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**Proceedings of the PSARC  
Groundfish Subcommittee Meeting**

**May 18, 2004  
Nanaimo B.C.**

**S. Romaine  
Groundfish Subcommittee Chair**

**Fisheries and Oceans Canada  
Pacific Scientific Advice Review Committee  
Pacific Biological Station  
Nanaimo, British Columbia V9T 6N7**

**July 2004**



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**PACIFIC SCIENTIFIC ADVICE REVIEW COMMITTEE (PSARC)  
GROUNDFISH SUBCOMMITTEE MEETING**

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## **SUMMARY**

### **Working Paper G2004-02: The British Columbia Longspine Thornyhead Fishery: Analysis of Survey and Commercial Data (1996 – 2003)**

The long-term downward trend in CPUE in the commercial fishery suggests that current removals may not be sustainable. The survey provides a high precision index of longspine thornyhead biomass for WCVI with a coefficient of variation of about 10% for each year. The biomass trends derived from the September commercial CPUE data reasonably match the survey trends for WCVI from 2001 to 2003. A Rennell survey is required to compare with the commercial CPUE data. Fishing effects could be evaluated by surveying both fished and unfished areas. Production ageing is critical for advancing assessment of LST. The subcommittee recommended: 1) develop a decision rule framework that relates fishery and survey data to management actions prior to the 2005-06 fishing season. This is particularly important given the downward trend in abundance indices and that the current fishery may not be sustainable; 2) establish the production ageing of LST as a priority; and 3) continue survey monitoring and develop a plan for rotation among areas, including unfished areas.

### **Working Paper G2004-03: Stock Assessment Framework for Inshore Rockfish**

A strategic groundfish survey strategy is required and inshore rockfish should be included within this strategy. Jig surveys could be used to update catch rate indices for all areas where previous surveys were conducted. Fishing surveys could be calibrated with non-intrusive techniques to address the concern of possible local area depletion. The complete species composition and inshore rockfish biological data should continued to be collected on the IPHC survey in B.C. Continued investigation of the gene tagging methods for inshore rockfish assessment and monitoring within RCAs is warranted. The index site surveys should be integrated into a depth/habitat stratified and random design over a larger spatial scale and broader depth range. These should be calibrated to allow the continued use of the index after the transition to the new survey design. The Subcommittee recommended:

1. The development of a strategic survey plan for groundfish that includes inshore rockfish. This would involve the development of a survey strategy to monitor all inshore rockfish habitats coastwide over the long term.
2. The continued development of the inshore rockfish management framework to prioritize stock monitoring activities, to assess existing and develop further management objectives and to identify linkages between survey results and management decisions.

## **SOMMAIRE**

### **Document de travail G2004-02 : La pêche du sébastolobe à longues épines en Colombie-Britannique – Analyse des données de relevés et de la pêche commerciale (1996 – 2003)**

La tendance à la baisse à long terme des CPUE de la pêche commerciale porte à croire que les prélèvements actuels ne sont pas durables. Le relevé fournit un indice très précis de la biomasse de sébastolobe à longues épines sur la côte ouest de l'île de Vancouver (COIV), le coefficient de variation se chiffrant à environ 10 % chaque année. L'évolution de la biomasse calculée à partir des données de CPUE de la pêche commerciale en septembre correspond assez bien à l'évolution de l'indice de biomasse obtenu lors des relevés effectués sur la COIV de 2001 à 2003. Un relevé Rennell est nécessaire pour effectuer des comparaisons avec les données de CPUE de la pêche commerciale. Les effets de la pêche pourraient être évalués en réalisant le relevé dans des secteurs pêchés et non pêchés. La détermination de l'âge est essentielle pour améliorer l'évaluation du sébastolobe à longues épines. Le Sous-comité fait les recommandations suivantes : 1) élaborer un cadre de règles de décision permettant de relier les données de pêche et de relevé aux mesures de gestion avant la saison de pêche 2005-2006 (cela est particulièrement important compte tenu de la tendance à la baisse des indices d'abondance et de la possibilité que la pêche actuelle ne soit pas durable), 2) établir comme priorité la détermination de l'âge des sébastolobes à longues épines, et 3) continuer la surveillance par relevé et élaborer un plan de rotation entre les divers secteurs, y compris ceux qui ne sont pas pêchés.

### **Document de travail G2004-03 : Cadre d'évaluation des stocks de sébaste côtier**

Une stratégie de relevé du poisson de fond, notamment du sébaste côtier, est nécessaire. Des relevés de pêche à la turlutte pourraient servir à mettre à jour les indices de taux de capture dans tous les secteurs où des relevés ont déjà été effectués. Les relevés de pêche pourraient être étalonnés grâce à des techniques non-intrusives pour répondre aux préoccupations liées à l'épuisement local possible des stocks. Il faudrait continuer de déterminer la composition spécifique complète et de recueillir des données biologiques sur le sébaste côtier dans le cadre du relevé de la CIFP en C.-B. La poursuite des études sur les méthodes de marquage génétique pour l'évaluation et la surveillance du sébaste côtier dans la zone de conservation du sébaste est justifiée. Les relevés des sites de pêche indicatrice devraient être intégrés à un plan d'échantillonnage aléatoire et stratifié par profondeur et par habitat sur une échelle spatiale étendue et une gamme de profondeurs élargie. Ces relevés devraient être étalonnés pour permettre leur utilisation après la transition au nouveau plan d'échantillonnage. Le Sous-comité fait les recommandations suivantes :



3. Élaborer un plan de relevé stratégique du poisson de fond, notamment du sébaste côtier pour en surveiller à long terme tous les habitats à la grandeur de la côte.
4. Poursuivre la mise au point du cadre de gestion du sébaste côtier pour établir l'ordre de priorité des activités de surveillance des stocks, pour évaluer les objectifs de gestion existants et en établir d'autres, ainsi que pour déterminer les liens entre les résultats de relevé et les décisions de gestion.



## **INTRODUCTION**

The PSARC Groundfish Subcommittee met 18-19 May 2004, at the Pacific Biological Station in Nanaimo, British Columbia. External participants from the Canadian Groundfish Research and Conservation Society (CGRCS) and the Pacific Halibut Management Association (PHMA) attended the meeting. The Subcommittee Chair S. Romaine opened the meeting by welcoming the participants. During the introductory remarks the objectives of the meeting were reviewed, the confidential nature of the discussion was highlighted, and the Subcommittee accepted the meeting agenda.

The Subcommittee reviewed two Working Papers. Summaries of the Working Papers are included as Appendix 1. The meeting agenda appears as Appendix 2. A list of meeting participants, observers and reviewers is included as Appendix 3.

## **DETAILED COMMENTS FROM THE REVIEW**

### **G2004-02: The British Columbia Longspine Thornyhead Fishery: Analysis of Survey and Commercial Data (1996 – 2003)**

Jon Schnute, Rowan Haigh, Brian Krishka, Alan Sinclair, Paul Starr

#### **Paper accepted subject to revisions**

#### **Subcommittee Discussion**

This paper was reviewed by one internal and one external Reviewer. The first Reviewer stated that in his opinion the paper was very well written and that the Authors had done an excellent job and he could find no major faults or questions. This Reviewer offered only a few typographical changes to the paper.

The second Reviewer commended the Authors for the energy and thoroughness with which they pursued the analysis contained in the paper, stating it was clearly articulated and the notation and explanations in the paper were complete. This Reviewer evaluated the paper considering whether it had achieved the objectives of the request for working paper and whether it provided scientific advice in support of fisheries management. A number of questions and issues within the manuscript were raised by the Reviewer and many of these were subsequently discussed among the Subcommittee.

The Reviewer first questioned the use of a strictly additive lognormal model standardization for CPUE and area swept methodology. The Review suggested that the Authors should have identified interaction terms to refine their interpretation of commercial CPUE. The Authors noted that this would have been desirable but noted they lacked sufficient data to investigate all candidate models.

The Reviewer noted that there were disagreements between 2001 to 2003 Longspine Thornyhead (LST) commercial data indices derived from the May to October fishing period and those from September only. The Authors noted that due to data variability, this disagreement was acceptable. They further reiterated that the CPUE for the September survey reasonably matched the commercial fishery CPUE for that month indicating that the commercial CPUE and survey CPUE reasonably indexes biomass for the WCVI area.

The Review also questioned the use of particular models used in the analysis and the weightings applied by each of the methods. The Authors responded by noting that there were several different possible analyses, but the addition of more models within the paper would likely not change the overall results. There were also concerns over sex measurement data presented in one of the tables with no accompanying analysis. The Authors stated that biological data collection is an integral part of the survey but that they had not analyzed the data as part of the Working Paper. They noted that analysis of biological data could be informative in the long term.

The Subcommittee discussed if the deepwater (>1200 m) may act as a refugium for LST. Presently the fishery does not target waters deeper than 1200 m. It is unknown if productivity rates in the deepwater are comparable to shallower depths. Information presented at the meeting indicates the deepwater fish are smaller but it is not known whether they are juveniles or adults. One participant questioned whether the small fish in deepwater were the same species.

The Subcommittee noted that the survey should be rationalized in the context of an overall groundfish survey strategy. Other species could be assessed improving the overall efficiency and utility of the survey.

The Reviewer commented on the use of the ageing lab to assist in LST ageing. The Authors responded that this would be an expensive undertaking and difficult with the current load on the ageing lab. The Subcommittee agreed that ageing was identified as an area with potential promise to complement data from surveys. Ageing methods have been evolving over the last two years and it should be possible to move LST to production ageing. Size at age has been shown to be highly variable and ageing data will prove more useful in assessing stock status.

The Subcommittee noted that the survey results and fishery data could be linked to a management decision framework. This has been identified as a groundfish priority for fisheries management.

The Subcommittee agreed that the analysis has indicted that the commercial fishery CPUE index the Rennell area has declined about 15-25% per annum during 2000-2003 for a cumulative decline of 35-55%.

The Subcommittee agreed that the analysis has indicated that the WCVI commercial fishery CPUE index has declined about 6-8% per annum during 1996-2003 for a cumulative decline of 40%.

The Subcommittee noted that commercial CPUE is affected by such factors as fuel prices, gear developments, avoidance, quota holdings, markets, management plan changes, etc. It was also noted that the LST fishery is a directed fishery that occurs at depths greater than most other groundfish fisheries. Consequently, the commercial CPUE index is likely to reflect changes in abundance to a greater extent than other mixed-species fisheries.

The Subcommittee noted that fishers targeted both Shortspine Thornyhead (SST) and LST simultaneously and differentially and this could affect the LST commercial CPUE index. Future analysis could look at both SST and LST combined to determine if the commercial CPUE trends are the same. This data is available from commercial logbooks going back to 1991.

The Subcommittee suggested that surveys could be undertaken in both the Flamingo and Triangle areas to collect reference baseline biological and CPUE data to compare fished and unfished regions.

The 2001 survey was conducted with a different net and as such, this may have influenced catch rates in that year. The Subcommittee noted, however, that the commercial CPUE index matched the survey index for the same period (September, 500-1200m depth range).

### **Subcommittee Conclusions**

- Accept the paper subject to revisions
- The long-term downward trend in CPUE in the commercial fishery suggests that current removals may not be sustainable.
- The survey provides a high precision index of LST biomass for WCVI with a coefficient of variation of about 10% for each year.
- The biomass trends derived from the September commercial CPUE data reasonably match the survey trends for WCVI from 2001 to 2003.
- A Rennell survey is required to compare with the commercial CPUE data.
- Fishing effects could be evaluated by surveying both fished and unfished areas.
- Production ageing is critical for advancing assessment of LST.

### **Subcommittee Recommendations**

1. Develop a decision rule framework that relates fishery and survey data to management actions prior to the 2005-06 fishing season. This is particularly important given the downward trend in abundance indices and that the current fishery may not be sustainable.
2. Establish the production ageing of LST as a priority
3. Continue survey monitoring and develop a plan for rotation among areas, including unfished areas.

## **G2004-04: Assessment Framework For Inshore Rockfish**

K.L. Yamanaka, L.C. Lacko, J.K. Lochead, J. Martin, R. Haigh, C. Grandin, K. West

**Paper accepted subject to revisions**

### **Subcommittee Discussion**

Three external Reviewers reviewed this paper. The first Reviewer had some concerns with the magnitudes of uncertainty associated with the various estimates or indices of abundance. The Authors noted that survey results from the 1980's to 2003 showed a statistically significant decline in abundances between sampling years based on the sampling intensity applied. The Reviewer questioned why there was no analysis in the paper to estimate the survey intensity required to detect changes in key metrics in the range necessary to assess management actions. The Subcommittee noted that ultimately this is required to develop a study design to meet management objectives.

The Subcommittee agreed that there has been considerable progress in designing and executing surveys of inshore rockfish on the B.C. coast. The results of these activities will be very useful in evaluating the design of long term surveys needed to monitor the effectiveness of the inshore rockfish conservation strategy. The Subcommittee also noted that there are a large number of survey initiatives and it is necessary to evaluate and prioritize these activities to address the current and any future objectives of the management framework. This will require dialogue among fishery managers, stakeholders and stock assessment staff. For example, does the goal of having fishing mortality of 2% apply only to areas outside Rockfish Conservation Areas (RCAs) or is it meant to be coastwide? Are there any specific rebuilding targets that should be addressed? The Subcommittee requested more discussion on the strengths and weaknesses of the survey methods and approaches in revisions of the working paper

A Reviewer questioned the confidence in identifying and quantifying rockfish species using the towed camera system. The authors stated that the towed-body trackline position was determined by lasers and that they had confidence in the observers being able to identify rockfish over repeated surveys. Using the same tracklines and observers would lead to a repeatable survey grid.

Reviewers also suggested that the Authors discuss the potential biases of fish attraction and avoidance caused by towed cameras and submersibles. The Authors noted that because the camera is forward-looking, detection of fish avoidance is possible. If fish flee before seen; however, then this issue cannot be addressed. The Authors further noted that inshore rockfish appear to be sedentary and observations have noted that they do not show attraction or avoidance when approached by the submarine but seem to remain stationary. The Subcommittee asked about the survey potential for China, Black, Tiger, and Copper rockfish. These are rare in the survey catches, but they are taken in fisheries. The Authors reported that those species are territorial and evasive and may not be easily seen in towed video surveys or submersible surveys. The authors noted that the towed

video survey covers depths as shallow as 10m and other inshore rockfish species are sometimes seen. Observations of inshore rockfish have been made in dive surveys designed for lingcod. There is little information with which to assess China, Black, Tiger, and Copper rockfish.

The Subcommittee asked if it was possible to use the historical longline CPUE time series as an abundance index in a stock assessment model. The Authors noted that while there are some CPUE time series from longline fisheries, there are a number of difficulties in their interpretation given the sensitivity to management actions and hyperstability of CPUE as rockfish abundances declines.

A Reviewer raised concerns over the ultimate goal of the stock assessment research and in particular setting the fishing mortality rate  $F$  at 0.75 times natural mortality  $M$ . The Reviewer saw this value as a moderately precautionary level, but if the goal of the stock assessment was to realistically rebuild the stock then this might require lower levels of  $F$ . The Authors responded and noted that the value of  $F = 0.75$  was discussed in detail with fisheries managers at PSARC meetings in 2001. The Subcommittee asked how fishing mortality would be monitored. The data needed to estimate age composition of fish in surveys had been collected, but in past surveys, catch curves have been used to estimate total mortality. The Subcommittee asked if there are annual data on age composition from surveys and if so, could these be used in age-structured models to estimate total mortality. To be effective, the surveys must collect age structures and be conducted over several years in a consistent manner in all areas. This may include RCAs if it was deemed important to monitor total mortality. The survey design simulation methodology could also potentially be modified to evaluate sampling rates required to monitor total mortality. The Subcommittee asked if it was possible to use absolute estimates of abundance instead of mortality estimates. For example, if the catch were known, then there would be a necessary population size to have a fishing mortality ( $F$ ) of 2% or less. If it is possible to obtain absolute biomass estimates, then this could be an alternative to measuring fishing mortality. All the Reviewers noted that there is a need to improve catch monitoring in aboriginal and recreational fisheries.



## **Subcommittee Conclusions**

- The Subcommittee accepted the Working Paper subject to revisions.
- A strategic groundfish survey strategy is required and inshore rockfish should be included within this strategy
- Jig surveys could be used to update catch rate indices for all areas where previous surveys were conducted.
- Fishing surveys could be calibrated with non-intrusive techniques to address the concern of possible local area depletion.
- The complete species composition and inshore rockfish biological data should continued to be collected on the IPHC survey in B.C.
- Continued investigation of the gene tagging methods for inshore rockfish assessment and monitoring within RCAs is warranted.
- The index site surveys should be integrated into a depth/habitat stratified and random design over a larger spatial scale and broader depth range. These should be calibrated to allow the continued use of the index after the transition to the new survey design.

## **Subcommittee Recommendations**

1. The Subcommittee recommended the development of a strategic survey plan for groundfish that includes inshore rockfish. This would involve the development of a survey strategy to monitor all inshore rockfish habitats coastwide over the long term.
2. The Subcommittee recommended the continued development of the inshore rockfish management framework to prioritize stock monitoring activities, to assess existing and develop further management objectives and to identify linkages between survey results and management decisions.

## **APPENDIX 1. Working Paper Summaries**

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### **G2004-02: The British Columbia Longspine Thornyhead Fishery: Analysis of Survey and Commercial Data (1996 – 2003)**

Jon Schnute, Rowan Haigh, Brian Krishka, Alan Sinclair, Paul Starr

This report presents an analysis of the biomass survey conducted annually from 2001-2003 on the deep-water population of Longspine Thornyheads off the west coast of Vancouver Island (WCVI). We examine the survey data in the context of a coastwide Longspine fishery that began in 1996 and extended northward from WCVI into two northern regions, Tidemarks and Rennell. Within WCVI, the survey appears to index Longspine Thornyhead biomass well, achieves coefficients of variation near 10%, and indicates no significant biomass change in 2001-2003. Because the survey has limited coverage in space and time, we compare that analysis with similar analyses of commercial catch per unit effort (CPUE) data in WCVI and the two northern regions, where no surveys exist. We present an integrated framework of three mathematical models for making these comparisons: (i) swept-area biomass estimates, (ii) standardized catch rates with fixed effects for various factors, and (iii) swept-area biomass estimates with standardized vessel effects. All commercial indices for the three regions show downward trends since the inception of the fishery, with the largest decline in the Rennell Sound area. The magnitude of decline depends on the model chosen for analysis. If these trends in the commercial data reflect real declines in population biomass, current removals of Longspine Thornyhead may not be sustainable. We conclude with recommendations for planning future surveys, integrating data from surveys and commercial fisheries, planning future reductions in the commercial fishery, and improving the basic biological information available for this species.

## **G2004-04: Assessment Framework for Inshore Rockfish**

K.L. Yamanaka, L.C. Lacko, J.K. Lothead, J. Martin, R. Haigh, C. Grandin, K. West

This working paper is prepared in response to a management request to provide a detailed outline of scientific monitoring and assessment programs required to improve the ability to assess the status of inshore rockfish populations and monitor changes in abundance. This working paper provides a brief background section on biology, fishery management and historic fishery dependent abundance indices for inshore rockfish in B.C., then reviews survey methods and design, trends in relative abundance and biological population parameters and considers these for future surveys. The surveys are grouped into:

a) historic research survey programs

- Hook and line jig surveys primarily in Statistical Area 12 – 19
- Submersible surveys in Statistical Area 15 and 15
- Longline surveys with industry on the west coast Queen Charlotte Islands and the west coast of Vancouver Island.

b) new research survey programs aimed at developing fishery independent abundance indices and through simulation modeling assesses the utility of the survey to index rockfish abundance and provide biological data for assessment

- observer on the IPHC setline survey
- longline survey in Statistical Areas 12 and 13
- towed camera survey in Statistical Areas 17-19

c) research to develop methods of estimating biomass

- Bowie Seamount and Gwaii Haanas
- Lower Strait of Georgia
- Genetic tagging in Trincomali Channel

Discussion of research program priority may be developed in concert with the fisheries management framework. Encompassing management goals into a management framework would help to identify specific priorities for monitoring and research programs.

## **APPENDIX 2: PSARC Groundfish Subcommittee Meeting Agenda**

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**PSARC GROUND FISH SUBCOMMITTEE  
May 18-19, 2004  
Pacific Biological Station  
Seminar Room - Nanaimo, B.C.**

### **Tuesday, 18 May 2004**

Opening remarks and introductions	9:00
The British Columbia Longspine Thornyhead Fishery: Analysis of Survey and Commercial Data (1996 – 2003)	9:15
Reviewers Comments and Subcommittee questions	10:00
<i>Lunch Break</i>	<i>11:45</i>
Assessment Framework for Inshore Rockfish – Presentation	12:45
Reviewers Comments and Subcommittee Questions	13:30
<i>Coffee Break</i>	<i>14:45</i>
Adjournment	16:00

### **Wednesday, 19 May 2004**

Discussion and Formulation of Subcommittee Conclusions and Recommendations for Longspine Thornyhead	9:00
<i>Coffe Break</i>	<i>10:30</i>
Discussion and Formulation of Subcommittee Conclusions and Recommendations for Inshore Rockfish	10:45
Adjournment	12:15

### APPENDIX 3. List of Attendees

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**Date:** 18-19 May 2004  
**Subcommittee Chair:** Steve Romaine (RomaineS@pac.dfo-mpo.gc.ca)  
**PSARC Chair:** Al Cass (CassA@pac.dfo-mpo.gc.ca)

Name	Affiliation
Ackerman, Barry	Groundfish Management Unit, RHQ
Bonnet, Terri	Groundfish Management Unit, RHQ
Castle, Kris	Groundfish – Prince Rupert
Fargo, Jeff*	PBS Groundfish
Grandin, Chris	PBS Inshore Rockfish
Haggarty, Dana	PBS Groundfish
King, Jackie*	PBS Groundfish
Krishka, Brian	PBS Groundfish
Lacko, Lisa	PBS Groundfish
Lothead, Janet	PBS Groundfish
Macdonald, Al*	Groundfish Management Unit, RHQ
Martin, Jonathan	PBS Groundfish
McFarlane, Sandy	PBS Groundfish
Perry, Ted	PBS Stock Assessment
Rutherford, Kate	PBS Groundfish
Schnute, Jon	PBS Groundfish
Sinclair, Alan	PBS Groundfish
West, Kim	DFO Fish Management
Workman, Greg	PBS Groundfish
Yamanaka, Lynne	PBS Groundfish

Name	Affiliation
Dickens, Brian	Canadian Groundfish Research and Conservation Society
Robinson, Gary	Pacific Halibut Management Association
Sporer, Chris	Pacific Halibut Management Association
Turris, Bruce	Canadian Groundfish Research and Conservation Society

Reviewers for the PSARC papers presented at this meeting are listed below, in alphabetical order. Their assistance is invaluable in making the PSARC process work.

Rob Kronlund	Fisheries and Oceans Canada
Rick Stanley	Fisheries and Oceans Canada
Victoria O'Connell	Alaska Department of Fish and Game
Wayne Palsson	Washington Department of Fish and Wildlife
Mark Wilkins	NOAA NMFS AFSC
Mary Yoklavich	NOAA NMFS SWFSC