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Proceedings of the Regional Peer Review of 3Ps and 3LNO Haddock, 3Ps Pollock, and 3Ps American Plaice Stock Assessment - 2014

January 29-30, 2014
St. John's, NL

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Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

A meeting of the Newfoundland and Labrador (NL) Regional Advisory Process (RAP) on Subdiv. 3Ps and Divs. LNO haddock, Subdiv. 3Ps pollock and Subdiv. 3Ps American plaice was held on January 29-30, 2014 in St. John's, NL. Its purpose was to assess the status of, and provide the most recent information on, these stocks within their designated Northwest Atlantic Fisheries Organization (NAFO) divisions.

Working papers detailing recent environmental trends, fish assemblages, current management, and species-division data were presented. Representatives from DFO Science and Fisheries Management, the Provincial Government, industry, and academia were present and contributed to the discussion. This Proceedings report includes an abstract, summary of discussions, and potential Science Advisory Report (SAR) bullets for each working paper presented.

Compte rendu de l'examen régional par les pairs de l'évaluation des stocks d'aiglefin dans 3Ps et 3LNO, de goberge dans 3Ps et de plie canadienne dans 3Ps – 2014

SOMMAIRE

Une réunion du processus de consultation régionale de Terre-Neuve-et-Labrador sur l'aiglefin dans 3Ps et 3LNO, la goberge dans 3Ps et la plie canadienne dans 3Ps a eu lieu les 29 et 30 janvier 2014 à St. John's (Terre-Neuve-et-Labrador). Elle visait à évaluer l'état de ces stocks dans leurs divisions désignées de l'Organisation des pêches de l'Atlantique Nord-Ouest (OPANO) et à fournir les derniers renseignements à leur sujet.

Des documents de travail détaillant les récentes tendances environnementales, les assemblages de poissons, la gestion actuelle et les données sur les espèces par division ont été présentés. Des représentants du Secteur des sciences et du Secteur de la gestion des pêches de Pêches et Océans Canada, du gouvernement provincial, de l'industrie et du milieu universitaire étaient présents et ont contribué à la discussion. Le présent compte rendu comprend un résumé, un sommaire des discussions et d'éventuels points d'avis scientifique pour chaque document de travail présenté.

INTRODUCTION

A meeting of the Newfoundland and Labrador (NL) Subdivision (Subdiv.) 3Ps and Divisions (Divs.) 3LNO haddock, Subdiv. 3Ps pollock and Subdiv. 3Ps American plaice Regional Advisory Process (RAP) was held from January 29-30, 2014 in St. John's, NL. The purpose of this meeting was to provide the most recent data available and assess the current status of the aforementioned groundfish stocks. Terms of reference, the agenda, and list of participants are provided in Appendices I through III, respectively.

Participation in the meeting included personnel of Fisheries and Oceans Canada (DFO) Science and Fisheries Management Branches (NL Region), Provincial Department of Fisheries and Aquaculture (DFA), representatives from fishing industry, fish harvesters, the Food Fish and Allied Workers Union (FFAW), and Memorial University of Newfoundland (MUN).

Working papers detailing recent environmental conditions, community status, management frameworks, and species-division data trends were presented. Open discussion and deliberation followed the presentation of each working paper. On the final day of the meeting, consensus was reached on bullets summarizing the assessment of each species and division for inclusion in the Science Advisory Report (SAR).

These Proceedings contain abstracts, summaries and consensus bullets obtained following each working paper presentation. Additional information for each topic can be found within the working papers and references cited therein.

WORKING PAPER ABSTRACTS AND DISCUSSION SUMMARIES

OCEANOGRAPHIC ENVIRONMENT OF THE GRAND BANKS, UPDATE FOR 2013

Authors: E. Colbourne, J. Craig, C. Fitzpatrick, D. Senicall, P. Stead and W. Bailey

Presenter: E. Colbourne

Abstract

A key indicator of ocean climate conditions on the NL Shelf, the North Atlantic Oscillation (NAO) index, returned to a negative phase in 2013 and as a result arctic air outflow to the Northwest Atlantic during the winter decreased over the previous year. This appears to have resulted in an increase in winter air temperatures over much of the Labrador Sea area causing a continuation of less sea-ice than normal on the NL Shelf. As a result of these and other factors, local water temperatures remained above normal in most areas in 2013 but show a decrease over 2011-12 values. In particular, average Grand Banks sea surface temperatures decreased from 1.5°C to 0.7°C, Divs. 3LNO bottom temperatures from 2.7°C to 2.0°C and Subdiv. 3Ps bottom temperatures from 3.3°C to 2.9°C, an approximate decrease of 1 standard deviation. In general, all environmental indices indicate a continuation of the warmer than normal trend throughout the area since the mid-1990s. During the past 2 years however temperatures have decreased compared to the record warm conditions of 2011.

Discussion

Year-to-year variation in temperature requires the interpretation of data over longer time periods (>10 years), limiting the use of short-term trends. Overall, data suggests that bottom temperatures of the past decade have been above the long term average (average temperature 1981-current), though decreasing from a peak observed temperature in 2010. In recent years the cold intermediate layer (CIL) has become reduced in extent, in particular there has been a

much lower than normal extent for the spring CIL over the Grand Banks region, potentially due to increase warm water inclusion from the Gulf Stream. Concomitantly, cold water thermal habitats (<0°C) have become significantly reduced.

The influence of recent temperature trends were not framed in context of pollock, haddock and American plaice, explicitly, though increase surface temperatures have been linked to increased larval survival for a variety of larval fish species. Increased temperatures could potentially favor warm water species, such as pollock, potentially leading to changes in community structure.

TRENDS IN THE FISH COMMUNITY IN NAFO SUB-DIV. 3Ps AND DIVS. 3LNO

Authors: M. Koen-Alonso, N. Wells, D. Holloway, J. Mercer, B. Vaters

Presenter: Nadine Wells

Abstract

The marine community in Subdiv. 3Ps is not isolated from the surrounding ecosystems (Grand Bank, Gulf of St. Lawrence, Scotian Shelf); these external influences should be taken into consideration when assessing stocks inhabiting this area. There is a clear warming signal in the 3Ps region; since the early 1990s, bottom temperature during the spring survey has been increasing at an average rate of around 3% per year. Ecosystem trends in the 1980s and early 1990s are potentially confounded with changes in the DFO RV survey (e.g. timing of survey, sampling effort, gear change), making their interpretation difficult. Nonetheless, it seems clear that the fish community declined during the mid-1980s and early 1990s. This decline was also accompanied by a decrease in the average fish size. Overall, the biomass and abundance of the fish community has increased since the mid-1990s.Increases in biomass have been moderate, while increases in abundance have been more clear and led by planktivore species like sand lance, and to a lesser extent herring. During this period, average fish size has shown ups and downs, without a consistent trend. Changes in biomass/abundance (BA) ratio at the fish community level can be explained by changes in community composition, like recent increases in planktivores. Among piscivores, Atlantic cod is the dominant species in this functional group. Pollock has shown fluctuations over time, with 2010 and 2012 being relatively strong years compared to all others. During the early 2010s, dominance of cod seems to be increasing among piscivores, but other gadoids (e.g. silver hake) also seem to be increasing within this functional group. Among large benthivores, American plaice biomass levels have shown very few changes since the mid-1990s. This functional group has been dominated by thorny skate and American plaice. Haddock has shown fluctuation but is not a dominant species among large benthivores. The observed warming of this system, together with recent increases of “warmer-water” species like sand lance, silver hake, and pollock suggests that this ecosystem could be undergoing structural changes. Until the extent and magnitude of these changes can be properly evaluated, management with higher than normal risk-aversion is advisable.

The fish community in Divs. 3LNO declined during the mid-1980s and early 1990s. This decline was also accompanied by a decrease in the average fish size. Since the mid-1990s the biomass of the fish community has shown a positive trend. With the only exception of shellfish (mainly shrimp), which peaked around 2007 and declined since, this increasing pattern is observed in all fish functional groups, with plankpiscivores (mainly redfish) showing the largest increases in recent years. Average fish size has shown high variability, with a clear increase since the lowest levels observed in early 2000s. These changes in biomass/abundance (BA) ratio at the fish community level can be explained by a reduction in the abundance of Shrimp in recent times. Among large benthivores, haddock biomass levels have fluctuated little since the mid-1990s. This functional group has been dominated by American plaice and thorny skate.

There is limited diet information for Subdiv. 3Ps. The available data for American plaice (spring 2013) indicates a diet dominated by sand lance, brittle/basket stars and other echinoderms. This is different from spring Divs. 3LNO samples (1977-78, 1981-82, 1984-86, 2013) which show a diet with a higher proportion of capelin and sand lance.

Discussion

Diet assessments for American plaice are limited, though current information suggests a diet primarily comprised of sand lance, brittle/basket stars among other echinoderm species in Subdiv. 3Ps. Comparatively, American plaice samples from Divs. 3LNO find a diet comprised with a higher proportion of capelin and sand lance. Diet trends among assessment regions were discussed. Diet compositions, and comparisons, are primarily influenced by availability.

NAFO Subdiv. 3Ps functional community analysis suggests that Atlantic cod and other gadoids (i.e. silver hake) are increasingly the dominant piscivorous species. American plaice and thorny skate are the dominant large benthivores, with little change since the early 1990s. Haddock periodically shows increased proportions within the large benthivore functional group, however no trend is discernable. Recent warming might potentially be driving functional community structure with increased prevalence of “warm-water” species like sand lance, silver hake and pollock.

Like Subdiv. 3Ps, functional community analysis for Divs. 3LNO finds that American plaice are the dominant large benthivore, haddock biomass levels have remained low with little change since the mid-1990s.

The relationship between Subdiv. 3Ps and Divs. 3LNO assessment regions, in terms of fish community were discussed.

MANAGEMENT OVERVIEW OF 3Ps AND 3LNO HADDOCK, 3Ps POLLOCK, AND 3Ps AMERICAN PLAICE

Presenter: David Coffin

Abstract

An overview of the history of the Subdiv. 3Ps haddock, pollock, and American plaice, and Divs. 3LNO haddock stocks was provided. The historical overview included the date of implementation of a moratorium along with the total allowable catch immediately prior to its implementation. The catch history prior to the moratorium for each stock was reviewed along with the amount taken as bycatch in recent years. The summary included both Canadian and foreign catch, and the percentage taken by both the inshore and offshore fleets. The bycatch provision in the license conditions, and conservation harvesting plans, for the inshore fleet, offshore fixed gear fleet, and offshore mobile gear fleet were summarized.

Discussion

Bycatch levels for American plaice, pollock and haddock remain on average <5% of landings of the directed species. However, the spatially variable abundances of pollock and haddock occasionally yield large fluctuations in bycatch level in the mobile fleet. The Atlantic cod fishery has the highest overall levels of bycatch among American plaice, pollock and haddock.

UPDATED SPECIES ASSESSMENTS AS OF 2013

AMERICAN PLAICE IN NAFO SUBDIVISION 3Ps

Presenter: Joanne Morgan

Abstract

The basis for the assessment of this stock is a surplus production model in a Bayesian framework. The model accepted at the limit reference point meeting for this stock was updated with 3 more years of data. Input data were catch and survey indices. In the last three years catch has declined as have survey indices of abundance and biomass. Biomass in 2013 is estimated to be 60% below Blim (40% Bmsy) and therefore the stock is in the Critical Zone. The probability of being below Blim is high (0.97). Current median fishing mortality is estimated to be 20% of Flim and the probability of being above Flim (Fmsy) is low (0.05). Although fishing mortality is low, the stock has declined since 2010. Projections of stock size were conducted under current productivity conditions at various catch levels from 2014 to 2016. Five scenarios were considered (zero catch, current catch, current catch + 15% and current F). Although there was growth under all scenarios, the stock remained well below Blim in all cases. Additional projections determined that annual catches of 1,000 t or more will result in stock decline.

Discussion

American plaice landings in NAFO Subdiv. 3Ps have steadily declined since the 1970s until recently observed increases in the early 2000s. Bycatch of plaice is primarily the product of the cod fishery, though occasional high bycatch events occur in the witch flounder fishery, likely due to localized high abundances of plaice in Subdiv. 3Ps. Though abundances of plaice are spatially variable, they are relatively panmictic throughout Subdiv. 3Ps.

Length frequency analysis shows declines in recent year classes potentially alluding to decreases in recruitment to the fishery. There is a strong concordance between port and at sea sampling, enabling reliable joint interpretation.

Bayesian surplus modelling suggests American plaice are below the Biomass limit reference point (Blim) with a ~97% probability. It is estimated that biomass is 40% of Blim, therefore categorizing the species in the critical zone. Fishing activity and related mortality is below the critical fishing threshold (Flim) with a ~5% probability of being above the level given data and modelling estimates. Based on current levels of fishing activity, at or below Flim, Bayesian surplus models predict modest increases in population size.

Discussion about current fishing activity brought to question how robust predictions of population increase were. It was estimated that approximately an additional 1,000 t of American plaice would need to be removed from the Subdiv. 3Ps population to result in the cessation of predicted increases. Invariably continued population increases are contingent on fishing and bycatch levels remaining low or at current levels.

Suggested Bullets

- Biomass in 2013 is estimated to be 60% below Blim (40% Bmsy) and therefore the stock is in the ‘Critical Zone’. The probability of being below Blim is high (0.97). Current median fishing mortality is estimated to be 20% of Flim, with the probability of being above Flim, or Fmsy, is low (0.05).
- Despite low fishing mortality, the stock has declined since a peak in 2010.
- Projections of stock size were conducted under current productivity conditions at various catch levels from 2014 to 2016. Five scenarios were considered (zero catch, current

catch, current catch ± 15% and current fishing). Although there was growth under each scenario, the stock remained well below Blim. Model projections suggest that annual catches of 1,000 t or more will result in stock decline.

- To increase the probability of stock recovery, there should be no directed fishing and bycatch should be kept to the lowest possible level.

HADDOCK IN NAFO SUBDIVISION 3Ps

Authors: K. Dwyer, D. Ings, J. Morgan, B. Healey, R. Rideout, D. Power

Presenter: K. Dwyer

Abstract

Haddock (*Melanogrammus aeglefinus*) in Subdiv. 3Ps was last fully assessed in 2001. Prior to the moratorium in 1993, with the exception of some high catches in 1954-56 (35,000 t), catches were less than 7,500 t. The high peak of 58,000 t was largely due to the 1949 year class and the lower peak in 1985-86 was due to the 1981 year class. Since the moratorium, catches have been low, averaging 227 t. The average since 1996 is 252 t. Bycatch of haddock since the moratorium has been mostly the result of the directed cod fishery and mixed white hake fishery. Mainly the gears used have been the otter trawl and gillnet fisheries. Depending on which gear is utilized, the length range of the bycatch is 40-70 cm. Biomass varied without trend at low levels with the exception of 1985-87, which averaged >20,000 t. Since the moratorium, biomass averaged ~2,800 t. Abundance showed a similar trend; however, with the exception of a high value in 2007 (which was the result of one large tow), there were some higher values in 1999 and 2000, which were the result of the 1998 year class. When numbers at length from the RV surveys are examined, strong year classes can be followed through for several years, especially the 1981 year class. In April, from the RV surveys, haddock are distributed mainly at the bottom of the Halibut Channel. In the 1980s, when abundance and biomass were highest, the RV surveys occurred in February-March and haddock were distributed over the St. Pierre Bank, Burgeo Bank and the Halibut Channel. There appears to be no trend in maturity at length over time. Current lack of conversion factors and episodic recruitment are impediments to determination of reference points.

Discussion

Catch dramatically peaked in 1955, but has remained far below this anomalously high year since. Small increases in abundance have been observed since 1972, in particular 1988 when estimated biomass increased above the long-term mean. The fishery has remained under moratorium since 1993. Length frequency data shows good agreement between port and at sea sampling. Overall, length frequency data suggests that Divs. 3LNO haddock undergoes episodic recruitment with single semi-decadal year classes contributing a majority of recruitment to the fishery for several years. Episodic nature of recruitment makes estimating limit reference points (Blim, Flim, etc.) difficult, as the lack of co-dependence among yearly estimates negates any reasonable linear predictions. To date, no operational population-fishing model (i.e. Bayesian surplus) has been available for projections and population diagnostics.

Trawl survey data indicates that haddock are found over a gradient of depths, though predominantly haddock are found in the slope waters, >180 m. Given the affinity to waters greater than 180 m, there was some discussion of future assessment of this stock examining indexed strata reflecting this range.

There appears to be some synchrony among some survey indices from Subdiv. 3Ps and Divs. 3LNO haddock. There was some discussion about how this synchrony might be evidence of demographic linkages. Recruitment is episodic for both stocks and strong year-classes are

sometimes produced in concurrent years. However, haddock recruitment events were more frequent and landings during the 1950s and early 1960s were higher in Divs. 3LNO than in Subdiv. 3Ps.

The lack of a defined reference point to manage the stock, at any level of fishing activity, was raised as a point of concern. Some of the difficulties with the estimation of references points and/or proxies thereof – such as large set effects – were discussed.

Suggested Bullets

- Catch ranged widely from 147 t to 58,000 t from 1953 to 1992, with a singular anomalously high observation of 58,000 t in 1955. The stock has been under moratorium to directed fishing since 1993. Since then catch has averaged 277 t with catch in the most recent 5 years averaging 166 t.
- Two large recruitment events have been observed in this stock. One year class in each of the 1950s and 1980s supported larger than average catches.
- The survey indices, biomass and abundance, have varied without trend since 1996 while catch has ranged from 84 to 651 t (average 252 t). Increases in catch above this range should be treated with caution until there is evidence of an increase in stock size.

LIFE HISTORY AND POPULATION ECOLOGY OF 3Ps HADDOCK – 2012 AND 2013

Authors: S. Rowe and R. Rogers

Presenter: S. Rowe

Abstract

Surveys conducted by the Centre for Fisheries Ecosystems Research in Subdiv. 3Ps during May 12-22, 2012 and May 16-18, 2013 revealed aggregations of haddock along the edges of Halibut Channel and the western shelf slope of St. Pierre Bank. In 2012, haddock ranged 18-78 cm in length (n=351) with modes at approximately 23 cm and 56 cm. In 2013, there was a large mode at 31 cm although fish up to 83 cm in length were also observed (n=1403). Ageing revealed that fish ranged from 1 to 14 years of age with 2006 and 2011 cohorts featuring prominently in the survey catch. Examination of gross morphology of the gonads revealed many individuals to be approaching spawning or spent and that 50% of females had reached sexual maturity by 41 cm. Individual growth rates and length at maturity during 2012-13 appeared similar to those observed for this stock in the past.

Discussion

Haddock appear to be spatially aggregated in slope waters of less than 180 m. Haddock size at sexual maturity was estimated at approximately 41 cm. The utility of acoustic surveys can only be evolved with more validation with traditional (trawl) sampling. Discussions were made about the capacity of acoustic surveys to supplement traditional assessment techniques.

HADDOCK IN NAFO DIVISIONS 3LNO

Authors: D. Ings, K. Dwyer, R. Rideout, B. Healey, D. Power

Presenter: Danny Ings

Abstract

The status of haddock in Divs. 3LNO was evaluated using information from total commercial landings from all countries (1953-2012) and Canadian landings (2013) in conjunction with information from Canadian spring (1972-2013) and fall (1990-2012) RV surveys of Divs. 3LNO

with bottom trawls, plus EU-Spain summer RV trawl surveys (1997-2013) in Divs. 3NO, outside the 200 mile limit. Landings averaged 42,745 t during the period 1953 to 1962. Then, catches were lower averaging 3,496 t annually from 1963 to 1992. This stock has been under moratorium since 1993 and from 1993 to 2012, landings averaged 132 t annually. During the last five years, Divs. 3LNO haddock were caught mostly as bycatch in the yellowtail flounder and skate fisheries. The fall RV survey provides valuable indices for haddock because as the water temperatures warm, fish disperse over the banks from the slope waters where they tend to congregate in winter and early spring. Biomass and abundance indices from the fall RV surveys have varied without trend over time, although the last two years have been higher than the 1995-2012 average. These results are generally consistent with those from the spring RV survey. Recruitment to the stock is episodic. A recruitment index based on fish less than 20 cm in the fall RV surveys was higher in 2011 and 2012 than the 1995-2012 average. In the absence of a model of population dynamics and the lack of trend in the current RV survey indices at very low catch levels, advice could not be provided on whether to maintain a moratorium on fishing.

Discussion

Historical landings of Divs. 3LNO haddock averaged 2,378 t from 1973-92. Since the implementation of a fishing moratorium in 1993, the landings were from bycatch and have averaged 132 t annually.

There was some discussion on confidence in the landings data from the 1950s. At issue was whether there was misreporting of Divs. 3LNO as Subdiv. 3Ps landings because there was one spike in Subdiv. 3Ps landings that corresponded with the period of high landings in Divs. 3LNO. The meeting could not resolve this issue, but noted the magnitude of the landings attributed to Subdiv. 3Ps suggested that significant catches were likely taken there.

The spring biomass index has been relatively stable since 2006 with all surveys varying without trend over the time-series. Fall survey estimates have been above the long term average (1995-2012) since 2011.

To date, no operational population-fishing model has been available for projections and population diagnostics. Lack of a working model, coupled with the absence of a trend from trawl survey indices, prevents assessment on whether to maintain the fishing moratorium. Recent increases in survey indices suggest that under current removal levels Divs. 3LNO haddock population levels may increase, but it was cautioned that productivity of this stock is poorly understood.

There appears to be some synchrony among survey indices from Divs. 3LNO and Subdiv. 3Ps haddock. Recruitment is episodic for both stocks and strong year-classes are sometimes produced in both stocks during the same years. However, haddock recruitment events were more frequent in Divs. 3LNO than in Subdiv. 3Ps, and landings of Divs. 3LNO haddock were comparatively higher for a much longer period during the 1950s and early 1960s, than in Subdiv. 3Ps.

Suggested Bullets

- This stock has been under moratorium since 1993. From 1973 to 1992, landings averaged 2,378 t annually. Since 1993, landings averaged 132 t annually. The fall survey biomass and abundance indices have varied without trend although the last two years have been above average.
- A recruitment index based on fish less than 20 cm in the fall surveys was higher in 2011 and 2012 than the 1995-2012 long-term average.

- Without an operational population-fishing model, and any definitive trend in current survey indices at very low catch levels, advice could not be provided on whether to maintain a moratorium on fishing. Any planned increases in catches should be adaptive, accompanied by monitoring of stock indices.

POLLOCK IN NAFO SUBDIVISION 3PS

Authors: E. Lee, D. Power, and R. Rideout

Presenter: Eugene Lee

Abstract

An overview of the status of the Subdiv. 3Ps pollock stock was provided. Sources of information used to assess Subdiv. 3Ps pollock status included data from commercial landings (1960 to 2014) and data from DFO RV surveys (1972-2013).

Catches of pollock declined from 4,500 t in 1960 when most of the catch was taken by Spain. Since the extension of jurisdiction, catches have been mainly taken by Canada and France (St. Pierre). Catches were generally low from 1967-82 being less than 1,000 t annually. Catches gradually increased, peaking at 7,500 t in 1986 with the entry of the French Metropolitan fleet to the cod fishery. During the cod moratorium (1992-97) bycatches declined to pre-1980s levels and were less than 500 t. Bycatches since the Subdiv. 3Ps cod fishery reopened in 1997 have increased slightly but remain less than 1,000 t annually. Reported commercial bycatch of pollock has remained relatively consistent from 1992 to 2013, ranging below 1,000 t. Bycatches in recent years (2009-13) were in the range of 500 t.

RV abundance indices (mean#/tow) were generally low (<1) during the 1970s. Abundance gradually increased during the 1980s to a mean of 3 per tow during 1987. Abundance declined during the 1990s to near zero. Abundance increased during the early 2000s to near 2 then declined to nearly zero by 2008. Abundances from 2010 to 2013 are highly variable ranging from 0.3 to 1.7. RV biomass indices (mean kg/tow) were low <1 kg during the 1970s. Biomass gradually increased during the 1980s to a mean of 6kg/tow in 1987. Biomass decreased during the 1990s to near zero. Biomass increased during the early 2000s to a maximum of 1 kg/tow in 2004. Biomass from 2010 to 2013 was highly variable ranging from 0.2 kg/tow in 2010 to 3.75 kg/tow in 2012.

In light of issues identified with respect to the use of bottom trawl surveys to survey pollock (a semi-pelagic species) and changes in fishing gear over time, the information available is not sufficient to assess stock level and provide catch options at this time. Pollock have never occurred in NAFO Subdiv. 3Ps in large numbers. Their contribution to the groundfish fishery is based on the infrequent occurrence and survival of year-classes in the extreme north of their range.

Discussion

Newfoundland waters represent the northern limit of pollock and population size has been generally viewed to be insufficient to support a targeted fishery. The majority of Subdiv. 3Ps pollock have been encountered in the slope waters (>180 m) of the Burgeo and St. Pierre Banks.

Abundance and biomass estimates of Subdiv. 3Ps pollock have a high degree of variability likely due to the semi-pelagic nature of the species and data garnered from benthic trawl surveys. Commercial landings of pollock were variable ranging 300-7,500 t from 1960-92. A moratorium on cod fishing activity was imposed from 1992-97. Since the moratorium, commercial bycatch of Subdiv. 3Ps pollock has remained on average below 1,000 t (1997-2013)

and is primarily attributed to the cod fishery. In recent years (2009-13) the bycatch of pollock has decreased to below 500 t annually.

A point of concern was raised by industry regarding the potential of bycatch by targeted fisheries. In general increased effort does not necessarily translate to a proportional increase in bycatch. Caution was advocated when using current trends to predict the potential impact of increased fishing activity on bycatch levels.

The semi-pelagic nature and spatial variance in estimated Subdiv. 3Ps pollock abundance and biomass make it difficult to interpret indices based on demersal trawl surveys. Combining this with the fact that no conversion factors exist to address changes in fishing gear over time, the information available is not sufficient to assess stock level and provide catch options at this time.

Suggested Bullets

- Subdiv. 3Ps pollock, at their northern limit, do not generally occur in Newfoundland waters in sufficient numbers to support a major fishery. Distribution is restricted mainly to the slope waters of Burgeo and St. Pierre Banks and some inshore waters.
- Catches from 1960 to 1992 were highly variable ranging from 300 t to 7,500 t. Reported commercial bycatch of pollock has remained relatively consistent (1992-2013), usually below 1,000 t. In recent years (2009-13) bycatch was in the range of 500 t.
- Information available is not sufficient to provide an assessment and potential catch options. The semi-pelagic nature and spatial variance in estimated Subdiv. 3Ps pollock abundance and biomass make it difficult to interpret indices based on demersal trawl surveys.

APPENDIX I: TERMS OF REFERENCE

3Ps and 3LNO Haddock, 3Ps Pollock, and 3Ps American Plaice Stock Assessment

Newfoundland and Labrador Regional Peer Review Process

January 29-30, 2014 St. John's, NL

Chairperson: Ben Davis, Aquatic Resources, Science Branch, Department of Fisheries and Oceans

Context

The status of the haddock stocks in NAFO Subdiv. 3Ps and Divs. 3LNO were last assessed in 2005 (DFO 2005a). Subdiv. 3Ps pollock and American plaice were last assessed in 2004 (DFO 2004) and 2005 (DFO 2005b), respectively. The current assessments are requested by Fisheries Management to provide the Minister with advice that will inform the management decisions for the 2014 fishing season.

Objectives for the 3Ps Haddock Assessment

- Provide an ecosystem overview (e.g., environment, predators, prey) of the stock.
- Assess and report on the status of the stock based on commercial fishery statistics (overall landing distribution, breakdown by fishing gear and directed species) and biological data resulting from the commercial sampling program (size structure).
- Analyze historical data from the research surveys up to 2013 (abundance index, biomass, recruitment, size structure and geographical distribution of catches).
- Identify Blim, or a proxy for Blim, for this stock and report on the current spawning stock biomass relative to Blim.
- Identify indicators that should be evaluated during the years without a formal stock assessment.
- Perspectives for 2014 based on available indicators.

Objectives for the 3LNO Haddock Assessment

- Provide an ecosystem overview (e.g., environment, predators, prey) of the stock.
- Assess and report on the status of the stock based on commercial fishery statistics (overall landing distribution, breakdown by fishing gear) and biological data resulting from the commercial sampling program (size structure).
- Analyze historical data from the research surveys up to 2013 (abundance index, biomass, recruitment, size structure and geographical distribution of catches).
- Identify indicators that should be evaluated during the years without a formal stock assessment.
- Perspectives for 2014 based on available indicators.

Objectives for the 3Ps Pollock Assessment

- Provide an ecosystem overview (e.g., environment, predators, prey) of the stock.
- Assess and report on the status of the stock based on commercial fishery statistics (overall landing distribution, breakdown by fishing gear) and biological data resulting from the commercial sampling program (size structure).
- Analyze historical data from the research surveys up to 2013 (abundance index, biomass, recruitment, size structure and geographical distribution of catches).

- Identify indicators that should be evaluated during the years without a formal stock assessment.
- Perspectives for 2014 based on available indicators.

Objectives for the 3Ps American Plaice Assessment

- Provide an ecosystem overview (e.g., environment, predators, prey) of the stock.
- Assess and report on the current status of the stock relative to Blim and Flim.
- Biological characteristics (including age composition, size at age, age at maturity, year class strength and distribution). Describe these variables in relation to historic observations.
- Evaluate the risk of being below Blim in annual projections (F=0, F current, current catch plus or minus 15%) to 2016.

Expected Publications:

- Science Advisory Report
- Proceedings
- Research Document

Participation:

- Fisheries and Oceans Canada (DFO) (Science, Fisheries Management)
- Fishing Industry
- IFREMER (French Research Institute for Exploitation of the Sea)
- Provincial Department of Fisheries and Aquaculture (DFA)
- Academia or Academics
- Aboriginal organizations
- Non-government organizations

APPENDIX II: AGENDA

January 29, 2014

Time	Topic	Presenter
0900	Welcome and discussion of meeting objectives (Chair)	Brian Davis
0930	Environmental Update to Summer of 2013	Eugene Colbourne
1000	Ecosystem Update	Nadine Wells
1030	*BREAK*	N/A
1045	Management Overview	David Coffin
1115	3Ps American Plaice Assessment	Joanne Morgan
1200	*LUNCH*	N/A
1300	3Ps Haddock Assessment	Karen Dwyer
14:15	3Ps Haddock Life History and Ecology (CEFR update)	Sherryln Rowe
15:15	*BREAK*	N/A
15:45	3LNO Haddock Assessment	Danny Ings
16:15	3Ps Pollock Assessment	Eugene Lee
1700	*ADJOURN*	N/A

January 30, 2014

Time	Topic	Presenter
0900	Welcome and discussion of meeting objectives (Chair)	Brian Davis
0930	Updated analysis 3Ps American Plaice	Joanne Morgan
1000	Updated analysis 3Ps Haddock	Karen Dwyer
1030	*BREAK*	N/A
1045	Discussion of SAR bullets for each stock	Meeting participants
1200	*LUNCH*	N/A
1300	Discussion of SAR bullets for each stock *continued*	Meeting participants
15:00	*BREAK*	N/A
15:30	Final draft of SAR bullets for each stock	Meeting participants
16:45	Closing and next steps (Chiar)	Brian Davis
1700	*ADJOURN*	N/A

APPENDIX III: LIST OF PARTICIPANTS

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