

# WORKING GROUP ON WIDELY DISTRIBUTED STOCKS (WGWIDE)

VOLUME 3 | ISSUE 95

ICES SCIENTIFIC REPORTS

RAPPORTS  
SCIENTIFIQUES DU CIEM



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

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

The material in this report may be reused for non-commercial purposes using the recommended citation. ICES may only grant usage rights of information, data, images, graphs, etc. of which it has ownership. For other third-party material cited in this report, you must contact the original copyright holder for permission. For citation of datasets or use of data to be included in other databases, please refer to the latest ICES data policy on ICES website. All extracts must be acknowledged. For other reproduction requests please contact the General Secretary.

This document is the product of an expert group under the auspices of the International Council for the Exploration of the Sea and does not necessarily represent the view of the Council.

ISSN number: 2618-1371 | © 2021 International Council for the Exploration of the Sea

# ICES Scientific Reports

Volume 3 | Issue 95

## WORKING GROUP ON WIDELY DISTRIBUTED STOCKS (WGWIDE)

### Recommended format for purpose of citation:

ICES. 2021. Working Group on Widely Distributed Stocks (WGWIDE).  
ICES Scientific Reports. 3:95. 874 pp. <http://doi.org/10.17895/ices.pub.8298>

### Editors

Andrew Campbell

### Authors

Florian Berg • Esther Beukhof • Sigurvin Bjarnason • Höskuldur Björnsson • Thomas Brunel • Finlay Burns • Andrew Campbell • Neil Campbell • Rui Catarino • Anatoly Chetyrkin • Gersom Costas • Laurent Dubroca • Roxanne Duncan • Afra Egan • Sólva Eliassen • Patricia Goncalves • Ole Henriksen • Einar Hjørleifsson • Åge Højnes • Sondre Hølleland • Eydna í Homrum • Jan Arge Jacobsen • Teunis Jansen • Yury Kalashnikov • Alexander Krysov • Lisa Anne Libungan • Susan Lusseau • Sonia Sánchez-Maróño • David Miller • Richard Nash • Leif Nøttestad • Anna H. Olafsdottir • Alessandro Orio • Rosana Ourens • Martin Pastoors • Rosario Dominguez-Petit • Alexander Pronyuk • Maxim Rybakov • Are Salthaug • Aril Slotte • Claus Sparrevohn • Erling Kåre Stenevik • Jens Ulleweit • Sindre Vatnehol • Morten Vinther



**ICES**  
**CIEM**

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

# Contents

i	Executive summary .....	v
ii	Expert group information .....	vii
1	Introduction.....	1
1.1	Terms of References (ToRs) .....	1
1.2	Participants at the meeting .....	3
1.3	Overview of stocks within the WG.....	3
1.4	Quality and Adequacy of fishery and sampling data .....	4
1.5	Comment on update and benchmark assessments .....	13
1.6	Planning future benchmarks.....	13
1.7	Scientific advice and management of widely distributed and migratory pelagic fish .....	14
1.8	General stock trends for widely distributed and migratory pelagic fish .....	21
1.9	Ecosystem considerations for widely distributed and migratory pelagic fish species.....	29
1.10	Future Research and Development Priorities (Stock Coordinators/ Assessors) .....	33
1.11	References .....	36
2	Blue whiting ( <i>Micromesistius poutassou</i> ) in subareas 27.1–9, 12, and 14 (Northeast Atlantic) .....	40
2.1	ICES advice in 2020 .....	40
2.2	The fishery in 2020.....	40
2.3	Input to the assessment.....	40
2.4	Stock assessment .....	44
2.5	Final assessment .....	46
2.6	State of the Stock.....	46
2.7	Biological reference points .....	46
2.8	Short-term forecast .....	47
2.9	Comparison with previous assessment and forecast .....	49
2.10	Quality considerations .....	49
2.11	Management considerations.....	49
2.12	Ecosystem considerations.....	50
2.13	Regulations and their effects .....	51
2.14	Recommendations .....	51
2.15	Deviations from stock annex caused by missing information from Covid-19 disruption.....	52
2.16	References .....	52
2.17	Tables.....	54
2.18	Figures.....	87
3	Northeast Atlantic boarfish ( <i>Capros aper</i> ) .....	111
3.1	The fishery .....	111
3.2	Biological composition of the catch .....	115
3.3	Fishery Independent Information .....	116
3.4	Mean weights- at-age, maturity-at-age and natural mortality .....	118
3.5	Recruitment .....	119
3.6	Exploratory assessment .....	120
3.7	Short Term Projections .....	125
3.8	Long term simulations .....	125
3.9	Candidate precautionary and yield based reference points .....	125
3.10	Quality of the assessment.....	126
3.11	Management considerations .....	126
3.12	Stock structure .....	126

3.13	Ecosystem considerations.....	127
3.14	Proposed management plan.....	128
3.15	References .....	129
3.16	Tables.....	132
3.17	Figures.....	136
4	Herring ( <i>Clupea harengus</i> ) in subareas 1, 2, 5 and divisions 4.a and 14.a, Norwegian spring-spawning herring (the Northeast Atlantic and Arctic Ocean) .....	152
4.1	ICES advice in 2021 .....	152
4.2	The fishery in 2021.....	152
4.3	Stock description and management units .....	152
4.4	Input data.....	153
4.5	Stock assessment .....	156
4.6	NSSH reference points .....	160
4.7	State of the stock .....	160
4.8	NSSH catch predictions for 2021 .....	160
4.9	Comparison with previous assessment .....	161
4.10	Management plans and evaluations.....	162
4.11	Management considerations .....	162
4.12	Ecosystem considerations.....	163
4.13	Changes in fishing patterns.....	164
4.14	Recommendations .....	164
4.15	References .....	164
4.16	Tables and figures .....	167
5	Horse Mackerel in the Northeast Atlantic ( <i>Trachurus trachurus</i> ) .....	230
5.1	Fisheries in 2021 .....	230
5.2	Stock units.....	230
5.3	WG catch estimates .....	231
5.4	Allocation of catches to stocks.....	231
5.5	Estimates of discards .....	231
5.6	<i>Trachurus</i> species mixing .....	231
5.7	Length distribution by fleet and country .....	232
5.8	Comparing trends between areas and stocks.....	232
5.9	Quality and adequacy of fishery and sampling data.....	232
5.10	References .....	233
5.11	Tables.....	234
5.12	Figures.....	242
6	Horse mackerel ( <i>Trachurus trachurus</i> ) in divisions 3.a, 4.b–c, and 7.d (Skagerrak and Kattegat, southern and central North Sea, eastern English Channel) .....	252
6.1	ICES advice in 2021 .....	252
6.2	Fishery of North Sea horse mackerel stock.....	252
6.3	Biological data.....	253
6.4	Data exploration .....	254
6.5	Stock assessment .....	258
6.6	Basis for 2022 and 2023 advice.....	260
6.7	Ongoing work.....	260
6.8	Management considerations .....	261
6.9	Deviations from stock annex caused by missing information from Covid-19 disruption.....	261
6.10	References .....	262
6.11	Figures.....	263
7	Horse mackerel ( <i>Trachurus trachurus</i> ) in Subarea 8 and divisions 2.a, 4.a, 5.b, 6.a, 7.a–c,e–k (the Northeast Atlantic) .....	283
7.1	TAC and ICES advice applicable to 2020 and 2021 .....	283

7.2	Scientific data.....	284
7.3	State of the stock .....	288
7.4	Short-term forecast .....	289
7.5	Uncertainties in the assessment and forecast.....	289
7.6	Comparison with previous assessment and forecast .....	290
7.7	Management options.....	290
7.8	Management considerations .....	291
7.9	Ecosystem considerations.....	291
7.10	Regulations and their effects .....	291
7.11	Changes in fishing technology and fishing patterns .....	292
7.12	Changes in the environment.....	292
7.13	Deviations from stock annex caused by missing information from Covid-19 disruption.....	292
7.14	References .....	293
7.15	Tables.....	293
7.16	Figures.....	373
8	Northeast Atlantic Mackerel .....	396
8.1	ICES Advice and International Management Applicable to 2020 .....	396
8.2	The Fishery .....	397
8.3	Quality and Adequacy of sampling Data from Commercial Fishery .....	399
8.4	Catch Data.....	403
8.5	Biological Data .....	408
8.6	Fishery Independent Data.....	411
8.7	Stock Assessment.....	418
8.8	Short term forecast.....	424
8.9	Biological Reference Points.....	425
8.10	Comparison with previous assessment and forecast .....	425
8.11	Management Considerations.....	427
8.12	Ecosystem considerations.....	428
8.13	References .....	430
8.14	Tables.....	435
8.15	Figures.....	479
9	Red gurnard in the Northeast Atlantic .....	519
9.1	General biology .....	519
9.2	Stock identity and possible assessments areas .....	519
9.3	Management regulations.....	519
9.4	Fisheries data .....	519
9.5	Survey data .....	521
9.6	Biological sampling .....	521
9.7	Biological parameters and other research.....	521
9.8	Assessment .....	522
9.9	Data requirements.....	522
9.10	References .....	522
10	Striped red mullet in Subareas and Divisions 6, 7a–c, e–k, 8, and 9a .....	530
10.1	General biology .....	530
10.2	Management regulations.....	530
10.3	Stock ID and possible management areas .....	531
10.4	Fisheries data .....	531
10.5	Survey data, recruit series .....	531
10.6	Analysis of stock trends/ assessment .....	532
10.7	References .....	532
	Annex 1 List of Participants.....	541
	Annex 2 Resolutions.....	543

Annex 3 List of Stock Annexes .....	544
Annex 4 Audits .....	545
Annex 5 WGWIDE 2021 productivity changes survey .....	559
Annex 6 Working Documents presented to WGWIDE 2021 .....	564

## i Executive summary

WGWIDE reports on the status and considerations for management of the Northeast Atlantic mackerel, blue whiting, Western and North Sea horse mackerel, Northeast Atlantic boarfish, Norwegian spring-spawning herring, striped red mullet (Subareas 6, 8 and Divisions 7.a-c, e-k and 9.a), and red gurnard (Subareas 3, 4, 5, 6, 7, and 8) stocks.

**Northeast Atlantic Mackerel.** This migratory stock is widely distributed throughout the Northeast Atlantic with significant fisheries in several ICES subareas. The assessment conducted in 2021 is an update assessment, based on the configuration agreed during the 2019 inter-benchmark with updates to include sampling of the commercial catch, a recruitment index and tagging time series updated to 2020 and data from the 2021 IESSNS swept area survey. No update to the egg survey based SSB index is available with the most recent survey carried out in 2019 and the next survey scheduled for 2022. Advice is given based on stock reference points which were updated during a management strategy evaluation carried out in 2020. Following a strong increase from 2007 to 2014, SSB has been declining although it remains above MSY Btrigger. Fishing mortality has been below FMSY since 2015 but is rising and is just below FMSY in 2020.

**Blue Whiting.** This pelagic gadoid is widely distributed in the eastern part of the North Atlantic. The current assessment configuration (inter-benchmark in 2016) uses preliminary catch and sampling data along with the acoustic survey data from the current year. The 2021 update assessment indicates that SSB is continuing to decrease from a maximum reached in 2017, with below average recruitment from 2017-19, although it remains above MSY Btrigger in 2021. Fishing mortality has been above FMSY since 2014 and is rising since 2019. There are indications in the most recent data of a moderate increase in recruitment in 2020-21.

**Norwegian Spring Spawning Herring.** This stock is migratory, spawning along the Norwegian coast and feeding throughout much of the Norwegian Sea. The 2021 update assessment is based on an implementation of the XSAM assessment model introduced following a benchmark in 2016. This year's assessment is consistent with that from 2020 but indicates an increase in SSB in the most recent year due to the strong 2016 year-class, the size of which has been revised upwards by the assessment. However, stock size is forecast to resume declining with weak recruitment since 2016, although the stock is predicted to remain above MSY Btrigger.

**Western Horse Mackerel.** The western stock of horse mackerel is distributed throughout ICES subareas 4,6,7,8 and 9. Following a benchmark in 2017, the stock is assessed using the Stock Synthesis integrated assessment model. Stock reference points were revised in 2019. Following a period of declining SSB, above average recruitments from 2014-2018 have contributed to a recent rise in SSB, albeit from a low level in 2017. As in previous years the assessment, whilst indicating the same trend as previous assessments rescales the absolute levels of SSB and F over the time series and the working group proposes that a benchmark be scheduled to address this. SSB in 2020 is estimated to be just above Blim.

**North Sea Horse Mackerel.** Catch advice for this stock is issued biennially on the basis of an assessment based on a combined index from groundfish surveys in the North Sea and the Channel. Although no 2020 survey index is available due to restricted survey coverage, a reduction in the index value is observed in 2019 and a length based indicator continues to indicate F is above FMSY in both 2019 and 2020.

**Northeast Atlantic Boarfish.** Boarfish is a small, pelagic, planktivorous, shoaling species, found over much of the Northeast Atlantic shelf but primarily in ICES subareas 4,6,7 and 8. The directed



fishery occurs primarily in the Celtic Sea and developed during the early 2000s, initially unregulated before the introduction of a TAC in 2011. The stock is assessed using an exploratory Bayesian surplus production model with catch and survey data from groundfish surveys and an acoustic survey. The current assessment indicates that, following a sharp decline after 2012, biomass has been increasing in recent years. The most recent acoustic surveys indicate a period of above average recruitment from 2018-2020.

**Northeast-Atlantic Red Gurnard.** This stock was first considered by WGWIDE in 2016 with advice issued biennially. The assessment was benchmarked in 2021 and a survey-based relative biomass indicator was developed. The 2021 update assessment continues to show the indicator fluctuating without trend since 2010. However, large uncertainties remain with regard to landings data due to poor resolution at the species level and reported discarding levels vary widely.

**Striped Red Mullet in Bay of Biscay, Southern Celtic Seas, Atlantic Iberian Waters.** No assessment is available for this stock and information on abundance and exploitation level is limited with advice given triennially on the basis of the precautionary approach. However, there are a number of research projects underway which will inform a future benchmark and potential up-grade of the assessment category.

ii Expert group information

Expert group name	Working Group on Widely Distributed Stocks (WGWIDE)
Expert group cycle	Annual
Year cycle started	2021
Reporting year in cycle	1/1
Chair(s)	Andrew Campbell, Ireland
Meeting venue(s) and dates	25-31 August 2021, online, 46 participants