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Contents

1	Introduction	1
1.1	Terms of reference.....	1
1.2	Working group procedure.....	2
1.3	Software used	3
1.4	Recommendation.....	3
2	Demersal Stocks in the Faroe Area (Division Vb and Subdivision IIA4)	5
2.1	Overview	5
2.1.1	Fisheries.....	5
2.1.2	Fisheries and management measures	6
2.1.3	The marine environment.....	8
2.1.4	Catchability analysis.....	8
2.1.5	Summary of the 2005 assessment of Faroe Plateau cod, haddock and saithe	9
2.1.6	Medium term projections and reference points for Faroe Stocks	10
2.1.6.1	Data and methodology	10
2.1.6.2	Stock and recruitment	10
2.1.6.3	Medium term projections.....	11
2.1.6.4	Flim.....	13
2.1.6.5	Conclusion	13
2.1.7	References:	14
2.2	Faroe Plateau Cod.....	20
2.2.1	Stock definition.....	20
2.2.2	Trends in landings.....	20
2.2.3	Catch-at-age.....	21
2.2.4	Mean weight-at-age	21
2.2.5	Maturity-at-age	21
2.2.6	Groundfish surveys.....	22
2.2.7	Stock assessment	22
2.2.7.1	Tuning and estimates of fishing mortality	22
2.2.7.2	Stock estimates and recruitment	23
2.2.8	Predictions of catch and biomass.....	24
2.2.8.1	Short-term prediction.....	24
2.2.8.2	Biological reference points	24
2.2.8.3	Medium-term prediction	24
2.2.8.4	Long-term prediction	24
2.2.9	Management considerations	24
2.2.10	Comment on the assessment	25
2.2.10.1	References.....	25
2.3	Faroe Bank Cod.....	57
2.3.1	Trends in landings and effort.....	57
2.3.2	Stock assessment	58
2.3.2.1	Comment on the assessment.....	59
2.3.3	Reference points	59
2.3.4	Management considerations	59
2.4	Faroe Haddock.....	68
2.4.1	Introduction.....	68
2.4.2	Trends in landings and fisheries	68
2.4.3	Catch-at-age.....	68
2.4.4	Weight-at-age	69
2.4.5	Maturity-at-age	69
2.4.6	Assessment	70

2.4.6.1	Tuning and estimates of fishing mortality	70
2.4.6.2	Stock estimates and recruitment	72
2.4.7	Prediction of catch and biomass	72
2.4.7.1	Input data	72
2.4.7.1.1	Short-term prediction.....	72
2.4.7.1.2	Long-term Prediction.....	73
2.4.7.2	Biological reference points	73
2.4.7.3	Projections of catch and biomass	73
2.4.7.3.1	Short-term prediction.....	73
2.4.8	Medium-term projections	74
2.4.9	Management considerations	74
2.4.10	Comments on the assessment	74
2.5	Faroe Saithe	122
2.5.1	Landings and trends in the fishery	122
2.5.2	Catch at age.....	123
2.5.3	Weight at age	123
2.5.4	Maturity at age.....	123
2.5.5	Stock assessment	124
2.5.5.1	Tuning and estimation of fishing mortality.....	124
2.5.5.2	Stock estimates and recruitment	125
2.5.6	Prediction of catch and biomass	125
2.5.6.1	Input data	125
2.5.6.2	Biological reference points	126
2.5.6.3	Projection of catch and biomass	126
2.5.7	Management considerations	126
2.5.8	Comments on the assessment	126
2.5.9	Annex	128
3	Stocks in Icelandic waters.....	174
3.1	Ecosystem overview	174
3.1.1	Historical	174
3.1.2	Present observations	174
3.1.3	Overview of the dynamics in the fishery in ICES division Va	175
3.1.4	The fishery	175
3.1.4.1	Pelagic fishery	176
3.1.4.2	Demersal fishery.....	177
3.1.5	Mixed fisheries	177
3.1.6	Discards in demersal fisheries	178
3.1.7	By-catch in the Icelandic blue whiting fishery	178
3.1.8	Misreporting	179
3.1.9	Management	179
3.1.9.1	Adoption of a Harvest Control Rule for the Icelandic cod stock in 1995	179
3.1.10	Comments.....	180
3.1.11	References.....	181
3.2	Saithe in Icelandic waters	193
3.2.1	Trends in landings, discards and bycatch.....	193
3.2.2	Fleets and fishing grounds	193
3.2.3	Landings at age	193
3.2.4	Mean weight at age	194
3.2.5	Maturity at age.....	194
3.2.6	Migration of saithe.....	195
3.2.7	Stock Assessment	196
3.2.7.1	Tuning input.....	196
3.2.7.1.1	Commercial fleets.....	196
3.2.7.1.2	Survey.....	196

3.2.7.2	Estimates of fishing mortality	196
3.2.7.3	Spawning stock and recruitment	198
3.2.8	Prediction of catch and biomass	199
3.2.8.1	Input data	199
3.2.8.2	Biological reference points	199
3.2.8.3	Medium term projections	199
3.2.9	Management considerations	200
3.2.10	Comments on the assessment	200
3.3	Icelandic cod	244
3.3.1	Summary	244
3.3.1.1	Input data	244
3.3.1.2	Assessment models	244
3.3.1.3	Changes in assessment results	244
3.3.1.4	Comments	244
3.3.2	Input data	245
3.3.2.1	Fisheries dependent data	245
3.3.2.1.1	Catch: Landings, discards and misreporting	245
3.3.2.1.2	Sampling intensity	246
3.3.2.1.3	Landings in numbers by age	246
3.3.2.1.4	Mean weight at age in the landings	246
3.3.2.1.5	Logbooks	246
3.3.2.2	Fisheries independent data	247
3.3.2.2.1	Survey abundance indices	247
3.3.2.2.2	Mean weight at age in survey	247
3.3.2.2.3	Maturity at age in survey	247
3.3.2.3	Analysis of input data	248
3.3.3	Assessment	248
3.3.3.1	Exploratory analysis	248
3.3.3.2	Final assessment	250
3.3.3.3	Short term projections	251
3.3.3.3.1	Input data to the short-term prediction	251
3.3.3.3.2	Short-term prediction results	251
3.3.3.4	Long term predictions	251
3.3.3.4.1	Long-term prediction input	251
3.3.3.4.2	Long-term prediction results and biological reference points	252
3.3.3.5	Reference points and management strategies (HCR)	252
3.3.3.6	Medium term simulations	252
3.3.3.7	Harvest control rule scenarios	253
3.3.4	Management considerations	253
3.3.4.1	Management measures	253
3.3.4.2	Technical management measures	253
3.3.4.3	Evaluation of management measures	254
3.3.4.4	Comments on the assessment	254
3.3.5	Assessment deficiencies, data gaps and research priorities	255
3.3.6	Ecosystem considerations	255
3.3.6.1	Ecosystem effect on the stock	255
3.3.6.2	Fishery effect on the ecosystem	255
3.3.6.3	Technical interactions	256
3.3.7	Icelandic cod (Quality handbook)	256
3.3.7.1	Stock definition	256
3.3.7.2	Fisheries dependent data	256
3.3.7.2.1	Sampling protocol	256
3.3.7.2.2	Catch rate and effort data (log books)	257
3.3.7.3	Fisheries independent data	257
3.3.7.3.1	Survey description	257
3.3.7.4	Assessment input data	258
3.3.7.4.1	Survey abundance indices	258
3.3.7.4.2	Mean weight at age	258

3.3.7.5	Stock assessment model.....	258
3.3.7.5.1	Present input data	258
3.3.7.5.2	Predictions	258
3.3.7.5.3	Present model setup	259
3.4	Icelandic haddock	324
3.4.1	Introductory comment.....	324
3.4.2	Trends in landings and fisheries	324
3.4.3	Catch at age.....	325
3.4.4	Weight and maturity at age	326
3.4.5	Survey and cpue data	326
3.4.6	Stock Assessment and recruitment estimates.....	327
3.4.7	Prediction of catch and biomass	331
3.4.7.1	Input data	331
3.4.7.2	Biological reference points	332
3.4.7.3	Projection of catch and biomass	332
3.4.8	Management considerations	332
3.4.9	Comments on the assessment	334
3.5	Icelandic summer spawning herring	373
3.5.1	Fishery	373
3.5.2	Fleets and fishing grounds	373
3.5.3	Catch in numbers, weight at age and maturity	374
3.5.4	Acoustic survey	374
3.5.5	Data exploration.....	375
3.5.5.1	Analysis of catch at age in commercial data and in the acoustic survey.....	375
3.5.5.2	Data exploration with different assessment models.....	375
3.5.5.3	Comparisons between models.....	376
3.5.6	Assessment	376
3.5.7	Short term prediction	377
3.5.8	Medium term predictions.....	377
3.5.9	Management consideration	377
3.5.10	Comments on the PA reference points.....	377
3.5.11	Comments to the assessment.....	378
4	Overview on fisheries and their management in Greenland waters.	405
4.1	Ecosystem considerations.....	405
4.2	Description of the fisheries	405
4.2.1	Inshore fleets;.....	405
4.2.2	Offshore fleets	406
4.3	Overview of resources	407
4.4	Description of the most important commercial fishery resources - except mammals.....	407
4.4.1	Shrimp	407
4.4.2	Snow crab	407
4.4.3	Scallops.....	407
4.4.4	Squids	407
4.4.5	Cod	407
4.4.6	Redfish.....	408
4.4.7	Greenland halibut.....	408
4.4.8	Lump sucker	408
4.4.9	Capelin;.....	408
4.5	Advice on demersal fisheries.....	408

5	Cod Stocks in the Greenland Area (NAFO Area 1 and ICES Subdivision XIVB)	411
5.1	Stock definition -offshore	411
5.1.1	Historic assessment.....	412
5.1.1.1	Trends in landings and fisheries (offshore component).....	412
5.1.2	Surveys (offshore component).....	413
5.1.2.1	Results of the German groundfish survey off West and East Greenland.....	413
5.1.2.2	Results of the Greenland groundfish survey off West Greenland.....	414
5.1.3	Biological sampling of commercial catches	415
5.1.4	Stock assessment (offshore component)	415
5.1.4.1	Short term predictions.....	416
5.1.4.2	Medium term predictions.....	417
5.1.4.3	Long term predictions.....	417
5.1.5	State of the stock (offshore component)	417
5.1.6	Management considerations	418
5.1.7	Comments on the assessment	418
5.1.8	References.....	418
5.2	Cod off Greenland (Inshore component)	440
5.2.1	Trends in landings and fisheries (Inshore component)	440
5.2.2	Survey (Inshore component).....	440
5.2.2.1	Results of the West Greenland young cod survey	440
5.2.3	Biological sampling of commercial landings.....	441
5.2.4	Assessment of the stock.....	441
5.2.5	Status of the stock.....	441
5.2.6	Biological reference points	441
5.2.7	Management considerations	441
6	Greenland Halibut in Subareas V, VI, XII, and XIV	446
6.1	Executive summary.....	446
6.2	Landings, Fisheries, Fleet and Stock Perception	446
6.3	Trends in Effort and CPUE.....	449
6.4	Catch-at-age.....	450
6.5	Weight-at-age	451
6.6	Maturity-at-age	451
6.7	Survey information	451
6.8	Stock Assessment	452
6.8.1	Summary of the various observation data.....	452
6.8.2	State of the stock.....	452
6.8.3	Biological reference points	453
6.9	Management Considerations	453
6.10	Comments on the Assessment	453
7	Redfish in Subareas V, VI, XII and XIV	475
7.1	Nominal landings and splitting of the landings into stocks	475
7.2	Abundance and distribution of 0-group and juvenile redfish.....	476
7.3	Discards and by-catch of small redfish.....	476
7.4	Special Requests.....	476
7.5	Stock identity and management units of <i>S. mentella</i>	477

8	Sebastes Marinus	481
8.1	Trends in landings	481
8.1.1	Biological data form the fishery	482
8.2	Assessment data.....	482
8.2.1	CPUE	482
8.2.2	Survey data	483
8.2.3	Assessment by use of BORMICON model.....	484
8.2.4	State of the stock.....	485
8.2.5	Catch projections and management considerations	486
8.3	Biological reference points	486
8.4	Comment on the assessment.....	486
9	Demersal <i>Sebastes Mentella</i> on the Continental Shelf	509
9.1	Landings and Trends in the Fisheries	509
9.2	Assessment	510
9.2.1	CPUE indices.....	510
9.2.2	Survey indices.....	511
9.3	State of the stock.....	511
9.4	Biological reference points	512
9.5	Management considerations	512
10	Pelagic <i>Sebastes mentella</i>	527
10.1	Fishery	528
10.1.1	Summary of the development of the fishery	528
10.1.2	Description on the fishery of various fleet.....	529
10.1.2.1	Faroese.....	529
10.1.2.2	Germany	529
10.1.2.3	Greenland.....	529
10.1.2.4	Iceland	529
10.1.2.5	Norway	530
10.1.2.6	Poland	530
10.1.2.7	Portugal.....	531
10.1.2.8	Russia.....	531
10.1.2.9	Spain	532
10.1.2.10	Other nations	532
10.1.3	Discards	532
10.1.4	Illegal Unregulated and Unreported Fishing (IUU)	533
10.1.5	Trends in landings.....	533
10.1.6	Biological sampling from the fishery.....	533
10.2	Trends in survey and CPUE indices	534
10.2.1	Acoustic data	534
10.2.2	Trawl estimate	535
10.2.3	CPUE	535
10.2.4	Ichthyoplankton assessment	536
10.3	State of the stock.....	536
10.4	Management considerations	536
10.5	Comments on the assessment	537
10.6	Pelagic Surveys on <i>S. mentella</i>	537
10.7	Environmental conditions	538
10.7.1	Water masses shallower than 500 m.....	538
10.7.2	Water masses deeper than 500 m.....	539

11 Capelin in the Iceland-East Greenland-Jan Mayen Area 560

11.1 The Fishery 560

 11.1.1 Regulation of the fishery..... 560

 11.1.2 The fishery in the 2004/05 season 560

11.2 Catch Statistics 562

11.3 Surveys of Stock Abundance..... 562

 11.3.1 0-group surveys 562

 11.3.2 Stock abundance in summer/autumn 2004 and winter 2005..... 562

 11.3.2.1 The adult fishable stock 562

 11.3.2.2 Estimates of immature capelin..... 563

11.4 Historical Stock Abundance 564

11.5 Management of capelin in the Iceland-East Greenland-Jan Mayen area 564

11.6 Precautionary Approach to Fisheries Management 565

11.7 Special Comments 565

11.8 Sampling..... 566

Annex 1: List of participants 580

Annex 2: List of working documents 583

Annex 3: Recommendations 585

Annex 4: Technical Minutes Review Group I 586

Annex 5: Technical Minutes Review Group II..... 600

1 INTRODUCTION

1.1 Terms of reference

The North-Western Working Group [NWWG] (Chair: E. Hjörleifsson, Iceland) will meet at ICES Headquarters from 26 April - 5 May 2005 to:

- a) assess the status of and provide management options for 2006 for the stocks of redfish in Subareas V, XII and XIV, Greenland halibut in Subareas V and XIV, cod in Subarea XIV, NAFO Subarea 1, and Division Va, saithe in Division Va, haddock in Division Va, Icelandic summer spawning herring and capelin in Subareas V and XIV;
- b) assess the status of and provide effort options and expected corresponding catches for 2006 for cod, haddock, and saithe in Division Vb as these stocks are under effort control;
- c) submit new information on stock identity of the components of redfish such as “pelagic deep-sea” *Sebastes mentella*, “oceanic” *Sebastes mentella* fished in the pelagic fisheries and the “deep-sea” *Sebastes mentella* fished in demersal fisheries on the continental shelf and slope.
- d) update survey and fishery information on the stocks of redfish in Subareas V, VI, XII and XIV. In particular, update information on the horizontal and vertical distribution of pelagic redfish and fisheries in the Irminger Sea and adjacent waters as well as seasonal and inter annual changes in distribution. This information should allow NEAFC to further consider the appropriateness of separate management measures of different geographical areas/seasons;
- e) provide information on the horizontal and vertical distribution of pelagic redfish stock components in the Irminger Sea as well as seasonal and interannual changes in distribution;
- f) for the stocks mentioned in a) and b) perform the tasks described in C.Res. 2ACFM01.

NWWG will report by 6 May 2005 for the attention of ACFM.

In ToR f referring to C.Res.2ACFM01 is given below:

WGSSK, WGSSDS, WGHMM, WGMHSA, WGBFAS, WGNSDS, WGNPBW, AFWG, HAWG, NWWG, and WGPAND will, in addition to the tasks listed by individual group, in 2005:

1. for stocks where it is considered relevant, review limit reference points (and come forward with new ones where none exist) and develop proposals for management strategies including target reference points if management has not already agreed strategies or target reference points (or HCRs) following the guidelines from SGMAS (2005) and AMAWGC (2004 and 2005);
2. comment on the outcome of existing management measures including technical measures, TACs, effort control and management plans;
3. based on input from WGRED incorporate (where appropriate) existing knowledge on important environmental drivers for stock productivity and management into assessment and prediction, and important impacts of fisheries on the ecosystem;
4. update the description of fisheries exploiting the stocks, including major regulatory changes and their potential effects. The description of the fisheries should include an enumeration of the number, capacity and effort of vessels prosecuting the fishery by country;
5. where misreporting is considered significant provide information on its distribution on fisheries and the methods used to obtain the information;

6. provide for each stock information on discards (its distribution in time and space) and the method used to obtain it. Describe how it has been considered in the assessment;
7. provide on a national basis an overview of the sampling of the basic assessment data for the stocks considered;
8. provide specific information on possible deficiencies in the 2005 assessments including, at least, any major inadequacies in the data on landings, effort or discards; any major inadequacies in research vessel surveys data, and any major difficulties in model formulation; including inadequacies in available software. The consequences of these deficiencies for both the assessment of the status of the stocks and the projection should be clarified.

In addition to the ToR from ICES the NWWG is asked to address the NEAFC request to ICES on the following issues: “In particular, NEAFC requests ICES to provide the following: Regarding redfish stocks in the Irminger Sea and adjacent areas:

- a) Provide information of stock identity of *Sebastes mentella* fished in pelagic and demersal fisheries. ICES is asked to describe concepts on which management of *Sebastes mentella* can be based;
- b) Provide quantitative information to allow spatial and temporal limitations in catches and other measures to avoid disproportionate exploitation rate of any one component, especially to prevent local depletion;”

1.2 Working group procedure

The stocks dealt with by NWWG can be divided into two classes: those for which data are sufficient to allow an age-based analytical assessment, and those for which either the data is limited or for which the quality of the data is questionable, impeding analytical assessments. The Icelandic herring, capelin and all gadoid stocks are in the first class except for Faroe Bank cod, where a short time-series and incomplete biological sampling of the landings inhibit standard ICES analytical assessment, and the offshore cod in Greenland, where an almost ceased fishery prevents an analysis based on catch at age. One redfish stock, *S. marinus* falls also in the class of analytical assessment, it being assessed by a age/length-based model (Bormicon). In the second class are the *S.mentella* management units as well as Greenland halibut.

The long list of ToR for the working groups in addition to the NWWG now having additional two additional stocks to assess (Capelin and Icelandic where moved from the WGNPBW to the NWWG this year) necessitated prioritization of the ToRs. Within the timeframe of the working group meeting the WG principally focused on addressing ICES ToR a, b, d, and e and NEAFC ToR a and b. The answer to these ToR can be found in the relevant chapters.

The ToRs from the C.Res. 2ADFM01 were not addressed systematically for all stocks. The main focus was on reviewing limit reference points where evaluate management strategies where appropriate (ToR1). The evaluation of management strategies where in principle limited to software that was familiar to the assessor and the time frame of the WG meeting. For the stocks where analytical assessment is done, misreporting (ToR1) and discards (ToR6) are considered to be relatively minor compared with what is reported to occur in EU waters and are thus not expected to result in major deficiencies in the assessment (ToR8). The quality of the surveys for those stocks are also considered to be relatively good, at least for cod and had-dock. Given that fishing mortality estimates are in practice used as a proxy for effort in the Faroese waters when advice is formulated attention has focussed on understanding the discrepancies in the reference F values in the terminal years.

For most of the stocks for which age-based analytical assessments were carried out, the terminal fishing mortality was estimated by tuning aged catch data with selected fleet age-disaggregated commercial or survey indices. In “the final runs” only the Faroe saithe was based on a commercial tuning series since the available survey index needs to be evaluated

further. Overview of the observables, models and principal assumptions used for the gadoid stocks that are analytically assessed by the NWWG are shown in table 1.1, including a comparison with settings in the two previous years.

The *S. mentella* is in principle assessed in a subgroup within the NWWG with plenary discussions limited to the main issues. The subgroup focused on providing assessments according to presently set management units, the demersal *S. mentella* and the pelagic *S. mentella*. However, different perception on the stock structure of the *S. mentella* within the group often hampers the work process and makes the reaching of a consensus often difficult. Repeated requests for reviewing material related to the stock structure, an issue that is not suitable to address in an annual assessment working group environment, does not help.

In last two years report it was noted that changes in the structure of the report (Annex, "Quality Control") needed intercessional work. Since this work was not done prior to this meeting (except for some restructuring of the Icelandic cod section) it was decided to keep more or less the past format of the report. The format of the report for the Faroese stocks are internally relatively consistent but the format of the different Icelandic stocks is still very stock (assessor) specific. It is recognized that this may impede an efficient review of the available material. The format of the other sections are driven by the data that is available.

1.3 Software used

The assessment on the Faroese stocks has historically been based on the Lowestoft software (XSA). This year the working group continued experimenting with the ADAPT as implemented in the NOAA Fisheries Toolbox (<http://nft.nefsc.noaa.gov>), in particular since it provides some indication of the noise in the observables (given the model assumption) through easily executable bootstrapping. The working group thought this tool was of great value to judge the quality of the assessment although point estimators used as the basis of forward projections were still based on the XSA.

In recent years Icelandic stocks have been assessed by using various approaches. The reason for the use of different software platforms than the standard ICES packages is a result of the preference and expertise of the individual user that does the assessment. The limitation of the input control and the archaic output of the Lowestoft software when it comes to exploratory work on the diagnostic, model results and predictions has helped this move. All the models are based on catch-at-age analysis (i.e. using the stock and the catch equation) using survey information as additional information.

1.4 Recommendation

The Group was repeatedly requested to provide information on stock identity of redfish. Since the Group does not have sufficient expertise to thoroughly review the scientific content of new information submitted on stock identification of redfish, the Group recommends to forward this information to the external Expert Groups holding the required expertise.

Stock	Assessment Year	Assessment model	Survey at age						Catch at age								
			Tuning fleets	Year range for tuning	Age range for tuning	cpue-population model: Power	Survey-population model: Proportional	q-platau	Time series weights	Separability model	Time variant selection	Selectivity platau	Shrinkage year range	Shrinkage age range	S.E for shrinkage	F inertia	Plus group
Faroe cod	2003	XSA	Summer survey	1996-2002	2-8	2 3-8	6+	None				5	5	2			
	2004	XSA	Summer survey	1996-2003	2-8	2 3-8	6+	None				5	5	2		No	N/A
			Spring survey	1994-2004	2-9	2 3-9	6+	None								No	
	2005	XSA	Summer survey	1996-2004	2-8	2-8	6+	None				5	5	2		No	N/A
			Spring survey	1994-2005	2-9	2-9	6+	None								No	
Faroe haddock	2003	XSA	Summer survey	1996-2002	1-8	1-2 3-8	6+	None				5	5	0.5			Not modelled
			Spring survey	1994-2003	1-5	1-2 3-5	None	None									
	2004	XSA	Summer survey	1996-2003	1-8	1-2 3-8	6+	None				5	5	0.5		10+	Not modelled
			Spring survey	1994-2004	1-5	1-2 3-5	None	None									
	2005	XSA	Summer survey	1996-2004	1-8	1-8	6+	None				5	5	0.5		10+	Not modelled
			Spring survey	1994-2005	1-5	1-5	None	None									
Faroe saithe	2003	XSA	Cuba log books	1985-2002	3.5-11	3 5-11	9+	Yes				5	3	0.5		12+	Not modelled
	2004	XSA	Cuba log books	1985-2003	3-11	3,4 5-11	9+	Yes				5	3	0.5		12+	Not modelled
	2005	XSA	GLM log books	1995-2004	3-11	3-11	8+	None				5	3	2		12+	Not modelled
Icelandic saithe	2003	Camera	March survey	1985-2003	2-8	2-8	6+	None	parametric	Fixed	8+ platau				None	No	N/A
	2004	Camera	March survey	1985-2004	2-8	2-8	6+	None	parametric	Fixed	8+ platau				None	No	N/A
	2005	Camera	March survey	1985-2005	2-8	2-8	6+	None	parametric	Fixed	8+ platau				None	No	N/A
Icelandic cod	2003	ADCAM	March survey	1985-2003	1-10	1-5 6-10	None	None	parametric	RW	None				RW	No	N/A
	2004	ADCAM	March survey	1985-2004	1-10	1-5 6-10	None	None	parametric	RW	None				RW	No	N/A
	2005	ADCAM	March survey	1985-2005	1-10	1-5 6-10	None	None	parametric	RW	None				RW**	No	N/A
Icelandic haddock	2003	ADCAM	March survey	1985-2003	1-9	1-9	None	None	parametric	RW	None				RW	No	N/A
	2004	ADCAM	March survey	1985-2004	1-9	1-9	None	None	parametric	RW	None				RW**	No	N/A
	2005	ADCAM	March survey	1985-2005	1-9	1-9	None	None	parametric	RW	None				RW	No	N/A
Icelandic herring	2004	AMCI	Accustic survey	1981-2003	3-9	3-9	5+	None	parametric	RW	5+				None		
	2005	Camera	Accustic survey	1987-2004	3-4	3-4	None	None	parametric	Fixed	8+				None	No	N/A

** Reduced inertia on the random walk (RW) for fishing mortality.

Table 1.1 Overview of the observables, models and principal assumptions used for the stocks that are analytically assessed by the NWWG. Comparison of settings are made between consecutive assessment years, with changes indicated with shading.