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History of Catch estimation in NAFO

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Abstract

The issue of reliable catch data has been discussed frequently in Scientific Council (SC) since the mid-1980s, as it is a key input into stock assessments. The use of unofficial estimates to replace officially reported catches arose in SC in the mid-1980's and was subjected to a number of reviews by various bodies, including NAFO. The use of catch estimates, when considered by SC to be more reliable than official statistics, has continued. Discrepancies between some catches reported officially to NAFO by contracting parties, and catches estimated by SC for its assessments have resulted in an independent review in 2012-13 of SC's catch estimation procedures. In addition, SC has not had the data available to estimate catches for some 2011 and 2012 fisheries, resulting in difficulties with several stock assessments.

Introduction

Obtaining accurate estimates of commercial catch from fisheries in the NAFO area is critical to the assessment and management of most NAFO stocks. Estimated catches, in addition to or in place of officially reported catches, have been used by Scientific Council in its stock assessments since the 1980's. In recent years, the use of these estimates, and in particular the discrepancy between these and some reported catches, has come under increased scrutiny. This paper outlines the history of catch estimates in NAFO SC and provides some detail involved in this process during different periods.

Initial use of catch estimates by SC in the 1980's

The use of estimated catches, either in place of or in addition to, officially reported (STATLANT 21) catches in Scientific Council (SC) stock assessments has existed since at least 1986. In its June 1986 report (NAFO 1986), STACFIS stated:

“In view of the major discrepancies between the catches reported by some member countries and those estimated from Canadian surveillance data and the fact that some non-member countries fished in Div. 3L, 3M, 3N, and 3O without reporting their catches, STACFIS recommends that the SC request the FC at its meeting in September 1986 to evaluate these estimates from surveillance data and the estimation procedure involved and advise the SC on the appropriateness of using such estimates to derive total removals in future assessments”.

Fisheries Commission (FC) and STACTIC reviewed this document in its 1986 and 1987 meetings, and in 1987 STACTIC reported (NAFO 1987): “Canadian authorities conducted a review of catches taken from the NAFO Regulatory Area in 1986 as determined from inspections of actual catches and estimates based on criteria outlined in the paper "Methodology for the Calculation of Catch Estimates for NAFO Regulated Stocks". As a result of those calculations it was believed that Contracting Party (CP) catches were more than double (excluding Canadian

catches) the total TAC's set by NAFO at the 1986 Annual Meeting. In addition, an estimated 19,000 tons was taken by non-member nations.” Although these catch estimates were the only ones available for non-member catches in the NRA (who did not report fishing activity to NAFO), this was not the only reason that these catch estimates were developed. Some CPs questioned the appropriateness of such calculations and reserved the right to object to these at a later meeting.

The catch estimation methodology was also reviewed by scientists in Canada during 1986 within the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC 1986). In 1987, the impact of possible misreporting of catches on the stock assessments of yellowtail flounder and American plaice in Div. 3LNO, and cod in Div. 3NO (CAFSAC 1987) was examined. In the latter review, catch estimates from surveillance were presented for the flatfish species for 1984-86, and for cod for 1983-86.

In summary, the issue of using surveillance-based estimates to replace officially reported catches in the mid 1980's was treated very seriously when it first arose, and was subjected to a number of internal reviews in Canada by the Department of Fisheries and Oceans, as well as peer reviews in various bodies of NAFO and CAFSAC. It was highly controversial in NAFO, and the subject of much debate in both SC and FC. SC never did have the “raw data” used in developing the surveillance estimates, as there were a number of confidentiality issues around these data, but based on the various presentations and reviews, SC had a clear understanding of how these data were collected and used in developing the catch estimates.

Use of catch estimates up to 2001

SC continued to use the surveillance estimates in its stock assessments from the late 1980s onward. This often produced considerable debate in SC over the validity of these numbers, and in some cases agreement on particular catches was not achieved, e.g. a range is listed, and the mid-point of the range is the total catch used in the assessment.

Over time, SC moved to documenting only total catches for stock assessments, and keeping the agreed breakdowns of catch by CP/member states out of the SC reports and Research Documents. The detailed breakdowns of the catch estimates were known to the members of SC, as they were important in calculating catch at age for the various fleets and fisheries, and in evaluating changes in the fishery, etc. However, SC concluded that it was not necessary to “point fingers” in its report, given that some catch estimates were much higher than allocated quotas, and agreed that documenting just the total catch by stock in its reports was sufficient. Also, unofficial catch estimates were not available for all fleets or all countries. The confidential nature of much of the data used in deriving catch estimates from several sources was also acknowledged. In effect, SC opted to use what it considered to be the best estimates of catch, albeit not fully documented by SC, rather than all officially reported catches (STATLANT) which were well documented but not believable to SC and many others in NAFO. It is important to note that SC never had the full datasets or complete methodology used to derive the estimates, although it understood what these data and methods were.

Even with its best estimates, STACFIS regularly observed that catch statistics were not adequate for some stocks, for a variety of reasons. This, combined with problems related to lack of biological sampling of the catches, and later the low catches associated with moratoria on fishing, resulted in a few assessments moving away from catch-based methods for a period of time (e.g. 3LNO American plaice in the early to mid-1990's). Eventually, “best estimates” were generally accepted as catches for all years. In its 2001 report, STACFIS included, for all stocks assessed, tables comparing the total STATLANT 21A data with the STACFIS estimates available for the stocks, for the years 1985-2000 (NAFO 2001). It was also in 2001 that SC began to record (in spreadsheets for its internal use only), available catch data from multiple sources (surveillance, observers, STATLANT, etc.), and how these data were combined in arriving at the accepted catches for each stock. These discussions occurred in plenary in SC and/or STACFIS, and were often difficult and time-consuming. Catch tables in the STACFIS assessment reports in 2001 included a row for “Non-reported catches”, and in STACFIS reports since that year, both the STATLANT 21 data and the STACFIS estimates have been given in the catch tables.

SC *ad hoc* WG on catch, after 2001

For a few years following 2001, a small group of NAFO scientists met at the start of the June SC meeting to try to arrive at acceptable estimates of catch for all stocks, considering all the available information. These meetings were not held in plenary, and no written reports were produced, recognizing the confidentiality of the data used to derive the catch estimates. Accepted estimates of catch were circulated to meeting participants, and discussions of catch in plenary sessions of SC/STACFIS were therefore minimized. During the last few years, the meetings were held by conference call in advance of the June SC meeting, with the objective of distributing accepted catches to the stock assessment scientists (Designated Experts, or DE's) to facilitate completing the assessments as early as possible. The group that met was referred to as the *ad hoc* catch WG, and it was agreed not to produce minutes or documentation of its work due to the ongoing confidentiality issues.

During the late 1990's and early 2000's another source of catch estimates became available in SC, from data collected by Scientific observers of some countries deployed on various vessels. These, which differ from the data collected by NAFO observers, were often in very good agreement with surveillance estimates (particularly in 2004-06), indicating possible misreporting in some fleets/fisheries in excess of 100%. After 2006 the estimates began to diverge (surveillance estimates were generally lower and closer to the reported catches than were the observer-based estimates). This was not a major concern for the 2006 catch estimates, but became an issue in 2008 (for the 2007 catches). At that time, many people in NAFO (outside SC) believed that misreporting had diminished to a relatively low level, due in part to new measures thought to be more effective in controlling fleet behaviour and subsequent catch reporting. However SC's accepted catch estimates, largely based on Scientific observer data, indicated otherwise, i.e. that misreporting levels suspected in the previous years had not changed substantially. Other anecdotal information also indicated possible problems with catch reporting for some fleets. Again, all the raw data that went into the various estimates, either from surveillance or observers, were never made available to the *ad hoc* catch WG (due to confidentiality), although it was understood what these data were.

Scientific Council recognized in 2005 the importance of reliable catch estimates to stock assessments, as well as the considerable efforts of some Contracting Parties to produce more accurate catch estimates. Scientific Council recommended that all CPs take measures to improve the accuracy of their catch estimates (NAFO 2005).

The catch discrepancy issue continued to draw more attention, as the gap between SC's estimates and reported catches for some fisheries remained large or even widened in 2009 and 2010. The newly reopened cod fishery in Div. 3M, and the fishery for Greenland halibut (GHL) in the NRA were the most problematic, the latter particularly so because of the possibility that SC's estimated catch levels may have triggered the exceptional circumstances provision in the application of the harvest control rule for GHL.

Present situation (2012-13)

At present, SC does not have information from surveillance for the past couple of years to use in developing catch estimates. As well, in 2012, observer estimates from 2011 catches were not made available to SC, leaving SC with no catch estimates from any sources other than official STATLANT 21 data. This was the case for most CPs in 2013, and has required SC to consider methods for assessing various stocks on a case by case basis, if/where STATLANT data are deemed as unreliable. SC assessments impacted include 2+3KLMNO GHL, 3LNO A. plaice, and 3M cod. Although Canada provided SC in 2013 with some catch estimates from its yellowtail fishery, this did not resolve the larger issue for the stocks noted above.

In 2012, General Council of NAFO initiated a review of SC's catch estimation procedure, and contracted a three-person peer review panel. The panel met with SC scientists at various points, and requested information and data from SC. SC provided the information where possible, noting that in one case it did not have the material requested by the panel, and in another that it could not provide the data. In both cases, confidentiality issues (between the scientists who had the data and fleets from which it was collected) were the reasons. Despite these well-known issues around confidentiality, and SC's cooperation with the panel whenever possible, SC's actions were seen by some as being uncooperative on this matter. The panel produced an interim report in September 2012, indicating that "The methodology employed to derive the scientific estimates is logical and sensible". The panel made several recommendations and requests for follow-ups, and its final report is expected to be produced for the September 2013

Annual Meeting. SC has again indicated it will provide information to assist the panel, within the limitations previously described.

Summary/conclusion

The issue of reliable catch data has occupied much time in SC over the years, as it is an important input into stock assessments. Contracting Parties have the responsibility to report accurate catches to NAFO via STATLANT 21 submissions, and Scientific Council has the responsibility to “compile” these catches for NAFO. Scientific Council considered that it is not its responsibility to provide the best catch figures (NAFO 2012), and SC has noted that it would prefer to receive accurate official catch data to conduct its work, rather than have to use unofficial estimates. SC has also recognized the difficulties resulting from the use of unofficial estimates of catch in its stock assessments, particularly when there are substantial discrepancies between these and the official data. However, it chose to use these estimates, which in many cases were demonstrated to be more reliable than catches based solely on officially reported (STATLANT) data, accepting that the underlying raw data were not always available to SC. Such acceptance of unofficial or undocumented catch data is common in various other scientific assessment bodies, such as ICES and ICCAT. The peer review panel also noted in its interim report that, “While such estimates may not always be welcome, they are generally accepted as the appropriate basis for scientific advice”. At present, SC is trying to deal with the issue of not having reliable catch estimates for several stocks, and the impact on various stock assessments.

References

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