MEETING
NAMMCO SCIENTIFIC COMMITTEE WORKING GROUP ON BYCATCH

REPORT

Videoconference, 4 April 2018

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1. CHAIR'S WELCOME AND OPENING REMARKS

The Chair of the By-catch Working Group (WGBYC), Kimberly Murray, welcomed the participants (Appendix 2) to the videoconference meeting. She drew the attention of the participants to the documents (see Item 5) and the terms of reference. She noted that the main duty for this meeting was to review the revised estimates from Iceland, but if time allowed other countries would be asked to provide updates since the last meeting in May 2017.

Murray reviewed the recommendations from the WGBYC to Iceland which provided the basis for the reanalysis that Iceland submitted.

2. TERMS OF REFERENCE

1. *Review the Icelandic lumpsucker and cod gillnet fishery by-catch data and estimates;*
2. *Updates on answers to BYCWG recommendations from 2017*

3. ADOPTION OF AGENDA

The agenda (Appendix 1) was adopted without revisions.

4. APPOINTMENT OF RAPPORTEURS

Prewitt acted as rapporteur, with help from Desportes and Murray to finalise the report.

5. REVIEW OF AVAILABLE DOCUMENTS AND DATA

The WG had two documents from Iceland for consideration.

- Bycatch of seabirds and marine mammals in lumpsucker gillnets 2014 - 2017, Marine and Freshwater Research Institute, Mars 2018 [New document]
- Bycatch of seabirds and marine mammals 2014 - 2016, Marine and Freshwater Research Institute, September 2018, Technical Report [Revision of the document/analysis presented in May 2017, following WGBYC 2017 recommendations]

6. ICELAND

It should be noted than in Iceland, what is usually called observers in other fisheries (i.e., independent specialist placed onboard commercial fishing vessels for observing/controlling fishing activities and catch within the framework of a fisheries observer program) are called inspectors. Icelandic inspectors go out with fishing vessels and observe fishing activities like observers but have also the authority to fine or charge the vessel with criminal charges. Therefore, in the text below, reference to inspection/inspectors are what would usually be called observation/observers.

6.1. By-catch of marine mammals 2014 - 2016

Sigurðsson (Iceland) reviewed the document presenting the revised analysis based on the advices and recommendations formulated at the May 2017 meeting. The error estimates for the analysis had been considered very low, and the WG had suggested that Sigurðsson (Iceland) used a bootstrap approach. Therefore, the present analysis uses a bootstrap approach on the error estimates for the cod gillnet fishery. Sigurðsson also noted that he used statistical squares for the spatial stratification of the cod gillnet data.

The WG noted that it would be helpful to explain the data sources in the Table 1 caption better. For instance, it was not clear that the data for the "cod nets" were from the MFRI April cod survey, whereas

the otter trawl, longline, and monkfish net data originated from inspections carried out throughout the year. It was also not made clear that the cod by-catch estimates were spatially stratified, whereas bycatch estimates in the other gear types were not. It was suggested that the observer effort by month be listed for the other gear/target fishery types and separated from the cod gillnet data.

The WG also noted that for the cod gillnet estimates, it would be informative to see the aggregated summary tables for the statistical squares, and due to the large numbers of these, this table could include only those that have by-catch.

It was also suggested that a map of the aggregated statistical areas be provided to show where the bycatch occurred spatially around Iceland.

6.1.1 Harbour porpoise – cod gillnet

As discussed at the May 2017 meeting, the WG recognised that there are no other data sources for abundance of harbour porpoises outside of the 2007 summer aerial survey, and therefore the market data was used as an index of abundance. Using the abundance index reduces the by-catch estimate, and the group recommended that both analyses, with and without using the index, be presented.

The WG noted that it would be helpful to outside readers to expand the explanation in the paper of why the market data from 1990 was used as an index of abundance.

The WG discussed the apparent large increase in harbour porpoise abundance in June (Figure 1 from Bycatch of Seabirds and Marine Mammals 2014-2016). This suggests that there are very few harbour porpoises in the Icelandic fishing area in fall/winter but a high presence in April – July, or that they are only caught in these months. This may be possible, as harbour porpoise presence appears to be related to capelin spawning around Iceland.

The WG suggested that Iceland explore the market data to examine whether there could be some drivers affecting the changes in the markets, e.g., whether more harbour porpoises could be caught in June because of market demand and not because of an increased abundance.

The cod gillnet estimates are based on the cod gillnet survey conducted by MRI during April. This fishery is not monitored every year, but there had been inspectors in 2015 and 2017. The WG recommended that Sigurðsson examine the inspector coverage in these 2 years to determine whether these data could be used to estimate by-catch rates outside of April. If there was enough coverage, it may be possible to determine whether the by-catch rate in other months is as low as the analysis is predicting. It will also verify the reliability of the abundance index and inform whether there was by-catch in months of predicted low abundance. Sigurðsson should investigate how many monitoring days/trips would be necessary to verify that the by-catch is as low as predicted.

Recommendations : harbour porpoise – cod gillnet

- Include the 2017 data from the April cod gillnet survey
- Explore the observer data from 2015 and 2017 – especially, check if observers recorded harbour porpoise bycatch in other months to check the assumption that porpoises are only “available” in May/June. It would also be helpful to determine the level of observer effort each month.
- Provide cod gillnet fishing effort by month. If the effort is very low in the months outside of April-June, then it is likely that the by-catch rate is low as well.
- Create a map for cod gillnet by-catch and effort like the one generated for lumpsucker net

The recommended analyses should be presented to the BYCWG before it can endorse the harbour porpoise by-catch estimates.

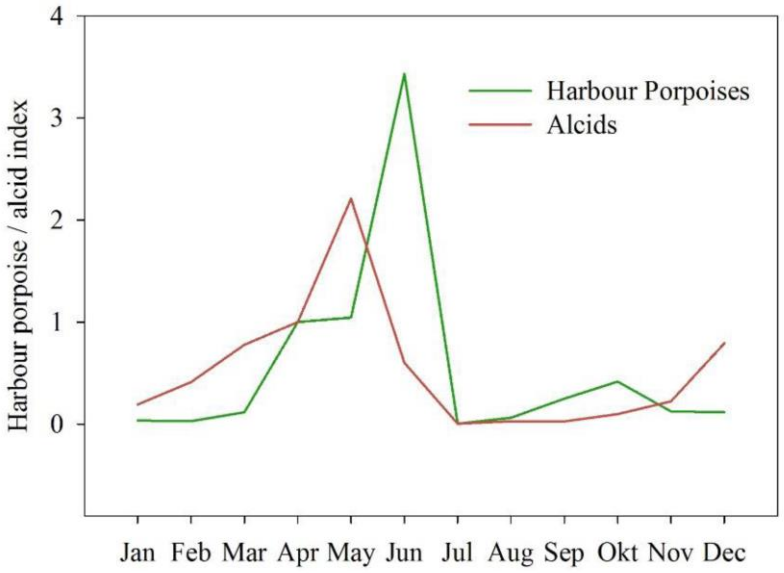

Fig. 1. Abundance index by month of harbour porpoises and alcids used to account for seasonal differences in abundance of marine mammals and seabirds assembled from amounts of those animals sold at fish markets in Iceland between 1991 and 1993. The index is standardized so that bycatch in April is equal to 1 in the index. [Fig. 1 from Bycatch of seabirds and marine mammals 2014-2016]

6.1.2 Seals – Cod gillnet

The WG noted that more harbour and grey seals have been reported by the fishing fleet than by the inspectors. In fact, no grey seals were recorded during the April cod survey. This could be due to a species identification problem (e.g., young harp seals are reported by fishermen as harbour or grey seals), or an issue with the estimation. As data are only available in April, it is possible that seals may be present in the fishing areas outside of April. The WG had previously recommended the of collection of jaws, skin, or at least photos to solve the species identification problem, but this has not been implemented yet.

It is not possible to use an approach similar to harbour porpoises of using market data for seals as the seal market is much older.

Recommendations: seals – cod gillnet

The WG suggested to provide a map of the fishing effort around Iceland by month to show whether there is high effort in the months outside of April. This would indicate if it is likely that there is by-catch in other months. Seals are by-caught in the lumpsucker fishery in other months, suggesting that they are present and available to be by-caught by the cod gillnet fishery outside of April. The WG recommended that Iceland examine these data (i.e. look in which months the fishing fleet reports the by-catch; look whether/where seal presence and the cod gillnet fishery overlap in space and time). Additionally, explore for all species using a broader spatial and temporal scheme for stratifying (e.g., include area/region).

The recommended analyses should be presented to the BYCWG before it can endorse the estimates of seal by-catch in cod gillnets.

6.1.3 Conclusions - cod gillnet estimates

Sigurðsson noted that he is in the process of updating this analysis for an internal document with a deadline of 6 June and he will take the recommendations provided into account in this process. The part concerning the lumpsucker fishery would be removed as it has now its own document. Sigurðsson

agreed to send to the WG the updated document mid-May, and the BYCWG agreed to review the paper via email initially, and via videoconference in mid-late May if necessary.

Other Fisheries
The WG noted the increase in by-catch in the monkfish fishery in 2016, which may be due to a few events of multiple animals per trip.

It was noted that there are no reports of by-catch from the pelagic trawl fleet, even with decent observer coverage. The WG recommended that Iceland provide more detail on the amount of observer effort in pelagic trawl fleets which would give more confidence in stating that there is no by-catch in the pelagic trawl fleet.

There is also very high observer coverage in the mid-water trawl fleet (10 vessels), however the WG noted that in other areas it is very easy for observers to miss by-catch events in this type of fishery. Iceland should note this caveat when stating that there is little to no by-catch in this fishery.

6.2. By-catch in lumpsucker nets 2014 - 2017

The Marine Stewardship Council (MSC) certification of the lumpsucker fishery in Iceland was suspended due to high by-catch of harbour and grey seals, and black guillemot. As a result, the Ministry requested a more detailed analysis for that fishery.

6.2.1 By-catch estimates

Sigurðsson reviewed the paper for the WG, which presents the data stratified by management areas (Fig 1 in lumpsucker paper), depth, and month.

The WG noted that the depth data was a rough estimate, as only about half of the fishermen and around 75% of the inspectors reported depth, and these data had been applied to the whole fleet. This year, the inspectors will be instructed to all report depth. It is also unknown which depth is recorded, e.g. is it the deepest part of the net.

The WG discussed its previous recommendations that inspection be carried out on vessels randomly selected. Prior to 2017, vessels to be inspected were selected to examine by-catch of cod, net infractions, other discrepancies in groundfish landings, nets, etc., and not necessarily marine mammal by-catch. From 2017, some of the inspections were also carried out on randomly selected vessels. Results indicated that the randomly selected trips had higher bycatch rates than the non-randomly selected vessel (39 animals on 40 trips versus 19 animals on 31 trips), though the difference in marine mammal bycatch rates was not significant. This result may have been due to the way in which the differences were tested (e.g. testing of number of takes versus number of bycatch events per trip). The WG recommended that the data from the 2 groups be explored further because it may have implications for data collected on non-random trips.

Overall, the difference in by-catch rate per year was not significantly different – based on number of animals. There were fewer single events with a high number of individual by-caught in 2017 that were seen in 2016. The highest number in a single trip in 2017 was 9 harbour seals – most trips had 1 or 2 harbour seals, and a few trips had 3 by-caught. The WG noted that the clumping contributes to the non-significant difference, and it might be informative to test for a non-random effect by treating the data as binomial (either there is by-catch or not).

The summary of by-catch estimates across 4 different stratification schemes are provided in Table 1: non-stratified, stratified by management area, by depth, and by month. Sigurðsson noted that variability in the bycatch rates is likely a combination of these factors, but the data were too limited to use a combined stratification. However, there are clear patterns that show when and where most of the by-catch is occurring which is useful. The WG noted that a broader combined stratification might still work with the data available: for instance, 2 management areas (B&C vs. all others) and 2 seasons (Mar-May, Jun-July) would provide 4 strata. Even so, the WG noted that all the estimates are fairly similar, and it does not appear to matter which stratification is used.

The WG noted that in 2017 there was a 10-fold increase in logbook recordings for harbour porpoises, and also increased reporting of seals. This is likely due to the fishermen being compensated for providing MRI with harbour porpoise samples. However, even with a compensation provided, the reporting in logbook remains less than the by-catch estimates.

The WG discussed how these estimates will be used in the assessments, and the Secretariat noted that the primary purpose would be to look at the sustainability of the removals. It might be helpful to run a range of estimates for assessment purposes. The WG noted that the CVs for the grey seal estimates are high, and that the assessment group should take this into account.

6.2.2 Conclusion - lumpsucker nets

The WG accepted the by-catch estimates presented in Table 1 and recommended forwarding all the estimates – non-stratified and stratified – to the Scientific Committee. The stratified estimates are preferred over the non-stratified estimate, however there is not enough information to suggest one stratification over another. Reducing the stratification could improve the estimates (see recommendations below).

The WG noted that, as has been observed in most other areas, the logbooks do not provide a reliable source of data to use for estimating by-catch, even when fishermen should be motivated by a compensation. It therefore strongly recommended that logbooks are not used for calculating/assuming by-catch rates, but only used as indicators for raising concerns when by-catch reporting is increasing.

6.2.3 Recommendations for future work

The analysis did not show a significant difference between randomly and non-randomly selected inspected vessels, however the data should be further explored. Specifically, whether the difference changes if the analysis uses number of by-catch events rather than number of individuals caught should be investigated (i.e., using a binomial analysis with "catch vs no-catch"). It is helpful to continue selecting vessels randomly and keeping track of which vessels are selected randomly/non-randomly.

The depth stratification would be improved with more consistent reporting, and an agreed consistent definition of how to report the depth.

The stratification of management areas could be improved by examining the management areas with high by-catch versus low by-catch. This could be done by reducing the management areas to these 2 strata, and then by month or quarter. This is mostly a spring fishery (from March/April to July/August) and the by-catch is mainly March–May. Collating the data on fewer strata will both improve the estimate and its precision.

7. UPDATES

7.1. Iceland

The WG noted that foreign vessels are fishing in Icelandic waters and recommended that any information that is available on by-catch from these vessels be presented. Iceland informed the WG that there are conditions for observer coverage in the fishing agreements, especially for large trawlers and pelagic vessels. The WG recommended that Iceland provide a description of the coverage and by-catch reports, even if there is none, as it provides more evidence that there is little by-catch risk.

7.2. Norway

No participant from Norway was present in the meeting.

Table 1. Summary of four average annual marine mammal bycatch estimates per species (n/year) – period 2014-2017. The numbers reported in logbooks by the fleet in 2017 are also shown. [Table 12 from Bycatch of seabirds and marine mammals in lumpsucker gillnets 2014-2017]

Species	**Non-stratified** (± CV*estimate)	**Stratified by management area** (± CV*estimate)	**Stratified by depth** (± CV*estimate)	**Stratified by month** (± CV*estimate)	**Logbooks 2017**
Harbour porpoise	551 (412-630)	549 (264-834)	662 (324-998)	428 (240-616)	286
Harbour seal	1367 (1135-1599)	1255 (728-1782)	1663 (915-2411)	1221 (684-1758)	700 (all seal species)
Grey seal	1385 (886-1884)	1091 (502-1680)	1034 (165-1903)	1907 (840-2974)	
Harp seal	177 (113-241)	132 (15-249)	213 (49-377)	190 (55-325)	
Ringed seal	53 (13-93)	33 (1-65)	48 (1-95)	60 (1-118)	
Bearded seal	36 (9-63)	42 (12-72)	NA	42 (13-71)	
White beaked dolphin	0	0	0	0	2
Unidentified dolphin	0	0	0	0	1
Total marine mammals	**3 570 (2963-4177)**	**3102 (2016-4188)**	**3620 (760-6480)**	**3847 (2270-5424)**	**988**

7.3. Faroe Islands

At the meeting in May 2017, the WG made various recommendations to the Faroe Islands and reiterated these recommendations at this meeting.

1. With regards to by-catch reporting, the WG reiterated its recommendation that:

1.1. Add selection of local marine mammal species to e-logbook design, so species identification can be easily reported.

1.2 Implement a reporting system for vessels below 15 GMT, as also recommended by the previous BYCWG.

2. With regards to by-catch observation, the WG reiterated its recommendation that:

2.1 Improve reporting of by-catch on pelagic pair trawl fisheries by monitoring vessels in the fleet with an electronic monitoring video system (EM) or onboard observers. Electronic Monitoring might be more cost-effective than an observer scheme, particularly because only 5 vessels operate in the pelagic pair trawl fishery, and likely only a few hours per fishing trip need to be observed and videoed. The use of the EM could also be rotational. These fisheries are difficult to observe due to the high volume of catch and the multi-vessel nature of the fishery, so attention must be given to where the observer or cameras are placed and to the stage of the haul.

2.2 Implement observer coverage in other fleets with potential for by-catch, such as the high vertical opening trawl fleet (6 vessels).

2.3 Review the data already collected by fishery observers on the monkfish fishery during an experimental monitoring of the fishery prior to 2015.

2.4 Include documentation of marine mammal by-catch in the protocol of fisheries observers, as well as other standard characteristics of the fleet (effort, location, month, etc.) to measure by-catch rates.

Additionally, it was noted that the Faroese Fisheries Inspection inspect fishing activities at sea at sea and when vessels deliver catches, but do not have observers on board the vessels for any length of time during fishing operation, and therefore would not be able to provide reliable by-catch reports. The Faroes plan to introduce quotas in fishery management, as a substitute for fishing days, and in this context plan to increase inspection intensity and the frequency and duration of observers' activities onboard vessels at sea, which will provide a more reliable by-catch monitoring.

Similar as in Iceland, foreign vessels are frequently fishing in Faroese waters, and the WG recommended that any information on observers and reports of by-catch by foreign fleet be presented to the next BYCWG meeting.

8. NEXT MEETING

As noted under Item 6.1, revised estimates from the Icelandic cod gillnet fishery will be sent in mid-May, with a possible videoconference in mid-late May.

Murray thanked Sigurðsson for his efforts in implementing the recommendation of the WG in his analysis, and the participants for their constructive comments. The report was accepted via email correspondence on 26 April 2018.

AGENDA

1. CHAIRMAN WELCOME AND OPENING REMARKS

2. TERMS OF REFERENCE

3. *Review the Icelandic lumpsucker and cod gillnet fishery by-catch data and estimates;*
4. *Updates from BYCWG recommendations from 2017*

3. ADOPTION OF AGENDA

4. APPOINTMENT OF RAPPORTEURS

5. REVIEW OF AVAILABLE DOCUMENTS AND DATA

6. ICELAND
6.1. By-catch of marine mammals
6.2. By-catch in lumpsucker nets

7. UPDATES
7.1. Iceland – other
7.2. Norway
7.3. Faroe Islands

8. NEXT MEETING

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