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**Proceedings of the regional peer review of the Assessment of American Lobster
(*Homarus americanus*) in Newfoundland**

May 15-16, 2013

St. John's, NL

Chairperson: Bill Brodie

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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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TABLE OF CONTENTS

SUMMARY	v
SOMMAIRE	vi
INTRODUCTION	1
PRESENTATIONS AND DISCUSSIONS	1
OCEANOGRAPHY OVERVIEW	1
Abstract	1
Discussion	1
MANAGEMENT OVERVIEW	1
Abstract	1
Discussion	1
ASSESSMENT METHODOLOGY	2
Abstract	2
Discussion	2
LOBSTER ASSESSMENT - NORTHEAST, AVALON, SOUTH COAST, AND WEST COAST	2
Abstract	2
Discussion	3
FFAW SCIENCE DATA (LOBSTER FECUNDITY)	5
Abstract	5
Discussion	6
LOBSTER NODE	6
Abstract	6
Discussion	7
EASTPORT MARINE PROTECTED AREAS: LOBSTER CONSERVATION AND MONITORING ACTIVITIES	7
Abstract	7
Discussion	8
NSERC/FFAW PROJECT - LOBSTER FECUNDITY IN NEWFOUNDLAND IN NEWFOUNDLAND: RESULTS FROM 2009-12	9
Abstract	9
Discussion	9
MORTALITY AND BEHAVIOUR OF LARVAL LOBSTERS	9
Abstract	9
Discussion	10
DRAFTING OF SAR BULLETS	10
RESEARCH RECOMMENDATIONS	11
APPENDIX 1: LIST OF PARTICIPANTS	12
APPENDIX 2: TERMS OF REFERENCE	14
Meeting of the Newfoundland and Labrador Regional Advisory Process (RAP) on Lobster ..	14

Context.....	14
Objectives	14
Outputs	14
Participants	14
APPENDIX 3: AGENDA.....	15
Regional Advisory Process Meeting: 2013 Assessment of American Lobster	15
Wednesday, May 15.....	15
Thursday, May 16	16

SUMMARY

A Regional Advisory Process (RAP) was held on May 15-16, 2013 at the Holiday Inn in St. John's, Newfoundland, to assess the stock of American lobster in Newfoundland in four different regions. These stocks were last assessed in 2009 and are scheduled to be assessed every three years. In 2013, the Lobster Fishing Areas (LFAs) were assessed based on 4 regions (Northeast (LFAs 3-6), Avalon (LFAs 7-10), South Coast (LFAs 11-12) and West Coast (LFAs 13-14)). The key indicators for the assessment are landings, nominal effort, mean catch per unit effort (CPUE), and survival rate estimates.

Participants at the Meeting (Appendix 1) included representatives from Fisheries and Oceans Canada (DFO) Science Branch, DFO Fisheries Management Branch, Newfoundland Department of Fisheries & Aquaculture (DFA), Fish, Food and Allied Workers Union (FFAW), Memorial University, Qalipu Mi'kmaq First Nation Band, University of New Brunswick, and Pisces Consulting.

In addition to these proceedings, publications to come from the meeting include a Science Advisory Report (SAR) and a research document which will be available online on the [DFO Canadian Science Advisory Secretariat Website](#).

Compte rendu de l'examen régional par des pairs sur l'Évaluation du stock du homard américain (*Homarus americanus*) à Terre-Neuve

SOMMAIRE

Un processus de consultation régionale a eu lieu les 15 et 16 mai 2013 au Holiday Inn de St. John's (Terre-Neuve-et-Labrador) afin d'évaluer les stocks de homard dans quatre différentes régions de Terre-Neuve-et-Labrador. Ces stocks ont été évalués pour la dernière fois en 2009 et doivent faire l'objet d'une évaluation tous les trois ans. En 2013, l'évaluation des zones de pêche du homard (ZPH) était basée sur quatre régions (nord-est [ZPH 3 à 6], Avalon [ZPH 7 à 10], côte sud [ZPH 11 et 12] et côte ouest [ZPH 13 et 14]). Les indicateurs clés pour l'évaluation sont les débarquements, l'effort nominal, les prises moyennes par unité d'effort et les estimations du taux de survie.

Les participants à la réunion (annexe 1) comprenaient des représentants de la Direction des sciences de Pêches et Océans Canada (MPO), de la Direction de la gestion des pêches du MPO, du ministère des Pêches et de l'Aquaculture de Terre-Neuve-et-Labrador, de la Fish, Food and Allied Workers Union (FFAW), de l'Université Memorial, de la Première Nation Qalipu Mi'kmaq, de l'Université du Nouveau-Brunswick et de Pisces Consulting.

En plus du présent compte rendu, les publications émanant de la réunion incluent un avis scientifique et un document de recherche, qui seront tous disponibles en ligne sur le [site Web du Secrétariat canadien de consultation scientifique de Pêches et Océans Canada](#).

INTRODUCTION

The status of American Lobster in the LFAs was last assessed in 2009. The assessment of these stocks was requested by Fisheries Management to provide current information on the status of the resource and provide the data that will be used in an updated Integrated Fisheries Management Plan (IFMP).

The objective (see Terms of Reference-Appendix 2) of this Regional Advisory Process (RAP) was to assess the status of the stock in 4 regions: Northeast (LFAs 3-6), Avalon (LFAs 7-10), South Coast (LFAs 11-12), and West Coast (LFAs 13-14).

The meeting started with a round of introductions. The Chair then reviewed the agenda (Appendix 3) and outlined the advisory process. Information was then presented on oceanography and management measures, stock, methodology assessment for the regions, marine protected areas (MPAs), lobster NODE project, fecundity, and mortality and behaviour of larvae.

PRESENTATIONS AND DISCUSSIONS

OCEANOGRAPHY OVERVIEW

Presenter: Don Stansbury, Science Branch, DFO NL Region

Abstract

Abstract not provided.

Discussion

The oceanographic presentation showed data from a long term monitoring program, set up in a number of stations from 1990-2012. The speaker stated that there were no clear trends in terms of temperature.

A participant questioned whether it was difficult to correlate temperature to catches. The speaker responded that they tried combining many different data sets together, and could not find any trends with lobster landings and annual temperature data.

MANAGEMENT OVERVIEW

Presenter: Patricia Williams, Fisheries Management, DFO NL Region

Abstract

The Resource Management and Aboriginal Fisheries presentation provided a brief overview of the American Lobster in the Newfoundland and Labrador region.

This included recent landings and landed value data, recent license holder counts and a summary of the management measures which apply in this fishery. Additionally, it provided a current summary of the Lobster Enterprise Retirement program up to April 2013.

Discussion

Clarification was requested from a participant on the difference between the values of a decrease of 500 license holders and 194 licenses retired. The speaker responded that there could be a number of reasons why people would leave the fishery and retirement of licenses is

not the sole reason for a decrease. Another participant asked whether the retired licenses would be classified as permanent. The speaker responded that the reason behind retiring a license is not explicitly stated and could not be determined from the available data.

It was pointed out that there is no way to quantify the number of lobsters sold locally, so the landings presented could change if this were taken into account. Additionally, prompting fishermen regarding logbooks may increase return rates, and there may need to be a transition period for e-books as fishermen are still adjusting to getting their licenses online.

There was also some confusion on whether lost traps should still be reported to DFO since the tags have been switched to the Fishermen's Resource Center (FRC). The speaker clarified that although the tags have been switched to FRC, reporting lost traps is a condition of licensing and still have to be reported to DFO.

Another participant expressed concern over a shortage of logbooks in certain areas as some people have stocked up on them. As well, it would be easier for the fishermen to drop off the logbooks to the FRC.

ASSESSMENT METHODOLOGY

Presenter: Don Stansbury, Shellfish, Science Branch, DFO NL Region

Abstract

Abstract not provided.

Discussion

The speaker presented four new regions made from grouping existing LFAs: Northeast, Avalon, South Coast and West Coast.

A participant asked how independent surveys would be done. The speaker responded that post-seasonal sampling could be done; however, cost would be a big factor to consider.

Another participant questioned how Catch per Unit Effort (CPUE) would be calculated for the new regions. The speaker stated that CPUE could be calculated by dividing total landings by the total number of traps, the same method that is used to determine CPUE for each LFA.

A question arose whether the data for time and location of each sample was available. The speaker confirmed that the data was available for each sample, although the location data only lists a town name rather than a latitude and longitude.

The consensus of the group at this time in the discussion was that the LFAs should be grouped by geographical region, if the data is similar.

LOBSTER ASSESSMENT - NORTHEAST, AVALON, SOUTH COAST, AND WEST COAST

Presenters: Elizabeth Coughlan and Katherine Skanes, Science Branch, DFO NL Region

Abstract

American Lobster (*Homarus americanus*) in Newfoundland is harvested near shore by approximately 2700 license holders in LFAs 3-14C. The fishery is managed by input controls including a minimum legal size of 82.5 mm carapace length (CL), prohibition on landing v-notched or ovigerous females, limited entry, seasons and trap limits. The number of active fishers, duration of season, and trap limits vary by year and LFA.

The Newfoundland lobster assessment was done on four assessment regions which are a geographical grouping of LFAs into Northeast (LFAs 3-6), Avalon (LFAs 7-10), South Coast (LFAs 11-12) and West Coast (LFAs 13-14). Data available for the assessment were solely fishery-dependent. The key indicators for the assessment are reported landings, nominal effort, CPUE and survival rate indicators based on molt class ratios.

The fishery has always been a recruit-based fishery, therefore reported landings reflect abundance. Most size frequency plots clearly show a sharp drop at legal size and few lobsters achieving the second molt class, indicating that most of the exploitable biomass is caught in the year of recruitment to the fishery. Reported landings are going down in the Northeast and Avalon and going up on the South and West Coasts. Total reported landings for Newfoundland have remained relatively stable since the 1960s. Reported landings increased by 70% from 1760 t in 2000 to 3000 t in 2008 before declining by 28% to 2150 t in 2012 resulting from a decrease in the Northeast and Avalon regions and an increase in the South and West Coasts. The reported landings have become spatially concentrated. The contribution of the most productive LFA (11) to the reported landings has increased from less than 15% in the early 1990s to around 45% in the last three years. Nominal effort (based on active fishers, trap limits and fishing days) has decreased by 31% since 2008, due to license retirements, fewer active fishers, shorter seasons, and trap limit reductions. Mean catch rates of pre-recruit lobsters show little annual variation and there is no apparent relationship between these catch rates and future commercial reported landings or CPUE. Catch per unit effort has changed little over the time period for which data are available (2004-12). It appears that the survival fraction has increased, since 2008, in all regions except for the Northeast. It appears that the survival fraction in the South and West Coast regions is lower than in the Northeast and Avalon regions.

Discussion

Northeast

There was some concern expressed over grouping areas with different trends (e.g. LFA 4A, which showed no statistically significant change in CPUE, being grouped in the Northeast region with LFA 6, an area that had increased by approximately 10%). Some proposed options include LFAs 5, 6, and 7 being grouped in their own region or to keep the regions proposed earlier and note any exceptions to the general trends described in the region. The argument was made that LFA 6 landings are so small that they should not distort any analysis.

Clarification was requested regarding how CPUE was determined and if the number of fishermen in each LFA is known. The speaker responded that CPUE was determined by dividing the reported landings by the number of fishermen. He also confirmed the number of fishermen in each LFA is known. A comment was made that the areas should be weighted when calculating CPUE.

It was also noted that the presentation showed that there was an overall decrease in the landings for the Northeast region, whereas the CPUE doesn't reflect a decline. The speaker indicated that CPUE doesn't necessarily reflect changes in landings. One participant stated that it would be worthwhile to investigate the reason why the landings are decreasing. Another participant suggested the fishermen have decided that it is not worth the effort to take part in the fishery. As long as the number of fishermen decreases along with decreased landings, then the CPUE will remain high. High levels of competition, gear saturation, and low prices were given as reasons why fishermen may not remain active.

Some debate persisted on whether to discuss trends by region or by LFA. The main reason for concern was that grouped LFAs may have different trends than what is shown by region and

some LFAs may be misrepresented. The group decided to look at some other regions before making a decision.

The presentation showed a decrease in the percent of v-notched females. One of the participants questioned the reason behind the decrease and the speaker suggested that some fishermen are not sure if it works and have decreased their v-notching efforts. Another participant asked whether there could be variations due to inconsistencies in LFAs, since the results were presented by region. The speaker confirmed that the results could be affected by area and year.

Another participant asked whether exploitation rates have been looked at since other areas look at them. The speaker responded that other regions use different methodology and have different data sources so those regions are better able to calculate exploitation rates.

Avalon

Some concern was expressed that LFA 10 should not be grouped with LFAs 8 and 9.

It was pointed out that the molt class ratio, an indicator of survival rate, ratio used in the presentation was based on pooled numbers and this area appears to be driven by Placentia Bay.

The group was asked whether they were comfortable combining the LFAs into regions at this point, the consensus of the group was to look at the trends of the LFAs first. The LFAs for the Avalon region were very similar, with the overall trends driven by LFAs 7 and 10. The group agreed that the similarities among the LFAs add confidence to the decision of making comments on trends by region.

One participant mentioned that fishermen stated that there was a peak in LFA 10 in 2010 and they were wondering if there were any environmental conditions that may prevent lobsters from surviving or if the Green Crab population could be having an effect. Another participant responded that temperature and predation by Green Crab could have an effect on larval lobster survival but the Green Crab population is too new to have an effect on recruitment sized lobsters. However, the group agreed that Green Crab should be noted as a potential concern for the area.

South Coast

A participant noted that there was a drop in nominal effort in 2012 and a slight increase in landing and CPUE, and asked if there was a reason for the drop in effort. The speaker replied that it could be attributed to the license buyback program. There was a drop in the trap limit in LFAs 11 and 12, by 15 traps, which was a voluntary reduction on behalf of the fishers.

The group was asked again whether they were okay with grouping the two LFAs into one region. The group agreed they were fine with combining the two LFAs but wanted to note that LFA 12 has fewer fishermen than LFA 11 and although recent trends were similar, historically, the two areas had very different fisheries. Also, it should be noted that the CPUE was dominated by LFA 11.

Participants also wanted to highlight that there was a lot of concern in Fortune Bay regarding aquaculture and the effects it could be having on the lobster population. They would like more studies done in an attempt to identify any detrimental effects.

West Coast

The group was asked about combining the LFAs for the West Coast region. The consensus was that although LFA 14C was lacking some information, the trends were similar and there wasn't one particular area with significantly more weight, so they were fine with combining the LFAs.

A participant commented that they would like to see the results for the island as a whole rather than for the four regions. The speaker replied that the trends for CPUE and survival are different for the four regions and there isn't a coherent picture of the Newfoundland lobster stock. The speaker also stated that it was concerning that half the landings are coming from Fortune Bay when historically it did not. A participant commented that Fortune Bay did not fish lobster in the past and the recent increase can be linked to the moratorium.

Additional CPUE Analysis

With regards to modified traps, which is a project by the index fishers, a participant asked how the traps were modified to catch pre-recruit lobsters. The speaker responded that the escape mechanism was removed from the traps. Another participant questioned why one of the areas had a value of zero for pre-recruit lobsters caught in modified traps. The speaker responded that only a small number of the observations for the area was usable. It was discovered that this data pertained to modified at sea sampling logbooks rather than the modified log books, which may provide further insight.

Initial discussions on CPUE analysis resulted in additional graphs being required based on the modified logbooks. The additional graphs were produced for discussion on the second day of the meeting. It was noted by the speaker that overall there was no statistically significant relationship between pre-recruit CPUEs and future landings in the four regions.

A participant asked when the changes in the traps occurred. The speaker responded that the traps were standardized in 2010. Prior to this fishers modified the traps. A question arose asking whether the time series was long enough since the traps were modified. After comparing CPUE graphs it appeared that it did not have any effect on the graphs.

Another participant asked if the traps were put back to the same area and whether recapture was an issue. It was confirmed that the traps are shifted a certain amount and not put back in the exact spot.

There was debate in the group over the use of CPUE as an indicator of the stock health. Many factors affect CPUE; it would be difficult to accurately report values without taking all factors into consideration. It was noted that this could be investigated in the future with some modelling to determine how good of an index it is in evaluating abundance but the current focus is on assessing the lobster population.

After looking at all the CPUE graphs for LFAs and regions, the group agreed that the best approach would be to describe trends at the region level and list any deviations from the trend at the LFA level.

FFAW SCIENCE DATA (LOBSTER FECUNDITY)

Presenter: Marthe Larsen Haarr, University of New Brunswick/Canadian Fisheries Research Network

Abstract

Data obtained from commercial traps during the fishing season by at-sea-samplers of the FFAW from 2006 to 2012 were analyzed by pooling all data by region on an annual basis. The South

and West coasts are the most productive in terms of landings, although West Coast landings have been in decline the past four years. Avalon landings are low, but stable; while Northeast landings are both low and in a steady decline. Lobster abundance and density is likely high along the South Coast compared to the other regions as landings here are spatially concentrated as opposed to accumulated from a large area, and the catch-per-unit effort is also very high. Size structure of the catch indicates high fishing intensity and a recruit-based fishery throughout Newfoundland. The highest fishing intensity is seemingly along the South and West coasts where the size structure is even more truncated than in the other two regions, and the reliance on recruits even higher. Pre-recruit catch rates in commercial traps do not correlate strongly with future landings and cannot be used as a forecasting tool. This may change, however, by monitoring pre-recruit catch rates in modified traps designed to retain sub-legal lobsters and/or by assessing catch rates vs. landings at a finer spatial scale. Landings from 1965 to 2012 were analyzed using a cluster analysis to determine whether LFAs can be grouped into regions based on landings trends. The analysis confirmed the status of the West Coast as a region, and suggests that LFAs 6 through 9 should constitute the Avalon region. The spatial resolution of this analysis is very low however, which is likely a serious limitation and caution should be taken when interpreting the results. A more inclusive approach of incorporating various stock indicators along with spatial restraints into a regression tree type approach on a finer spatial scale is recommended as an alternative analysis.

Discussion

A participant had a question regarding the clustering used in the analysis performed on the data presented. The speaker clarified that the data used was historical landings and years were the multi-variate used in the analysis. The speaker was also asked about the scope for change in molt increment. Although this was unknown, it was noted that size of maturity is changing and would be useful to look at on a future date.

A participant questioned the pooling of the data and any effects it would have. The speaker responded that poor spatial resolution may be an issue and that using a smaller spatial resolution may be beneficial as the current method may be grouping too much together and losing a signal.

Another participant suggested weighting the areas in the cluster analysis, to which the speaker responded that it was considered but time restrictions were a factor.

There was discussion amongst participants regarding the conclusions about fishing pressure within the regions. It was concluded that the regions have a reliance on pre-recruits but this reliance is highest on the South and West coasts.

There was a question directed at the speaker regarding the source of data and the calculation of CPUEs. The speaker responded that the CPUEs were calculated using NODE logbook data and a value was determined by dividing all the legal lobsters measured in the given year by the sum of the traps.

LOBSTER NODE

Presenter: Marthe Larsen Haarr, University of New Brunswick/Canadian Fisheries Research Network

Abstract

The Natural Sciences and Engineering Research Council of Canada (NSERC) funded “Lobster Node” of the Canadian Fisheries Research Network is a unique tripartite collaboration between

industry, government and academia on the question of lobster stock structure and connectivity in Atlantic Canada. The project involves five research components, four of which are based on stages of the life cycle: larval production, larval drift, larval settlement, and movement of juveniles and adults. The fifth component aims to elucidate genetic stock structure. The objective of the first component is to estimate spatiotemporal variation in larval production based on the abundance and characteristics of ovigerous females, and data is collected by harvesters at ~50 km intervals. With the exception of parts of the southwest coast, catch rates and sizes of ovigerous females are low throughout Newfoundland, resulting in low estimated egg production. Ovigerous females with partial or abnormal clutches are rare (< 20%) for almost all of Newfoundland except for some areas in the Avalon region. The current biophysical model of larval drift only incorporates the South and West coasts of Newfoundland, and predicts larval drift to follow the coastline west and north with high retention of larvae produced along the northwest coast. Larval settlement and recruitment monitoring has been tried once unsuccessfully on the West Coast, but work in the Bay of Fundy shows high variability in settlement on relatively small spatial scales, highlighting the importance of choosing the best sites of deploying settlement collectors. The larval drift model can possibly be used to identify likely sites for future studies. Four sites in Newfoundland (southwest, northwest, north central and northeast) were sampled for genetic testing in 2012 and the results will likely be available within the year.

Discussion

A participant noted that in the presentation it was stated that females from the South and Southwest are the largest but previously it was mentioned that they were smaller. The speaker clarified that the presentation was referring to ovigerous females being the largest.

Another participant questioned the larval drift showing movement to the Northwest when the fishery in the area isn't as strong. The speaker noted that just because the larvae move there doesn't necessarily mean they survive and recruit there.

It was also noted that the settlement measurement is quite fine and questioned the level of confidence. The speaker replied that there were a large number of settlements and there has been a lot of research into the settlement data and the researchers have confidence in the values and variability.

A participant questioned whether larvae have any ability to stay in an area. It was noted that this is the case after stage four when the juvenile can actively swim.

The speaker was asked when the genetic component of the research could be expected and she replied that this research will possibly be available by the end of the year.

The speaker was asked what causes the abnormal clutches mentioned in the presentation and she commented that some possible causes include rough handling throughout the season, increasing temperature and sperm limitation.

EASTPORT MARINE PROTECTED AREAS: LOBSTER CONSERVATION AND MONITORING ACTIVITIES

Presenter: Nadine Templeman, Science Branch, DFO NL Region

Abstract

In 1995, to address declining catches, local lobster fish harvesters formed the Eastport Peninsula Lobster Protection Committee (EPLPC) with the aim to implement an overall lobster conservation strategy for the Eastport Lobster Management Area (EPLMA; 400 km²). In 1997,

the EPLPC developed an agreement with DFO to limit local fisheries and close two areas of prime lobster habitat to lobster harvesting. Finally, in 1999, the EPLPC approached DFO on establishing these as Marine Protected Areas (MPAs; 2.1 km²) under the Oceans Act - and in October 2005, the Minister of DFO announced this designation. The regulatory conservation objective of the MPAs is to maintain a viable population of American Lobster through the conservation, protection, and sustainable use of resources and habitats in the EPLMA.

Monitoring of the lobster population inside and outside the MPAs (within the EPLMA) has been ongoing by local lobster harvesters since 1997-98. From the outset monitoring activities included logbooks and at-sea sampling (both outside the MPAs during the commercial harvest); and in 2004 started to include information on an annual fall sampling program - a specific research survey inside and outside the MPAs that makes use of commercial and modified traps and incorporates tagging to track movement. The information provided by these activities includes population size, population structure (size, sex, fecundity, etc.) and movement.

Recommendations by DFO Science for improvement of monitoring protocols and data analysis were incorporated into monitoring program in 2012, and efforts to recruit research to address outstanding questions regarding the effectiveness of the MPA are progressing starting this year.

Outside the MPAs, logbook results indicate a stable population size (CPUE varying without trend) between 1997 and 2011; while at-sea-sampling indicates the highest relative abundance of lobsters are sub-legal, and a high proportion of the females are ovigerous. The mean size of males and females has also been increasing since 1998, and the EPLMA shows an unusually high incidence of large male and female lobsters, including v-notched, compared to other areas in NL. After a decade of protection, inside the MPAs, there is a broadening of the population structure. These areas also have a greater average size and a greater number of large lobsters (> 120 mm CL), including ovigerous females, which have higher proportions inside the MPAs than the adjacent areas. Only small numbers of lobsters appear to be moving from the MPAs (although greater than those moving to). Comparisons of Eastport at-sea-sampling to other at-sea sampling around Newfoundland and Labrador would be useful as a next step to making conclusions on the benefits of the MPA; as would improving tracking of lobster movement in the area.

One of the benefits of the Eastport MPAs has been the ability of fish harvesters, government, community youth, academics, and scientists to work together and share information and knowledge for better management of the lobster fishery. Overall, monitoring suggests that protecting the two areas of habitat has sustained, and perhaps enhanced, the local resource. This success highlights the potential for similar lobster management tools and/or monitoring via stewardship elsewhere in the region.

Discussion

A participant asked the speaker whether the priority should be focused on adults or larval drift. The speaker responded that she personally felt that larval drift was more important but it would also depend on the opinion of stakeholders and committee members; however, both are important.

A participant noted that there are a number of closed areas outside of the MPA and questioned whether these areas have been highlighted, or if there were plans to look at them. The speaker responded that there were between 8 to 12 areas where data was collected under an Atlantic Canada Opportunities Agency (ACOA) project in 2004 but nothing has been looked at since. The chair commented that it would be a good idea to look into what has happened since and if there are any monitoring programs in the areas.

NSERC/FFAW PROJECT - LOBSTER FECUNDITY IN NEWFOUNDLAND IN NEWFOUNDLAND: RESULTS FROM 2009-12

Presenters: Kate Wilke and Ryan Stanley, Memorial University of Newfoundland

Abstract

Unavailable

Discussion

The chair asked if any studies were available on the viability of eggs at different sizes and whether the quality of eggs increased with lobster size. One of the speakers responded that the viability of eggs would be discussed further in the next presentation. They also noted that the number of eggs in the clutch and the size of the eggs increase with lobster size up to a certain point.

One participant questioned whether it would be more beneficial to have larger lobsters with more eggs and less frequent hatching or smaller lobsters with less eggs but a higher frequency. One of the speakers replied that even though it is less frequent, the number of eggs is still greater overall compared to smaller lobsters and the eggs from the larger lobsters are more viable.

Some participants also expressed concern that the larger berried females are killing smaller lobster when they are caught in the same trap. Also some participants expressed concerns that because v-notching can protect earlier maturing females, fishers are seeing a larger number of small berried females.

MORTALITY AND BEHAVIOUR OF LARVAL LOBSTERS

Presenter: Ryan Stanley, Ocean Sciences Centre, Memorial University of Newfoundland

Abstract

Ovigerous female lobsters were collected from coastal Newfoundland and transported to Memorial University's Ocean Sciences Centre for rearing and observation. Behaviour and mortality during the larval stage underpins dispersal and connectivity achieved by early life history stages. We found relationships between larval phenotype, maternal phenotype, natal region, and environment with both behaviour and mortality of the first larval stage. Larval colour distributions mirror assessment LFA groupings with north east coast ports being characterized with predominantly blue larvae, Avalon region ports with red larvae, and west coast ports with an even split between red and blue. In predation experiments red 'darker' larvae had higher survival probability than bluer 'lighter' counterparts. Behaviourally, blue larvae swam on average 15% faster than their red counterparts. Larvae from cold ports (Port au Choix) had better survival and faster average swim speeds than their warmer counterparts (Red Harbour, Port aux Basques) in cold-water treatments (10°C), while the converse was observed in warmer temperatures (16-20°C). Collectively our results demonstrate regional and maternal influences on the behaviour and mortality of larval lobsters. The application of province wide generalizations of these larval parameters, behaviour and mortality, is cautioned especially at small spatial scales.

Discussion

A participant asked whether the fish in the experiment ate the red larvae and the speaker responded that the trial ended after 30 minutes and any uneaten larvae were removed from the tank.

Another participant questioned whether the larvae would settle close to where they are released. The speaker responded that it was likely and that previous modeling does not take behaviour into account and in the depth they are at in the water column can have an effect on the dispersal.

DRAFTING OF SAR BULLETS

At this point, the group started discussions on editing the bullets for the SAR report. This included two general summary pages and then a page for each region. Each region had bullet points summarizing trends on landings, nominal effort, mean CPUE, molt class ratio (an indicator of survival) and v-notching. The statements used in the original bullet points were drafted from the data and analysis as presented for each region. The bullet point discussion included editing for grammatical errors, assessing accuracy of stated facts and ensuring the important trends for each region and its LFAs were represented.

There was debate on whether the total landings for Newfoundland could be described as stable when there had been an increase of 70% in the last 8 years, mainly due to a significant increase in landings in LFA 11. It was argued that overall landings were stable since the year-to-year changes have been steady. Participants wanted to highlight the fact that LFA 11 not only contributes the most towards the total landings in recent years, but has increased its contribution to the landings from 10% in the early 1990s to 45% in recent years, which some may consider alarming.

There was debate on whether v-notching should be included in the regional bullets since it is not directly related to stock status. The group decided to keep the bullet in at least the up front summary bullets because people would be interested in what level of v-notching is being done in the areas.

The group debated extensively on whether CPUE is a good indicator of abundance. Some argued that it is more an indicator of cause and effect and suggested that total catch would be a better indicator. Others rebutted that landings do not reflect abundance, they may not include total catches and that CPUE is suitable and it follows other trends in some cases. The group agreed to state the CPUE and landings trends in each region, without definitively labelling it as an indicator to avoid any potential misrepresentation.

Due to time constraints, only the summary and Northeast bullets were completed in plenary. The template that was used for the Northeast region was to be applied to the other three regions. Values that illustrated the trends in each of the regions were entered by lead scientists after the meeting was completed and a copy of the bullets was sent by email to all participants. All participants were given ample time to comment and provide input on the bullets before they were finalized and used in the drafting of the SAR report.

RESEARCH RECOMMENDATIONS

Throughout the plenary discussions, multiple research recommendations were made. These include:

- Initiating work on reference points and establishing timelines.
- Investigate current studies on salmon aquaculture and its effects on lobster on the South Coast, as well as the effect of mussel aquaculture on lobster populations in the Northeast region.
- Investigate the standardizing or weighting of CPUE indices.

APPENDIX 1: LIST OF PARTICIPANTS

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APPENDIX 2: TERMS OF REFERENCE

MEETING OF THE NEWFOUNDLAND AND LABRADOR REGIONAL ADVISORY PROCESS (RAP) ON LOBSTER

May 15-16, 2013

Holiday Inn, 180 Portugal Cove Road, St. John's, Newfoundland & Labrador

May 21-22, 2013¹

Northwest Atlantic Fisheries Centre, 80 East White Hills Road, St. John's, Newfoundland
& Labrador

Chairperson: Bill Brodie

Context

The status of Lobster in Lobster Fishing Areas (LFAs) 3-14C were last assessed in 2009. The present assessment of these stocks is requested by Fisheries Management to provide current information on the status of the resource and provide the data that will be used in the updated Integrated Fisheries Management Plan.

Objectives

Status of the following stocks will be assessed:

Lobster will be assessed in 4 regions: Northeast (LFA 3-6) Avalon (LFA 7-10) South Coast (LFA 11-12), and West Coast (LFA 13-14).

Outputs

A CSAS Science Advisory Report (SAR) and associated research documents will be produced for this assessment. A Proceedings document will record the meeting discussions.

Participants

- DFO Science, Newfoundland and Labrador and NCR
- DFO Fisheries Management, Newfoundland and Labrador Region
- Industry Representatives
- Provincial Department of Fisheries and Aquaculture
- Memorial University
- Aboriginal organizations

¹ If required, an additional two days have been planned to word craft the complete text of the SAR. Summary bullets for each stock will be agreed upon in plenary during the meetings of May 15-16, 2013. RAP Participants are encouraged to attend the additional two days of discussions on May 21-22 and assist in the drafting of the SAR.

APPENDIX 3: AGENDA

REGIONAL ADVISORY PROCESS MEETING: 2013 ASSESSMENT OF AMERICAN LOBSTER

May 15th - 16th, 2013
Holiday Inn, St. John's, NL

May 21st - 22nd, 2013²
Northwest Atlantic Fisheries Centre (NAFC), East White Hills, St. John's, NL

Chair: Bill Brodie, Science Branch, DFO

Wednesday, May 15

Time	Topic	Presenter
09:00 – 09:15	Opening Remarks & Review of RAP Process	<i>Chair</i>
09:15 – 09:30	Oceanography Overview	<i>Don Stansbury</i>
09:30 – 09:45	Management Overview	<i>Patricia Williams</i>
09:45 – 10:30	Assessment Methodology	<i>Don Stansbury</i>
10:30 – 10:45	BREAK (coffee/tea will be provided)	
10:45 – 12:00	Lobster Assessment – Northeast & Avalon	<i>Elizabeth Coughlan & Katherine Skanes</i>
12:00 – 13:00	LUNCH (not provided)	
13:00 – 15:05	Lobster Assessment – South Coast & West Coast	<i>Elizabeth Coughlan & Katherine Skanes</i>
15:05 – 15:20	15:05 – 15:20	
15:20 – 17:00	FFAW Science Data & Lobster NODE	<i>Marthe Larsen Haarr</i>
17:00	Adjournment	

² If required, an additional two days have been planned to word craft the complete text of the SAR. Summary bullets for each stock will be agreed upon in plenary during the meetings of May 15th-16th, 2013. RAP Participants are encouraged to attend the additional two days of discussions on May 21st-22nd and assist in the drafting of the SAR.

Thursday, May 16

Time	Topic	Presenter
09:00 – 09:15	Opening Remarks	<i>Chair</i>
09:15 – 09:30	Eastport Marine Protected Areas: Lobster Conservation and Monitoring Activities	<i>Nadine Templeman</i>
09:30 – 10:00	NSERC/FFAW Project – Lobster Fecundity in Newfoundland: Results from 2009-2012	<i>Kate Wilke & Ryan Stanley</i>
10:00 – 10:30	Mortality and Behaviour of Larval Lobsters	<i>Ryan Stanley</i>
10:30 – 10:45	BREAK (coffee/tea will be provided)	
10:45 – 12:00	Summary Bullets and other SAR Items	
12:00 – 13:45	LUNCH (not provided)	
13:45 – 15:30	Summary Bullets and other SAR Items	
15:30 – 15:45	BREAK (coffee/tea will be provided)	
15:45 – 18:00	Summary Bullets and other SAR Items; PA & Reference Points Discussion	
18:00	Adjournment	