

Annex 6: Audit reports

Audit of her.27.20-24

Working Group: HAWG

Stock Name: her.27.20-24

Date: 25 March 2020

Auditor: Steven Mackinson and Claus Reedtz Sparrevohn

- Audience to write for: ADG, ACOM, benchmark groups and EG next year.
- Aim is to audit (check if correct):
 - the stock assessment– concentrate on the input data, settings and output data from the assessment
 - the correct use of the assessment output in the forecast, and check if forecast settings are applied correctly
- Any deviations from the stock annex should be described sufficiently.
- By the conclusion of the working group, all update assessments should be audited successfully.
- Store all audits on SharePoint for future reference.

[BITS IN YELLOW ARE FROM LAST YEAR, SO AMEND/ DELETE AS NECESSARY]

For single stock summary sheet advice:

Short description of the assessment: extremely useful for reference of ACOM.

9) **Assessment type:** update -special abbreviated advice with 2019 advice appended

10) **Assessment:** Analytical

11) **Forecast:** Presented

12) **Assessment model:** Age-based analytical assessment SAM – tuned by 5 surveys.

13) **Data issues:** The stock annex for WBSS was updated at HAWG 2019 following a benchmark. Survey numbers going into the assessment can be found in the report tables and stockassessment.org. Similar for catch numbers and other biological information. The final assessment input data on sharepoint, matches that of the final assessment on stock-assessment.org. Leave on out analysis shows that the trajectory of the assessment is most sensitive to the GERAS acoustic data, which shows very low index values in 2019 and 2018 that stand out as much lower than the downward trend in the index.

14) **Consistency:** The new assessment shows the same pattern as the 2019 assessment but the stock perception is lower over the whole time series. The recruitment series is lower throughout and more variable.

15) **Stock status:** The reference points were changed during the 2018 benchmark, and the updated assessment indicates that SSB <Blim and F>Fmsy. Future short and medium predictions show that there are no scenarios that SSB is predicted to be above Blim by 2023, and there are no scenarios to indicate what might be the earliest year at which stock size may exceed Blim.

- 16) **Management Plan:** No specific management plan for WBSS are present. The Baltic MAP and the 3.a TAC setting rule are reflected in the advice.

General comments

- *This was a well documented, well ordered and considered section. It was easy to follow and interpret.... Etc*
- The reference points for this WBSS assessment were changed at the 2018 benchmark. In particular Blim has increased from 90kt to 120kt. This has had important consequences for the perception of the stock abundance, fishing pressure and the catch advice since 2019.
- Notwithstanding the changes from the benchmark, the assessment of this stock is not straightforward due to mixing of WBSS with North Sea Autumn spawners both within IIIa and in the transition area of the North Sea. Further there has in recent years been suspicion of a mixing with central Baltic herring.
- The fishery on WBSS is conducted by several fleets both in a directed consumption fishery and as bycatch in small meshed industrial fisheries.
- A considerable amount of time was devoted to issue of method for estimating Blim - as the reference point indicating impaired recruitment. The impact of this on the quality of the assessment and the advice scenarios was discussed a length.
- A new multi-fleet assessments is used for the assessment and advice. The multi-fleet assessment model based on the basic state-space assessment model (SAM). The new model is extended from having one fishing mortality matrix describing the total fishing mortality by year and age to having one fishing mortality matrix for each of the four fleets (A, C, D, F). The single fleet model assessment is also made available. Comparisons show that they are generally consistent with one another. However, comparison of the 2019 and 2020 assessment shows that while the single fleet assessments are very similar, the multifleet model shows a difference between 2019 and 2020, with 2020 assessment of SSB being lower from around 2011 onward. [CLAUS]

Technical comments

(Include comments on points where the draft report contains errors, is unclear and if the assessment is done according to the stock annex)

- The complexity of the assessment and the advice make this difficult to follow and careful attention is needed to improving the language further to make the advice understood and accessible to its users.
- The stock annex was updated in 2019 and the assessment settings and data files are consistent with the stock annex. No obvious errors were detected.
- Note that in the Canum table, the last three years are to multiple decimal points, whereas others are to whole number.
- Weight at age in the stock for 2017 for fish 6 and older were considerably lower than in the previous 8 years. The same is observed in the landings.

Conclusions

The assessment has been performed correctly

(If needed describe if relevant what extra things need to be done for a correct final assessment)
(Include suggestions for future benchmarks, and things to be done before ADG)

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice?

Is the assessment according to the stock annex description?

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

Have the data been used as specified in the stock annex?

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Is there any **major** reason to deviate from the standard procedure for this stock?

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables.

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG.

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

ICES stock advice

- ☒ Ensure the basis of the advice used is the correct one i.e Management plan; MSY approach; precautionary approach. The same as stated in the basis of advice table and history of advice table.

Comments and edits have been made directly on the draft advice sheet by SM on 25/3/19 and the stock assessors notified by email the same day.

- ☒ The advised value of catches should be the same as presented in the catch options table.
- ☒ Check the years for which the advice is given.

The top line of the advice could indicated that this is abbreviated advice based on the guidelines of ICES regarding procedures during covid-19. A suggestion was made on the advice sheet

Stock development over time

- ☒ Ensure all units used in the plots are correct (compare with previous year advice sheet).
- ☒ Ensure all titles of the plots are correct i.e catches; landings, recruitment age (0, 1, 2...); relative index

Should the title of the catches graph be 'Landings'?

- ☒ Recruitment plot: if the intermediate years is an outcome of a model the value should be unshaded.
- ☒ Ensure the F and SSB reference points (RP) in the plots are the same as in the reference points table. Also, check the respective labels if they correspond with the RP.
- ☒ Check if the legend of the plots is consistent with what is shown in the plots.
- ☒ Check that the graphs match the data in table of stock assessment results.

Audit of Her. 27. 3a74d

Working Group: HAWG

Stock Name: her.27.3a47d Choose an item.

Date:

Auditor:

Florian Berg, Institute of Marine Research, Norway

Niels Hintzen, Wageningen Marine Research, The Netherlands

Johnathan Ball, Centre for Environment, Fisheries and Aquaculture Science, UK

- Audience to write for: ADG, ACOM, benchmark groups and EG next year.
- Aim is to audit (check if correct):
 - the stock assessment– concentrate on the input data, settings and output data from the assessment
 - the correct use of the assessment output in the forecast, and check if forecast settings are applied correctly
- Any deviations from the stock annex should be described sufficiently.
- By the conclusion of the working group, all update assessments should be audited successfully.
- Store all audits on SharePoint for future reference.

General

The assessment of the stock is complicated by the mixing of Western Baltic Spring Spawners with North Sea Autumn spawners within Div. 3a and in the northeastern North Sea. Additionally, there is some doubt as to the stock boundary with the adjacent management area stock in Div. 6a. Where there is the possibility of misallocated catches/fish in both the fisheries and the surveys. There is a complex fleet structure operating in the area consisting of a human consumption fishery (A-fleet in the North Sea and C in Div. 3.a) and a sprat fishery, that takes juvenile herring as a by-catch (B- and D-fleet, respectively, in the two areas).

For single stock summary sheet advice:

This stock was last benchmarked in February 2018. Assignment of catches to relevant stocks/areas is relatively complex but is agreed and has been utilized for many years. The assessment uses all catches from most of the North Sea area and the estimated catches of NSAS herring in the transfer area in Subdiv. 27.4.aEast and Div. 27.3.a. A variable natural mortality at age (from the SMS North Sea multispecies model) is used, and was updated in the benchmark. The most recent natural mortalities have thus been used. This SMS run provides the most up-to-date perception of the natural mortality fields for herring, by age and year, in the North Sea. An averaging process is used to estimate M for years post the SMS model key run and for years prior to the first SMS years estimated. Updated survey indices, along with updated biological parameters e.g. mean weight, catches etc. are all used.

- 17) **Assessment type:** Benchmarked in 2018, and previously in 2012
- 18) **Assessment:** Analytical assessment
- 19) **Forecast:** Presented
- 20) **Assessment model:** “state-space” modelling approach (SAM, in the FLR environment), single fleet, tuned by 5 tuning indices (IBTSQ1 1-ringer, IBTS0, LAI, HERAS 1-8 ringers, IBTSQ3 0-5 ringers) for the assessment. In addition, a multi-fleet (Fleet A-D) assessment was run for estimating fleet selectivity for use in the forecast (new in last benchmark, WKPELA 2018).

- 21) **Data issues:** All data were available to the working group, and there did not appear to be any issues.
- 22) **Consistency:** The same set up for the assessment have been used since the benchmark in February 2018 (WKPELA 2018).
- 23) **Stock status:** $MSYB_{trigger} > B > B_{lim}$, $F < F_{lim}$. The poor productivity of this stock continues with survival from larvae to recruitment continuing to be low. 2013 is a strong year class whereas later year classes were very weak (2014) or weak (2016,2018,2019).
- 24) **Management Plan:** There is not an approved management plan yet. An EU-Norway request for an MSE of different management plan options was tested and advice delivered by the WKSNMSE in 2019.

General comments

In general, the chapter on North Sea autumn spawning herring is well-documented, well ordered and considered, as well as easy to follow and interpret.

The assessment shows a 1-directional bias in change in perception over the years (retrospective pattern) with a mohs-rho of 13% over the last 5 years in SSB. The retrospective pattern might be caused by poor internal consistency for age 6-7 for HERAS in the last recent years (see working report).

Requesters of advice indicated that the advice provided by ICES did not completely follow the Fmsy approach in 2019 as there was a fixed F outtake by the B-fleet assumed. HAWG slightly modified its approach to be consistent with the ICES MSY approach and consistent with the estimated reference points that were derived at the benchmark. Catch proportions by fleet are still presented in the catch option table and rely on partial selection by each of the fleets catching NSAS.

Technical comments

The assessment has been completed according to the Stock Annex.

We have worked through the detailed check list given in this template, and, where needed, corrections and comments has been added directly into the advice sheet.

Conclusions

The assessment has been performed correctly.

Audit of Her.6a7bc

Working Group: HAWG

Stock Name: her.27.6a7bc

Date: 27.03.20

Auditor: Norbert Rohlf and Mathieu Lundy

General

Herring in this Division consists of two stocks. It is not possible yet to differentiate the two stocks and although HAWG still considers them to be discrete, they will be assessed together as a meta-population until the combined survey indices can be successfully split. A monitoring TAC is in place since 2016.

For single stock summary sheet advice:

- 1) **Assessment type:** new procedures as agreed in Interbenchmark 2019
- 2) **Assessment:** Analytical assessment
- 3) **Forecast:** not presented
- 4) **Assessment model:** Multifleet FLSAM with 3 tuning indices (one acoustic survey, two trawl surveys)
- 5) **Data issues:** The updated assessment provides the best statistical fit to the input data, but the assessment still has a strong retrospective bias. There is also a pattern of increasing catchability with age for the acoustic survey data
- 6) **Consistency:** New assessment method following inter-benchmark process.
- 7) **Stock status:** The assessment does not provide any information on the state of either constituent stock. No reference points defined. Assessment used as indicative of trends only.
- 8) **Management Plan:** No management plan in place

General comments

The model and decisions of the inter-benchmark process as presented to HAWG were used in the assessment. The report of the inter-benchmark process is not yet published.

Technical comments

None

Conclusions

The assessment has been performed correctly. This stock would benefit from a benchmark which addresses the methods to split stock components.

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice?

Is the assessment according to the stock annex description?

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

Have the data been used as specified in the stock annex?

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Is there any **major** reason to deviate from the standard procedure for this stock?

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables.

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG.

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

Quality of the assessment

- ☒ Are the units in plots correct?
- ☐ Are the titles in the plots correct including F (age range) recruitment (age). -No. F(wr) is missing -
- ☐ The red line correspond to the year of assessment (except F which is year of assessment -1)
- ☒ Each plot should have five lines.
- ☐ Ensure the reference points lines (in the SSB and F plots) are correct and match with the values in the reference point table and summary plots.

Audit of Her.27.irls

Working Group: HAWG

Stock Name: her.27.irls

Date: 22 March 2020

Auditor: Richard Nash and Cindy van Damme

General

The spawning-stock biomass (SSB) has decreased significantly in the last decade and is below Blim since 2017. The fishing mortality (F) is above Fmsy since 2014. Recruitment has been below average since 2013. The assessment has a substantial historical retrospective revision compared to last year, with the spawning-stock biomass now estimated to be lower and fishing mortality to be higher than previous year assumed. Applying ICES MSY approach advice is zero catch for 2021. However, in order to continue to monitor the stock development ICES advices also to allow a 869 tonnes monitoring TAC.

For single stock summary sheet advice:

- 1) **Assessment type:** updateassessment
- 2) **Assessment:** analytical assessment
- 3) **Forecast:** presented
- 4) **Assessment model:** ASAP tuned to a single acoustic survey using age 2-7
- 5)
- 6) **Data issues:** *Data are available as described in the stock annex*
- 7) **Consistency:** The assessment has a substantial historical retrospective revision compared to last year, with the spawning-stock biomass now estimated to be lower and fishing mortality to be higher than previous year assumed. Recruitment is forecasted to increase in recent years, but in retrospective is estimated to be lower and decreasing. **Stock status:** *B<Blim for a while, F<Fpa, R uncertain, seem to be high recent years B<Blim since 2016, F>Fpa, R is uncertain, seems to be high in recent years, but in retrospective is estimated lower and decreasing*
- 8) **Management Plan:** The long-term management strategy for Celtic Sea herring that was proposed by the Pelagic AC in 2011 (Pelagic AC, 2011) was evaluated by ICES in 2018. ICES advises that the harvest control rule is no longer consistent with the precautionary approach.

General comments

This was a well documented, well ordered and considered section. It was easy to follow and interpret

Technical comments

No comments

Conclusions

The assessment has been performed correctly

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice?

Yes

Is the assessment according to the stock annex description?

Yes

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

The harvest control rule in the long-term management plan for Celtic Sea herring is no longer consistent with the precautionary approach. The management plan results in a greater than 5% probability of the stock falling below Blim in several years throughout the 20 year simulated period.

Have the data been used as specified in the stock annex?

Yes

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Yes

Is there any **major** reason to deviate from the standard procedure for this stock? No

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice? Yes

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Has been done

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables. Correct

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG. OK

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

Audit of Her.27.nirls

Working Group: HAWG

Stock Name: her.27.nirls

Date: 3 April 2020

Auditor: Martin Pastoors, Cecilie Kvamme

General

- The report section on Irish Sea herring in the HAWG 2020 report was available for auditing
- The input files were cross referenced with the input files from last year ("GIT\wg_HAWG\IrishSea\QC.Rmd") and with the tables in the WG report. It was noted that:
 - The catch in numbers for 2019 in canum.txt deviate from the catch in numbers in table 7.6.3.1
 - A small deviation existed in the 2019 proportion mature at 3 WR (1.0 in matprop.txt, 0.9 in table 7.6.3.5)
 - A large deviation existed in the 2019 1 WR Acoustic index (548867 in fleet.txt, 148867 in table 7.3.2 and 7.6.3.8)
 - A small deviation existed in the 2019 SSB acoustic index (41.1849 in ssbll.txt and 44184.9 in table 7.6.3.8)
- No checks between the acoustic indices and WGIPS has been made so far, as the final WGIPS report was not yet available.
- The structure of data folders on github is somewhat confusing.
 - There is a folder called 'assessment' that has data up to 2018 and assessments for 2017 and 2018.
 - There is a folder called 'UpdateAssessments' that has a 'SAM' folder the data up to 2019 and assessments (RData) carried in 2019 and 2020. For the data comparison we have used the UpdateAssessments folder
- The configuration and bindings on the parameters for the catch and the acoustic survey used in the SAM assessment are as per the stock annex (2017 version).

For single stock summary sheet advice:

This stock was benchmarked in 2017 and incorporates commercial catches, two acoustic survey indices (one age disaggregated and the second an SSB index), and invariant natural mortalities from the SMS North Sea multispecies model supplied by WGSAM (2010).

25) **Assessment type:** update

26) **Assessment:** analytical

27) **Forecast:** presented

28) **Assessment model:** FLSAM version 1.02 with 2 tuning indices based on acoustic surveys in September and during spawning time respectively.

FLSAM.version 1.02

FLCore.version 2.6.6

R.version R version 3.2.0 (2015-04-16)

platform i386-w64-mingw32

run.date 2020-03-12 10:01:42

29) **Data issues:** The data described in the stock annex were available

- 30) **Consistency:** Last years assessment was accepted.
- 31) **Stock status:** $SSB > B_{pa}$ and $MSYB$ trigger since 2007. $F < F_{msy}$ and F_{pa} since 2007
- 32) **Management Plan:** No management plan in place

General comments

This was a well documented and well ordered section. It was easy to follow and interpret.

Technical comments

There are a few minor editorial errors in the draft report, some where updating from previous years reports have not been made (e.g. section 7.1.1, 7.1.2). The assessment in terms of parameter bindings and model configuration has been completed according to the stock annex.

The treatment of landings data could benefit from a more transparent description in the stock annex. There is a large discrepancy between the official landings data and the ICES estimated landings. Probably this is due to separating between 7a North and 7a South. However, it is not explained how this is done and, more importantly, how this split turns out in terms of landings from 7a North and from 7a South.

Conclusions

The assessment has been performed correctly, although some mismatches between the assessment input data and the tables in the report needs to be cleared up.

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice? **YES**

Is the assessment according to the stock annex description? **YES**

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary? **No management plan**

Have the data been used as specified in the stock annex? **YES**

Has the assessment, recruitment and forecast model been applied as specified in the stock annex? **YES**

Is there any **major** reason to deviate from the standard procedure for this stock? **NO**

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice? **YES**

ICES stock advice

- ☒ Ensure the basis of the advice used is the correct one i.e Management plan; MSY approach; precautionary approach. The same as stated in the basis of advice table and history of advice table.
- ☒ The advised value of catches should be the same as presented in the catch options table.
- ☒ Check the years for which the advice is given.

Stock development over time

- ☒ Ensure all units used in the plots are correct (compare with previous year advice sheet).
- ☒ Ensure all titles of the plots are correct i.e catches; landings, recruitment age (0, 1, 2...); relative index
- ☒ Recruitment plot: if the intermediate years is an outcome of a model the value should be unshaded.
- ☒ Ensure the F and SSB reference points (RP) in the plots are the same as in the reference points table. Also, check the respective labels if they correspond with the RP. (**Note: checked with reference points from 2019 advice**)
- ☒ Check if the legend of the plots is consistent with what is shown in the plots.
- ☒ Check that the graphs match the data in table of stock assessment results.

Stock and exploitation status

- ☒ Compare with the previous year's advice sheet. The years in common should have the same status (symbol).
- ☒ Check if the labels for the years are correct.
- ☒ Compare the status table with the F and SSB plots they should show the same information.
- ☐ Does the stock have a management plan? If yes than the row for the management plan should be filled as well otherwise will read not applicable.

Catch options

Basis of catch options table:

For each of the rows in the table ensure that:

- ☒ The year is correct,
- ☐ The value is correct, **Note: the rounding of F seems inconsistent with the values in the report**
- ☒ The notes are correct and
- ☒ The sources are correct.

Catch options table:

- ☐ The forecast should be re-run to ensure all values are correct. **Note: the forecast is not on github**
- ☐ Compare the input data with previous year run (previous year should be in the share point under the data folder). **Note: unclear what should be compared**
- ☒ The wanted catch and SSB values should be given in tonnes (t);
- ☒ Confirm if the F values for the options F_{lim} ; F_{pa} ; are correct.
- ☒ For the options where the value of F will take SSB of the forecast year to be equal to B_{lim} ; B_{pa} ; $MSY_{Btrigger}$ confirm if the SSB value for the forecast year is equal or close to the reference points.
- ☐ For the options where a percentage is added or taken (i.e +10%; 15%, etc.) from the current TAC. Ensure that the calculated values are correct. **Not relevant**
- ☒ For all the options given in the table calculate the percentage of change in SSB and TAC.
- ☒ In the first column (Rationale) ensure the rational of the first line is the correct basis for the advice. All other options should be under "Other options".
- ☒ Compare different catch options; higher F should result in lower SSB
- ☒ Check if SSB change is in line with F.

Basis of the advice

- ☒ Ensure the basis of the advice is correct and if the same is used in the catch option table and in the ICES stock advice section.

- ☐ Is there a management plan? If there is one it should be stated if it has been evaluated by ICES and considered precautionary or not and also if it has been sign off by the clients(EU; Norway, Faroe Islands, etc.)

Quality of the assessment

- ☒ Are the units in plots correct?
- ☒ Are the titles in the plots correct including F (age range) recruitment (age).
- ☒ The red line correspond to the year of assessment (except F which is year of assessment -1)
- ☒ Each plot should have five lines.
- ☒ Ensure the reference points lines (in the SSB and F plots) are correct and match with the values in the reference point table and summary plots.

Issues relevant for the advice

- ☒ Along with the spelling and structure in the text ensure that any values referenced in the text match the values or percentages in the tables within the advice sheet.

Reference points

- ☐ Ensure all the values, technical basis and sources are correct. If new values were not calculated the table should be the same as previous year. **Reference points table not shown; values used are correct**

Basis of the assessment

- ☐ If there is no change from the previous year the table should be the same. **[this table is not shown]**
- ☐ Ensure there is no typos wrong acronyms for the surveys.
- ☐ Assessment type- check that the standard text is used.

Information from stakeholders

- ☐ If no information is available the standard sentence should be "There is no available information" **[this section is not shown]**

History of advice, and management

- ☒ This table should only be updated for the assessment year and forecast year except if there was revision to the previous years.
- ☒ Ensure that the forecast year “predicted landings or catch corres. to advice” column match the advice given in the ICES stock advice section (usually given in thousand tonnes).

History of catch and landings

Catch distribution by fleet table:

- ☐ Ensure the legend of the table reflects the year for the data given in the table. **[table is not shown]**
- ☐ Ensure that the sum of the percentage values in each of the components (landings and discards) amount to 100%
- ☐ Ensure that the sum of the values for discards and landings are equal to the value in the catch column. However, if only landings or discards components are shown, then total catch should be unknown.

History of commercial landings table:

- ☐ Ensure that the values for the last row are correct check against the preliminary landings (link to be added)

Summary of the assessment

- ☒ This table is an output from the standard graphs. If there was any errors picked up with any of the plots, then this table should be replaced by a new version once the errors are corrected.
- ☒ Check if the column names are correct mainly recruitment age and age range for F.
- ☐ If the stock is category 5 or 6 then it should read “There is no assessment for this stock”

Sources and references

- ☒ Ensure all references are correct.
- ☒ Ensure all references in the advice sheet are referenced in this section.

Audit of San.sa.1r

Working Group: HAWG

Stock Name: san.sa.1r

Date: January 31, 2020

Auditor: Claus R. Sparrevohn

- Audience to write for: ADG, ACOM, benchmark groups and EG next year.
- Aim is to audit (check if correct):
 - the stock assessment– concentrate on the input data, settings and output data from the assessment
 - the correct use of the assessment output in the forecast, and check if forecast settings are applied correctly
- Any deviations from the stock annex should be described sufficiently.
- By the conclusion of the working group, all update assessments should be audited successfully.
- Store all audits on SharePoint for future reference.

General

Use bullet points and subheadings (Recommendations, General remarks, etc.) if needed

For single stock summary sheet advice:

Short description of the assessment: extremely useful for reference of ACOM.

- 33) **Assessment type:** update
- 34) **Assessment:** analytical
- 35) **Forecast:** presented
- 36) **Assessment model:** SMS seasonal model,
- 37) **Data issues:** No data issues
- 38) **Consistency:** There is considerable retrospective bias in SSB in the assessment.
- 39) **Stock status:** SSB is estimated to be under Blim the 1st January 2020. SSB was also below Blim 1st January 2019. The stock is expected to increase due to the incoming 2019 yearclass.
- 40) **Management Plan:** No agreed or evaluated management plan

General comments

Well document assessment.

Technical comments

No comments

Conclusions

The assessment has been performed correctly and in accordance with the stock annex

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice?

yes

Is the assessment according to the stock annex description?

Yes

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

NA

Have the data been used as specified in the stock annex?

Yes

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Yes

Is there any **major** reason to deviate from the standard procedure for this stock?

No

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

yes

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables.

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG.

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

Audit of San.sa.2r

Working Group: HAWG

Stock Name: san.sa.2r

Date: 03-02-2020

Auditor: Valerio Bartolino

- Audience to write for: ADG, ACOM, benchmark groups and EG next year.
- Aim is to audit (check if correct):
 - the stock assessment– concentrate on the input data, settings and output data from the assessment
 - the correct use of the assessment output in the forecast, and check if forecast settings are applied correctly
- Any deviations from the stock annex should be described sufficiently.
- By the conclusion of the working group, all update assessments should be audited successfully.
- Store all audits on SharePoint for future reference.

General

The assessment was last benchmarked in 2016 and the area 2 revised into 2r in a special request in 2017. The status of the stock has raised concerns for numerous year given its poor status since the early 2000s.

Since the benchmark, the assessment is known to be affected by strong retrospective in both R and SSB. This year the WG has proposed an adjustment of the survey catchability for recruits which resulted in a reduction of the retrospective patterns. Main justifications for such an interim (before the planned benchmark for 2021) include:

- the poor status of the stock
- the estimated high recruitment index in 2019 which will contribute considerably to the 2020 catch
- the apparent link between survey index catchability and the strength of the year class

Catches in 2019 matched approx. the monitoring TAC of 5000 t which was advised last year by ICES.

For single stock summary sheet advice:

Short description of the assessment: extremely useful for reference of ACOM.

- 41) **Assessment type:** Update (but an adjustment of the model has been done via an inter-benchmark following the assessment)
- 42) **Assessment:** Analytical assessment based on SMS
- 43) **Forecast:** presented
- 44) **Assessment model:** SMS assuming a relationship between F and fishing effort – 1 fleet and 1 dredge survey
- 45) **Data issues:** commercial and survey time series are only updated with 1 extra year. No particular issues with 2019 data. The dredge survey shows a high recruitment in 2019. Age composition in the commercial catches follows the good 2016 year class which still made quite a proportion of the catches in 2019 (age3)
- 46) **Consistency:** Consistent with last year with the exception of the introduction of a power function to account for density.-dependency in the survey catchability of age0 (reviewed in an IBP prior the ADG)
- 47) **Stock status:** B<Blim for a while and still at the beginning of 2020, but the estimated good incoming year class is expected to bring the stock well above Bpa and sustain some fishery.

48) **Management Plan:** No MP for SA2r

General comments

The advice text is simple and clear enough. Data in support of the assessment are described in the report. The stock annex has been updated with information on the adjustment of the model passed through the IBP.

Technical comments

The assessment is in agreement with the updated stock annex.

Conclusions

The assessment has been performed correctly. The temporal pattern in the mohn's rho value suggests that the oldest peel of the retrospective contributes to inflate this statistic. This suggests that next year mohn's rho should be improved. Together with the model adjustment included this year via the IBP the model appears suitable for advice.

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice? YES

Is the assessment according to the stock annex description? YES

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary? NO MP

Have the data been used as specified in the stock annex? YES

Has the assessment, recruitment and forecast model been applied as specified in the stock annex? YES

Is there any **major** reason to deviate from the standard procedure for this stock? THE DEVIATION HAS BEEN REVIEWED IN THE IBP AND INTEGRATED IN THE UPDATED STOCK ANNEX

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice? YES, SEE REASONS ABOVE UNDER CONCLUSIONS

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies. DONE

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables. DONE

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG. SOME OF THE ROUNDING DONE BY THE WG, BUT IT SEEMS ACCORDING TO THE STANDARD RULES

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

Audit of San.sa.3r

Working Group: HAWG

Stock Name: san.sa.3r

Date: 03.02.2020

Auditor: Norbert Rohlf

General

The stock is separated in seven management areas. Fishing takes place in five of these seven areas (sandeel area 1r-3r, 4 and 6). The stock was last benchmarked in 2016. Interbenchmark in 2020. Sandeel area 3r mainly consists of fishing grounds in Norwegian EEZ.

For single stock summary sheet advice:

- 1) **Assessment type:** update
- 2) **Assessment:** analytical
- 3) **Forecast:** Short-term forecast presented
- 4) **Assessment model:** Seasonal SMS-effort model, tuned by dredge and acoustic survey index. As a result of the interbenchmark, density-dependency in the recruitment index of the dredge survey was included to account for overestimation of large incoming year classes.
- 5) **Data issues:** Input data as in the stock annex. In 2019, most catches consists of 1-group (47%) and 3-group fish (44%), while the proportion of 2-group in 2018 was only 6%. These proportions are similar to catches obtained in 2013-2015.
- 6) **Consistency:** Model was applied as per stock annex. The formerly seen large retrospective pattern in the recruitment is now reduced due to the inclusion of density-dependent catchability.
- 7) **Stock status:** SSB has been above B_{pa} since 2015. High recruitment in 2019 and 2018, very low in 2017. F has increased in the last three years, but is below long term average.
- 8) **Management Plan:** There is no agreed management plan for this stock.

General comments

The report is very concise and documents all decisions and settings made in the assessment well. The inclusion of density-dependent catchability in the dredge survey reduced the retrospective bias in the recruitment.

Technical comments

None

Conclusions

The assessment has been performed correctly and considered adequate as the basis for TAC advice. Most of the fishing grounds are in Norwegian EEZ and managed according to a Norwegian area based management plan. However, this management plan has not been evaluated by ICES.

General aspects

Has the EG answered those TORs relevant to providing advice?

Yes

Is the assessment according to the stock annex description?

Yes

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

NA

Have the data been used as specified in the stock annex?

Yes

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Yes

Is there any **major** reason to deviate from the standard procedure for this stock?

No

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

Yes

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables.

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG.

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

Audit of San.sa.4

Working Group: HAWG

Stock Name: san.sa 0.4

Date: 30-01-2020

Auditor: Claus R. Sparrevohn

- Audience to write for: ADG, ACOM, benchmark groups and EG next year.
- Aim is to audit (check if correct):
 - the stock assessment– concentrate on the input data, settings and output data from the assessment
 - the correct use of the assessment output in the forecast, and check if forecast settings are applied correctly
- Any deviations from the stock annex should be described sufficiently.
- By the conclusion of the working group, all update assessments should be audited successfully.
- Store all audits on SharePoint for future reference.

General

Sandeel in this area was first in 2017 assessed as a category 1 advice. The change was done after latest benchmark in 2016.

Use bullet points and subheadings (Recommendations, General remarks, etc.) if needed

For single stock summary sheet advice:

Short description of the assessment: extremely useful for reference of ACOM.

- 49) **Assessment type:** Update
- 50) **Assessment:** Analytical assessment
- 51) **Forecast:** presented
- 52) **Assessment model:** Seasonal SMS
- 53) **Data issues:** No data issues
- 54) **Consistency:** This is the fourth advice based upon an analytic assessment. Last year, a zero-catch advice with a recommended monitoring fishery, was advised.
- 55) **Stock status:** SSB is below MSYBtrigger 1 january 2020 and above Blim. The stock size is expected to increase due to the incoming yearclass.
- 56) **Management Plan:** No management plan for this stock exist.
- 57)

General comments

Well documented assessment.

Technical comments

Conclusions

The assessment has been performed correctly

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice?

Yes

Is the assessment according to the stock annex description?

Yes

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

NA

Have the data been used as specified in the stock annex?

Yes

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Yes

Is there any **major** reason to deviate from the standard procedure for this stock?

No

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

Yes

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables.

All the values presented in the advice sheet should not be rounded at the WG. All rounded will be done at the ADG.

The check list below is given by section and it results from a compilation of the most frequent errors but by no means is it a complete list.

Audit of spr.27.3a4

Working Group: HAWG

Stock Name: spr.4-3.a Choose an item.

Date: 23/03/2020

Auditor: Henrik Mosegaard, Christophe Loots

General

During the the previous benchmark in 2018 the stock unit was re-defined, combining division 3.a and subarea 4.

For single stock summary sheet advice:

Short description of the assessment: extremely useful for reference of ACOM.

- 58) **Assessment type:** Update abbreviated advice
- 59) **Assessment:** Analytical assessment
- 60) **Forecast:** presented
- 61) **Assessment model:** SMS in quarterly steps. Tuning data IBTS Q1 (age 0-3), IBTS Q3 (age 1-3), HERAS (age 1-3)
- 62) **Data issues:** all identified issues resolved
- 63) **Consistency:** Second assessment for the re-defined stock Mohn's Rho slightly higher than 0.3 but well within MSE 95% cf interval
- 64) **Stock status:** B>Bescapement, F is higher than Fcap (0.69).
- 65) **Management Plan:** No management plan has been developed.

General comments

This was a well documented, well ordered and considered section. It was easy to follow and interpret.... etc

Technical comments

There is no technical issue with this stock

Conclusions

The assessment has been performed correctly

Checklist for audit process

General aspects

- Has the EG answered those TORs relevant to providing advice?

Yes, the assessment and advice for sprat in division 3.a and subarea 4 have been carried out according to the TORs.

- Is the assessment according to the stock annex description?

Yes, according to stock annex

- If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

No management plan used.

- Have the data been used as specified in the stock annex?

Catches are supposed to be raised to ICES landings – it is not specified how this is done for 2020 Q2

- Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

Yes

- Is there any **major** reason to deviate from the standard procedure for this stock?

No

- Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

Yes

Audit of Spr.27.7de

Working Group: HAWG

Stock Name: spr.27.7.de Choose an item.

Date: 25/03/2020

Auditor: Christophe Loots, Michael Gras

General

This is a category 3 stock for which the assessment is based on the trend and absolute estimate of biomass in the PELTIC acoustic index from 2013 onward. The acoustic survey covers a much wider area than the Lyme Bay area where the stock is defined and the fishery is focused.

The stock biomass index has been revised upward in 2018 (+27%) due to a software bug detected during the PELTIC survey (see the report).

In the advice sheet, sentence before table 3 : “***[advice for 2021] × [uncertainty cap]History of the advice, catch, and management” should be amended.

For single stock summary sheet advice:

Short description of the assessment: extremely useful for reference of ACOM.

- 1) **Assessment type:** Update
- 2) **Assessment:** Trends based on the PELTIC survey result used as an absolute assessment of stock size
- 3) **Forecast:** N/A
- 4) **Assessment model:** No model used
- 5) **Data issues:** No data issues
- 6) **Consistency:** Same advice as in 2020 is given for 2021 given that there was a change of less than 20% in the stock biomass following the 2 over 3 rule calculation.
- 7) **Stock status:** No reference points but an increase in the stock biomass and a decrease in fishing pressure.
- 8) **Management Plan:** There is no management plan for this stock.

General comments

The draft report is well documented and easy to read. The ways the assessment is performed and the catch advice is provided are clear and well explained.

Technical comments

The assessment appears to be done according to the stock annex.

The decision to use the 2 over 3 rule (following the ICES framework for category 3 stocks but defined as not precautionary according to the MSE performed during WkspratMSE and WKDLSSLs) rather than the 1 over 2 rule (more adapted but still need to be approved) to evaluate change in the biomass index is clearly explained in the report. Change in the biomass according to this rule is less than 20% hence conducting to rollover for 2021 the same advice as for 2020.

Conclusions

The assessment has apparently been performed correctly according to the Stock Annex and the advice was given following the rules accepted during the last benchmark of this category 3 stock.

Checklist for audit process

General aspects

Has the EG answered those TORs relevant to providing advice?

Yes

Is the assessment according to the stock annex description?

Yes

If a management plan is used as the basis of the advice, has been agreed to by the relevant parties and has the plan been evaluated by ICES to be precautionary?

No management plan available.

Have the data been used as specified in the stock annex?

Yes

Has the assessment, recruitment and forecast model been applied as specified in the stock annex?

N/A

Is there any **major** reason to deviate from the standard procedure for this stock?

No

Does the update assessment give a valid basis for advice? If not, suggested what other basis should be sought for the advice?

Yes

It is useful to print previous year advice sheet for comparison purposes it will make it easier to find potential errors and or inconsistencies.

Along with the spelling and structure of the text ensure that any values referenced in the text match the values or percentages shown in the tables.

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