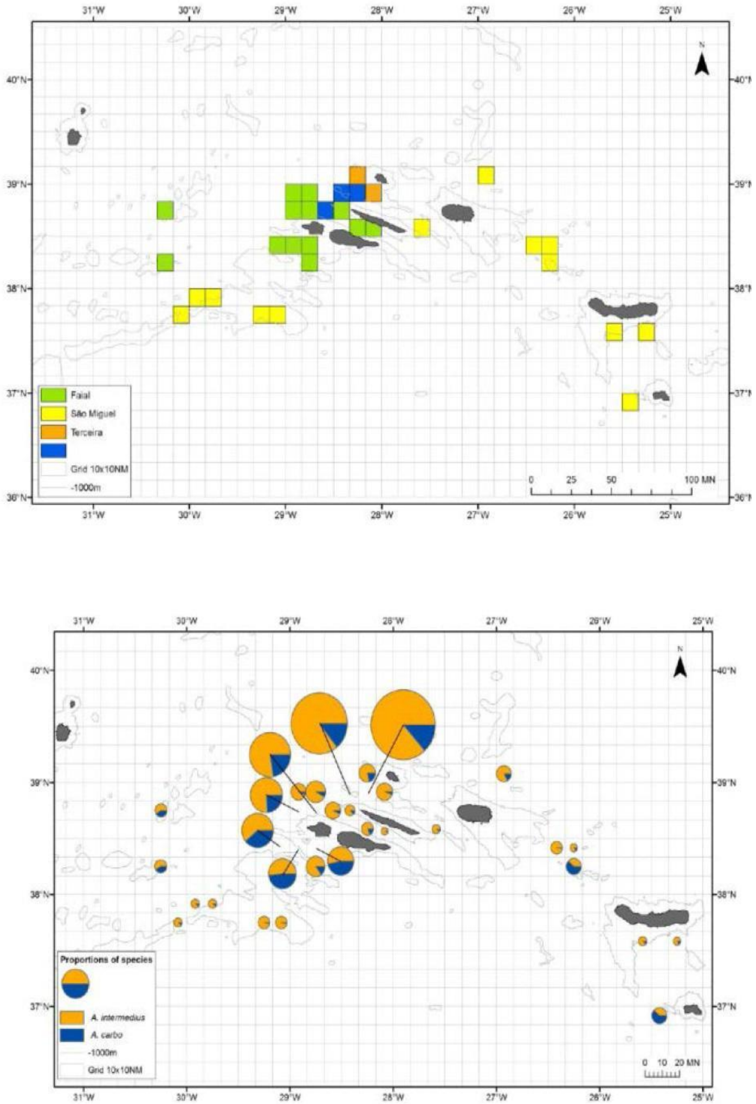


Figure7.4.6. Haddock in 7.bc–ek. Distribution of sampled and unsampled in catches by country and gear (left) and by age (right). Note that both France and Ireland allocated age data to most unsampled strata before uploading to InterCatch.

WGCSE 2017

III.6 – Sampling information



WGDEEP 2017. Figure 10.4.3. bsf.27.nea. Other areas. Map of the sampling locations (a) and estimates of the proportion of each *A. carbo* and *A.*

***intermedius* at different sampling points (b)**

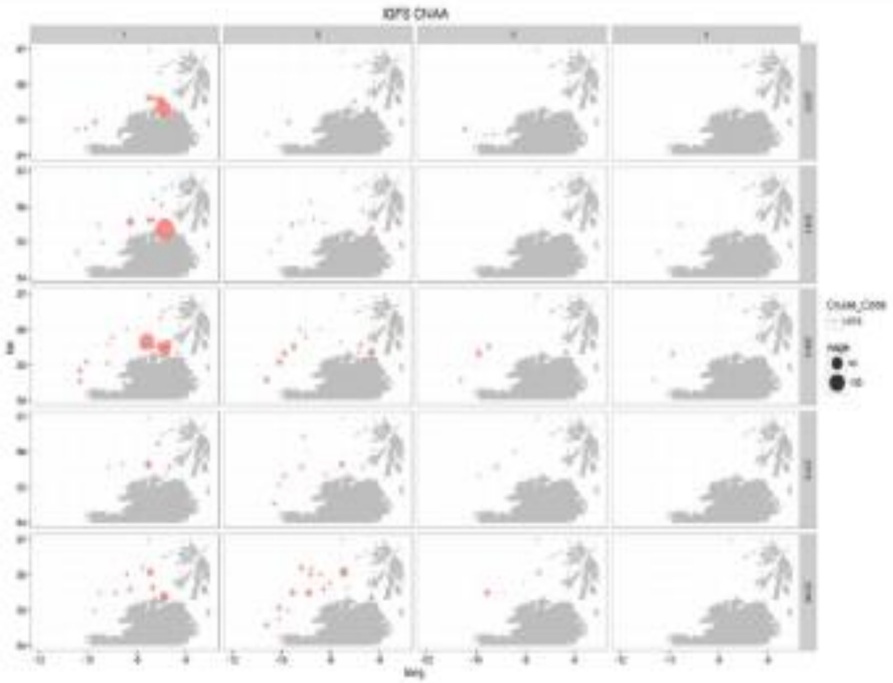


Figure 3.13. Cod in Division 6.a. Catch numbers for fish aged at 1+ per haul resulting from quarter four Irish ground fish survey (IRGFS-WIBTS Q4). Values are standardised to 60 minutes towing. Zero shown as a black + symbol.

WGCSE 2017

III.7 – Surveys

Mapping

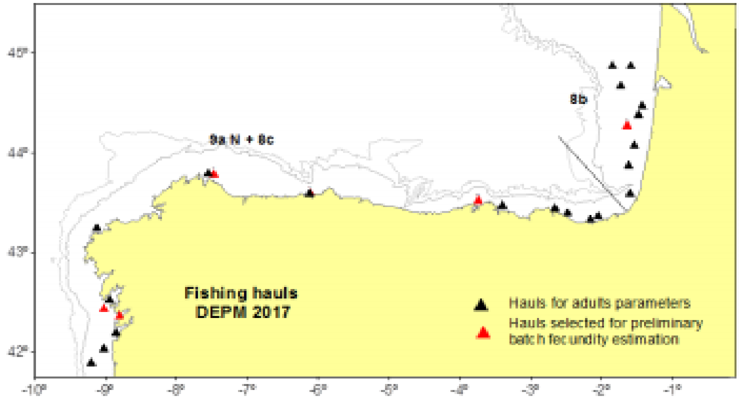


Figure 1. Spatial distribution of fishing hauls. Hauls selected for preliminary batch fecundity estimation (triangle in red).

WGHANSA 2017

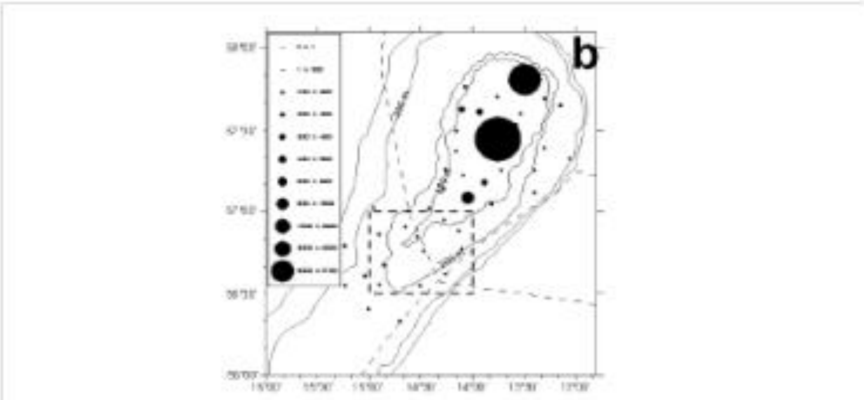
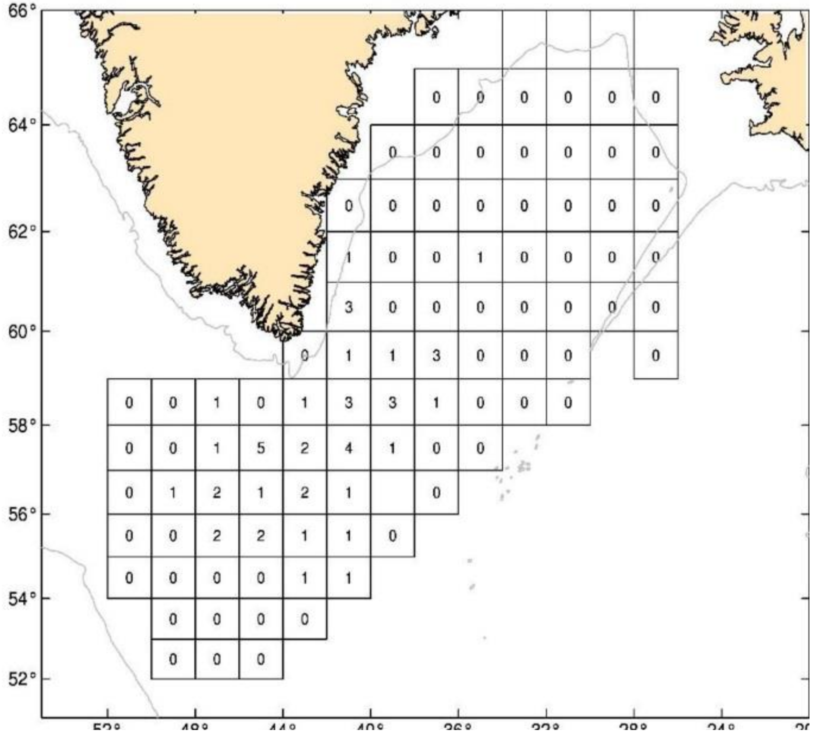


Figure 4.3.2. Haulings pattern during bottom survey by RV 'Scotia' in September 2016: a) the whole area; b) the standard area.

WGCSE 2017



NWWG 2017. Figure 21.6.2. Redfish acoustic estimates shallower than the DSL. Average sA values within statistical rectangles during the joint international redfish survey in June/July 2013.

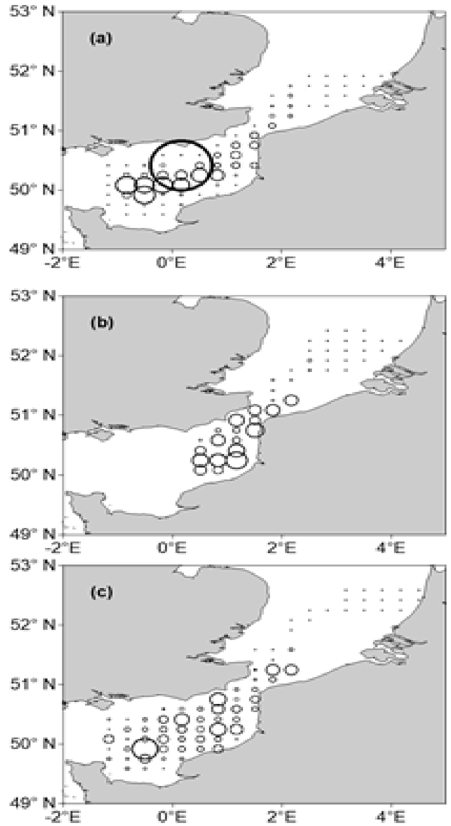


Figure 3.3.2.2 a-c: North Sea herring - Abundance of larvae < 11 mm (n/m²) in the southern North Sea as obtained from the International Herring Larvae Survey in the second half of December 2016 (a, maximum circle = 30 000 n/m²) and in the first (b) and the second half (c) of January 2017 (maximum circle size = 2 000 n/m²).

HAWG (2017)

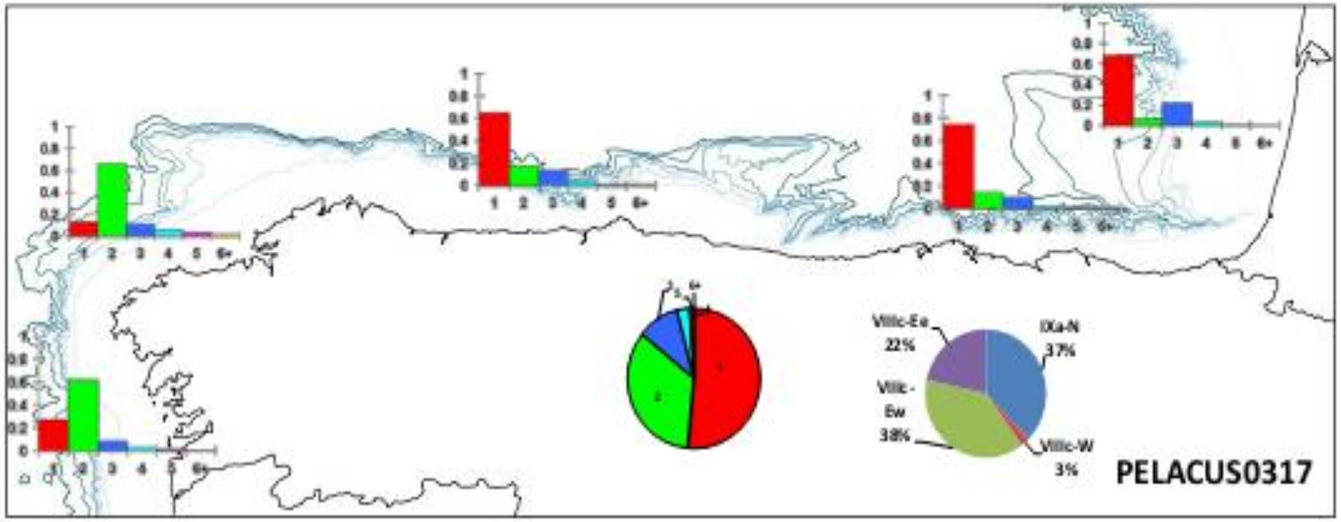


Figure 7. Sardine: relative abundance at age in each sub-area estimated in the PELACUS0317. The pie chart shows the contribution of each sub-area and each age group to the total numbers only for 8c and 9a subdivisions.

WGHANSA 2017

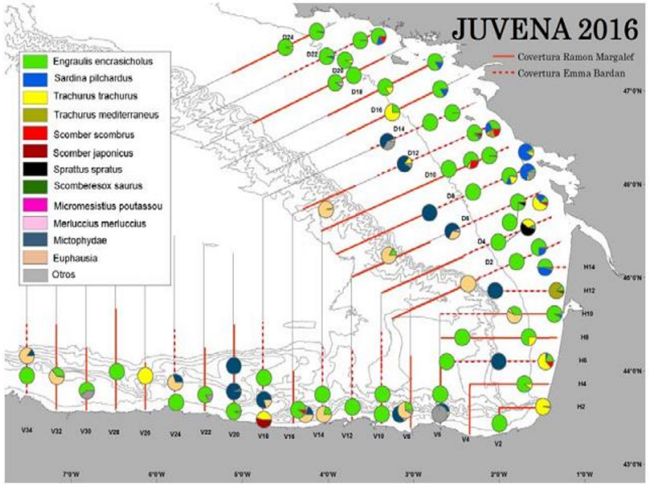


Figure 3.3.3.1. Bay of Biscay anchovy. Surveying transects and spatial distribution and species composition of the pelagic hauls in JUVENA 2016.

Sardine egg abundance

The distribution of sardine eggs (obtained from the analysis of 494 CUFES stations) indicates a coastal distribution, agreeing with that observed in previous years (Figure 8).

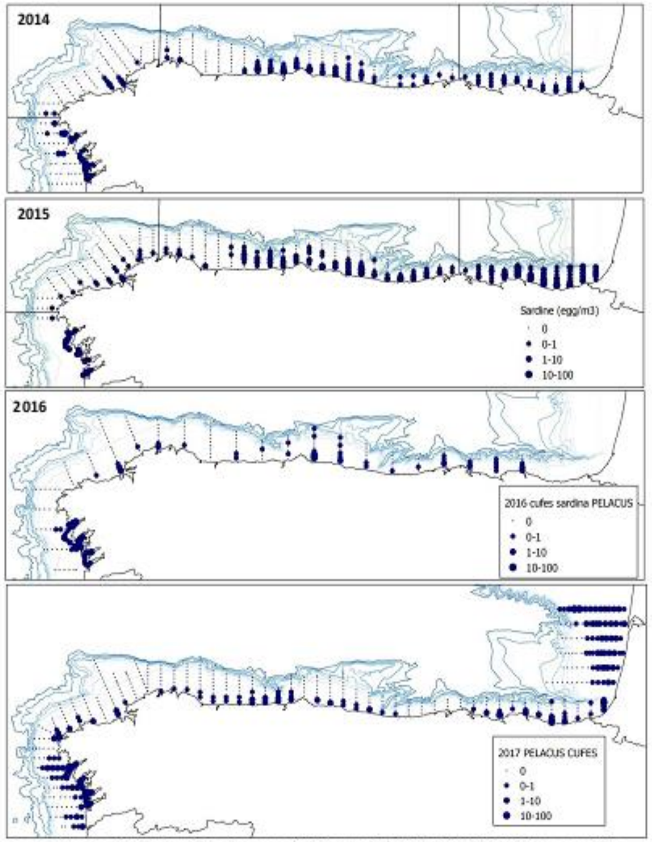


Figure 8. Sardine: distribution of sardine eggs (CUFES samples) in 2014-2017 PELACUS surveys. Blue circles indicate positive stations with diameter proportional to egg density.

WGHANSA 2017

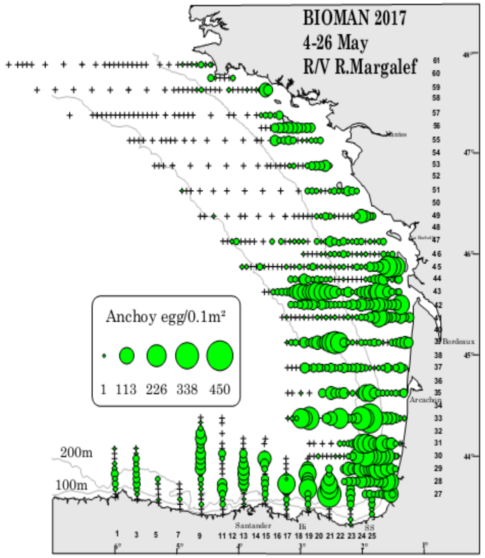


Figure 3.3.1.1.1. Bay of Biscay anchovy: Spatial distribution of anchovy egg abundance (eggs per 0.1 m²) from the DEPM survey BIOMAN2017 obtained with PairoVET (vertical sampling).

WGHANSA 2017

Indicators

WGWIDE 2017

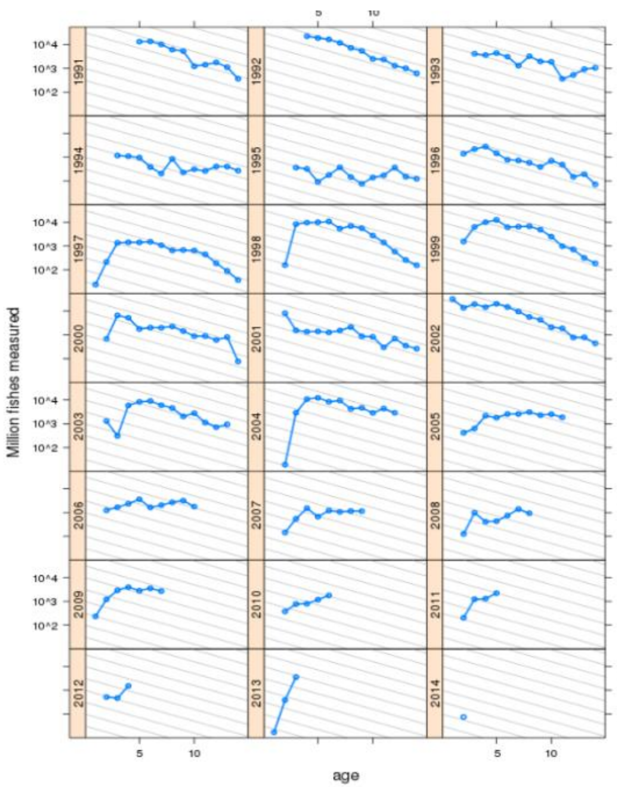


Figure 4.4.7.4.. Norwegian spring spawning herring. Age disaggregated abundance indices (billions) from the acoustic survey on the feeding area in the Norwegian Sea in May (survey 5) plotted on a log scale. The labels indicate year classes and grey lines correspond to Z = 0.3.

WGHANSA 2017

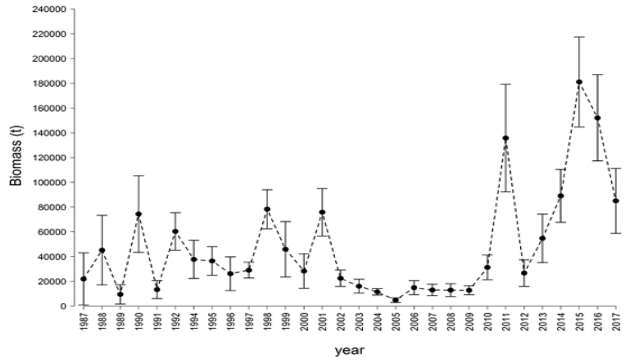


Figure 3.3.1.3.1. Bay of Biscay anchovy: Series of anchovy total biomass estimates (in tonnes) obtained from the DEPM.

WGCEPH 2016

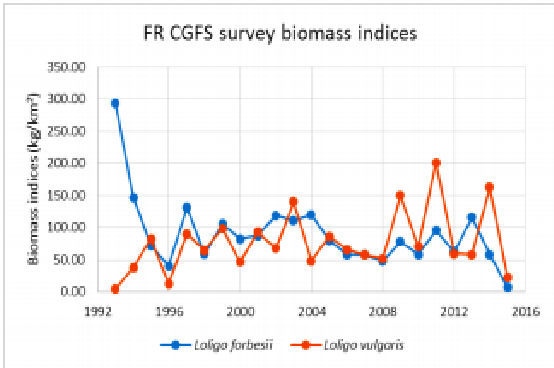


Figure 4.2.2.1. Time-series of France CGFS survey Biomass indices (kg/km²).

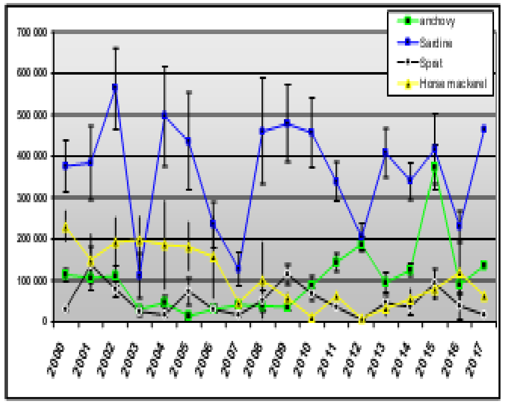


figure 2.3.3. – biomass estimate using Thalassa acoustic data along transects and all the consort identification fishing operations (Thalassa + commercial vessels) and associated coefficients of variation.

WGHANSA 2017

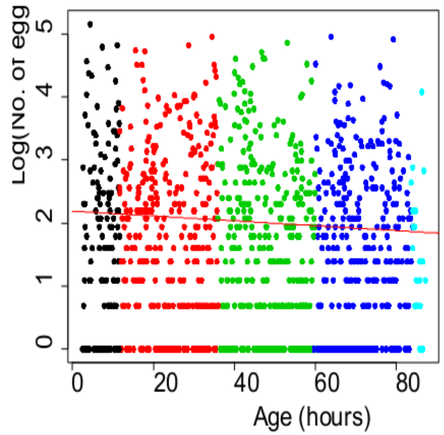
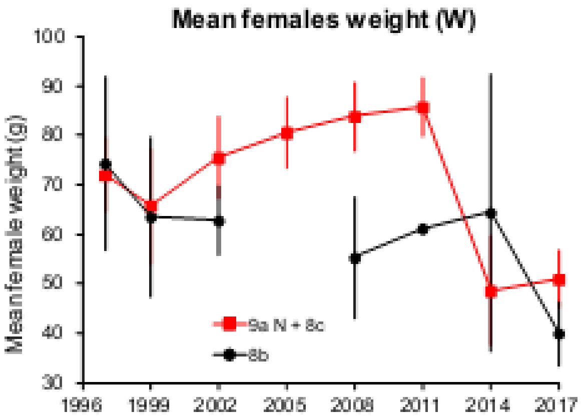
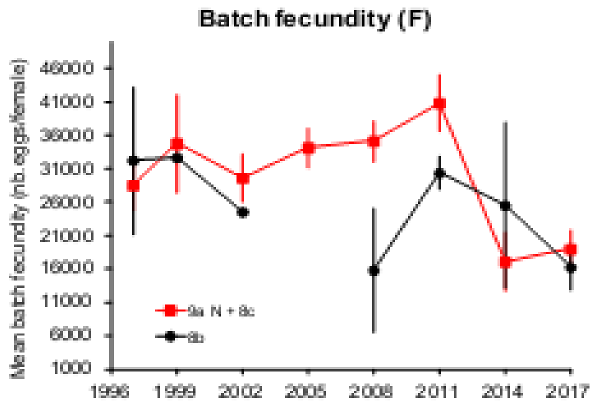


Figure 3.3.1.2.1. Bay of Biscay anchovy: Exponential mortality model adjusted applying a GLM to the data obtained in the Bayesian egg ageing (spawning peak at 23:00h GMT). The red line is the adjusted line. The coloured dots represent the different cohorts.

WGHANSA 2017



WGHANSA 2017



WGHANSA 2017

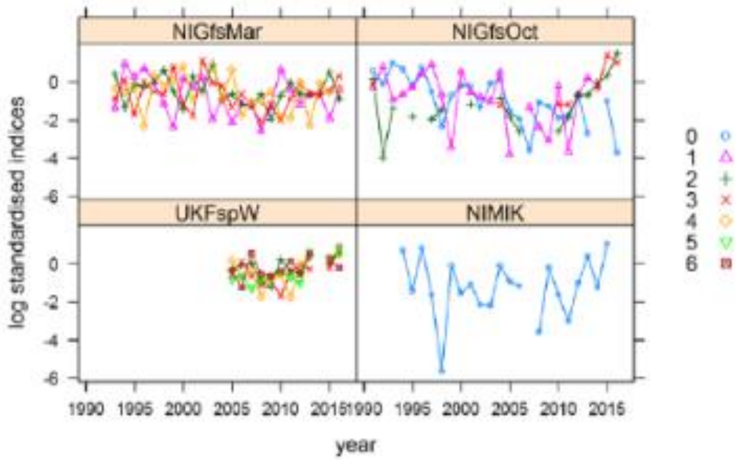


Figure 7.5. Log-standardised age distribution in survey indices.

WGCSE 2017

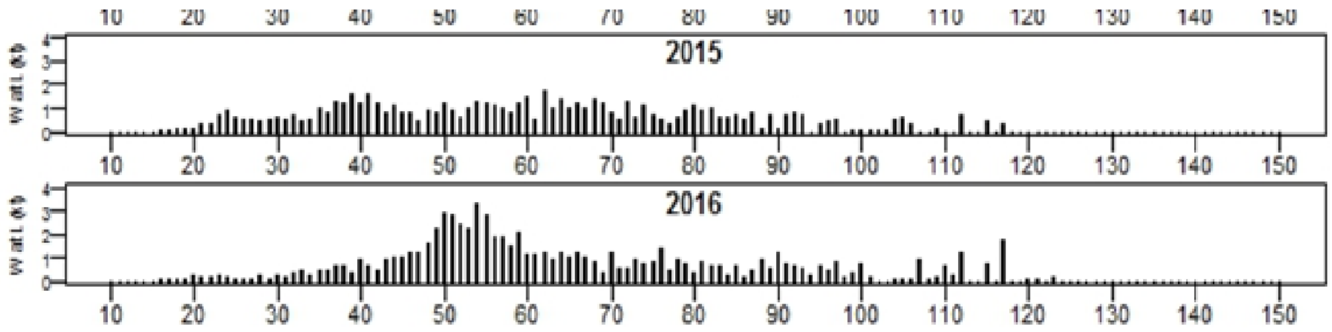


Figure 4.9. SCO-IV-VI-AMISS-Q2 estimates of total biomass (kt) at-length (cm) for Subareas 4.a–c and 6.a–b combined, 2007–2016.

WGCSE 2017

Quality control

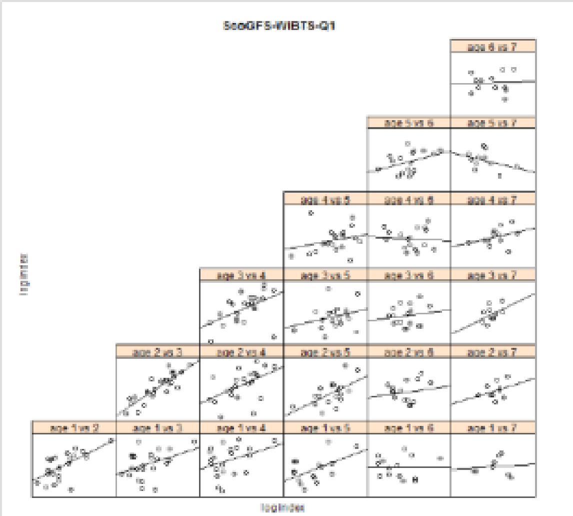


Figure 5.22. Cod in Division 6.a. Within-survey correlations for the Scottish quarter one ground fish survey (ScoGFS-WIBTS-Q1), comparing index values at different ages for the same cohorts. The straight line in a linear regression. Survey finished in 2010.

HAWG 2017

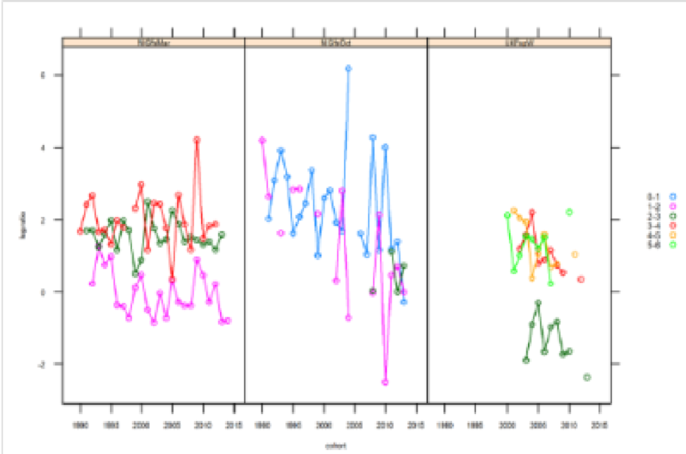


Figure 7.7. Log ratio of cohorts in surveys.

WGCSE 2017

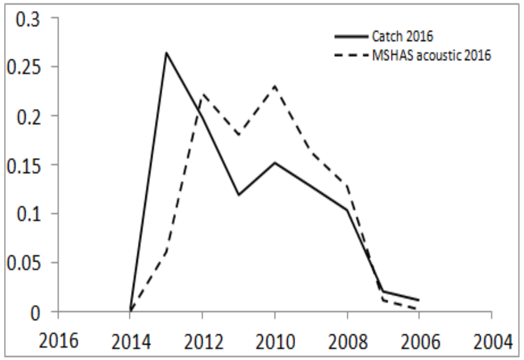


Figure 4.3.1.1. Herring in 6.a (combined) and 7.b and 7.c. Comparison of the proportions-at-age, by year class, in the 2016 acoustic survey (MSHAS) and the 2016 catch.

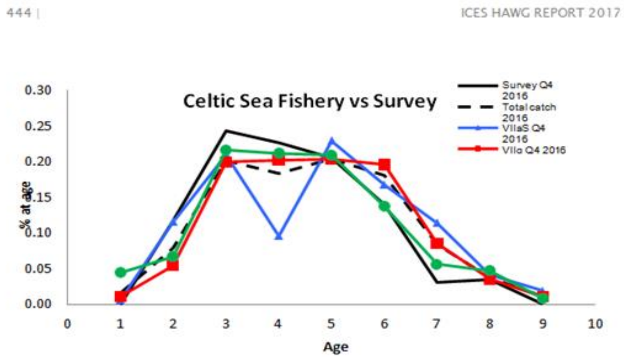


Figure 6.2.1.3. Herring in the Celtic Sea. Percentage age composition in the survey (2-9 wr) and the commercial fishery (1-9 wr) 2016/2017. Age in winter rings.

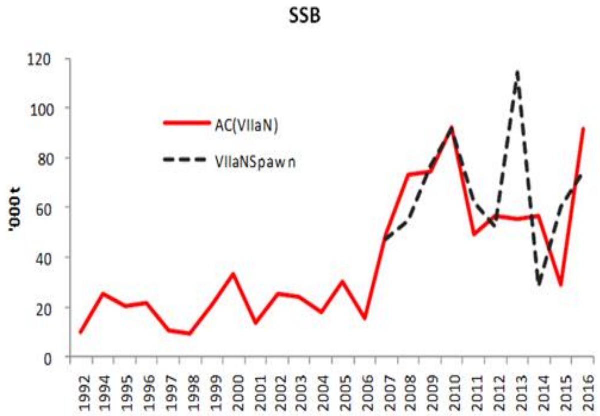


Figure 7.3.5. Herring in Division 7.a North (Irish Sea). Comparison of SSB indices from the acoustic survey estimates of SSB (red line) and the later survey 7.aNSpawn (dotted line).

HAWG (2017)

HAWG 2017

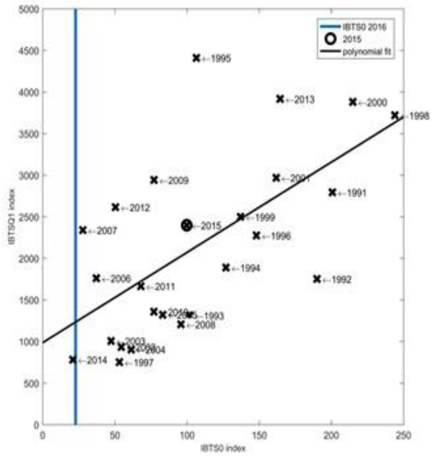


Figure 3.5.1. North Sea herring. Relationship between indices of 0-ringers and 1-ringers for year classes 19991 to 2016. The 2015 year class relation is the marker circled in black. the present 0-ringer index for year class 2016 is indicated as the vertical blueline.

HAWG 2017

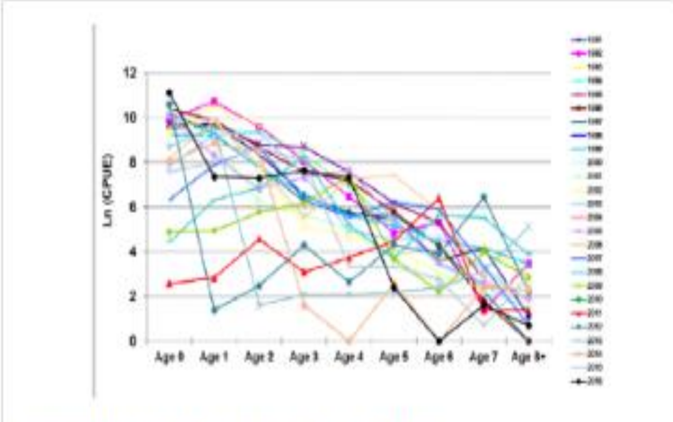


Figure 4.3.20. Haddock in 6.b. Log survey cpue at-age by year.

WGCSE 2017

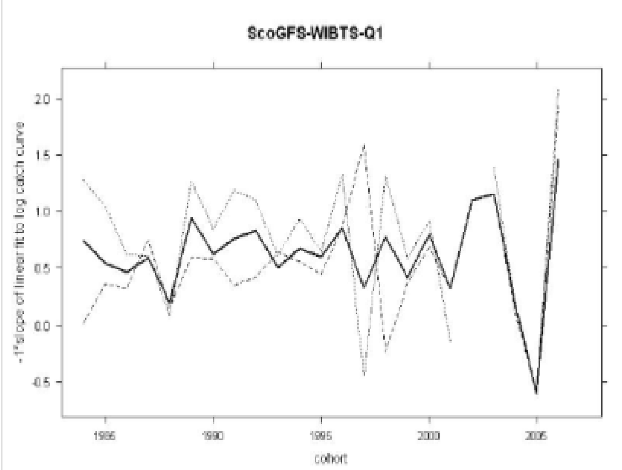


Figure 5.23. Cod in Division 6.a. Log catch curve gradient plot using ScoGFS-WIBTS-Q1 index data. Solid line shows time-series of gradient of linear fit to curve over the age range 2–5, dashed line over the ages 2–4 and dotted line over the ages 3–5. Last cohort shown was at-age 5 in 2010, the last year of the ScoGFS-WIBTS-Q1 survey.

WGCSE 2017

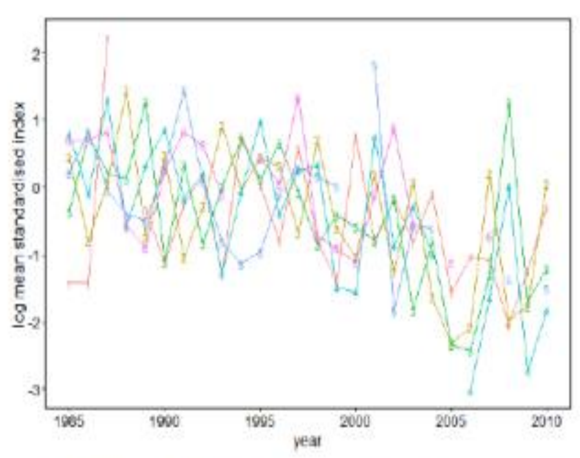


Figure 5.19. Cod in Division 6.a. Log mean standardised index values, by year, from Scottish quarter one ground fish survey (ScoGFS-WIBTS-Q1); ages 1–6. Survey finished in 2010.

WGCSE 2017

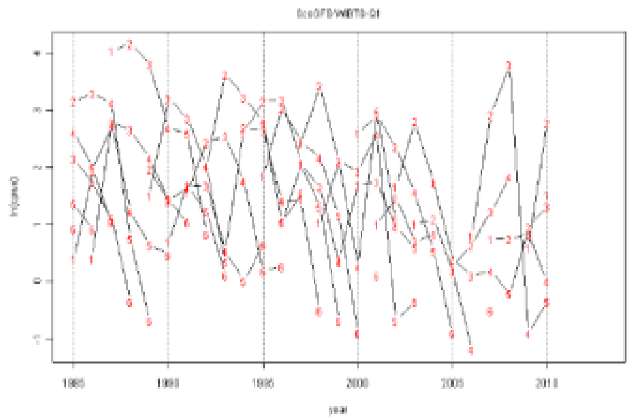


Figure 5.21. Cod in Division 6.a. Log catch curves from Scottish quarter one ground fish survey (ScoGFS-WIBTS-Q1); ages 1–6. Survey finished in 2010.

WGCSE 2017

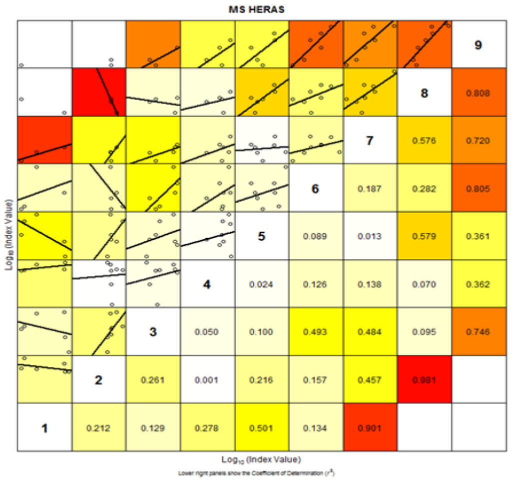
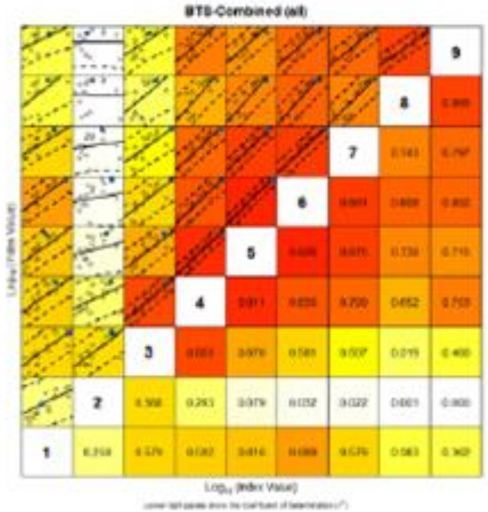


Figure 4.3.1.2. Herring in 6.a (combined) and 7.b and 7.c. Internal consistency between ages (rings) in the Malin Shelf herring acoustic survey time series (2008–2016).

HAWG (2017)



WGCSE 2017

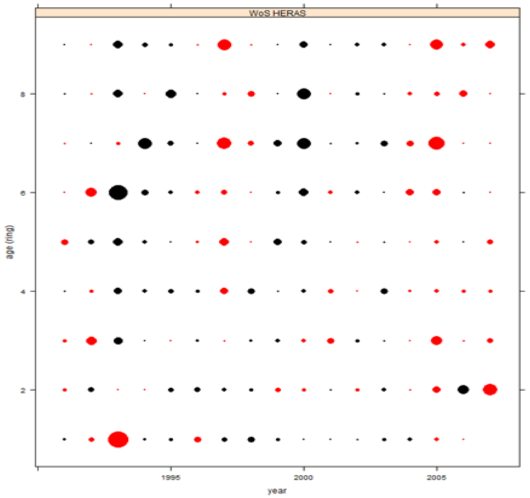


Figure 4.6.2: Herring in 6.a (combined) and 7.b and 7.c. Bubble plot of standardised survey residuals from the West of Scotland geographical area (6.aN) acoustic survey (1991–2007).

HAWG 2017

WGWIDE 2017

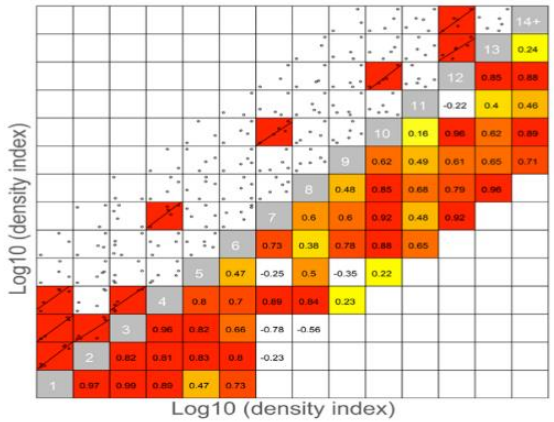


Figure 8.5.3.3. Internal consistency of mackerel density index in the IESSNS surveys from 2007-2016. Ages indicated by white numbers in grey diagonal cells. Statistically significant positive correlations ($p<0.05$) are indicated by regression lines and red cells in upper left half. Correlation coefficients (r) are given in the lower right half.

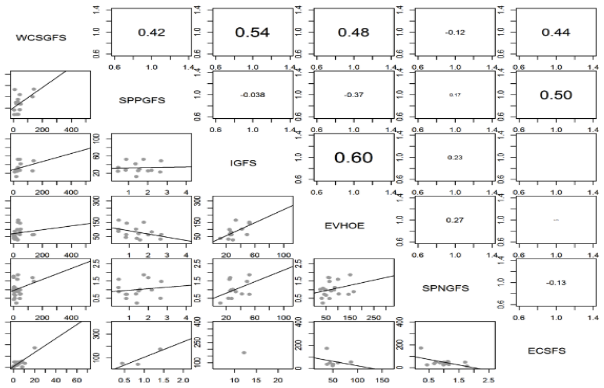


Figure 3.6.1.5. Boarfish in ICES Subareas 6, 7, 8. Pair-wise correlation between the annual mean survey indices.

WGWIDE 2017

HAWG 2017

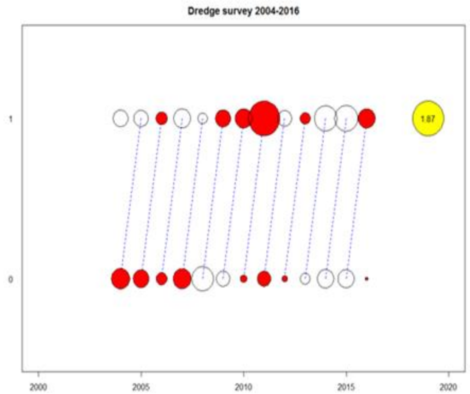


Figure 9.2.6 Sandeel Area-1r. Survey CPUE at age residuals (log(observed CPUE)- log(expected CPUE). "Red" dots show a positive residual.

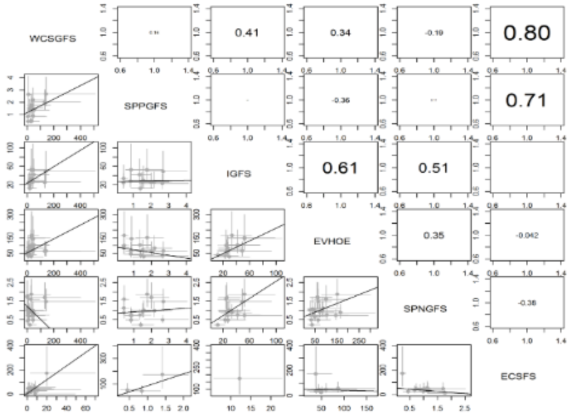
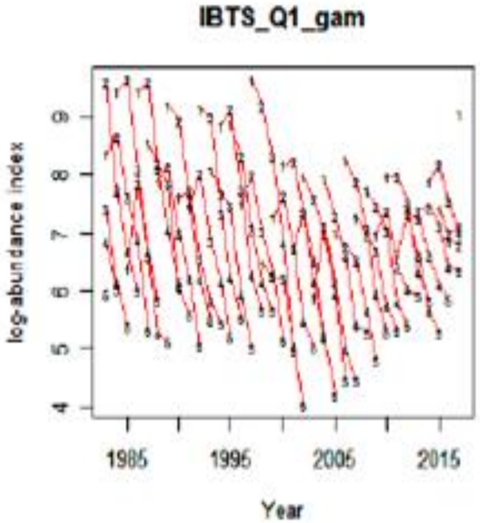


Figure 3.6.1.6. Boarfish in ICES Subareas 6, 7, 8. Weighted correlation between the annual mean survey indices. Correlations are weighted by the sum of the pair-wise variances.

WGWIDE 2017



WGWIDE 2017

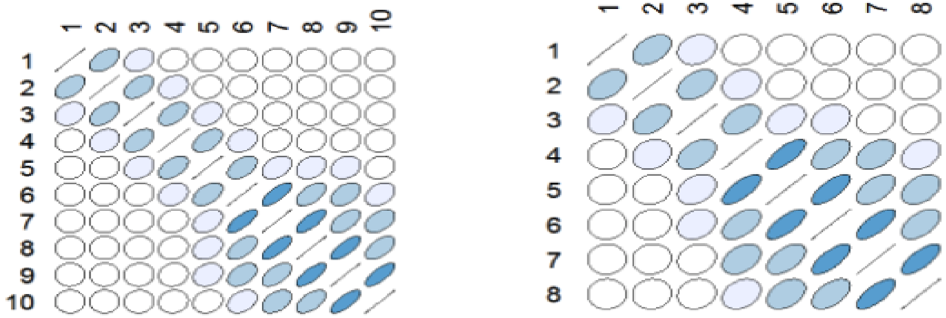


Figure 2.4.2.3.Blue Whiting. The correlation matrix between ages for the catches and survey indices. Each ellipse represents the level curve of a bivariate normal distribution with the corresponding correlation. Hence, the sign of a correlation correspond to the sign of the slope of the major ellipse axis. Increasingly darker shading is used for increasingly larger absolute correlations, while uncorrelated pairs of ages are depicted as circles with no shading.

III.8 – Mortality

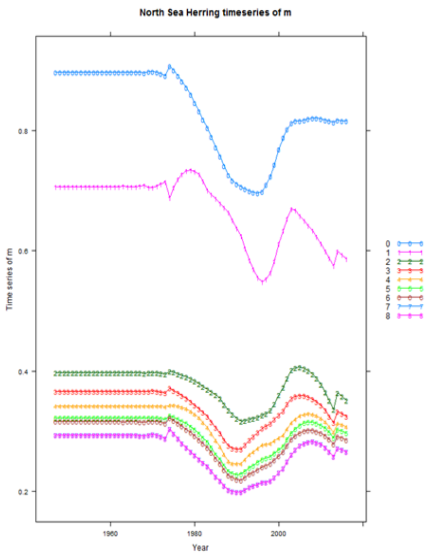
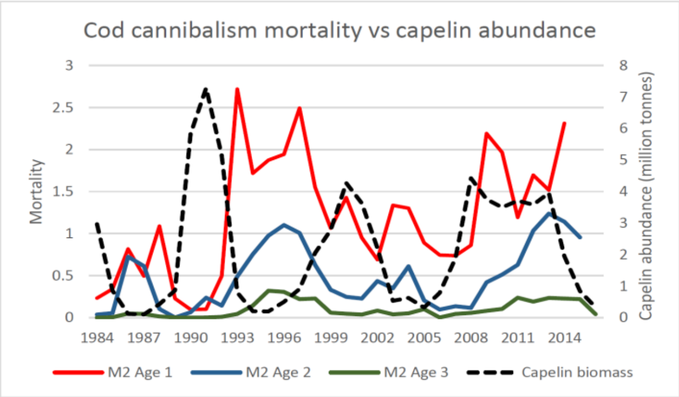


Figure 3.6.1.3. North Sea Herring. Time series of absolute natural mortality values at age 0-8+ as used in the North Sea herring assessment. Natural mortality values are based on the 2015 North Sea key-run (WGSAM 2015).



AFWG (2017). Fig. 3.5. NEA cod cannibalism mortality vs. capelin abundance

HAWG (2017)

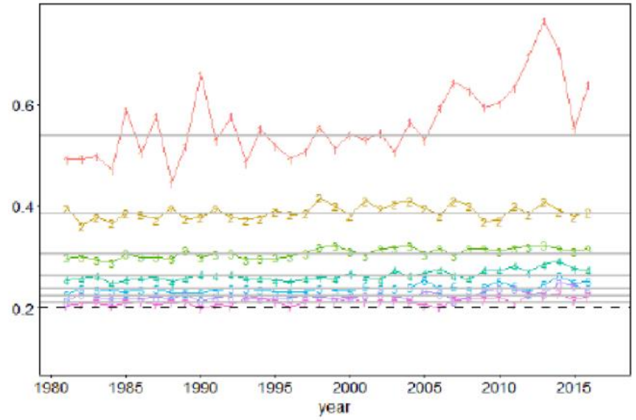


Figure 5.15. Cod in Division 6.a. Natural mortality-at-age based on mean weight-at-age and mortality–weight relationship. Solid horizontal lines show the time averaged values at each age used in the assessment. Dotted horizontal line shows value of 0.2 previously used at all ages in all years.

WGCSE 2017

III.9 – Maturity

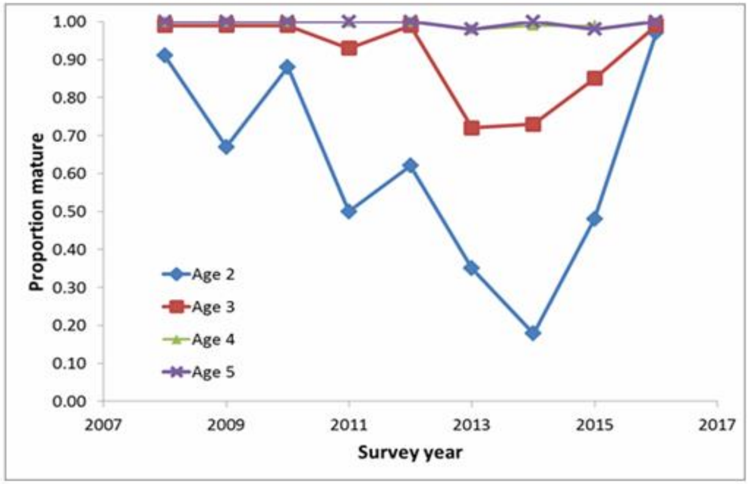


Figure 4.4.2.1. Herring in 6.a (combined) and 7.b and 7.c. Maturity ogive for the years 1993 to 2016.

HAWG 2017

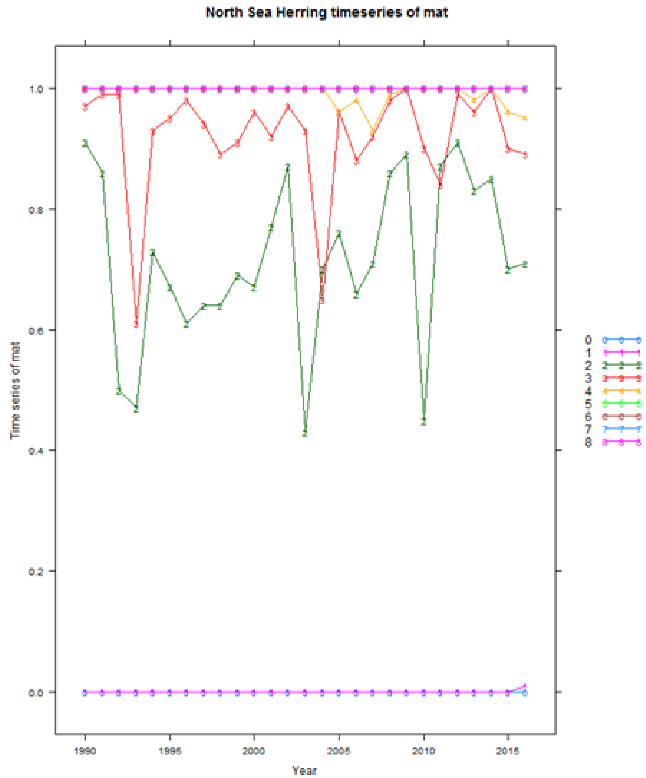


Figure 3.6.1.1 North Sea Herring. Time series of proportion mature at ages 0 to 8+ as used in the North Sea herring assessment.

HAWG (2017)