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**Proceedings of the Newfoundland and
Labrador Regional Advisory Process
for Skates in Divisions 3LNO and
Subdivision 3Ps**

**Compte rendu de la réunion du
Processus consultatif régional de
Terre-Neuve-et-Labrador sur raie
épineuse des Divisions 3L, 3N, et 3O
ainsi que de la Subdivisions 3Ps.**

March 12-14, 2003

EPS Boardroom, Northwest Atlantic Fisheries Centre, St. John's, NL

E. D. Richards, Chairperson

**Science Branch
Fisheries and Oceans Canada
PO Box 5667
St. John's, NL
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SUMMARY

A meeting of the Newfoundland and Labrador Regional Advisory Process (RAP) on skates was held in St. John's, Newfoundland and Labrador, March 12-14, 2003. Full assessment of the stock status of Divisions 3LNO and Subdivision 3Ps skates were reviewed. These proceedings contain a summary of the working paper, associated presentations and ensuing discussions. A list of participants and the Meeting Remit are also appended to this report. Additional information on the resource assessed is contained in the Canadian Science Advisory Secretariat Research Documents and Stock Status Report series.

SOMMAIRE

Du 12 au 14 mars 2003, on a tenu une réunion à St. John's, Terre-Neuve, dans le cadre du Processus consultatif régional (PCR) de Terre-Neuve et du Labrador pour étudier les stocks de raies. On a procédé à l'examen de l'évaluation complète de l'état du stock de raies des divisions 3LNO et de la sous-division 3Ps. Le présent compte rendu résume le document de travail, les présentations connexes et les discussions tenues au cours de cette réunion. Une liste des participants et le cadre de référence de la réunion sont également inclus. Le lecteur peut trouver des renseignements supplémentaires sur la ressource évaluée dans les Documents de recherche du Secrétariat canadien de consultation scientifique et dans la série de Rapports sur l'état des stocks.

INTRODUCTION

A meeting of the Newfoundland and Labrador Regional Advisory Process (RAP) on skates was held March 12-14, 2003 in the EPS Boardroom, Northwest Atlantic Fisheries Centre, St. John's, Newfoundland and Labrador. The stock status of Divisions 3LNO and Subdivision 3Ps thorny skate was assessed.

In addition to Department of Fisheries and Oceans (DFO) scientific staff the meeting was also attended by invited participants including DFO Fisheries Management Branch, Provincial Department of Fisheries and Aquaculture, and industry.

Complete details of the data and methodologies used in the assessment are published in the Department of Fisheries and Oceans Canadian Science Advisory Secretariat (CSAS) Research Document series, while the overall report on stock status is contained in Stock Status Report (2003/023).

Participants attending the assessment session, in whole or in part are listed in Appendix 1. A copy of the Remit or Terms of Reference for the meeting and accompanying invitation list is provided in Appendix 2.

Only one working paper was presented and reviewed. The meeting recessed during the afternoon of March 13 to allow the lead scientist to prepare some additional material, as requested by a consensus of the meeting participants. Summary points for thorny skate are as follows:

- The abundance of thorny skate increased from the early 1970's to the mid-1980's then declined to its lowest level in the mid-1990's. The population has since been stable at this lower level.
- Thorny skate on the Grand Banks undergo a migration. They are concentrated along the outer bank between December and June and on the bank between July and November. The degree of offshore migration (proportion off the bank in the winter/spring) appears to have intensified during the period of decline of the population (mid-1980's to the early 1990's).
- Thorny skate have become increasingly concentrated in a smaller area (hyper-aggregation). The extent to which this is happening increased following the decline in biomass. Once densely concentrated on the northern Grand Bank, thorny skate are now absent from much of the area. About 90% of the biomass is now concentrated in 20% of the area (near the edge of the Southwest Grand Banks).
- The southwest edge of the Grand Bank is where the fishery occurs and commercial catch rates (inside and outside 200 miles) have increased as the fish have become increasingly more aggregated.

- Concurrent with the decline in biomass of thorny skate, a reduction in average weight was observed: 2 kg in the mid-1970's compared to 1.3 kg in the mid to late 1980's and 0.5 kg in the mid-1990's. Since 1994, average weight has increased to about 1.5 kg.
- Small skates (10-30 cm) have been largely absent from the northern Grand Banks (NAFO Div. 3L) since 1996. The largest occurrence of small skates is now found in NAFO Subdiv. 3Ps.
- Since the mid-1990's, 16.5% of the biomass has been outside of the 200-mile limit while 72% of the catch came from outside 200 miles.
- Reported commercial catch increased substantially in 2000 compared to the previous five years. The increase occurred outside of 200 miles.
- The Exploitation Index (commercial catch/spring survey biomass index) increased from about 5% in the mid-1980's to about 15% in 2000. This coincides with the period of decline.
- Causes for the decline are unclear. The area of greatest decline, on the Northern Grand Banks, is an area with little or no fishing. The period of decline was concurrent with that of the decline of many other demersal species.
- Information is lacking on most aspects of the population dynamics of thorny skate. Thus, it is not possible to undertake age based analyses or estimate the spawning stock biomass with any certainty.

WORKING PAPER SUMMARIES AND RELATED DISCUSSION

Working Paper 1: The status of Thorny skate (*Amblyraja radiata* Donovan, 1808) in NAFO Divisions 3L, 3N, 3O and Subdivision 3Ps – D. W. Kulka and C. M. Miri.

Abstract:

This evaluation of thorny skate (*Amblyraja radiata*) represents the fourth assessment of this relatively new fishery. The stock biomass indices, following a decline to their lowest historic level in the early 1990s have stabilized since the mid1990s. However, a change in research survey gear (in the fall of 1995) with different catch characteristics has created a discontinuity in the survey time series, thereby preventing a comparison between two periods: 1986 to 1994, and 1995 to date. The spring survey, previously used to estimate biomass and abundance, may not include a substantial portion of the population, and thus represents only the portion of the stock that occurs within the surveyed area. On average (1990-2002), fall survey estimates of biomass for the comparable area (NAFO Divisions 3LNO) were 41%. Analysis of lengths taken during research surveys have covered a consistent range since 1985, with main modes occurring at 15-32 cm and 65-83 cm in both spring and fall; the latter mode comprising mature skates. Since 1996, a single mode in the 30-60 cm range (a mix of mature and immature fish) has been observed. A recent increase in the proportion of larger skates in survey catches is noted. Since the mid1980s, Spain, Portugal, and Russia have prosecuted a directed fishery for skate (*Raja* sp.) outside Canada's 200-mile-limit on the Tail of the Grand Banks. However, Canada only established a limited directed fishery for skate on the southwestern Grand Banks and southern St. Pierre Bank after the decline of traditionally exploited groundfish resources. Prior to 1993, skates in Canadian waters were taken only as bycatch, most of which were discarded. Reported catches of all countries combined have averaged 12,191 t since 1985. In 2002, the (preliminary) reported catch was 9838 t (3342 t for Canada; including discards). A comparison of skate distribution from research survey data with commercial grounds indicates that the Canadian fleet fishes about one third of the area where skate are greatly aggregated in the spring; primarily along the shelf edge where skate are largest. Non-Canadian fleets fish a separate area on the Tail of the Grand Banks (outside 200 miles) in the fall, catching smaller skates.

Discussion:

Comments (C)/ Questions (Q)/ Responses (R):

Discussion from March 12, 2003

1. **Q:** When were 3LNOPs skates last assessed?

- R:** It was pointed out that 3LNOPs skates were last assessed in 1998. This is the fourth assessment to date. The research vessel surveys however go back to 1976.
2. **C:** There is currently no aging information available for skates, although an attempt was made several years ago to age them. The otoliths are not easy to read because they are so tiny. Aging may also be completed by counting rings in the vertebra.
3. **C:** It was noted that the 1996 increase in catch is the result of several high catches.
4. **C:** In 1983 the research vessel survey was not completed and in 1994 the survey coverage was not great either.
5. **C:** Pertaining to the Spring adjusted Biomass figure, there seems to be a high distribution of skate in Divisions 3O and 3Ps in the Campelen time series, in comparison to the Engels time series.
6. **Q:** What is the meaning of “relative biomass”?
- R:** Relative biomass indicates that it is not an absolute measure of the biomass. A 2.8 conversion factor was used to obtain the plotted values. There were comparative tows and conversions completed for the major species, but not for skate.
7. **C:** The Spring abundance estimates largely reflect the biomass index pattern.
8. **C:** The Fall surveys are not complete until 1990. The surveys show that prior to 1990 the 3L biomass distribution was high in comparison to the present distribution.
9. **C:** If a comparison is made between the proportion of biomass that occurs north versus south of the 3L Division line over time, it becomes evident that most of the lost of biomass was in the northern area.
10. **C:** Looking at the Spring versus Fall Biomass. The biomass in the survey area (3LNO) is higher in the Spring than the Fall, especially in the years 1993 and 1998. The Fall index is higher with regards to catchability.
11. **Q:** Observing the annual frequency of skates from the fall and spring surveys and the length composition information available is it possible to follow modes going through these surveys?
- R:** Notably following modes past the first five years is difficult.

12. **C:** This assessment information will be presented again in NAFO.
13. **Q:** Pertaining to the Fall and Spring distribution maps, how is this information constructed?
- R:** This is potential mapping. Point data is converted to a surface.
14. **C:** During the time period 1980-1982, skate were widely distributed. However, the area occupied by skate decreased since the 1980s and the largest decline occurred in the most recent years and on the northern half of the bank. The only significant recruitment since the 1990s is from the 3Ps area.
15. **C:** There is a change in the distribution over time and there is a change between Spring and the Fall distribution. Skate undergo a migration towards the edge of the Bank in Winter/Spring and back on the bank in mid-summer. 1986-1988 marks the start of the decline period.
16. **Q:** Is this decline possibly temperature driven?
- R:** If we put up a temperature chart, you may see trends between the warm and cold areas.
17. **C:** In 2000-2001 skates are found closer to the shelf edge and more and more fish are concentrated in a smaller area (hyperaggregated).
18. **Q:** How does skate distribution compare to monkfish?
- R:** It is very similar.
19. **C:** Biomass in 3LNO is higher in the spring than the fall, especially between 1993 and 1998.
20. **Q:** How was the non-Canadian effort outside 200 miles obtained?
- R:** The set by set data came from surveillance. It is only a subset of the fishery, but it provides good representation of coverage over time. This may represent 60-70% of the sets via observer logbooks.
21. **C:** The December-August effort was primarily directed for species other than skate; the September-November effort was primarily a directed fishery.

22. **C:** Skate bycatch rates from non-Canadian fisheries along the shelf edge show a disconnect from Spring to Fall. The distribution is primarily on the southwest part of the Grand Bank.
23. **C:** Skate perform a seasonal migration tending to move into deeper water along the shelf edge in the spring.
24. **Q:** Explain K-selected?
- R:** Skate populations show vulnerability to fishing pressure. They have a low reproductive potential due to slow growth rates, late sexual maturation, low fecundity and long reproductive cycles. They are very similar to mammals. Skates have a higher proportion of survival of the young. Recruitment over spawning stock (R/S) calculations does not exist. The potential for them to be susceptible to fishing pressure is high. Elasmobranchs such as skates and sharks have a low reproductive capacity due to low egg production. These characteristics result in low rates of increase and skates are thought to have very low resilience to fishing mortality.
25. **C:** The fishery outside 200 miles is unregulated in terms of TAC. Mesh sizes and bycatch regulations do exist however.
26. **Q:** What about the Nordmore grate in the shrimp fishery?
- R:** Yes, the Nordmore grate is selecting out the skates. The mandatory use of the Nordmore grate in the shrimp fishery since 1994 has reduced the bycatch of skate in that fishery.
26. **C:** There was a commercial mixed fishery from 1999-2002. Gillnet, longline and trawl were used over the southwest slope of the Grand Banks. Catch rates for skates were higher on the inner part of the grounds, away from the edge of the shelf.
27. **Q:** What about the non-Canadian fishery?
- R:** Catch rates for skate outside the 200 mile limit were highest on the shallow part of the Bank in the fall. Fishing effort on the shelf edge constituted bycatch in the Greenland halibut fishery.
28. **Q:** What is the source of the information pertaining to discards?
- R:** The majority of the reported landings are non-Canadian and the information for 2001 and 2002 are currently incomplete. The statistics on discards is taken from discard data, but there is some evidence to

suggest that reported discards are higher than what the numbers indicate.

29. **C:** With regards to the Canadian catch most of the landings occurred in the middle to the latter part of the year after 1994.

30. **Q:** Why do gillnets in Division 3O catch so few males starting in 1999?

R: The lead research scientist indicated that he was unable to suggest a reason why so few males appeared in the Division 3O catch. Perhaps, the harvesters would be best able to comment on this question.

31. **C:** With regards to the skate lengths determined using the trawl data it should be noted that for the most part mature fish are being taken and that prior to 1999 there are very small sample sizes available. The data is poorest in the lengths captured using the longline information (1995 and 2000 only plotted).

32. **C:** The exploitation index increased from 1999 to 2000 by 20%. It was noted that this exploitation rate is too high. It decreased from 1997 to 2000 and increased slightly in the mid-1980s to mid-1990s. Exploitation for 2000 and 2001 is currently incomplete, but it is postulated that exploitation rates are about 20% each.

Q: Why is the exploitation index for 2000 and 2001 currently incomplete?

R: To date, some countries have not submitted data for 2001.

Q: Is there a stable population with this level of exploitation?

R: Notably there is a considerable drop in the biomass in 2002; however, this is a single year change.

33. **C:** The environment is playing a large role in the distribution and decline of skates and fishing pressure is further adding to this decline. The only variable that is controllable is the fishery.

34. **C:** The non-Canadian catch needs to be regulated and it needs to be noted that the current exploitation rate is too high. The hyperaggregation was also seen for cod prior to its collapse.

Q: How much of the area would you have to add together to get 90% of the population (D-95 index)?

R: The area of occupancy would first need to be re-visited, prior to determining a D-95 index.

35. **C:** The Fall survey best represents the skate population in Division 3LNO, however, the time series does not start until the 1990s and it does not include Subdivision 3Ps. Therefore, the assessment must rely on the Spring survey. It was noted that the Figure 3 caption in the Research Document should indicate that the Spring data was used.
36. **Q:** Is the distribution of skates reflective of the temperature distribution?
- R:** When the mean annual oceanographic temperatures are compared to what is known regarding skate distribution trends can be noted.
37. **C:** The breakdown of the proportion of the population inside and outside the 200-mile limit was requested for the Spring and the Fall. It is suspected that most of the biomass is inside the 200 mile limit. The lead scientist indicated that he does have this information available and that it could be presented at the meeting at a later date. There was some debate on whether the catch outside is too high: however, in any case the change in skate distribution over time is of notable concern.

Suggestions were made for the inclusions into the draft Stock Status Report Summary bullets: biomass, distribution, migration, lack of aging information, etc...

The decision was made to adjourn the meeting and reconvene on March 14 to revisit the percent of biomass of thorny skate inside 200 miles as derived from the Spring and Fall research surveys (see comment #37 above). This break would allow the lead author time to prepare this information for presentation at the meeting. Draft summary bullets for the SSR would also be reviewed.

Discussion from March 14, 2003

1. **C:** One has to assess the approximately 16% thorny skate biomass outside the 20 mile limit versus the approximately 70% biomass inside and the impact that fishing practices will have. The hyperaggregation with further fishing will result in an eventual collapse of the stock. When this will happen is unknown. There is always a concern when a large proportion of the catch comes from a small area.
2. **C:** The D-95 index is currently unavailable. This is one of the three indices mentioned at the NAP. The D-95 can be done through ACON. This is completed using presence/absence. There will be a better estimate available than using the D-95.
3. **C:** Surveillance estimates are needed.

APPENDIX I: LIST OF PARTICIPANTS

Name	Affiliation/Address	Email Address	Telephone No.	Fax No.
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APPENDIX II: REMIT

Remit

Meeting of the Newfoundland Regional Advisory Process (RAP) on Skates

**EPS Boardroom, Northwest Atlantic Fisheries Centre, East White Hills Road
St. John's, Newfoundland & Labrador
March 12 – 14, 2003**

Stock Assessments

Status of the following stocks will be assessed:

- Skates in Divisions 3LNO and Subdivision 3Ps

A Stock Status Report and associated research documents will be produced for this assessment.

Role of Participants

The Department is endeavouring to ensure all stock assessment meetings are open and transparent peer review process, and provide ample opportunity for knowledgeable individuals to contribute to the process. As such, attendees are expected to participate fully in the discussions and offer objective, informative, and constructive input that will aid in the process while respecting confidentiality requirements. It is not intended that participants come to RAP meetings merely to be informed about conclusions on stock status nor to 'lobby' regarding any issue.

Invited Participants:

All Staff – Science, Oceans and Environment Branch, Newfoundland & Labrador Region

James A. Baird, Fisheries Management, DFO, Newfoundland & Labrador Region

Jacqueline Perry, Fisheries Management, DFO, Newfoundland & Labrador Region

Gary Brocklehurst, Fisheries Management, DFO, Newfoundland & Labrador Region

Len Knight, Fisheries Management, DFO, Newfoundland & Labrador Region

John Collins, Policy and Economics, DFO, Newfoundland & Labrador Region

Fred Woodman, FRCC, DFO, Ottawa

Jim Simon, Bedford Institute of Oceanography, DFO, Maritimes Region

Tom Dooley, Provincial Dept. of Fisheries and Aquaculture, NL

David Coffin, Provincial Dept. of Fisheries and Aquaculture, NL

Bruce Chapman, GEAC

Earl McCurdy, Fish, Food and Allied Workers Union

Alastair O'Reilly, Fisheries Association of Newfoundland and Labrador

Industry Working Group (3-4 representatives), Harvesting Sector