

Annex 5: Audit reports

Audit of her.27.20-24

Review of ICES Scientific Report, (HAWG) (2022) (20.05.2022)

Reviewers: Norbert Rohlf, Martin Pastoors

Expert group Chair: Cecilie Kvamme, Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Consistent with last year's advice, continued to be zero catch advice when MSY approach is applied. Stock is well below Blim with a slight upward trend and strong decline in fishing mortality in recent years

For single-stock summary sheet advice

Stock: her.27.20-24

The WBSS stock is caught in several management units, in Subdivision 20-24 and in Sub-area 4a. Catches consists of a mixture of WBSS and NSAS herring. The stock was last benchmarked in 2018.

- 1) Assessment type: update
- 2) Assessment: accepted
- 3) Forecast: accepted
- 4) Assessment model: multi-fleet SAM
- 5) Consistency: consistent with last year's assessment. Model was applied as per stock annex. Assumptions on age structure in catches taken in the transfer area differ somewhat from preceding years, but conclusions were analyses, presented and explained at HAWG.
- 6) Stock status: SSB is below Blim. Recruitment continues to be very low.
- 7) Management plan: There is no agreed management plan for this stock.

General comments

In 2022, 100% of herring quotas can be transferred from 3.a into 4.a., compared to 50% in recent years. This results in important changes of the proportions of WBSS caught in the different fleets, and predicted catches of WBSS highly depend on the area where the catches will be taken.

The stock is caught in different management unit. Recovery will be impaired if catches are not minimized in all units.

Fleet definitions used in the assessment and forecast have been updated to respond to the recent request for explanation for several stakeholders. These definitions have also been used for the North Sea herring advice.

Technical comments

None

Conclusions

The assessment has been performed correctly and considered adequate as the basis for TAC advice. All information is available on [Stockassessment.org](https://stockassessment.org).

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.
- ☒ 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,
- ☒ The notes are correct and
- ☒ The sources are correct.

Catch options table:

- ☐ The forecast should be re-run to ensure all values are correct.
- ☒ Compare the input data with previous year run (previous year should be in the share point under the data folder)
- ☒ 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} ; $MSY_{trigger}$ 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.
- ☒ 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.

Basis of the assessment

- ☒ If there is no change from the previous year the table should be the same.
- ☒ 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 **additional** available information”

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.
- ☒ 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 Her.6aS7bc

Working Group: HAWG Stock Name: her.27.6aS7bc

Review of ICES Scientific Report, HAWG 2022

Reviewers: Paul Marchal, Kirsten Birch Håkansson

Expert group Chair: Cecilie Kvamme and Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

- Assessment and forecasts up to date with 2022 procedure for Category 3 stocks (constant harvest rate, method 2.2)
- The reasons why MSHAS survey lacks of consistency for a number of age pairs should be further investigated

For single-stock summary sheet advice

Stock : Herring in 6a South and 7b,c

Short description of the assessment as follows:

- 1) Assessment type: benchmark (carried out in 2022; Category 3 stock)
- 2) Assessment: accepted
- 3) Forecast: NA
- 4) Assessment model: Category 3, Constant harvest rule (CHR, WKLIFE method 2.2), based on a survey-based biomass index (Split Malin Shelf Acoustic Survey) and harvest rates. Advised catches building on the MSHAS biomass index, commercial catch length frequencies and relative von Bertalanffy parameters estimates, a biomass safeguard cap and a life-history-based multiplier. A stability clause bound by -30% and +20% of 1999-2021 catch applies.
- 5) Consistency: the most reliable survey index (MSHAS) has been used.
- 6) Stock status: Increasing biomass from low level in 2006, but no recent recruitment indices in recent years. Harvest rate $< F_{\text{proxyMSY}}$ and $SSB > MSY B_{\text{trigger}}$. No recent recruitment indices. Advised catch increased by 20% compared to 2019-2021 catch average, which is entirely driven by the stability clause in the CHR;
- 7) Management plan: NA

Conclusions

Assessment performed correctly and according to procedure, except the value for the index trigger value seems a bit off in the advice table 1 and 3. The value is set to 51,340 t, but table 8 (advice) shows that the lowest value is 36,707 t, which should give a value of 51,390 t. Further, it is not clear from the report if this index trigger value will be updated if a lower survey biomass is observed in the future.

The reasons why the MSHAS survey lacks of consistency for a number of age pairs should be further investigated.

Audit of Her.6aN

Review of ICES Scientific Report, (HAWG) (2022) (9-12/06/2022)

Reviewers: Vanessa Trijoulet

Expert group Chair: Cecilie Kvamme and Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock: Autumn-spawners herring in Division 6.a North

Short description of the assessment as follows (examples in grey text):

- 1) Assessment type: update following benchmark in 2022, Category 3
- 2) Assessment: accepted
- 3) Forecast: Not relevant
- 4) Assessment model: Category 3, Method 2.2 Constant Harvest Rate using indices for 6aN herring from Malin Shelf Herring Acoustic Survey (MSHAS) and commercial catches above the 56°N line (total catch and length frequencies)
- 5) Consistency: Method used as agreed at the benchmark
- 6) Stock status: Fishing pressure on the stock is below $F_{MSYproxy}$ since 2017 and SSB index is above the MSY Btrigger ($I_{trigger} = 1.4 \cdot I_{loss}$) since 2020.
- 7) Management plan: Not relevant

General comments

The assessment and advice was performed in adequacy with what was decided at the 2022 benchmark. The 2023 advice of 1 212 t is entirely driven by the stability clause of the chr rule that constrains the advice to not exceed 20% of the previous advice (here the average 3-year catch). Without the stability clause the advice would have been significantly larger (8 119 t). Given that the previous combined stock (6aN+6aS7bc) advice was zero in 2022, using the stability clause is deemed appropriate. It has to be noted that both stocks have now a positive catch advice given the downgrade to category 3, which does not allow zero catch advice if applied. The advice catch for 2023 is below the monitoring TAC that was used to date.

Technical comments

The following comments were sent to the stock assessors and edited accordingly:

Advice sheet:

Stock development over time: SSB plot the $I_{trigger}$ line is full in the plot but described as dashed in the caption. Catches plot, is the value of 177 t in 2020 missing or it is due to the scale of the plot?

Catch scenarios: Table 1 add "tonnes" after 8 119 (CHR calculation) or eventually remove the unit everywhere and add it to the caption. Second footnote (**) should maybe be $C_{y+1} = I_{y-1} \times FMSY_{proxy} \times b \times m$? C because it is not last year advice but 3 year average catch and index of year for I.

Issues relevant for the advice: 4th paragraph "remains"?

History of commercial landings table: should the double asterisk be removed for 2020?

Summary assessment: Table 8, typo in caption: " L_{mean} refers"

References: References identified by Ellie should be removed if not added somewhere in the sheet.

Stock annex: Reference to multifleet SAM model should be replaced by Nielsen et al. 2021 (<https://doi.org/10.1093/icesjms/fsab078>)

Report: Add value of I_{trigger} in the section 4.6. Some problems with values when comparing tables in report and advice sheet (explained in a excel document to stock assessors). This needs to be checked to see which are correct. Also 2 columns for UK in Table 4.1.6 in report.

Conclusions

The assessment was performed correctly and according to procedure.

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.
- ☒ 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,
- ☐ The notes are correct and
- ☐ The sources are correct.

Catch options table:

- ☐ The forecast should be re-run to ensure all values are correct.
- ☐ Compare the input data with previous year run (previous year should be in the share point under the data folder)
- ☒ 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.
- ☐ 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.

Basis of the assessment

- ☐ If there is no change from the previous year the table should be the same.
- ☐ 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 **additional** available information”

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.
- ☒ 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 Her.27.irls

Working Group: HAWG Stock Name: her.27.irls

Date: May 2022

Review of ICES Scientific Report, Herring Assessment Working Group (HAWG) 2022, 9-12/05/2022

Reviewers: Neil Campbell

Expert group Chair: Cecilie Kvamme (Norway), Afra Egan (Ireland)

Secretariat representative: Sarah Millar

Stock Celtic Seas Herring

Short description of the assessment as follows (examples in grey text):

- 1) Assessment type: Update
- 2) Assessment: Accepted
- 3) Forecast: Accepted
- 4) Assessment model: ASAP – as defined at WKWEST (2015) and WKPELA (2018), tuned by the Celtic Sea herring acoustic survey
- 5) Consistency: the assessment has developed a strong retrospective pattern on SSB (Mohn's $\rho = 1.34$). Because the stock is below B_{lim} , the assessment is still used to provide advice.
- 6) Stock status: $B < B_{lim}$ with no catch options in 2023 consistent with rebuilding the stock above this level; F under the monitoring TAC below both F_{pa} ; uncertainty on R is high in the most recent year
- 7) Management plan: The long-term management strategy for Celtic Sea herring that was proposed by the Pelagic Advisory Council in 2011 was re-evaluated by ICES in 2018. ICES advises that the harvest control rule is no longer consistent with the precautionary approach. The management strategy results in a greater than 5% probability of the stock falling below B_{lim} in several years throughout the 20-year simulated period.

General comments

The spawning-stock biomass (SSB) has decreased significantly in the last decade and has been below B_{lim} since 2016. The fishing mortality (F) was above F_{msy} since 2014, and above F_{lim} between 2016 and 2019, but in 2020 F fell below F_{msy} and remained there in 2021. Recruitment has been below average since 2013 and is uncertain. The assessment had a substantial historical retrospective bias in recent years. Applying the ICES MSY approach results in zero catch for 2023, however, in order to continue to monitor the stock development ICES provides a technical service assuming a continued monitoring TAC of 869 tonnes, the same as last year.

The assessment is well presented and carried out in line with the process described in the stock annex.

Technical comments

Table 8 (advice sheet) and Table 6.1.1.2 (report) Totals column do not correspond to sum of catches in country & discard columns, differing by up to 30%.

Conclusions

The assessment has been performed correctly in line with the stock annex, and appropriate procedures followed to provide advice and technical services.

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? **Management plan not used.**

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. **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. **OK**

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.
- ☒ 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.

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,
- ☒ The notes are correct and
- ☒ The sources are correct.

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 coloured 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.

Basis of the assessment

- ☒ If there is no change from the previous year the table should be the same.
- ☒ Ensure there is no typos wrong acronyms for the surveys.
- ☒ Assessment type- check that the standard text is used.

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.
- ☒ 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

Her27.irls

Review of ICES Scientific Report, (HAWG) (2022) (24.05.2022)

Reviewers: Johnathan Ball

Expert group Chair: Cecilie Kvamme, Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock: Her.irls

- 1) Assessment type: update
- 2) Assessment: accepted
- 3) Forecast: accepted
- 4) Assessment model: ASAP Analytical assessment, using a single acoustic survey ages 2-7 (2002-2021) and catch data (1958-2021)
- 5) Consistency: The assessment has been accepted last year and this year, but has suffered from retrospective revisions for both SSB and F.
- 6) Stock status: Biomass remains below B_{lim} , but has seen a slight increase, F at age was above F_{pa} between 2016 and 2019, but in 2020 was brought under F_{msy} and remains there in 2021. Recruitment is up from 2020 but remains low and a downwards revision is

seen in the retrospectives. The uncertainty in recruitment has been attributed to a lack of fisheries independent information.

- 7) Management plan: The long-term management strategy for the stock was evaluated by ICES in 2018 and the harvest control rule was found to be no longer consistent with the precautionary approach. The current TAC (869t) has been agreed following the special request to ICES and the advisement of a monitoring TAC to allow for continued stock assessment in the face of a zero catch advice.

General comments

Well written

Technical comments

No comments

Conclusions

The assessment has been performed correctly

Audit of Her.27.nirs

Review of ICES Scientific Report, (*expert group/workshop title*) (*year*) (*dates*)

Reviewers: *Campbell Pert and Ed Farrell*

Expert group Chair: *Afra Egan, & Cecile Kvamme*

Secretariat representative:

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock: *Herring in Division 7.a North of 52°30'N (Irish Sea)*

Short description of the assessment as follows (examples in grey text):

- 1) Assessment type: *Update*
- 2) Assessment: *Accepted*
- 3) Forecast: *Accepted*
- 4) Assessment model: *Age-based analytical assessment (FLSAM; ICES, 2022) that uses catches in the model and in the forecast.*
- 5) Consistency: *The advice is consistent with last year's assessment although the historic SSB appears to be sensitive to addition of a new year's data resulting in revision during the recent time period.*
- 6) Stock status: *The assessment is performed on a mixed stock (including juveniles from the Celtic Sea), which affects the estimates of the younger ages. Due to the presence of herring from other stocks, the assessment may overestimate*

the Irish Sea stock. However, fishing pressure on the stock is below FMSY and spawning-stock size is above MSY Btrigger, Bpa, and Blim.

- 7) Management plan: *There is no agreed management plan for this stock.*

General comments

This has previously been raised but it seems unusual to be calculating F on ages 4-6, when from the data it's clear that the majority of the catches comprise of 2-3yr and therefore this appears to differ from how we deal with other stocks.

A wider issue with this and other adjacent stocks is that trying to forecast the SSB to 2024 given all the uncertainties and also the partial data for 2022 seems like a bit of a stretch and perhaps not very useful for the advice. This is a wider issue than just this stock though it may be worth discussing at the ADG.

The assessment outputs (recruitment, F at age and SSB) seem to have a high level of uncertainty, which has increased annually over the past number of years.

Technical comments

Figure 1 SSB, Table 1, Table 9: The SSB for 2022 in Fig 1 and Table 9 is indicated as 27504t but in Table 1 it is 24716t. The 2022 SSB in the presentation was the same as Table 1. Also applies to Figure 2 SSB.

Table 2. Can you check the percentage SSB change and advice change values in this table.

Table 4. There is only one 2021 reference so you don't need 2021a

Table 8. The UK catch in 2021 doesn't tally with the catch in slide 23 of the presentation. Was there other UK catch (apart from NI) that wasn't sampled?

On the references 'Groot' is cited in the text but it should be 'de Groot'

Conclusions

As an update assessment the assessment appears to have been performed correctly for the purposes of providing updated advice. However given the issues mentioned above in general comments and the pattern on increasing uncertainty it may be time to look at the assessment data and model in more detail.

Audit of san.sa.1r

Reviewers: Espen Johnsen

Expert group Chair: Cecilie Kvamme and Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

For single-stock summary sheet advice

Stock: san.sa.1r

- 1) Assessment type: update
- 2) Assessment: accepted
- 3) Forecast: accepted
- 4) Assessment model: Analytical assessment based on SMS 2 season (Jan-Jun and Jul-Dec) model. Age based assuming a relationship between F and fishing effort. 1 fleet and 1 dredge survey,

- 5) Consistency: Consistent assessment, but with some retrospective pattern in the recruitment and SBB
- 6) Stock status: spawning-stock size is above below MSY Bescapement and Bpa, but above Blim 1st January 2022. R 2021 is far below average.
- 7) Management plan: No MP for SA1r

General comments

Technical comments

Audit of san.sa.1r

Review of ICES Scientific Report, HAWG 2022

Reviewers: Claus R. Sparrevohn

Expert group Chair: Cecilie Kvamme

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock

Short description of the assessment as follows (examples in grey text):

- 1) Assessment type: update
- 2) Assessment: accepted
- 3) Forecast: accepted
- 4) Assessment model: SMS with dredge survey index and commercial effort
- 5) Consistency: Accepted. Model is consistent with to last year
- 6) Stock status: $SSB > B_{lim}$ but fluctuates somewhat between years due to the nature of shortlived species. No fishery reference point is defined for this stock
- 7) Management plan: No agreed management plan

General comments

Due to a low recruitment index (dredge survey), the combination of the incoming 2021 yearclass and the estimated 2022 SSB is not big enough to support any fishery. Because of that, the group support setting a monitoring TAC on 5000 t combined with a sampling procedure ensuring data for next years assessment.

Technical comments

There is retrospective bias in the assessment, especially in the SSB and recruitment,

Conclusions

An assessment appropriate basis for advice.

Audit of san.sa.2r

Review of ICES Scientific Report, HAWG 2022, 3 February

Reviewers: Valerio Bartolino and Christopher Griffiths

Expert group Chair: Cecilie Kvamme and Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

- Assessment and forecasts conform to the procedures
- The retrospective patterns in both R and SSB are known to be problematic for the stock and the Mohn's rho has deteriorated further compared to the last year's assessment (ρ .SSB from 0.49 to 0.55 and ρ .R from 0.29 to 0.37). When compared to last year's assessment, SSB has been revised downwards for several years back in time. The reasons for this are not clear from the text in the advice sheet but it must be related to the revision in R.
- The dredge survey found high densities of age 0 in 2021 throughout both the northern and southern grounds. This builds confidence in the good 2021 age 0 survey index
- The estimate of survey catchability (especially for age 0) is highly variable among years which is problematic to the assessment of the stock. However, the net effect given by the combination of the catchability parameter and the parameter used in the power model is consistent with last year's assessment.
- The increase in the advice seems in line with the predicted 2021 year class

For single-stock summary sheet advice

Stock: san.sa.2r

Short description of the assessment as follows (examples in grey text):

- 8) Assessment type: update
- 9) Assessment: accepted
- 10) Forecast: accepted
- 11) Assessment model: analytical assessment based on SMS assuming a relationship between F and fishing effort – 1 fleet and 1 dredge survey, two timesteps per year (Jan-Jun and Jul-Dec).
- 12) Consistency:
 - The assessment has a strong retrospective pattern. The downward revision of recruitment and SSB is not limited to last year estimates and goes several years back in time. Reasons for this are only partially understood by the group
 - There is an important change in the survey catchability especially for age0 (from 0.616 to 0.356) but ultimately not in the net effect

once the density-dependent catchability parameter (DD-parameter) of the power model is taken into account. The DD-parameter is estimated to be 1.32 in the 2022 assessment compared to 1.27 from the 2021 assessment

- An increased variance in catchability for all ages in the fishery suggests some deterioration of model fitting to the catch.
- The survey residuals for age 0 are larger in the years 2015, 2016, 2018, 2019 compared to the last year's assessment (see bubble plot residuals for age 0).

13) Stock status: SSB in 2022 is estimated below Blim but the good year class estimated for 2021 results in relatively high advice. This might not be the best situation given the tendency to overestimate recruitment in this assessment. Increases in the DD-parameter should help but uncertainty around this advice remain high. The overall perception is that the stock has had low productivity for >20 years and it continues to stay low despite signals of occasionally good incoming year classes (only informed by the survey). The good incoming year class for 2021 has produced a considerable increase in the advice for 2022. The Fcap drives the advice for 2022.

14) Management plan: No MP for SA2r.

Conclusions

The assessment has been performed correctly and according to procedure. The retrospective pattern is problematic, especially on SSB.

Audit of San.sa.3r

Working Group: HAWG Stock Name: san.sa.3r

Review of ICES Scientific Report, (HAWG) (2022) (02.02.2021)

Reviewers: Johnathan Ball

Expert group Chair: Cecilie Kvamme

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock: san.sa.3r

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 (Inter-benchmark in 2020). Sandeel area 3r mainly consists of fishing grounds in Norwegian EEZ.

- 15) Assessment type: update
- 16) Assessment: accepted
- 17) Forecast: accepted
- 18) Assessment model: SA3r uses a seasonal SMS-effort model, tuned by dredge and acoustic survey index. The recruitment index of the dredge survey includes a density-dependency, to account for overestimation of large incoming year classes. An update to natural mortality's is available but has not been implemented.
- 19) Consistency: The advice is consistent with last year's assessment.
- 20) Stock status: SSB has been above B_{pa} since 2015. F is lower than last year, however confidence around F has increased compared to recent pre 2020 values and remains above averages. Recruitment is noted to be lower than average for the stock.
- 21) Management plan: There is no agreed management plan for this stock.

General comments.

This has probably been discussed but should a note be added to the management plan section of the advice mentioning the existence of a Norwegian management plan. I realise this is not universally agreed, but it does affect the stock. It's a bit jarring to find it buried in the report with no mention in the advice.

Will the new natural mortalities be looked at the benchmark?

Advice sheet

- SSB legend and lines are different from last year
- blim and bpa values swapped in legend MSYbescape also appears to be 80,000 not 129,000 as in table 4
- same issue in figure 2
- History of catch (table 8) does not match the table 9 provided during advice meeting.

Report

- Report table 9.4.10 is this model values vs actual values as they do not match advice table 9. I also checked the report table also does not match the sag graph data from the sag excel. Is this just because the tables are showing different things? I do note that the report labels table 9.4.10 as report model estimates

Technical comments

Conclusion

The report is well written, however given the discussion around the power model should a detailed explanation of how it functions and is applied be added?

Audit of San.sa.3r

Review of ICES Scientific Report, (HAWG) (2022) (03.02.2022)

Reviewers: Norbert Rohlf

Expert group Chair: Cecilie Kvamme, Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock: san.sa.3r

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 (Inter-benchmark in 2020). Sandeel area 3r mainly consists of fishing grounds in Norwegian EEZ.

- 1) Assessment type: update
- 2) Assessment: accepted
- 3) Forecast: accepted
- 4) Assessment model: Seasonal SMS-effort model, tuned by dredge and acoustic survey index. Density-dependency in the recruitment index of the dredge survey was included to account for overestimation of large incoming year classes. Natural mortalities not updated with latest SMS runs; this would have led to substantial changes of stock's historic perception. HAWG to consider if new reference points should be estimated.
- 5) Consistency: consistent with last year's assessment. Model was applied as per stock annex. Implementing density dependence on the relationship between recruitment and the dredge survey reduced the retrospective bias in the recruitment and the Mohn's Rho in the current assessment.
- 6) Stock status: SSB has been above B_{pa} since 2015, combined with low F . Above recruitment in period 2018 to 2020. F is actually increasing and peaked in 2020. Thus, SSB has decreased considerably, but is still well above B_{pa} .
- 7) Management plan: There is no agreed management plan for this stock. Since 2011, the Norwegian sandeel fishery in SA3r has been managed according to an area-based management plan for the Norwegian EEZ.

General comments

The report is very concise and documents all decisions and settings made in the assessment well.

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.

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.
- ☒ 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 then 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,
- ☒ The notes are correct and
- ☒ The sources are correct.

Catch options table:

- ☐ The forecast should be re-run to ensure all values are correct.
- ☒ Compare the input data with previous year run (previous year should be in the share point under the data folder)
- ☒ 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.
- ☒ 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.

Basis of the assessment

- ☒ If there is no change from the previous year the table should be the same.
- ☒ 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 **additional** available information”

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.
- ☒ 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.4

Review of ICES Scientific Report, HAWG 2022, 4 February

Reviewers: Espen Johnsen

Expert group Chair: Cecilie Kvamme and Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

There is a concern that TAC is given for an area that includes a closed area without any commercial sandeel fishing. The advice does not consider the potential consequences of this spatial distribution of effort, which may lead to high catches in the open areas.

For single-stock summary sheet advice

Stock: san.sa.4

- 22) Assessment type: update
- 23) Assessment: accepted
- 24) Forecast: accepted
- 25) Assessment model: Analytical assessment based on SMS 2 season (Jan-Jun and Jul-Dec) model. Age based assuming a relationship between F and fishing effort. 1 fleet and 1 dredge survey,
- 26) Consistency: The 2022 assessment resulted in a marked reduction and downshift in SBB for the full time series (see attached Figure). The reason for this change is not clear, but it may be related to an increase in the assessment CV of the dredge survey that has destabilized the assessment.
- 27) Stock status: spawning-stock size is above below MSY Bescapement and Bpa, but above Blim 1st January 2022. R 2021 is below average.
- 28) Management plan: No MP for SA4, but the area off the east coast of Scotland, from Rat-tray Head to St Abbs have been closed for industrial fishery for sandeel since 2000.

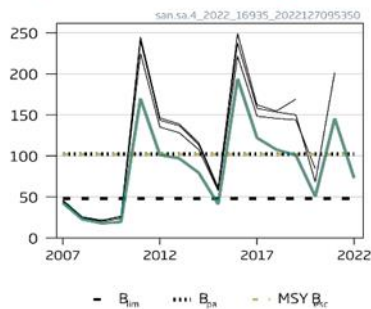
General comments

The dredge survey covers the closed area off the coast of Scotland, and does not overlap with the open area with commercial catches. Any spatial structure of recruitment and survival may affect the two time series and lead to some extra uncertainty in the assessment.

Technical comments

Conclusions

The assessment has been performed correctly and according to procedure. The retrospective downscaling of the SSB is of concern.

SSB (thousand tonnes)**Audit of San.sa.4**

Review of ICES Scientific Report, (*expert group/workshop title*) (*year*) (*dates*)

Reviewers: Claus R. Sparrevohn

Expert group Chair: Cecilie Kvamme

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice**Stock SA4**

Short description of the assessment as follows (examples in grey text):

- 1) Assessment type: update
- 2) Assessment: accepted
- 3) Forecast: accepted
- 4) Assessment model: SMS with dredge survey index
- 5) Consistency: Accepted. Model is consistent with to last year
- 6) Stock status: $SSB > B_{lim}$ but fluctuates somewhat between years due to the nature of shortlived species. No fishery reference point is defined for this stock
- 7) Management plan: No agreed management plan

General comments

Due to a low recruitment index (dredge survey), the combination of the incoming 2021 yearclass and the estimated 2022 SSB is not big enough to support any fishery. Because of that, the group support setting a monitoring TAC on 5000 t combined with a sampling procedure ensuring data for next years assessment.

Technical comments

There is a pronounced retrospective bias in the assessment, especially in the SSB and recruitment. The 2020 recruitment has been downward revised with 79% and a downward revision is seen for most of the timeseries. This is related to changes in catchability in the dredge survey, which also had a higher CV this year.

Conclusions

An assessment appropriate basis for advice, but there is some issues that should be looked at during the upcoming benchmark.

Audit of Spr.27.7de

Working Group: HAWG Stock Name: spr.27.7.de

Review of ICES Scientific Report, *HAWG 2022, 5th April 2022*

Reviewers: *Eleanor MacLeod, Kristen Birch Hakånsson*

Expert group Chair: *Afra Egan, Cecile Kvamme*

Secretariat representative: *Sarah Louise Millar*

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

Recommendations, general remarks for expert groups, etc. (use bullet points and subheadings if needed)

For single-stock summary sheet advice

Stock: Sprat in the English Channel (spr.27.7de)

Short description of the assessment as follows (examples in grey text):

- 8) Assessment type: *update*
- 9) Assessment: *accepted, based on PELTIC survey biomass trends*
- 10) Forecast: *NA*
- 11) Assessment model: *There is no assessment model for this stock*
- 12) Consistency: *This advice is consistent with last year's assessment, following ICES category 3 rules using an adjusted CHR (8.57%)*
- 13) Stock status: *No reference points for this stock, but large increase in stock biomass. Drop in harvest rate attributed to large abundances of juvenile sprat mixed into the stock hampering fishing.*
- 14) Management plan: *There is no agreed management plan for this stock*

General comments

Assessment has been conducted correctly according to the guidelines set out at the last interbenchmark. Both the draft report and the catch advice are clear and well explained.

There are three matters awaiting secretariat support:

1. SAG graphs in the advice sheet have not yet been completed. Updated plots should replace ones currently there.
2. Two references in the advice sheet need to be updated
3. Secretariat support required to decide whether the Istat value gets updated this year or stays at the level set at the interbenchmark. Will need to be updated in the advice sheet and draft report section.

Drop in harvest rate – second year in a row that this has substantially dropped – concerning that in both years there seems to be an extenuating circumstance to explain the drop. Last year the drop at least resulted in a small decrease in advice due to a lower index, now due to the index there is a substantial increase in advice. This is not an issue with the way the assessment has been performed this year, but should be kept in mind going forward.

Technical comments

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

Conclusions

The assessment seems to have been conducted correctly according to the Stock Annex and the advice was given following the new rules agreed at the 2021 interbenchmark for this category 3 stock

Audit of Spr.27.3a4

Working Group: HAWG Stock Name: spr.27.3a4

Review of ICES Scientific Report, HAWG 2022

Reviewers: Paul Marchal

Expert group Chair: Cecilie Kvamme and Afra Egan

Secretariat representative: Sarah Millar

Audience to write for: advice drafting group, ACOM, and next year's expert group

General

- Assessment and forecasts conform to the procedures
- Retrospective patterns in both R and SSB persist but have reduced to acceptable levels
- Trends in catch and IBTS-Q3 residuals to be investigated
- All catch options lead to an increase in forecast SSB. This may be driven by the GM-estimated 2022 recruitment value used in short-term forecast (120 billion), which is much higher than the 2021 (69 billion) and the 2020 (85 billion) values

For single-stock summary sheet advice

Stock : Sprat in 3a and 4

Short description of the assessment as follows (examples in grey text):

- 15) Assessment type: update (last benchmark in November 2018)
- 16) Assessment: accepted
- 17) Forecast: accepted
- 18) Assessment model: SMS-based analytical model with quarterly time steps, and tuned by three surveys
- 19) Consistency:
 - a. Medium-high CV for catch residuals; small CV for survey residuals;
 - b. Negative trend in catch residuals since late 1990s and positive trend in IBTS-Q3 residuals since late 2000s;
 - c. Tendency to overestimate R and SSB (although reduced compared to previous assessment);
- 20) Stock status: $B_{lim} < B(2022) < B_{pa}$; 2022 recruitment below average; $F(2021)=2.17$ well above $F_{cap}=0.69$ used in the advice
- 21) Management plan: NA

Conclusions

Assessment performed correctly and according to procedure. The reasons for trends in catch and IBTS-Q3 residuals should be investigated.