

WORKING GROUP FOR THE CELTIC SEAS ECOREGION (WGCSE)

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Contents

i	Executive summary	xxii
ii	Expert group information	xxiii
1	Introduction.....	1
	1.1 Terms of reference	1
	1.1.1 Generic ToRs for Regional and Species Working Groups.....	1
	1.1.2 Specific ToRs	3
	1.2 Participation.....	3
	1.3 Methods.....	3
	1.4 Data issues	4
	1.5 Transparent Assessment Framework (TAF)	4
	1.6 Internal auditing and external reviews	4
	1.7 Generic ToR e: WGCSE recommendations for stocks to be benchmarked	5
	In 2022 WGCSE recommend the following stocks to be benchmarked	6
2	Anglerfish (<i>Lophius budegassa</i> , <i>Lophius piscatorius</i>) in subareas 4 and 6 and in Division 3.a (North Sea, Rockall and West of Scotland, Skagerrak and Kattegat).....	9
	Assessment in 2022	9
	ICES advice applicable to 2021 and 2022	9
	ICES advice for 2021	9
	ICES advice for 2022	9
	2.1 General.....	9
	Stock description and management units	9
	Management applicable to 2021 and 2022.....	10
	Fishery description	13
	The fishery in 2021	13
	2.2 Data.....	14
	Landings.....	14
	Discards	15
	Length compositions	15
	Biological Data	16
	Research vessel surveys	16
	2.3 Historical stock development	17
	2.4 Application of the rfb advice rule	18
	2.5 Biological reference points	20
	2.6 Management plans	20
	2.7 Uncertainties and bias in assessment and forecast	20
	Commercial data	21
	Survey data	21
	Biological information	21
	Stock structure	21
	2.8 Recommendations for next Benchmark	22
	2.9 Management considerations	22
	2.10 References	23
3	Cod in Division 6.a	54
	3.1 Introduction	54
	3.2 General.....	54
	3.2.1 Advice.....	54
	3.2.2 Stock definition and the management unit	54
	Recent management	55
	TAC 2020	56
	TAC 2021	56

	TAC 2022	56
	3.2.3 The fishery in 2021	57
	3.3 Data	57
	Catch data	57
	Age-compositions and weights-at-age	59
	Biological data	60
	Survey data	60
	3.4 Stock assessment	61
	Data screening	61
	Final assessment	63
	Stock status	65
	3.5 Short-term stock projections	65
	3.5.1 Reference points	66
	3.5.2 Management plans	67
	3.6 Quality of the assessment	67
	Landings	67
	Discards	67
	Biological factors	67
	Stock structure	68
	Assessment method	68
	3.6.1 Recommendation for next Benchmark	69
	3.6.2 Management considerations	69
	3.7 References	70
4	Cod (<i>Gadus morhua</i>) in Division 6.b (Rockall)	150
	Assessment in 2022	150
	ICES advice applicable in 2021–2023	150
	ICES advice applicable in 2018–2020	150
	ICES advice applicable in 2016–2017	150
	4.1 Data	150
	Commercial LPUE data	151
	Survey data	151
	4.2 References	151
5	Cod in 7.a (Irish Sea)	160
	5.1 General	160
	Stock description and management units	160
	Fishery in 2021	161
	InterCatch procedure	162
	Landings	163
	Discards data	163
	Biological data	163
	Natural mortality	163
	Maturity	164
	Survey data used for advice	164
	5.2 Historical stock development	164
	Deviations from Stock Annex	164
	Final assessment	164
	Final assessment: long-term trends	165
	5.3 Short-term predictions	165
	5.4 Biological reference points	166
	5.5 Management plans	167
	5.6 Uncertainties and bias in assessment	167
	Surveys	167
	Stock structure and migrations	167

5.7	Management considerations	168
5.8	Future Issues and considerations	168
5.9	References	168
6	Cod in divisions 7.e–k (eastern English Channel and southern Celtic Seas)	206
	Full analytical assessment	206
	Latest ICES advices in 2020 and 2021	206
6.1	General.....	206
6.2	Stock description and management units	206
	Management applicable in 2021 and 2022	207
	Preliminary TAC 2022 (Council regulation 2022/109)	207
	Fishery	207
	Information from the industry	208
6.3	Data.....	208
	InterCatch procedure	208
	Catches	209
	Discards	209
	Biological	210
	Surveys and commercial tuning fleet	212
	Data issues.....	212
6.4	Stock assessment	213
	Final update assessment (SAM)	213
	State of the stock.....	213
6.5	Short-term projections	214
6.6	Medium-term projection	214
6.7	Biological reference points	214
6.8	Management plans	214
6.9	Uncertainties and bias in assessment and forecast	214
6.10	Recommendations for future developments	215
6.11	Management considerations	215
6.12	References	215
7	Haddock in Division 6.b (Rockall)	265
7.1	Introduction	265
7.2	General.....	265
	Advice	265
	Stock description and management units	265
	Management applicable to 2021 and 2022.....	265
	Fishery in 2021	267
	Russian fishery in 2021	267
	UK fishery in 2021.....	267
	Irish fishery in 2021	268
7.3	Data.....	268
	Landings.....	268
	BMS landings	268
	Discards	269
	Age- and length-compositions and mean weights-at-age.....	270
	Biological	270
	Surveys	270
	Commercial Effort, Lpue and Cpue.....	271
7.4	Derivation of stock indicators	273
	Survey index	273
	Growth parameter estimation	273
	Length-based indicator.....	273
7.5	Derivation of data limited reference points	274

	7.6	Application of the advice rule	274
	7.7	Management plans	275
	7.8	Recommendation for next benchmark	276
	7.9	Management considerations	277
	7.10	References	277
8		Haddock in Divisions 7.b,c,e-k	309
		Type of assessment in 2021	309
		ICES advice applicable to 2022	309
	8.1	General.....	309
		Stock description and management units	309
		2022 management (Council Regulation (EU) 2022/109).....	310
	8.2	The fishery	310
	8.2.1	Information from the industry.....	311
	8.3	Data.....	311
	8.3.1	Landings and discard numbers-at-age	311
	8.3.2	Biological.....	311
	8.3.3	Surveys and commercial tuning fleets	311
	8.4	Historical stock development	311
	8.4.1	Data screening	312
	8.4.2	Final update assessment.....	312
	8.4.3	State of the stock	312
	8.5	Short-term projections	312
	8.6	MSY evaluations and biological reference points	313
	8.7	Management plans	313
	8.8	Uncertainties and bias in assessment and forecast	313
	8.8.1	Landings	313
	8.8.2	Discards.....	314
	8.8.3	Assessment bias	314
	8.9	Forecast.....	314
	8.10	Recommendation for next benchmark.....	315
	8.10.1	Stock audit	315
	8.10.2	Recommendations for future work	315
	8.11	Management considerations	315
	8.12	References	315
9		Haddock (<i>Melanogrammus aeglefinus</i>) in Division 7.a (Irish Sea)	343
	9.1	General.....	343
	9.2	Data.....	345
	9.3	Assessment	348
	9.4	Short-term projections	351
	9.5	Biological reference points	351
	9.6	Management plans	352
	9.7	Uncertainties and bias in assessment and forecast	352
	9.8	Recommendations for next benchmark assessment	353
	9.9	References	353
10		Megrim (<i>Lepidorhombus</i> ssp.) in divisions 4.a and 6.a (northern North Sea, West of Scotland).....	379
		Type of assessment in 2022	379
		ICES advice applicable to 2023	379
	10.1	General.....	379
		Stock description and management units	379
		Fishery in 2021	381
		Landings.....	381
		Discards	381

	Catch.....	381
	Surveys	381
	10.2 Estimation of survey cpue indices.....	382
	Cpue trends of survey data	382
	10.3 Stock assessment	382
	2022 Final run.....	383
	Comparison with previous assessments	383
	State of the stock.....	383
	10.4 Short-term projections	383
	10.5 Biological reference points	384
	Precautionary approach reference points.....	384
	MSY reference points	384
	Uncertainties and bias in assessment and forecast	384
	Recommendation for next benchmark	385
	Management considerations.....	385
	10.6 References	385
11	Megrim (<i>Lepidorhombus</i> spp.) in Division 6.b (Rockall)	412
	Type of assessment in 2022	412
	ICES advice applicable to 2023	412
	General	412
	Stock description and management units	412
	Fishery in 2021	413
	Landings.....	413
	Discards	414
	Surveys	414
	Historical stock development	414
	Final Assessment	414
	State of the stock.....	415
	Short-term projections	415
	MSY reference points	415
	Uncertainties and bias in assessment and forecast	415
	Recommendation for next Benchmark	417
	Management considerations.....	417
	References	417
12	Norway lobster (<i>Nephrops norvegicus</i>) in Division 6.a, Functional Unit 11 (West of Scotland, North Minch)	426
	Type of assessment in 2022	426
	ICES advice applicable to 2021	426
	ICES advice applicable to 2022	426
	12.1 General.....	427
	Stock description and management units	427
	Management applicable to 2021 and 2022.....	427
	Ecosystem aspects.....	427
	Fishery description	427
	12.2 Data available	428
	InterCatch	428
	Commercial catch	428
	Effort data	429
	Sampling levels	429
	Length compositions	429
	Sex ratio.....	429
	Mean weights	430
	Discarding	430

	Abundance indices from UWTV surveys	430
	12.3 Assessment	431
	Comparison with previous assessments	431
	State of the stock.....	431
	12.4 Catch option table.....	431
	12.5 Reference points.....	432
	12.6 Management strategies	432
	12.7 Quality of assessment and forecast	433
	12.8 Recommendation for next benchmark	434
	12.9 Management considerations	434
	12.10 References	434
13	Norway lobster (<i>Nephrops norvegicus</i>) in Division 6.a, Functional Unit 12 (West of Scotland, South Minch)	458
	Type of assessment in 2022	458
	ICES advice applicable to 2021	458
	ICES advice applicable to 2022	458
	13.1 General.....	458
	Stock description	458
	Management applicable to 2021 and 2022.....	458
	Ecosystem aspects.....	459
	Fishery description	459
	13.2 Data available	459
	InterCatch	459
	Commercial catch.....	460
	Effort data	460
	Sampling levels	460
	Length compositions	460
	Sex ratio.....	460
	Mean weights.....	461
	Discarding	461
	Abundance indices from UWTV surveys	461
	13.3 Assessment	462
	Comparison with previous assessments	462
	State of the stock.....	462
	13.4 Catch scenarios table.....	463
	13.5 Reference points.....	463
	13.6 Management strategies	464
	13.7 Quality of assessment and forecast	464
	13.8 Recommendation for next benchmark	465
	13.9 Management considerations	465
	13.10 References	466
14	Norway lobster (<i>Nephrops norvegicus</i>) in Division 6.a, Functional Unit 13 (West of Scotland, the Firth of Clyde and Sound of Jura)	480
	Type of assessment in 2022	480
	ICES advice applicable to 2021	480
	ICES advice applicable to 2022	480
	14.1 General.....	480
	Stock description	480
	Management applicable to 2021 and 2022.....	481
	Ecosystem aspects.....	481
	Fishery description	481
	14.2 Data available	481
	InterCatch	481

	Commercial catch	482
	Effort data	482
	Sampling levels	483
	Length compositions	483
	Sex ratio	483
	Mean weights	483
	Discarding	484
	Abundance indices from UWTV surveys	484
	14.3 Assessment	485
	Comparison with previous assessments	485
	State of the stock	485
	14.4 Catch option table	485
	14.5 Reference points	486
	14.6 Management strategies	487
	14.7 Quality of assessment and forecast	487
	14.8 Recommendation for next benchmark	488
	14.9 Management considerations	488
	14.10 References	489
15	<i>Nephrops</i> in Division 7.a (Irish Sea East, FU14)	508
	15.1 <i>Nephrops</i> Subarea 7 general section	508
	Stock description and management units	508
	Landings Obligation	509
	Management applicable in 2021 and 2022	509
	Landings area 7	511
	<i>Nephrops</i> FU14 section	515
	ICES advice published 29 October 2021	515
	15.2 General	515
	Stock description and management units	515
	Fishery in 2021	516
	Information from stakeholders	517
	15.3 Data	517
	InterCatch	517
	Landings	517
	Effort	517
	Sampling Levels	518
	Commercial length–frequency distributions	518
	Length composition	518
	Sex ratio	518
	Mean weight explorations	519
	Discarding	519
	Abundance indices from UWTV surveys	519
	15.4 Assessment	520
	Comparison with previous assessments	520
	State of the stock	520
	15.5 Catch scenarios table	521
	15.6 Reference points	521
	15.7 Management strategies	522
	15.8 Quality of assessment and forecast	522
	15.9 Recommendation for next benchmark	523
	15.10 Management considerations	523
	15.11 References	524
16	Norway lobster (<i>Nephrops norvegicus</i>) in Division 7.a, Functional Unit 15 (Irish Sea, West)	542
	Type of assessment	542

	ICES advice applicable to 2022	542
	16.1 General.....	542
	Stock description and management units	542
	Fishery description	542
	The fishery in 2021	542
	Information from stakeholders	543
	16.2 Data.....	543
	InterCatch	543
	Landings.....	543
	Effort.....	543
	Sampling levels	544
	Commercial length–frequency distributions	544
	Sex ratio.....	544
	Mean weights	544
	Discards	544
	Surveys	545
	Abundance indices from UWTV surveys	545
	<i>Nephrops</i> trawl surveys	545
	16.3 Assessment	546
	Comparison with previous assessments	546
	State of the stock.....	546
	16.4 Catch option table.....	546
	16.5 Reference points.....	547
	16.6 Management strategy.....	547
	16.7 Quality of assessment and forecast	547
	16.8 Recommendations for next benchmark	548
	16.9 Management considerations	548
	16.10 References	549
17	Norway lobster (<i>Nephrops norvegicus</i>) in divisions 7.b–c and 7.j–Km Functional Unit 16 (west and southwest of Ireland).....	569
	Type of assessment in 2022	569
	ICES advice applicable to 2021	569
	ICES advice applicable to 2022	569
	17.1 General.....	569
	Stock description and management units	569
	Management applicable to 2021 and 2022.....	570
	TAC in 2021.....	570
	TAC in 2022.....	571
	17.2 Closed area restrictions	571
	17.3 Fishery in 2021	571
	Effect of regulations	572
	Information from stakeholders	572
	17.4 Data.....	573
	InterCatch	573
	Landings.....	573
	Sampling levels	573
	Commercial length–frequency distributions	573
	Sex ratio.....	573
	Mean weight explorations.....	574
	Discards	574
	Abundance indices from UWTV surveys	574
	Trawl surveys.....	574
	Commercial cpue.....	575

	17.5	Stock assessment	575
		Comparison with previous assessments	575
		State of the stock	575
		Catch options table	576
	17.6	Reference points	576
	17.7	Management strategies	576
	17.8	Quality of assessment and forecast	576
	17.9	Recommendation for next benchmark	577
	17.10	Management considerations	577
	17.11	References	578
18		Norway lobster (<i>Nephrops norvegicus</i>) in Division 7.b, Functional Unit 17 (west of Ireland, Aran grounds)	596
		Type of assessment in 2022	596
		ICES advice applicable to 2021	596
		ICES advice applicable to 2022	596
	18.1	General	596
		Stock description and management units	596
		Ecosystem aspects	597
		Fishery description	597
		Fishery in 2021	597
		Information from stakeholders	597
	18.2	Data	598
		InterCatch	598
		Landings	598
		Effort	598
		Sampling levels	598
		Commercial length–frequency distributions	598
		Sex ratio	598
		Mean weight explorations	598
		Discarding	599
		Abundance indices from UWTV surveys	599
	18.3	Assessment	599
		Comparison with previous assessments	599
		State of the stock	600
	18.4	Catch scenario table	600
	18.5	Reference points	600
	18.6	Management strategies	601
	18.7	Quality of assessment and forecast	601
	18.8	Recommendation for next benchmark	601
	18.9	Management considerations	602
	18.10	References	602
19		Norway lobster (<i>Nephrops norvegicus</i>) in divisions 7.a, 7.g and 7.j, Functional Unit 19 (Irish Sea, Celtic Sea, eastern part of southwest of Ireland)	625
		Type of assessment in 2022	625
		ICES advice applicable to 2021	625
		ICES advice applicable to 2022	625
	19.1	General	625
		Stock description and management units	625
		Ecosystem aspects	626
		Fishery description	626
		Fishery in 2021	626
		Information from stakeholders	626
	19.2	Data	626

	InterCatch	626
	Landings.....	627
	Effort.....	627
	Sampling levels	627
	Commercial length–frequency distributions	628
	Sex ratio.....	628
	Mean weight explorations.....	628
	Discarding.....	628
	Abundance indices from UWTV surveys	629
	Information from Irish Groundfish survey.....	629
	19.3 Assessment	630
	Comparison with previous assessments	630
	State of the stock.....	630
	19.4 Catch scenario table.....	630
	19.5 Reference points.....	630
	19.6 Management strategies	632
	19.7 Quality of assessment and forecast	632
	19.8 Recommendations for next benchmark	633
	19.9 Management considerations	633
	19.10 References	633
20	Norway lobster (<i>Nephrops norvegicus</i>) in divisions 7.g and 7.h, Functional Units 20 and 21 (Celtic Sea)	657
	Type of assessment in 2022	657
	ICES advice applicable to 2021	657
	ICES advice applicable to 2022	657
	20.1 General.....	657
	Stock description and management units	657
	Ecosystem aspects.....	658
	Fishery description	658
	Fishery in 2021	659
	Ireland	659
	France	659
	UK	659
	Information from stakeholders	659
	20.2 Data.....	659
	InterCatch	659
	Landings.....	659
	Effort.....	659
	Sampling levels	660
	Commercial length–frequency distributions	660
	Sex ratio.....	661
	Mean weight explorations.....	661
	Discards	661
	Abundance indices from UWTV surveys	662
	Groundfish survey data	662
	20.3 Assessment	662
	Comparison with previous assessments	662
	State of the stock.....	663
	20.4 Catch scenario table.....	663
	20.5 Reference points.....	663
	20.6 Management plans	664
	20.7 Quality of assessment and forecast	664
	20.8 Recommendations for next benchmark	666

	20.9	Management considerations	666
	20.10	References	666
21		Norway lobster (<i>Nephrops norvegicus</i>) in divisions 7.g and 7.f, Functional Unit 22 (Celtic Sea, Bristol Channel).....	692
		Type of assessment in 2022	692
		ICES advice applicable to 2021	692
		ICES advice applicable to 2022	692
	21.1	General.....	692
		Stock description and management units	692
		Ecosystem aspects.....	693
		Fishery description	693
		Fishery in 2021	693
		Information from stakeholders	694
	21.2	Data.....	694
		InterCatch	694
		Landings.....	694
		Effort.....	694
		Sampling levels	694
		Sampling and Raising Procedure Review.....	694
		Commercial length–frequency distributions	695
		Sex ratio.....	695
		Mean weight explorations.....	695
		Discarding	695
		Surveys	696
		Abundance indices from UWTV surveys	696
		Groundfish survey data	696
	21.3	Assessment	697
		Comparison with previous assessments	697
		State of the stock.....	697
	21.4	Catch scenarios table	697
	21.5	Reference points.....	698
	21.6	Management strategies	698
	21.7	Quality of assessment and forecast	698
	21.8	Recommendation for next benchmark.....	699
	21.9	Management considerations	699
	21.10	References	700
22		Norway lobster (<i>Nephrops norvegicus</i>) in divisions 8.a and 8.b, Functional Units 23-24 (northern and central Bay of Biscay)	0
		Norway lobster (<i>Nephrops norvegicus</i>) in Division 9.a, Functional Unit 30 (Atlantic Iberian waters East and Gulf of Cadiz)	0
23		Plaice (<i>Pleuronectes platessa</i>) in divisions 7.b–c (West of Ireland).....	722
	23.1	General.....	722
24		Plaice in Division 27.7.a (Irish Sea)	726
		Type of assessment in 2022	726
		ICES advice applicable to 2021	726
		ICES advice applicable to 2022	726
	24.1	General.....	726
		Stock description and management units	726
		Management applicable in 2021 and 2022	726
		2021.....	727
		2022.....	727
		The fishery in 2021	727
	24.2	Data.....	728

	Landings.....	728
	Discards	728
	Biological	729
	Surveys	729
	24.3 Historical stock development	731
	Model options chosen	731
	Input data types and characteristics	731
	Final update assessment	731
	Comparison with previous assessments	733
	State of the stock.....	733
	24.4 Short-term projections	733
	24.5 Medium-term projections.....	734
	24.6 MSY explorations	734
	Yield per Recruit analysis.....	735
	24.7 Management plans	735
	24.8 Uncertainties and bias in assessment and forecast	735
	24.9 Recommendations for next benchmark	736
	24.10 Management considerations	737
	24.11 References	737
25	Plaice (<i>Pleuronectes platessa</i>) in Division 7.e (western English Channel	766
	Type of assessment in 2021	766
	ICES advice applicable to 2022	766
	25.1 Impact of the COVID-19 pandemic	766
	25.2 ICES Transparent Assessment Framework.....	766
	25.3 General.....	766
	25.3.1 Stock description and management units	766
	25.3.2 Management applicable to 2021 and 2022	767
	25.3.3 Landing obligation.....	768
	25.4 Data.....	768
	25.4.1 InterCatch	768
	25.4.2 Landings	769
	25.4.3 Discards.....	769
	25.4.4 Sampling	769
	25.4.5 Revisions	770
	25.4.6 Biological.....	770
	25.4.7 Surveys.....	770
	25.4.7.1 UK Fisheries Science Partnership	770
	25.4.7.2 Q1SWBeam	771
	25.4.7.3 Commercial fleet effort and LPUE	771
	25.5 ICES advice considerations.....	771
	25.6 Choice of method for providing advice.....	771
	25.6.1 von Bertalanffy growth parameters	772
	25.7 Application of the rfb rule.....	772
	25.7.1 Component Ay.....	773
	25.7.2 Component r.....	773
	25.7.3 Component f.....	773
	25.7.4 Component b	774
	25.7.5 Component m	774
	25.7.6 Combining the rfb rule's components	774
	25.8 Legacy XSA assessment.....	775
	25.9 Exploratory SAM assessment.....	775
	25.10 Management plans	775
	25.11 Uncertainties.....	776

	25.12	Recommendations for the next benchmark	776
	25.13	Management considerations	777
	25.14	Stock assessment audit	777
	25.15	References	778
	25.16	Tables	780
	25.17	Figures	789
26		Plaice in Divisions 7.f–g (Celtic Sea)	807
	26.1	Type of assessment in 2022	807
		ICES advice applicable to 2021	807
		General stock description and management units	807
		Management applicable to 2021	807
		TACs and quotas set for 2021 (source COUNCIL REGULATION (EU) No 1239/2021)	807
		TACs and quotas set for 2022 (source COUNCIL REGULATION (EU) No 109/2022)	808
		Fishery in 2021	808
	26.2	Data	808
		Landings	808
		Discards	808
		Biological information	809
		Landings weight-at-age	809
		Discard weight-at-age	809
		Stock weight-at-age	809
		Natural mortality and maturity	809
		Surveys	809
		Commercial landings per unit of effort	810
		Other relevant data	810
	26.3	Stock assessment	810
		Assessment model	810
		State of the stock	814
	26.4	Short-term projections	814
	26.5	Precautionary approach reference points	814
	26.6	Management plans	815
	26.7	Uncertainties in assessment and forecast	815
	26.8	References	815
27		Plaice (<i>Pleuronectes platessa</i>) in divisions 7h–k (Celtic Sea South, southwest of Ireland)	848
		Type of assessment in 2022	848
		ICES advice applicable to 2023 and 2024	848
	27.1	Impact of the COVID-19 pandemic	848
	27.2	General	848
	27.2.1	Stock description and management units	848
	27.2.2	Landings obligation	849
	27.2.3	Management applicable to 2022 and 2021	850
	27.3	Data	850
	27.3.1	Commercial catch data	850
	27.3.2	Revisions	851
	27.3.3	Survey indices	851
	27.3.4	Biological	852
	27.4	Advice	852
	27.4.1	Analyses of stock trends and potential status indicators	852
	27.4.2	State of the stock	853
	27.4.3	Biological reference points	853
	27.5	Recommendations for the next benchmark	854
	27.6	References	854
28		Pollack in the Celtic Seas (ICES subareas 6 and 7)	874

	Type of assessment in 2022	874
	ICES advice applicable to 2023	874
	28.1 General.....	874
	Stock Identity.....	874
	Management applicable to 2022.....	874
	Fishery in 2021	874
	Landings.....	874
	Landings by division.....	875
	Landings by gear.....	875
	Landings by quarter	875
	Discards	875
	Landings uncertainty	875
	28.2 Stock assessment	875
	2022 Results	876
	Comparison with previous assessment	876
	Uncertainties in assessment and forecast.....	876
	Management considerations.....	876
	Management plan	876
	Recommendations.....	876
	28.3 References	877
29	Seabass (<i>Dicentrarchus labrax</i>) in divisions 4.b–c, 7.a, and 7.d–h (central and southern North Sea, Irish Sea, English Channel, Bristol Channel, and Celtic Sea)	889
	Type of assessment	889
	29.1 General.....	889
	29.1.1 Stock definition and ecosystem aspects	889
	29.1.2 Management.....	890
	29.1.2.1 Management applicable from 2020 to 2022	890
	29.1.3 Fishery description	891
	29.1.3.1 Total landings (official).....	891
	29.2 Data.....	891
	29.2.1 Commercial landings.....	891
	29.2.2 Commercial length and age compositions	892
	29.2.2.1 Sampling rates	892
	29.2.2.2 Length composition estimates.....	892
	29.2.2.3 Age composition estimates.....	892
	29.2.3 Commercial discards	893
	29.2.3.1 Discards and post-release mortality	893
	29.2.3.2 Commercial discards data	893
	29.2.4 Recreational catches	894
	29.2.4.1 Recreational catches point estimates	894
	29.2.4.2 Recreational removals time-series reconstruction	894
	29.2.5 Biological data	894
	29.2.6 Survey data used in assessment	894
	29.2.6.1 Pre-recruit surveys in UK	894
	29.2.6.2 Pre-recruit surveys in France	894
	29.2.6.3 Channel Groundfish survey FR-CGFS	895
	29.2.7 Commercial landings per unit of effort.....	895
	29.2.8 Other relevant data	895
	29.3 Stock assessment	895
	29.3.1 Model structure and input data / parameters for update assessment	895
	29.3.1.1 Model structure	895
	29.3.1.2 Fleet definition	895
	29.3.1.3 Landings and discards	896

	29.3.1.4 Abundance indices and compositional data	896
	29.3.1.5 Fishery landings age composition data	896
	29.3.1.6 Fishery landings length composition data	896
	29.3.1.7 Model assumptions and parameters	896
	29.3.1.8 Incorporation of recreational fishery catch estimates.....	896
	29.3.1.9 Final update assessment: diagnostics	896
	29.3.2 Analytical retrospective analyses.....	897
	29.3.3 Final update assessment: long-term trends	898
	29.3.4 Comparison with previous assessments	898
	29.3.5 The state of the stock	898
	29.4 Biological reference points	899
	29.5 Short-term predictions	900
	29.5.1 Recruiting year-class strength.....	900
	29.5.2 Numbers of fish in 2022.....	900
	29.5.3 F-at-age vectors	901
	29.5.4 Weights-at-age.....	901
	29.5.5 Maturity ogive.....	901
	29.5.6 Detailed short-term forecast output at <i>status quo</i> F.....	901
	29.5.7 Management options.....	901
	29.6 Uncertainties and bias in assessment and forecast	902
	29.6.1 Landings and discards data	902
	29.6.2 Fishery composition data.....	902
	29.6.3 Recreational fishery harvests.....	903
	29.6.4 Surveys.....	903
	29.6.5 Commercial LPUE indices.....	904
	29.6.6 Stock structure and migrations.....	904
	29.6.7 Biological parameters	904
	29.6.8 Intermediate year fishing mortality and catch levels for forecasts	905
	29.7 Recommendations	905
	29.7.1 Management considerations	905
	29.8 References	907
30	Sole (<i>Solea solea</i>) in divisions 7.b and 7.c (West of Ireland)	972
	30.1 General.....	972
	30.1.1 Stock identity	972
	30.1.2 Data.....	972
	30.1.3 Historical stock development	972
31	Sole (<i>Solea solea</i>) in Division 7.a (Irish Sea).....	976
	Type of assessment in 2022	976
	ICES advice applicable to 2022	976
	Comments made by the audit of last year's assessment	976
	31.1 General.....	976
	Stock description and management units.....	976
	Management applicable to 2021 and 2022.....	977
	Fishery in 2021	977
	31.2 Data.....	978
	Landings.....	978
	Discards	978
	Biological	978
	Surveys	979
	Commercial LPUE	979
	Historical Stock Development	980
	31.3 Stock assessment	981
	Data screening.....	981

	Final Update Assessment	981
	Comparison with previous assessments	982
	State of the stock.....	982
	31.4 Short-term projections	983
	Estimating year-class abundance	983
	Forecast assumptions.....	983
	MSY forecast.....	983
	Additional options	984
	31.5 Biological reference points	984
	31.6 Management plans	984
	31.7 Uncertainties and bias in assessment and forecast	984
	Sampling	984
	Landings.....	985
	Discards	985
	Effort.....	985
	Surveys	985
	Model formulation	985
	31.8 Recommendations for next Benchmark	986
	31.9 Management considerations	986
	31.10 Ecosystem considerations.....	987
	31.11 References	987
32	Sole (<i>Solea solea</i>) in Division 7.e (western English Channel).....	1037
	Type of assessment in 2021	1037
	ICES advice applicable to 2022	1037
	32.1 Impact of the COVID-19 pandemic	1037
	32.2 ICES Transparent Assessment Framework.....	1037
	32.3 General.....	1037
	Stock description and management units	1037
	The TAC and the national quotas by country for 2021.....	1038
	The TAC and the national quotas by country for 2022.....	1038
	Landing obligation	1038
	32.4 Data.....	1039
	InterCatch	1039
	Landings.....	1039
	Discards	1039
	Revisions.....	1040
	Biological data	1040
	Survey indices	1040
	The UK-FSP survey	1040
	The Q1SWBeam survey	1041
	Commercial fleets effort and Ipue.....	1041
	32.5 Stock assessment	1041
	Data screening.....	1042
	Final update assessment	1042
	Consistency of the stock assessment	1044
	State of the stock.....	1044
	32.6 Short-term projections	1045
	Forecast assumptions	1045
	MSY forecast.....	1046
	Additional options	1046
	32.7 Biological reference points	1046
	32.8 Management plan.....	1047
	32.9 Uncertainties in assessment and forecast	1048

	Discarding.....	1048
	Surveys	1048
	Sampling.....	1048
	Consistency.....	1048
	32.10 Recommendation for the next benchmark.....	1048
	32.11 Management considerations	1049
	32.12 Ecosystem considerations and changes in the environment.....	1049
	32.13 Regulations and their effects	1049
	32.14 References	1049
	32.15 Tables.....	1051
	32.16 Figures.....	1090
33	Sole (<i>Solea solea</i>) in Division 7.f and 7.g (Bristol Channel, Celtic Sea)	1111
	Type of assessment in 2022	1111
	ICES advice applicable to 2022	1111
	Comments made by the audit of last year's assessment	1111
	33.1 General.....	1111
	Management applicable to 2021 and 2022.....	1112
	Fishery in 2021	1112
	33.2 Data.....	1113
	Age-compositions and weights-at-age	1113
	Length-compositions	1114
	Biological	1114
	Surveys	1114
	Commercial LPUE	1115
	Tuning series.....	1115
	Other relevant data	1116
	33.3 Stock assessment	1116
	Historical stock development	1116
	This year's assessment	1118
	Comparison with previous assessments	1118
	State of the stock.....	1119
	33.4 Short-term projections	1119
	Estimating year-class abundance	1119
	Forecast assumptions	1119
	MSY forecast.....	1120
	Additional options	1120
	33.5 Biological reference points	1120
	33.6 Management plans	1121
	33.7 Uncertainties and bias in assessment and forecast.....	1121
	Sampling.....	1121
	Discards	1121
	Misreporting.....	1121
	Surveys	1121
	33.8 Recommendations for next Benchmark	1121
	33.9 Management considerations	1123
	33.10 Ecosystem considerations.....	1123
	33.11 References	1123
34	Sole (<i>Solea solea</i>) in divisions 7.h–k (Celtic Sea South, southwest of Ireland)	1165
	Type of assessment in 2022	1165
	ICES advice applicable to 2021	1165
	34.1 General.....	1165
	Stock identity.....	1165
	Management applicable to 2022.....	1166

	Landings obligation.....	1166
	34.2 Data.....	1167
	34.2.1 Landings and discards	1167
	34.3 Historical stock development	1167
	34.4 References	1167
35	Whiting (<i>Merlangius merlangus</i>) in Division 6.a (West of Scotland).....	1171
	Type of assessment in 2022	1171
	ICES advice applicable to 2022	1171
	ICES advice applicable to 2021	1171
	35.1 General.....	1171
	Stock description	1171
	Management applicable to 2021 and 2022.....	1171
	TAC for 2022	1172
	TAC for 2021	1172
	TAC for 2020	1172
	Fishery in 2021	1172
	35.2 Data.....	1173
	Landings.....	1173
	Discards	1174
	Biological	1174
	Surveys	1175
	Commercial cpue.....	1176
	35.3 Stock assessment	1176
	Data screening.....	1177
	Final assessment.....	1177
	Comparison with last year's assessment.....	1179
	SURBAR analysis	1180
	State of the stock.....	1180
	35.4 Short-term projections	1180
	35.5 MSY and biological reference points	1182
	35.6 Management plans	1182
	35.7 Uncertainties and bias in the assessment and forecast.....	1182
	35.8 Recommendation for next benchmark.....	1183
	35.9 Management considerations	1183
	35.10 References	1184
36	Whiting (<i>Merlangius merlangus</i>) in Division 6.b (Rockall)	1244
	36.1 General.....	1244
	Management applicable to 2021 and 2022.....	1244
	36.2 Data.....	1245
	36.3 Target category	1246
	36.4 Management considerations	1246
37	Whiting in 7.a (Irish Sea).....	1250
	2020 Assessment and advice.....	1250
	Type of assessment	1250
	ICES advice applicable to 2022 and 2023	1250
	37.1 General.....	1250
	Stock description and management units	1250
	Management applicable to 2022 and 2023.....	1251
	TAC 2021	1252
	TAC 2022	1252
	Fishery in 2021	1252
	37.2 Information from the Industry.....	1253
	37.3 Data.....	1253

	Fishery landings	1253
	Fishery discards	1253
	Landings-at-age data	1254
	Discards numbers-at-age data.....	1254
	Biological data	1254
	Survey data used in assessment.....	1255
	37.4 Historical Stock Development.....	1255
	Data screening.....	1255
	Final update assessment	1255
	The state of the stock	1256
	37.5 Short-term predictions	1256
	37.6 Medium-term projection	1257
	37.7 MSY evaluations and Biological Reference Points	1257
	37.8 Management plans	1258
	37.9 Uncertainties and bias in assessment and forecast	1258
	37.10 Recommendations for next benchmark assessment.....	1259
	Assessment method	1259
	Biological parameters.....	1259
	Discards	1259
	Life-history parameters	1259
	Other issues.....	1259
	Sampling.....	1259
	Tuning series.....	1259
	37.11 Management considerations	1260
	37.12 References	1260
	37.13 Tables.....	1260
	37.14 Figures.....	1301
38	Whiting (<i>Merlangius merlangus</i>) in divisions 7.b–c and 7.e–k (southern Celtic Seas and eastern English Channel)	1308
	38.1 General.....	1308
	Landings obligation.....	1309
	38.2 The fishery in 2021.....	1309
	38.3 Data.....	1310
	38.4 Historical stock development	1312
	38.5 Short-term projections	1313
	38.6 MSY evaluations and Biological reference points	1314
	38.7 Management plans	1315
	38.8 Uncertainties and bias in assessment and forecast	1315
	38.9 Recommendation for next benchmark	1316
	38.10 Management considerations	1316
	38.11 References	1317
	38.12 Tables.....	1318
	38.13 Figures.....	1335
Annex 1:	List of participants.....	1346
Annex 2:	Stock Annexes	1348
Annex 3:	Working documents.....	1351
Annex 4:	Audits	1375
	Audit of Cod (<i>Gadus morhus</i>) in Division 6.a (West of Scotland)	1375
	General	1375
	General comments	1375
	Technical comments	1375
	Conclusions.....	1375
	Audit of Cod (<i>Gadus morhua</i>) in Division 7.a (Irish Sea)	1376

General	1376
General comments	1376
Technical comments	1376
Conclusions.....	1376
Audit of Cod (<i>Gadus morhua</i>) in divisions 7.e–k (eastern English Channel and southern Celtic Seas)	1377
General	1377
General comments	1377
Technical comments.....	1377
Conclusions.....	1377
Audit of Haddock (<i>Melanogrammus aeglefinus</i>) in Division 7.a (Irish Sea)	1378
General	1378
General comments	1378
Technical comments.....	1378
Conclusions.....	1378
Audit of Haddock (<i>Melanogrammus aeglefinus</i>) in divisions 7.b–k (southern Celtic Seas and English Channel)	1380
General	1380
General comments	1380
Technical comments.....	1380
Conclusions.....	1380
Audit of Megrim (<i>Lepidorhombus</i> spp.) in divisions 4.a and 6.a (northern North Sea, West of Scotland)	1382
General	1382
General comments	1382
Technical comments.....	1382
Conclusions.....	1383
Audit of Plaice (<i>Pleuronectes platessa</i>) in Division 7.a (Irish Sea)	1384
General	1384
General comments	1384
Technical comments.....	1384
Conclusions.....	1384
Audit of Plaice (<i>Pleuronectes platessa</i>) in Division 7.e (western English Channel)	1385
General	1385
General comments	1385
Technical comments	1385
Conclusions.....	1385
Audit of Plaice (<i>Pleuronectes platessa</i>) in divisions 7.f and 7.g (Bristol Channel, Celtic Sea)	1386
General	1386
General comments	1386
Technical comments.....	1386
Conclusions.....	1386
Audit of Plaice (<i>Pleuronectes platessa</i>) in divisions 7.h–k (Celtic Sea South, southwest of Ireland)	1387
General	1387
General comments	1387
Technical comments	1387
Conclusions.....	1388
Audit of Pollack (<i>Pollachius pollachius</i>) in subareas 6–7 (Celtic Seas and the English Channel)	1389
General	1389
General comments	1389

Technical comments.....	1389
Conclusions.....	1389
Audit of Sole (<i>Solea solea</i>) in Division 7.a (Irish Sea).....	1390
General	1390
General comments	1390
Technical comments.....	1390
Conclusions.....	1390
Audit of Sole (<i>Solea solea</i>) in divisions 7.b and 7.c (West of Ireland)	1391
Audit of Sole (<i>Solea solea</i>) in Division 7.e (western English Channel).....	1392
General	1392
General comments	1392
Technical comments.....	1392
Conclusions.....	1392
Audit of Sole (<i>Solea solea</i>) in divisions 7.f and 7.g (Bristol Channel, Celtic Sea)	1393
General	1393
General comments	1393
Technical comments.....	1393
Conclusions.....	1393
Audit of Sole (<i>Solea solea</i>) in divisions 7.h–k (Celtic Sea South, southwest of Ireland)	1394
General	1394
General comments	1394
Technical comments.....	1394
Conclusions.....	1394
Audit of Whiting (<i>Merlangius merlangus</i>) in Division 6.a (West of Scotland).....	1395
General	1395
General comments	1395
Technical comments.....	1395
Conclusions.....	1395
Audit of Whiting (<i>Merlangius merlangus</i>) in divisions 7.b–c and 7.e–k (southern Celtic Seas and eastern English Channel)	1396
General	1396
General comments	1396
Technical comments.....	1396
Conclusions.....	1397
Annex 5: Technical Minutes of the Stony Brook University Review Group for the Advice Drafting Group for Biology and Assessment of the Celtic Sea Fisheries Resources...	1398

i Executive summary

The Working Group for the Celtic Seas Ecoregion (WGCSE) performs stock assessments on demersal stocks in Rockall, West of Scotland, Irish Sea, West of Ireland, Western English Channel, Bristol Channel, Celtic Sea and Southwest of Ireland. The working group provides updated fisheries data and reviews for ten *Nephrops* stocks, four sole and plaice stocks, three cod and whiting stocks, three haddock stocks, two megrim, one seabass, one anglerfish and one pollack stock. For most of the stocks, advice is drafted in May for June release. Advice for *Nephrops*, anglerfish and Rockall megrim are not issued until autumn to take account of the 2021 survey information.

For a number of stocks (bss.27.6a7bj, cod.27.6b, ple.27.7bc, sol.27.7bc, whg.27.7a, nop.27.6a, whg.27.6b, nep.27.6aoutFU, nep.27.7outFU) no new advice was provided this year.

Two stocks have gone through a benchmark procedure in the past year; cod.27.7a, ple.27.7f-g. the results of which were presented to the group. Analytical assessments using age-structured models were conducted for 12 of the fish stocks. Surplus-production models, without age or length structure, were used to assess lez.27.4a6a and lez.27.6b, and a Depletion-Corrected Average Catch model to assess pol.27.67.

In 2022 the state of the five fish stocks for which no analytical assessment could be performed were inferred from application of Data-Limited Methods, using survey or biomass indices as indicators of stock development along with indications of stock status inferred from length indicators.

UWTV survey-based assessments were conducted for ten *Nephrops* stocks. Overall the stock status across the ecoregion show a decline in abundance to last year, with a reduction of *circa* 8 800 tonnes in finfish advice (mostly owing to reduction in Celtic sea haddock [had.27.7.b-k]; down 4,045 tonnes, and Celtic sea whiting [whg.27.7.b,c,e-k]; down 2737 tonnes), in the order of a 14% reduction on 2021 advice. Of the 22 assessed fish stocks, five stocks were fished above F_{MSY} , ten below and seven stocks had unknown status relative to F_{MSY} ; 8 were above $MSY B_{lim}$, and seven below B_{lim} , with the status of seven unknown.

Of the eleven *Nephrops* stocks, catch advice saw an increase of *circa* 2 800 tonnes on 2021 advice (approximately 8%), with a range of Functional Unit increases and decreases.

ii Expert group information

Expert group name	Working Group for the Celtic Seas Ecoregion (WGCSE)
Expert group cycle	Annual
Year cycle started	2022
Reporting year in cycle	1/1
Chairs	Matt Lundy, United Kingdom
	Jonathan White, Ireland
Meeting venues and dates	4–13 May 2022, Online meeting, 29 participants
	13–15 September 2022, Online meeting, 15 participants

1 Introduction

The Introductory section will be completed in autumn when the WGCSE 2021 report is finalised.

1.1 Terms of reference

1.1.1 Generic ToRs for Regional and Species Working Groups

2021/2/FRSG01 The following ToRs apply to: AFWG, HAWG, NWWG, NIPAG, WGWIDE, WGBAST, WGBFAS, WGNSSK, WGCSE, WGDEEP, WGBIE, WGEEL, WGEF, WGHANSA and WGNAS.

The working group should focus on:

- a) Consider and comment on Ecosystem and Fisheries overviews where available;
- b) For the aim of providing input for the Fisheries Overviews, consider and comment on the following for the fisheries relevant to the working group:
 - i) descriptions of ecosystem impacts on fisheries;
 - ii) descriptions of developments and recent changes to the fisheries;
 - iii) mixed fisheries considerations; and
 - iv) emerging issues of relevance for management of the fisheries;
- c) Conduct an assessment on the stock(s) to be addressed in 2022 using the method (assessment, forecast or trends indicators) as described in the stock annex; - complete and document an audit of the calculations and results; and produce a **brief** report of the work carried out regarding the stock, providing summaries of the following where relevant:
 - i) Input data and examination of data quality; in the event of missing or inconsistent survey or catch information refer to the ACOM document for dealing with COVID-19 pandemic disruption and the linked template that formulates how deviations from the stock annex are to be [reported](#).
 - ii) Where misreporting of catches is significant, provide qualitative and where possible quantitative information and describe the methods used to obtain the information.
 - iii) For relevant stocks (i.e. all stocks with catches in the NEAFC Regulatory Area), estimate the percentage of the total catch that has been taken in the NEAFC Regulatory Area in 2021.
 - iv) For category 3 and 4 stocks requiring new advice in 2022, implement the methods recommended by WKLIFE X (e.g. SPiCT, rfb, chr, rb rules) to replace the former 2 over 3 advice rule (2 over 5 for elasmobranchs). MSY reference points or proxies for the category 3 and 4 stocks.
 - v) Evaluate spawning-stock biomass, total stock biomass, fishing mortality, catches (projected landings and discards) using the method described in the stock annex;
 1. for category 1 and 2 stocks, in addition to the other relevant model diagnostics, the recommendations and decision tree formulated by WKFORBIAS

(see Annex 2 of https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2020/WKFORBIAS_2019.pdf) should be considered as guidance to determine whether an assessment remains sufficiently robust for providing advice.

2. If the assessment is deemed no longer suitable as basis for advice, consider whether it is possible and feasible to resolve the issue through an inter-benchmark. If this is not possible, consider providing advice using an appropriate Category 2 to 5 approach;

vi) The state of the stocks against relevant reference points;

Consistent with ACOMs 2020 decision, the basis for F_{pa} should be $F_{p.05}$.

1. Where $F_{p.05}$ for the current set of reference points is reported in the relevant benchmark report, replace the value and basis of F_{pa} with the information relevant for $F_{p.05}$.
2. Where $F_{p.05}$ for the current set of reference points is not reported in the relevant benchmark report, compute the $F_{p.05}$ that is consistent with the current set of reference points and use as F_{pa} . A review/audit of the computations will be organized.
3. Where $F_{p.05}$ for the current set of reference points is not reported and cannot be computed, retain the existing basis for F_{pa} .

vii) Catch scenarios for the year(s) beyond the terminal year of the data for the stocks for which ICES has been requested to provide advice on fishing opportunities;

viii) Historical and analytical performance of the assessment and catch options with a succinct description of associated quality issues. For the analytical performance of category 1 and 2 age-structured assessments, report the mean Mohn's rho (assessment retrospective bias analysis) values for time-series of recruitment, spawning-stock biomass, and fishing mortality rate. The WG report should include a plot of this retrospective analysis. The values should be calculated in accordance with the "[Guidance for completing ToR viii\) of the Generic ToRs for Regional and Species Working Groups - Retrospective bias in assessment](#)" and reported using the [ICES application](#) for this purpose.

- d) Produce a first draft of the advice on the stocks under considerations according to ACOM guidelines.
 - i. In the section 'Basis for the assessment' under input data match the survey names with the relevant "SurveyCode" listed ICES [survey naming convention](#) (*restricted access*) and add the "SurveyCode" to the advice sheet.
- e) Review progress on benchmark issues and processes of relevance to the Expert Group.
 - i. update the benchmark issues lists for the individual stocks in SID;
 - ii. review progress on benchmark issues and identify potential benchmarks to be initiated in 2023 for conclusion in 2024;
 - iii. determine the prioritization score for benchmarks proposed for 2023–2024;
 - iv. as necessary, document generic issues to be addressed by the Benchmark Oversight Group (BOG).
- f) Prepare the data calls for the next year's update assessment and for planned data evaluation workshops;

- g) Identify research needs of relevance to the work of the Expert Group.
- h) Review and update information regarding operational issues and research priorities on the Fisheries Resources Steering Group SharePoint site.
- i) If not completed in 2020, complete the audit spread sheet 'Monitor and alert for changes in ecosystem/fisheries productivity' for the new assessments and data used for the stocks. Also note in the benchmark report how productivity, species interactions, habitat and distributional changes, including those related to climate-change, could be considered in the advice.

Information of the stocks to be considered by each Expert Group is available [here](#).

1.1.2 Specific ToRs

2021/2/FRSG10 The Working Group for the Celtic Seas Ecoregion (WGCSE), chaired by Mathieu Lundy, UK and Jonathan White*, Ireland will meet virtually 3–13 May 2022 and by correspondence September / October 2022 to:

- a) Address generic ToRs for Regional and Species Working Groups;

The assessments will be carried out on the basis of the stock annex. The assessments must be available for audit on the first day of the meeting.

Material and data relevant for the meeting must be available to the group on the dates specified in the 2021 ICES data call.

WGCSE will report by 25 May 2022 for the attention of ACOM, and by 1 October 2022 for *Nephrops* stocks, anglerfish and megrim in Rockall.

Only experts appointed by national Delegates or appointed in consultation with the national Delegates of the expert's country can attend this Expert Group.

1.2 Participation

Due to the COVID-19 pandemic and uncertainties in Europe owing to the Russian invasion of Ukraine, the decision was taken in mid-March to hold the meeting remotely in order to give participants certainty in the meeting process. An adequate participation was achieved with representation of the different institutes generally involved.

1.3 Methods

The type of final assessments presented at the WG are summarised as follows:

Category 1 age-based assessments and forecasts were conducted for *bss.27.4bc7ad–h*, *cod.27.7.e–k*, *had.27.7.a*, *had.27.7.b–k*, *had.27.6a*, *ple.27.7.a*, *sol.27.7.a*, *sol.27.7.e*, *sol.27.7.fg*, *whg.27.6.a* and *whg.27.7.b–ce–k*; *cod.27.7.a* went through benchmark in 2022 (WGNCS, ICES 2022), and is now assessed as a Category 1 assessment.

Category 1 Bayesian surplus production model for *lez.27.4.a6.a*;

Category 1: UWTV survey based assessments and advice will be used for *nep.fu.11*, *nep.fu.12*, *nep.fu.13*, *nep.fu.14*, *nep.fu.15*, *nep.fu.16*, *nep.fu.17*, *nep.fu.19*, *nep.fu.2021* and *nep.fu.22*. Fisheries data were updated at the May meeting and survey data were updated in the autumn;

Category 2: *Lez.27.6b* The stock has a SPICT assessment to determine stock status and a short-term catch forecast;

Category 3: Several stocks are now assessed as Data-Limited following the guidelines of WKLIFEIX and X, (ICES, 2019; 2020) following the “rfb” approach, implementing trends from combined biomass index and length-based indicators as the basis for advice. These include: ple.27.7.e; ple.27.7fg; ple.27.7h–k with trends from combined biomass index. Further, assessed in the autumn were anf.27.3a46 and had.27.6.b,

Ple.27.7fg went through a benchmarked process in 2022 (WKNSCS ICES, 2022). The resulting assessment and basis for providing forecast catch advice was approved. During WGCSE however, a number of issues became apparent with the assessment from which it was decided to revert the advice basis to the data-limited, Category 3 “rfb” approach. These are detailed in the Report Section on ple.27.7fg, and may be summarised as:

- A lack of justification or objectivity in choice of natural mortality (m) levels.
- Smooth trend in Fishing pressure resulting from no correlation process implemented across m age classes (F-at-age lognormal random walks were not correlated across ages).
- When correlations were introduced they produced a less smooth F trend over time, and strong model retrospective patterns in R, SSB and F (-0.19, 0.53 and -0.36 respectively) outside recommended limits.
- This also resulted in substantial changes in SSB and F in recent years.
- Recruitment in the assessment was modelled as a constant mean, removing this to enable recruitment to be calculated for each year from the data resulted in slight changes in SSB, F and R.

Category 4: Depletion corrected average catch was used for pol.27.67;

Category 5: sol.27.7h–k.

For the stocks for which a full analytical assessment was possible, the WG used either Extended Survivor’s Analysis (XSA), Age-Structured Assessment Program (ASAP) or state–space assessment model (SAM). These approaches and procedures for using them are discussed in further detail in the relevant stock annexes.

1.4 Data issues

Data were generally submitted in a timely fashion through the InterCatch database for landings and discards data, and through the accessions database for other sources of data.

1.5 Transparent Assessment Framework (TAF)

TAF is a new framework, currently in development, to organize all ICES stock assessments. Using a standard sequence of R scripts, it makes the data, analysis, and results available online, and documents how the data were pre-processed. Among the key benefits of this structured and open approach are improved quality assurance and peer review of ICES stock assessments. Furthermore, a fully scripted TAF assessment is easy to update and rerun later, with a new year of data. A number of assessments are being scripted in standard TAF scripts. See <http://taf.ices.dk> for more information and <https://github.com/ices-taf/> for details.

1.6 Internal auditing and external reviews

As in previous years the WG carried out its own internal audit process using the standard ICES template. Given the workload of many of the scientists at WGCSE (sometimes with one scientist

responsible for two or more stocks), many of the reports were not finalized until after the WG meeting. Audits were therefore typically carried out by correspondence after the WG and not completed for some stocks. All stocks for which advice was provided in June and October 2022 were audited by the WG and audit reports were produced for most of these. Issues discovered during the audit process were corrected in the WG report.

1.7 Generic ToR e: WGCSE recommendations for stocks to be benchmarked

Stocks recommended for next round(s) of benchmarks:

Listed for 2022–2023 Benchmark	Requested from 2023–2024 Benchmark
pol.27.67	pok.27.7–10
bss.27.4bc7ad–h	ple.27.7e
cod.27.6a	lez.27.4a–6a
	ple.27.7fg
Requested for 2022–2023 Benchmark	sole.7a
had.27.6b	whg.27.7b–ce–k
	lez.27.4a–6a

pol.27.67 and pok.27.7–10 were recommended for benchmark in 2020.

Currently, pol.27.67 is categorized as category 4 data-limited and the DCAC method is applied to provide advice. As the DCAC method only uses long time-series of official landings, it may not reflect recent stock fluctuations or changes in the fisheries, smoothed by the length of the time-series. As a result, new computations of DCAC are always very close to the previous year's results even if recruitment or SSB highly fluctuate. Therefore, it is relevant to explore new assessment models. No assessment or advice has been provided for the pok.27.7–10 stock, as a benchmark should establish if the DCAC approach can be improved upon.

had.27.6b was recommended for benchmark in 2020.

At-sea observer sampling for discards remains sparse for had.27.6b, which leads to uncertainty in fishery selectivity patterns and catch estimates data used in the assessment. The assessment model used (FLXSA) assumes catch is measured with no uncertainty and so does not account for this sampling issue. The estimates of SSB are consistently being overestimated and F is consistently being underestimated, therefore it is recommended to address this in a benchmark.

Atlantic seabass stocks were recommended for benchmark in 2020.

There was a joint recommendation with the Working Group for the Bay of Biscay and the Iberian Waters Ecoregion (WGBIE) to evaluate the stock identity of the Atlantic seabass stocks. The Working Groups recognized the complexity and considered that a stock identity workshop might be convened to allow relevant experts to consider relevant studies (data storage tags, conventional tags, genetics, otolith microchemistry and larval dispersion models) and advise whether the existing stock boundaries remain appropriate. This work should be proceeding towards a benchmark in the next stage. The aim should be to explore and peer-review all available information on recreational catches. There is also a need for information on recruitment trends in other areas, as it cannot be assumed that the Solent index will in the long-term represent overall recruitment patterns throughout areas 4 and 7. Estimates of discards are available only from the early 2000s, but do not cover all fisheries, are imprecise, and are only included for some fleets in the assessment. Discard rates are expected to increase in the short term as fishers adjust to take account of the management measures, such as the increase in minimum conservation reference

size from 36 cm to 42 cm. The difference in perception between the modelled discards and the observed, should also be addressed. The benchmark should evaluate if sampling is currently sufficient to support continued application of Stock Synthesis fitting selection parameters to fishery composition data.

In 2022 WGCSE recommend the following stocks to be benchmarked

ple.27.7e: A SAM assessment has been developed and is ready for critique and review.

whg.27.7b–ce–k: Following application in WGCSE the model has high retrospective patterns which are evidenced in Mohn's rho values from recruitment, SSB and fishing pressure. The assessment needs to be investigated and developed to improve its internal consistency and improve retrospective convergence.

lez.27.4a–6a: The present modelling approach is built on ageing IT architecture and more user-friendly applications are now available. A SPiCT model and SS3 should be explored as alternatives to the present labour-intensive approach.

ple.27.7fg: The SAM assessment developed in WKNCS (ICES, 2022) should be reviewed, with qualification for natural mortality levels detailed and correlation linkages across age classes implemented to assess potential relative to retrospective patterns. A SPiCT model may also be appropriate.

had.27.6b: While catch and survey data are presently available their processing needs to be reviewed as the approached are currently not visible. For 2022 a survey based DLS approach was advised by WGCSE, while a winter–spring data review and model development benchmark would provide grounds to provide a Category 1 based assessment for 2023.

Every year a prioritization exercise for the stocks that need to be benchmarked is done. The sum of the weighting scores (1–5) for each of the five criteria will determine the urgency for a benchmark. Those criteria are related to the quality of the previous assessments, the opportunity to improve the assessment, the management importance, the perceived stock status and the time since the previous benchmark. To have an overview of this information, an issue list is requested for every stock.