

HERRING ASSESSMENT WORKING GROUP FOR THE AREA SOUTH OF 62° N (HAWG)

VOLUME 4 | ISSUE 16

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
info@ices.dk

ISSN number: 2618-1371

This document has been produced under the auspices of an ICES Expert Group or Committee. The contents therein do not necessarily represent the view of the Council.

© 2022 International Council for the Exploration of the Sea

This work is licensed under the Creative Commons Attribution 4.0 International License (CC BY 4.0). For citation of datasets or conditions for use of data to be included in other databases, please refer to ICES data policy.



ICES Scientific Reports

Volume 4 | Issue 16

HERRING ASSESSMENT WORKING GROUP FOR THE AREA SOUTH OF 62° N (HAWG)

Recommended format for purpose of citation:

ICES. 2022. Herring Assessment Working Group for the Area South of 62° N (HAWG).
ICES Scientific Reports. 4:16. 745 pp. <http://doi.org/10.17895/ices.pub.10072>

Editors

Afra Egan • Cecilie Kvamme

Authors

Johnathan Ball • Valerio Bartolino • Dorte Bekkevold • Florian Berg • Benoit Berges • Aaron Brazier • Neil Campbell • Mikael van Deurs • Afra Egan • Edward Farrell • Annegret Finke • Christopher Griffiths • Tomas Gröhslér • Kirsten Birch Håkansson • Ole Henriksen • Bastian Huwer • Espen Johnsen • Matthias Kloppmann • Cecilie Kvamme • Mathieu Lundy • Susan Mærsk Lusseau • Steve Mackinson • Paul Marchal • Eleanor McLeod • Henrik Mosegaard • Richard Nash • Cormac Nolan • Martin Pastoors • Campbell Pert • Thomas Regnier • Anna Rindorf • Norbert Rohlf • Claus Reedtz Sparrevohn • Vanessa Trijoulet



ICES
CIEM

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

Contents

i	Expert group information	iv
1	Introduction.....	1
1.1	HAWG 2022 Terms of Reference	1
1.2	Generic ToRs for Regional and Species Working Groups.....	2
1.3	Reviews of groups or projects important for the WG	4
1.3.1	Meeting of the Chairs of Assessment Related Expert Groups (WGCHAIRS)	4
1.3.2	Working Group for International Pelagic Surveys (WGIPS).....	5
1.3.3	WGQUALITY, WGBIOP and WGCATCH.....	7
1.3.4	WGSAM.....	8
1.3.5	MIK surveys.....	9
1.3.6	Stock separation of herring in surveys and catches	10
1.3.7	WKDLSSLS	15
1.3.8	WKNSCS – Benchmark workshop on North Sea and Celtic Sea stocks	15
1.3.9	Other activities relevant to HAWG	16
1.4	Commercial catch data collation, sampling, and terminology	17
1.4.1	Commercial catch and sampling: data collation and handling	17
1.4.2	Sampling	18
1.4.3	Terminology	19
1.5	Methods Used	19
1.5.1	SAM.....	19
1.5.2	ASAP.....	19
1.5.3	SMS	20
1.5.4	Short-term predictions.....	20
1.5.5	Reference Points	20
1.5.6	Repository setup for HAWG.....	21
1.6	Ecosystem overview and considerations	21
1.7	Summary of relevant Mixed fisheries overview and considerations, species interaction effects and ecosystem drivers, Ecosystem effects of fisheries, and Effects of regulatory changes on the assessment or projections for all stocks.	24
1.8	Stock overview	28
1.9	Mohn’s rho and retrospective patterns in the assessments	37
1.10	Transparent Assessment Framework (TAF)	39
1.11	Benchmark process.....	40
2	Herring (<i>Clupea harengus</i>) in Subarea 4 and divisions 3.a and 7.d, autumn spawners.....	41
2.1	Introduction	41
2.1.1	ICES advice and management applicable to 2021 and 2022	41
2.1.2	Catches in 2021.....	41
2.1.3	Regulations and their effects	42
2.1.4	Changes in fishing technology and fishing patterns.....	43
2.2	Biological composition of the catch.....	43
2.2.1	Catch in numbers-at-age.....	44
2.2.2	Other Spring-spawning herring in the North Sea.....	44
2.2.3	Data revisions.....	45
2.2.4	Quality of catch and biological data.....	45
2.3	Fishery independent information	45
2.3.1	Acoustic Surveys in the North Sea (HERAS), West of Scotland 6.a (N) and the Malin Shelf area (MSHAS) in June–July 2021.....	45
2.3.2	International Herring Larvae Surveys in the North Sea (IHLS)	46
2.3.3	International Bottom Trawl Survey (IBTS-Q1).....	47
2.3.3.1	2.3.3.1 The 0-ringer abundance (IBTS0 survey)	47

2.3.3.2	The 1-ringer herring abundances (IBTS-1)	48
2.4	Mean weights-at-age, maturity-at-age, and natural mortality.....	49
2.4.1	Mean weights-at-age	49
2.4.2	Maturity ogive.....	49
2.4.3	Natural mortality	49
2.5	Recruitment	50
2.5.1	Relationship between 0-ringer and 1-ringer recruitment indices	50
2.6	Assessment of North Sea herring	51
2.6.1	Data exploration and preliminary results	51
2.6.2	NS herring assessment.....	52
2.6.3	Exploratory Assessment for NS herring	52
2.6.4	State of the Stock.....	53
2.7	Short-term predictions	53
2.7.1	Comments on the short-term projections	54
2.7.2	Exploratory short-term projections	54
2.8	Medium term predictions and HCR simulations	55
2.9	Precautionary and Limit Reference Points and FMSY targets.....	55
2.10	Quality of the assessment	55
2.11	North Sea herring spawning components	55
2.11.1	International Herring Larval Survey	55
2.11.2	IBTS0 Larval Index	56
2.11.3	Component considerations.....	56
2.12	Ecosystem considerations	56
2.13	Changes in the environment	56
3	Herring in Division 3.a and subdivisions 22–24, spring spawners [Update Assessment]	186
3.1	The Fishery	186
3.1.1	Advice and management applicable to 2021 and 2022.....	186
3.1.2	Landings in 2021	186
3.1.3	Fleets.....	186
3.1.4	Regulations and their effects	187
3.1.5	Changes in fishing technology and fishing patterns.....	188
3.1.6	Winter rings vs. ages	188
3.2	Biological composition of the landings	188
3.2.1	Quality of Catch Data and Biological Sampling Data.....	189
3.3	Fishery-independent Information.....	191
3.3.1	German Autumn Acoustic Survey (GERAS) in subdivisions 21-24.....	191
3.3.2	Herring Summer Acoustic Survey (HERAS) in Division 3.a and the North Sea	192
3.3.3	Larvae Surveys (N20)	192
3.3.4	IBTS/BITS Q1 and Q3-Q4	192
3.4	Mean weights-at-age and maturity-at-age	193
3.5	Recruitment	193
3.6	Assessment of Western Baltic spring spawners in Division 3.a and subdivisions 22–24	193
3.6.1	Input data.....	193
3.6.1.1	Landings data	193
3.6.1.2	Biological data	193
3.6.1.3	Surveys	194
3.6.2	Assessment method.....	194
3.6.3	Assessment configuration.....	195
3.6.4	Final run	195
3.7	State of the stock.....	197
3.8	Comparison with previous years perceptions of the stock.....	197
3.9	Short-term predictions	198

	3.9.1	Input data	198
	3.9.2	Intermediate year 2022	198
	3.9.3	Catch scenarios for 2023–2025	199
	3.9.4	Exploring a range of total WBSS catches for 2023 (advice year) to 2025	200
	3.10	Reference points	203
	3.11	Quality of the Assessment	203
	3.12	Considerations on the 2022 advice	203
	3.13	Management Considerations	204
	3.13.1	Quotas in Division 3.a	204
	3.13.2	ICES catch predictions vs. management TAC	204
	3.13.3	Application of the management rule for the herring fishery for human consumption in Division 3.a	206
	3.14	Ecosystem considerations	206
	3.14.1	Migration	206
	3.14.2	Predation	207
	3.14.3	Eutrophication	207
	3.15	Changes in the Environment	207
	3.15.1	Climate drivers	207
4		Herring (<i>Clupea harengus</i>) in division 6.a (North), autumn spawners (West of Scotland)	332
	4.1	The Fishery	332
	4.1.1	Advice and management applicable to 2016–2021	332
	4.1.2	Changes in the fishery	333
	4.1.3	The monitoring fishery	333
	4.1.4	Stock recovery plan	334
	4.1.5	Regulations and their affects	334
	4.1.6	Catches in 2021	334
	4.1.7	Length Frequency information	334
	4.2	Biological Composition of the Catch	334
	4.3	Fishery-independent Information	335
	4.3.1	Acoustic surveys (A9481)	335
	4.3.1.1	Industry–Science Acoustic survey	335
	4.4	Mean Weights-at-age, Maturity-at-age and natural mortality	336
	4.4.1	Mean weight-at-age	336
	4.4.2	Maturity ogive	336
	4.4.3	Natural mortality	336
	4.5	Recruitment	337
	4.6	Assessment of 6.aN autumn spawning herring	337
	4.6.1	Final Assessment for 6.aN autumn spawning herring	338
	4.6.2	State of the stock	338
	4.7	Quality of the Assessment	339
	4.8	Management Considerations	339
	4.9	Ecosystem Considerations	339
	4.10	Changes in the Environment	340
5		Herring (<i>Clupea harengus</i>) in divisions 6.aS and 7.b–c	359
	5.1	The Fishery	359
	5.1.1	Advice applicable to 2021–2022	359
	5.1.2	Changes in the fishery	359
	5.1.3	Regulations and their affects	360
	5.1.4	Catches in 2021	360
	5.2	Biological Composition of the Catch	360
	5.2.1	Catches in numbers-at-age	360
	5.2.2	Quality of the catch and biological data	360
	5.3	Fishery-independent Information	360

	5.3.1	Acoustic surveys (A9526)	360
	5.3.2	Industry–Science Acoustic survey	362
	5.3.3	Bottom-trawl surveys	363
	5.4	Mean Weights-at-age, Maturity-at-age and natural mortality	363
	5.4.1	Mean weight-at-age.....	363
	5.4.2	Maturity ogive.....	364
	5.4.3	Natural mortality	364
	5.5	Recruitment	364
	5.6	Assessment of 6.aS and 7.b–c herring	365
	5.6.1	Data Exploration	365
	5.6.2	Final Assessment for 6.aS and 7.b–c herring	365
	5.6.2.1	Calculation of k	366
	5.6.2.2	Calculation of Constant Harvest Rate (chr).....	366
	5.6.2.3	Constant Harvest Rate Results.....	367
	5.7	State of the Stock.....	368
	5.8	Short-term Projections	368
	5.8.1	Short-term projections	368
	5.8.2	Yield-per-recruit.....	368
	5.9	Precautionary and Yield Based Reference Points.....	368
	5.10	Quality of the Assessment	368
	5.11	Management Considerations	369
	5.12	Ecosystem Considerations.....	369
	5.13	Changes in the Environment	369
6		Herring in the Celtic Sea (divisions 7.a South of 52°30'N and 7.g, 7.h and 7.j)	395
	6.1	The Fishery	395
	6.1.1	Advice and management applicable to 2021–2022.....	395
	6.1.2	The fishery in 2021–2022.....	395
	6.1.3	Changes in fishing patterns.....	396
	6.1.4	Discarding	396
	6.2	Biological composition of the catch.....	396
	6.2.1	Catches in numbers-at-age	396
	6.2.2	Quality of catch and biological data.....	397
	6.3	Fishery-Independent Information	397
	6.3.1	Acoustic Surveys	397
	6.4	Mean weights-at-age and maturity-at-age and Natural Mortality.....	398
	6.5	Recruitment	398
	6.6	Assessment	398
	6.6.1	Stock Assessment.....	398
	6.7	Short-term projections	400
	6.7.1	Deterministic Short-Term Projections	400
	6.7.2	Multiannual short-term forecasts.....	400
	6.7.3	Yield-per-recruit.....	400
	6.8	Long-term simulations.....	400
	6.9	Precautionary and yield-based reference points	401
	6.10	Quality of the Assessment	401
	6.11	Management Considerations	402
	6.12	Ecosystem considerations	402
	6.13	Changes in the environment	402
7		Herring (<i>Clupea harengus</i>) in Division 7.a North of 52°30'N (Irish Sea)	441
	7.1	The Fishery	441
	7.1.1	Current advice.....	441
	7.1.2	The fishery in 2021.....	441
	7.1.3	Regulations and their effects	441

	7.1.4	Changes in fishing technology and fishing patterns.....	442
	7.2	Biological Composition of the Catch	442
	7.2.1	Catch in numbers	442
	7.2.2	Quality of catch and biological data.....	442
	7.3	Fishery Independent Information	443
	7.3.1	Acoustic surveys AC(7.aN)	443
	7.3.2	Spawning-stock biomass survey (7.aNSpawn)	443
	7.4	Mean weight, maturity and natural mortality-at-age	444
	7.5	Recruitment	444
	7.6	Assessment	445
	7.6.1	Data exploration and preliminary modelling	445
	7.6.2	Final assessment	446
	7.6.3	State of the stock	447
	7.7	Short-term projections	447
	7.7.1	Deterministic short-term projections	447
	7.7.2	Yield per recruit	447
	7.8	Medium term projections.....	447
	7.9	Reference points	447
	7.10	Quality of the assessment	448
	7.11	Management considerations.....	449
	7.12	Ecosystem Considerations.....	449
8		Stocks with limited data	469
	8.1	Clyde herring.....	469
	8.2	Division 7.e.f.....	469
	8.3	Subarea 8 (Bay of Biscay)	469
	8.4	Division 6.aN, spring spawners	469
9		Sandeel in Division 3.a and Subarea 4 and Division 6.a	476
	9.1	General.....	476
	9.1.1	Ecosystem aspects	476
	9.1.2	Fisheries	476
	9.1.3	ICES Advice.....	477
	9.1.4	Norwegian advice	477
	9.1.5	Management.....	477
	9.1.6	Catch	478
	9.1.7	Sampling the catch.....	479
	9.1.8	Survey indices	479
	9.2	Sandeel in SA 1r	479
	9.2.1	Catch data	479
	9.2.2	Weight-at-age	479
	9.2.3	Maturity	479
	9.2.4	Natural mortality	480
	9.2.5	Effort and research vessel data.....	480
	9.2.6	Data analysis	480
	9.2.7	Final assessment	481
	9.2.8	Historic Stock Trends	481
	9.2.9	Short-term forecasts.....	481
	9.2.10	Biological reference points	482
	9.2.11	Quality of the assessment.....	482
	9.2.11.1	Status of the stock	482
	9.2.12	Management Considerations.....	483
	9.3	Sandeel in SA 2r	483
	9.3.1	Catch data	483
	9.3.2	Weight-at-age	483

	9.3.3	Maturity	483
	9.3.4	Natural mortality	484
	9.3.5	Effort and research vessel data.....	484
	9.3.6	Data analysis	484
	9.3.7	Final assessment	485
	9.3.8	Historic Stock Trends	485
	9.3.9	Short-term forecasts	486
	9.3.10	Quality of the assessment.....	486
	9.3.11	Status of the Stock	486
	9.3.12	Management considerations	486
	9.4	Sandeel in SA 3r	487
	9.4.1	Catch data	487
	9.4.2	Weight-at-age	487
	9.4.3	Maturity	487
	9.4.4	Natural mortality	487
	9.4.5	Effort and research vessel data.....	487
	9.4.6	Data Analysis.....	488
	9.4.7	Final assessment	489
	9.4.8	Historic Stock Trends	489
	9.4.9	Short-term forecasts	489
	9.4.10	Biological reference points	490
	9.4.11	Quality of the assessment.....	490
	9.4.12	Status of the Stock	490
	9.4.13	Management Considerations.....	490
	9.5	Sandeel in SA 4.....	490
	9.5.1	Catch data	490
	9.5.2	Weight-at-age	491
	9.5.3	Maturity	491
	9.5.4	Natural mortality	491
	9.5.5	Effort and research vessel data.....	491
	9.5.6	Data analysis	492
	9.5.7	Final assessment	493
	9.5.8	Historic Stock Trends	493
	9.5.9	Short-term forecasts	494
	9.5.10	Biological reference points	494
	9.5.10.1	Quality of the assessment.....	494
	9.5.10.2	Status of the Stock	494
	9.5.10.3	Management considerations	494
	9.6	Sandeel in SA 5r	495
	9.6.1	Catch data	495
	9.7	Sandeel in SA 6.....	495
	9.7.1	Catch data	495
	9.8	Sandeel in SA 7.....	495
	9.8.1	Catch data	495
	9.9	Sandeel in ICES Division 6.a	495
	9.9.1	Catch data	495
	9.10	References	495
10		Sprat in Division 3.a and Subarea 4 (Skagerrak, Kattegat and North Sea)	595
	10.1	The Fishery	595
	10.1.1	ACOM advice applicable to 2020 and 2021	595
	10.1.2	Catches in 2021.....	595
	10.1.3	Regulations and their effects	595
	10.1.4	Changes in fishing technology and fishing patterns.....	596

	10.2	Biological composition of the catch.....	596
	10.3	Fishery Independent Information.....	596
	10.3.1	IBTS Q1 and Q3.....	596
	10.3.2	Acoustic Survey (HERAS).....	597
	10.4	Mean weights-at-age and maturity-at-age.....	597
	10.5	Recruitment.....	597
	10.6	Stock Assessment.....	597
	10.6.1	Input data.....	599
	10.6.1.1	Catch data.....	599
	10.6.1.2	Weight-at-age.....	599
	10.6.1.3	Surveys.....	599
	10.6.1.4	Natural mortality.....	599
	10.6.1.5	Proportion mature.....	600
	10.6.2	Stock assessment model.....	600
	10.7	Reference points.....	600
	10.8	State of the stock.....	600
	10.9	Short-term projections.....	601
	10.10	Quality of the assessment.....	601
	10.11	Management Considerations.....	601
	10.11.1	Stock units.....	601
	10.12	Ecosystem Considerations.....	602
	10.13	Changes in the environment.....	602
	10.14	References.....	656
11		Sprat in the English Channel (divisions 7. de).....	657
	11.1	The Fishery.....	657
	11.1.1	ICES advice applicable for 2022.....	657
	11.1.2	Landings.....	657
	11.1.3	Fleets.....	657
	11.1.4	Regulations and their effects.....	658
	11.1.5	Changes in fishing technology and fishing patterns.....	658
	11.2	Biological Composition of the Catch.....	658
	11.2.1	Catches in number and weight-at-age.....	658
	11.3	Fishery-independent information.....	658
	11.4	Mean weight-at-age and maturity-at-age.....	659
	11.5	Recruitment.....	659
	11.6	Stock Assessment.....	659
	11.6.1	Data exploration.....	661
	11.7	State of the Stock.....	661
	11.8	Catch Advice.....	661
	11.9	Short-term projections.....	662
	11.10	Reference Points.....	662
	11.11	Quality of the Assessment.....	662
	11.12	Management Considerations.....	662
	11.13	Ecosystem Considerations.....	663
	11.14	References.....	673
12		Sprat in the Celtic Seas (Subarea 6 and divisions 7.a-c and 7.f-k).....	674
	12.1	The Fishery.....	674
	12.1.1	ICES advice applicable for 2022 and 2023.....	674
	12.1.2	Landings.....	674
	12.1.3	Division 6.a (West of Scotland and Northwest of Ireland).....	674
	12.1.4	Divisions 7.b–c (West of Ireland).....	675
	12.1.5	Divisions 7.g–k (Celtic Sea).....	675
	12.1.6	Fleets.....	676

12.1.7	Regulations and their effects	676
12.1.8	Changes in fishing technology and fishing patterns.....	676
12.2	Biological Composition of the Catch	676
12.2.1	Catches in number and weight-at-age.....	676
12.2.2	Biological sampling from the Scottish Fishery (6.a)	676
12.3	Fishery-independent information	677
12.3.1	Celtic Sea Acoustic Survey (A4057)	677
12.3.2	Scottish Acoustic Surveys (A9481)	677
12.3.3	Scottish IBTS surveys (G1179)	678
12.3.4	Northern Ireland Groundfish Survey (G7144)	678
12.3.5	AFBI Acoustic Survey (A4075)	678
12.4	Mean weight-at-age and maturity-at-age	678
12.5	Recruitment	678
12.6	Stock Assessment	678
12.7	State of the Stock	678
12.8	Short-term projections	679
12.9	Reference Points	679
12.10	Quality of the Assessment	679
12.11	Management Considerations	679
12.12	Ecosystem Considerations	679
13	References	701
Annex 1:	List of participants.....	710
Annex 2:	Resolutions	712
	Generic ToRs for Regional and Species Working Groups	712
	HAWG – Herring Assessment Working Group for the Area South of 62°N.....	714
Annex 3:	List of stock annexes	715
Annex 4:	List of Working Documents.....	717
Annex 5:	Audit reports	718

i Executive summary

The ICES herring assessment working group (HAWG) met online for four days in May 2022 to assess the state of six herring stocks. Advice for two sprat stocks that have an advice schedule from 1st July–30th June was prepared in April. HAWG also provided advice for eight sandeel stocks in February. The working group conducted update category 1 assessments for four of the herring stocks and category 3 assessments for 2 herring stocks. An analytical assessment was performed for the combined North Sea and Division 3.a sprat, and data limited assessment (ICES category 3) was conducted for English Channel sprat (spr.27.7de). Biennial advice is given for sprat in the Celtic Seas and West of Scotland with advice provided in 2021.

The North Sea autumn spawning herring (her.27.3a47d). SSB in 2021 was estimated at 1.35 mill tonnes while F_{2-6} in 2021 was estimated at 0.20, which is below F_{MSY} . Recruitment in 2021 is the lowest since 2017 and within the low recruitment regime observed since 2015. Year classes since 2002 are estimated to be consistently weak with year classes 2014 and 2016 some of the weakest on record. ICES considers that the stock is still in a low productivity phase.

The **Western Baltic spring-spawning herring (her.27.20-24)** assessment was updated. The SSB and recruitment in 2021 are at low levels. SSB is estimated to be around 62 800 tonnes which is below both B_{pa} and B_{lim} . Recruitment has been low since 2006 and it has been further deteriorating with time. Fishing mortality decreased in 2018 and is now well below F_{MSY} (0.31) at 0.15. The stock has decreased consistently during the second half of the 2000s and given the continued low recruitments, the stock is not able to recover above B_{lim} unless a drastic reduction in fishing effort is applied for several years.

The **Celtic Sea autumn and winter spawning stock (her.27.irls)** is estimated to be at a very low level. SSB is currently estimated to be increasing from the lowest level in the time-series and has been below B_{lim} (34 000 t) since 2016. Mean $F_{(2-5 \text{ rings})}$ was estimated at 0.069 in 2021, having decreased from the peak of 1.2 in 2018. Recruitment has been consistently below average since 2013.

Irish Sea autumn spawning herring (her.27.nirs) assessment shows an increase in SSB in 2021 to 30 792 tonnes which is the highest in the current time series. The stock has experienced large incoming year classes in recent years. Fishing mortality (F_{4-6}) has been stable between 0.2 and 0.21 since 2009 and is below F_{MSY} (0.266).

6aN autumn spawning herring (her.27.6aN) were part of a combined assessment with herring in 6.a South and 7.b-c since 2015. Following a benchmark meeting in 2022, these two stocks are now assessed separately. This was made possible by the development of a genetically split acoustic survey index. The Malin Shelf herring estimate of SSB for autumn spawning herring in 6.aN in 2021 is 43 886 tonnes. Although estimates have increased from the minimum value in 2019, it should be noted that numbers of herring to the West of Scotland are low compared to historical estimates. Indicators show that fishing pressure on the stock is at or below $F_{MSY \text{ proxy}}$ (0.335) and the stock size index is above $MSY B_{trigger \text{ proxy}}$ (14 711 t).

Herring in 6.aS/7.b, c (her.27.6aS7bc) are now assessed separately from autumn spawning herring in 6aN, following a benchmark in 2022. This was made possible by the development of a genetically split acoustic survey index. The survey index for herring in 6.aS, 7b,c has been increasing since the lowest point in 2016 (36,707 t) and in 2021 was estimated to be 189,856 t, which is the second highest point in the current time series. Recent catches are among the lowest in the time series. Fishing pressure on the stock is at or below $F_{MSY \text{ proxy}}$ (0.034) and the stock size index is well above $MSY B_{trigger \text{ proxy}}$ (51 390 t).

North Sea and 3.a sprat (spr.27.3a4) were combined into a single assessment unit during the 2018 benchmark. Perception of the status of the stock is dominated by the dynamics in Subarea 4 where most of the catches occur. Fishing mortality in the last years has fluctuated at high levels between 0.6–2.2. Low recruitment the last two years have contributed to a decrease in SSB well below $MSY_{B_{escapement}}$. The estimates for 2022 show an SSB of 100 000 t which is below B_{pa} (125 000 t).

Catch advice for **sprat in the English Channel (7.d, e) (spr.27.7de)** was based on criteria for ICES category 3 stocks using the acoustic survey. The stock went through an interbenchmark in 2021 and a new basis for advice was recommended. The catch advice is now based on the latest biomass index multiplied by a constant harvest rate of 8.57%. Since sprat is a short-lived species and given the timing of the survey in October, an advice period, valid from 1st July to 30st June in the following year, has been adopted for this stock starting in 2022.

Catch advice for **sprat in the Celtic Seas and West of Scotland (spr.27.67a-cf-k)** was given for 2022 and 2023 using the ICES category 5 based method where only landings data are available. The precautionary buffer was applied and a 20% decrease in catch is advised.

The HAWG reviewed the category 1 assessments performed on four sandeel stocks (SA 1r-3r, 4) and the category 3-6 assessments of four more sandeel stocks (SA 5r, 6, 7r, Div. 6a) and updated the related advice. Section 9 of this report contains the assessments of sandeel in Division 3.a and Subarea 4.

Standard issues such as benchmark planning, the quality and availability of data, availability of data through industry surveys and scientific advances particularly with respect to the use of genetics for stock discrimination were discussed.

All data and scripts used to perform the assessments and the forecast calculations are available at https://github.com/ICES-dk/wg_HAWG and accessible to anyone.

ii Expert group information

Expert group name	Herring Assessment Working Group for the Area South of 62° N (HAWG))
Expert group cycle	Annual
Year cycle started	2022
Reporting year in cycle	1/1
Chairs	Afra Egan, Ireland
	Cecilie Kvamme, Norway
Meeting venues and dates	25-27 January 2022, virtual meeting (13 participants)
	March-May 2022, by correspondence (13 participants)
	9-12 May and 18 May 2022, virtual meetings, (35 participants)