Fisheries and Oceans Canada | Pêches et Océans Canada
Science | Sciences

C S A S | ***S C C S***

Canadian Science Advisory Secretariat | **Secrétariat canadien de consultation scientifique**

Proceedings Series 2004/035 | **Série des compte rendus 2004/035**

Proceedings of the PSARC Invertebrate Subcommittee Meeting

November 23-24, 2004
Nanaimo, B.C.

J. Boutillier
Invertebrate Subcommittee Chair

Fisheries & Oceans Canada
Pacific Scientific Advice Review Committee
Pacific Biological Station
Nanaimo, B.C. V9T 6N7

March 2005

Proceedings of the PSARC Invertebrate Subcommittee Meeting

November 23-24, 2004
Nanaimo, B.C.

J. Boutillier
Invertebrate Subcommittee Chair

Fisheries & Oceans Canada
Pacific Scientific Advice Review Committee
Pacific Biological Station
Nanaimo, B.C. V9T 6N7

March 2005

ISSN 1701-1272 (Printed / Imprimé)

Published and available free from:
Une publication gratuite de:

Fisheries and Oceans Canada / Pêches et Océans Canada
Canadian Science Advisory Secretariat / Secrétariat canadien de consultation scientifique
200, rue Kent Street
Ottawa, Ontario
K1A 0E6

http://www.dfo-mpo.gc.ca/csas/

CSAS@DFO-MPO.GC.CA

Printed on recycled paper.
Imprimé sur papier recyclé.

Correct citation for this publication:
On doit citer cette publication comme suit:

DFO, 2004. Proceedings of the PSARC Invertebrate Subcommittee Meeting November 23-24, 2004. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2004/035.

PACIFIC SCIENTIFIC ADVICE REVIEW COMMITTEE (PSARC)

INVERTEBRATE SUBCOMMITTEE MEETING

SUMMARY

The Pacific Scientific Advice Review Committee (PSARC) Invertebrate Subcommittee met November 23-24, 2004 at the Pacific Biological Station in Nanaimo, B.C. The Subcommittee reviewed two working papers and one stock status report.

Working Paper I2004-03: Potential implications of differential size limits in the Dungeness crab fisheries of British Columbia.
A Phillips, Z Zhang

The paper reviewed the biological impacts of implementing differential size limits to Dungeness crab fisheries (170 mm point-to-point for the commercial industry and 165 mm for recreational and First Nations fisheries was specified in the request for working paper). The rationale for the Working Paper was to assess the impacts on the commercial, recreational, and First Nations fisheries if the commercial minimum size limit for Dungeness crab is increased to 170 mm (carapace point to point) from the present limit of 165 mm. The results indicated that the initial loss to the commercial sector varied by area and was 20-60% of the total number of crab. Based on a yield-per-recruit analysis, the commercial fishery production would stabilize after 3 years at a level of 75-85% of current production, except for Boundary Bay which would experience a lower level of production. In addition, the effect of differential size limits resulted in a projected mean allocation to First Nations and recreational fishers of 2 crabs/trap using standardized experimental fishing protocols.

The paper was accepted subject to revisions. The Subcommittee made the following recommendations:

- The Subcommittee agreed in principle that the recommendations in the Working Paper were useful; however, they felt that they would be more appropriately expressed as caveats that should be considered prior to managing by differential size limits.

- The Subcommittee noted that differential size limits is only one of a broad range of management options that could be used in the allocation of Dungeness crab resources and recommended that other options be examined prior to implementing management changes.

Working Paper I2004-04: Implications of geoduck aquaculture on the conservation of wild geoduck populations and the harvestable TAC in British Columbia.
C Hand, K Marcus

This paper was written in response to a request to evaluate conservation issues for wild geoduck populations and to assess impacts on the commercial fishery that may result from geoduck aquaculture activities. The objectives of this paper were to identify the factors that may compromise conservation, to evaluate potential risks and to make recommendations for consideration in future decision making. A summary of current approaches to assess and manage wild geoduck stocks and the underlying conservation strategy for the commercial fishery was provided, along with relevant available information on genetics of geoducks, and known biophysical requirements for recruitment and growth. A framework for phased development of aquaculture was presented that would include the following geoduck bed categories: 1) no natural geoduck populations but may have the required biophysical characteristics for geoduck growth, 2) depleted beds that are not recovering, 3) beds that are open to the fishery but are not popular due to access challenges, 4) depleted beds that are not recovering, and 5) beds currently being harvested in the fishery.

Two recommendations flowed from the review of the paper: 1) the need to incorporate impacts of aquaculture into the assessment and management frameworks for management of wild stocks of geoducks; 2) the need for a phased approach to geoduck aquaculture that will allow us to address issues such as genetic impacts of cultured stock on wild populations, implications on recruitment of wild and cultured stocks, and disease issues as they relate to transfer and transplant of these animals.

The paper was accepted subject to revisions. The Subcommittee agreed with the recommendations noted above.

SOMMAIRE

Le sous-comité des invertébrés du Comité d'examen des évaluations scientifiques du Pacifique (CEESP) s'est réuni les 23 et 24 novembre 2004 à la Station biologique du Pacifique, située à Nanaimo (Colombie-Britannique), pour passer en revue deux documents de travail et un rapport sur l'état des stocks.

Document de travail I2004-03 : Conséquences possibles de l'application de limites de taille différentielles dans les pêches au crabe dormeur de la Colombie-Britannique
A. Phillips et Z. Zhang

Ce document examine les effets biologiques de l'application de limites de taille différentielles dans les pêches au crabe dormeur (la demande de document de travail précisait une limite de 170 mm d'une pointe à l'autre de la carapace pour la pêche commerciale et de 165 mm pour les pêches récréatives et autochtones). Le document de travail visait à déterminer quels seraient les effets sur ces trois types de pêche si la taille minimale des prises commerciales de crabe dormeur passait de 165 mm, la limite actuelle, à 170 mm (d'une pointe à l'autre de la carapace). Les résultats montrent que la perte initiale pour le secteur commercial varierait d'une région à l'autre, allant de 20 à 60 % du nombre total de crabes. Selon une analyse de rendement par recrue, la production de la pêche commerciale se stabiliserait au bout de trois ans à un niveau allant de 75 à 85 % de la production actuelle, sauf dans la baie Boundary, où la production serait plus basse. Les prévisions effectuées selon les protocoles normalisés de pêche expérimentale indiquent que les limites de taille différentielles donneraient lieu à une allocation moyenne de 2 crabes par casiers aux pêcheurs récréatifs et autochtones.

Le sous-comité accepte le document sous réserve de révisions et fait les recommandations suivantes :

- Le sous-comité convient en principe que les recommandations du document de travail sont utiles, mais il juge qu'il serait préférable de les présenter comme des mises en garde dont il faudrait tenir compte avant d'appliquer la gestion par limites de taille différentielles.

- Faisant remarquer que les limites de taille différentielles ne constituent qu'une seule des nombreuses options de gestion pour l'allocation des ressources en crabe dormeur, le sous-comité recommande que l'on se penche sur d'autres options avant de modifier la gestion de cette pêche.

Document de travail I2004-04 : Conséquences de l'élevage de la panope pour la conservation des populations de panopes sauvages et leur TAC en Colombie-Britannique

C. Hand et K. Marcus

Ce document a été rédigé en réponse à une demande d'évaluation des enjeux de conservation des populations de panopes sauvages et pour évaluer les impacts sur la pêche commerciale qui pourraient résulter d'activités d'élevage de la panope. Le document a pour objectifs de déterminer les facteurs pouvant nuire à la conservation, d'évaluer les risques possibles et de formuler des recommandations pour la prise de décisions futures. Il présente un résumé des méthodes actuelles d'évaluation et de gestion des stocks de panopes sauvages, la stratégie de conservation sous-jacente pour la pêche commerciale, des données pertinentes sur la génétique de la panope et les besoins biophysiques connus pour le recrutement et la croissance de cette espèce. Le document présente un cadre de développement graduel de l'élevage de la panope qui comprend les catégories suivantes de gisements de panopes : 1) gisements sans population naturelle de panopes mais qui pourraient avoir les caractéristiques biophysiques nécessaires à la croissance des panopes; 2) gisements épuisés qui ne se rétablissent pas; 3) gisements ouverts à la pêche mais qui sont peu exploités en raison de difficultés d'accès; 4) gisements épuisés qui sont en rétablissement; 5) gisements actuellement exploités.

L'examen du document a donné lieu à deux recommandations : 1) les cadres d'évaluation et de gestion des stocks de panopes sauvages doivent tenir compte des impacts de l'aquaculture; 2) l'élevage de la panope doit se faire par une approche graduelle qui nous permettra d'aborder des enjeux comme les impacts génétiques des panopes d'élevage sur les populations sauvages, les conséquences pour le recrutement des panopes sauvages et d'élevage et les questions liées aux maladies en ce qui concerne le transfert et la transplantation de ces animaux.

Le sous-comité est d'accord avec ces recommandations et a accepté le document sous réserve de révisions.

INTRODUCTION

DETAILED COMMENTS FROM THE REVIEWS

Working Paper I2004-03: Potential implications of differential size limits in the Dungeness crab fisheries of British Columbia.
A Phillips, Z Zhang

Subcommittee Discussion

The paper reviewed the biological impacts of differential size limits to Dungeness crab fisheries and examined the long-term impacts to the commercial fishery by using a yield-per-recruit analysis. The paper also examined the effectiveness of differential size limits in terms of access to the resource by First Nations and recreational fishers. The differential size limit investigated was 170 mm point-to-point for the commercial industry and 165 mm for recreational and First Nations fisheries.

Overall, both reviewers concluded that the manuscript was well written, that the objectives were clearly stated and that the methods were adequately described. One reviewer noted that natural mortality rate estimates and moulting probabilities used in this Working Paper were inconsistent with those in a previous publication. The authors acknowledged the inconsistency and stated the error was in the previous report.

The other reviewer made note of additional areas for future research:

- Examine potential long-term biological benefits resulting from an increase in minimum legal size.
- Estimate recreational and First Nations harvest rates to assess whether differential size limits will increase fishing effort in recreational and First Nations fisheries.

Both reviewers made a number of editorial comments and requested clarification on a number of areas. Some of these include:

- Clarifying the captions of tables in revisions to the Working Paper to reflect their contents.
- The use of consistent terms i.e., crabs fishing areas, size measurements.
- More explanation on how numbers are derived and presented throughout the paper (i.e., a suggestion to include additional columns in some of the tables).

The authors acknowledged the comments and will address the comments of the reviewers.

Further to this, the Subcommittee discussion focused on the following points:

- The Subcommittee commended the authors for the analysis. Managers were hopeful when requesting the Working Paper that differential size limits would help resolve allocation conflicts of Dungeness crab resources, but the conclusions indicate that the situation is complex and there is unlikely to be a single "best" solution.

- The Subcommittee suggested that the authors consider economic impacts in their yield-per-recruit analysis, especially if there is a size-specific price differential. Although economic assessment is outside the scope of the PSARC terms of reference, the Subcommittee suggested an economic assessment is appropriate to understand economic loss/benefit to the different fishing sectors. An industry participant noted that even though commercial fishers do sort their catch by size for different markets, they do not generally receive different prices for different size crabs.

- The Subcommittee also suggested that the percent loss to the commercial fishery, as reported in the Working Paper, needs clarification to report whether the percent loss is weight or numbers of crabs.

- The regression analysis figure should be accompanied by a table to highlight the difference in point-to-point and notch-to-notch measurements.

- There were concerns that the uncertainty expressed in the results for Boundary Bay could delay a manager's decision on whether or not to implement coast-wide differential size limits in situations where impacts to commercial fishing in other areas are considerably less.

- Questions were raised whether or not the high incidence of small crabs in Boundary Bay may be a consequence of selective harvesting for large crabs by the Washington State crab fishery just south of the Canadian Boundary Bay fishery. It was suggested that the Washington State Dungeness crab fishery may be limiting the size of crabs by effectively removing crabs greater than 170 mm (point-to-point width). The authors acknowledged further analysis of shell age data from Boundary Bay may help explain this high percent loss and if there is a correlation to the Washington State commercial fishery. The authors noted that the data needed for this assessment already exists. It was noted, however, that the proposed in-season monitoring in the next fishing season could better assess the true impact of a differential size limit in Boundary Bay.

- It was noted that Washington State uses differential size limits in their recreational fishery for different areas.

- The Subcommittee suggested several editorial comments to strengthen the manuscript. It was noted that the abstract, as presented, could not stand alone independent of the paper. The abstract needs to include some results and conclusions. There were suggestions that the introduction should reflect the Request for Working Paper and include information on the moulting process in Dungeness crabs. It was suggested that the manuscript should include a brief summary of the current assessment and management framework.

- There was confusion on the term "fisheries" used in the Working Paper's Recommendation 2. The Subcommittee noted that this statement is misleading and needs clarification as to which fishery applies. The authors noted the term "fisheries" implied the commercial industry. Some suggested that the recreational fishery could also apply in Recommendation 2 and the recreational prawn fishery was mentioned as an example. The handling mortality in the recreational crab fishery in unknown.

- Recommendation 2 in the Working Paper discusses potential management decision rules using threshold CPUE levels and discard ratios. The Subcommittee noted that there were no references in the paper to indicate what these levels might be. It was noted that decision rules based on discard ratios would require modifications to the observer data that is currently collected and expansion of the observer program to the whole coast.

- Recommendation 3 in the Working Paper referring to changes to escape ring size was not supported in the paper. A review of the effect of escape ring size would be required in the revisions.

- There was discussion regarding catch expectation of the recreational and First Nations fisheries if differential size limits are implemented. It was unclear what these expectations are and they are most likely highly variable.

- It was noted that in some crab fishing areas such as Area A (low intensity), the impact would most likely be minimal to all sectors, where as in Areas I & J (high intensity) the impact could be significant.

- There was a general sense from the commercial and recreational representatives that the allocation conflict of crab resources needs addressing with some urgency. Some had hoped differential size limits would be the answer but it was clear from the discussion of the Subcommittee that a broader range of options is available to managers to address this problem.

Subcommittee Conclusions

- The Subcommittee concluded that differential size limits is only one of several management tools that would address crab allocating issues. The Subcommittee recognized that the impact of using differential size limits would vary in relation to fishing pressure and area. The Subcommittee concluded, in light of the above discussion, that a broader management approach needs to be considered in the allocation of Dungeness crab resources but this is beyond the scope of the Working Paper. Other options that could be considered include but are not restricted to: First Nations and recreation-only fishing areas, seasonal commercial fishing closures, abundance-based quotas, implementation of discard ratios and differential escape rings. Depending on which management options are finally implemented, modification of the research framework for crabs may be required to assess their impacts on the productivity of the stock.

- The Subcommittee concluded that if further analysis of shell age data confirmed and helped explain the projected high commercial loss for Boundary Bay then it could be included in revisions to the paper.

- The Subcommittee recognized that the recommendations in the Working Paper are useful for considerations if differential size limits were to be applied. The Subcommittee concluded that the Working Paper recommendations need to be justified with supporting documentation in the discussion portion of the paper.

Subcommittee Recommendations

- The Subcommittee recommended acceptance of the paper with revisions as noted in the Subcommittee discussion and conclusion sections above.

- The Subcommittee recommended the recommendations in the Working Paper be reworded as caveats to implementation of differential size limits for Dungeness crabs.

- The Subcommittee recommended reviewing a broader range of management options for allocating Dungeness crab resources. A future assessment may be required to examine the biological and assessment implications of alternative management options. These options include but are not restricted to First Nations and recreation-only fishing areas, seasonal commercial fishing closures, abundance-based quotas, discard ratios and differential escape rings.

Working Paper I2004-04: Implications of geoduck aquaculture on the conservation of wild geoduck populations and the harvestable TAC in British Columbia.
C Hand, K Marcus

Subcommittee Discussion

The Working Paper was written in response to a request to evaluate conservation issues for wild geoduck populations and to assess impacts on the commercial fishery that may result from aquaculture activities. The objectives of the paper were to identify the factors that may compromise conservation, to evaluate potential risks and to make recommendations for consideration in future decision-making. A summary of current approaches to assess and manage wild geoduck stocks and the underlying conservation strategy for the commercial fishery was provided, along with relevant available information on genetics of geoducks, and known biophysical requirements for recruitment and growth.

The first reviewer had several comments with regard to habitat impacts and disease issues.

The second reviewer acknowledged the uncertainty in estimates of biomass and uncertainty in the impacts of geoduck aquaculture. He had specific questions regarding the rationale for using estimates of virgin biomass, 25 years into the fishery, and requested clarification on why harvesting 50% of virgin biomass in 50 years is the long-term goal. He pointed out the need to recognize uncertainty of parameters associated with the biomass estimate in the conservation strategy. The reviewer also highlighted the need to fully explore genetic and disease risks, and the importance of sound broodstock collection and management practices. Other comments included suggestions for species succession studies, and for methods to distinguish between cultured and wild product.

The Subcommittee discussed a variety of topics, including the likelihood of cultured geoducks spawning and producing viable larvae before being harvested, genetic impacts of successful recruitment resulting from cultured geoducks, and the relative fitness of recruits resulting from hatchery-reared geoduck compared to wild geoduck. It was pointed out that guidelines have been drafted to address disease risks involving hatcheries and origins of brood-stock relative to the destination of seed.

The Subcommittee noted that the paper focused on the Strait of Georgia, specifically with regard to the suggestions provided from the Underwater Harvesters Association (UHA) for consideration as initial tenure sites. A reviewer was concerned about the relevance of including potential aquaculture sites identified by the one harvest sector. The reviewer noted that there are other

individuals/groups that have also identified sites. Highlighting one group in the paper suggests that DFO might consider only the sites identified in the Working Paper. There was general support for the bed categorization method outlined in the paper, but it was agreed that specific site suggestions should be provided as examples only, to illustrate the impacts on wild stocks and the commercial fishery that might be expected.

The Subcommittee noted that there are other methods for selecting beds for aquaculture, including consideration of survival and growth rate characteristics. For example, the Tofino area on the west coast of Vancouver Island has the highest growth rates and as such might be desirable for aquaculture. However, sea otters are an expanding threat to wild geoduck populations in the region and may limit the development of aquaculture in regions that are populated by sea otters.

The rationale for the limit reference point of 50% of virgin biomass was questioned, and discussion followed on the differential application of the rule to individual beds, in the case of commercial fishery exploitation, and to larger-scale populations, in the case of use by aquaculture operations. This disparity needs to be clarified in the Working Paper. While the paper did not include discussion of the intertidal areas, it was pointed out that harvest strategies there would have a greater degree of habitat disruption than in the subtidal areas.

Further clarification was requested by subcommittee members on the following issues:

- Clarify the statement regarding the viability of geoduck being in question. This statement needs to be qualified in a more global sense.
- Clarify that the paper focused on subtidal geoduck aquaculture as opposed to intertidal areas.
- Substantiate the statement that farm sites should not be concentrated.

Subcommittee Conclusions

The Subcommittee concluded that the paper would be improved by a summary section that pulls together the critical information leading to conclusions and recommendations.

The Subcommittee concluded that the recommendation to integrate geoduck aquaculture impacts into the present assessment and management frameworks needs to be clarified. There is a disconnect between 'beds' and 'stocks'. Some confusion remains about the suggested consequences of removing a bed from the fishery for aquaculture. Are we now managing a smaller piece of the pie or is it 50% of the population in an area as defined by a stock? It is not yet understood how farmed animals contribute to recruitment and genetic fitness and how this

might affect the assessment framework. The wording 'conservation strategy' should be changed to 'future assessment and management frameworks'. It was concluded that this recommendation was acceptable if the above changes and points of clarification were added.

With respect to the recommendation to following a cautious "learn as we go" approach to aquaculture, the Subcommittee found that this recommendation was acceptable if the wording was modified to clarify some of the information gaps that needed to be addressed in this phased approach to development.

For the recommendation to "select beds that have a minimal impact on natural populations and on the commercial fishery", the Subcommittee felt that this recommendation could not be supported as it was beyond the scope of this paper. They also felt that the impact on the natural population was adequately covered with the integration of the aquaculture into the assessment and management frameworks for geoducks (see point 2 above).

The Subcommittee felt that the recommendation to "avoid geographic concentration of farms" was not adequately supported in the paper. The Subcommittee suggested that if the paper could be modified to substantiate the need for this action and if it could be defined in a manner that managers could deal with (i.e., some measure of unacceptable concentration), then it could be incorporated into the recommendation a "learn as you go approach" (see above). There was, however, a recognition that control systems need to be in place to manage the genetic risks of selected cultured animals interacting and breeding with wild populations, as these animals are broadcast spawners and their planktonic larvae cannot be contained.

The Subcommittee supported the recommendation to work closely with the aquaculture industry to monitor, set standards, and collect data, but suggested that it should also include Provincial participation and the UHA who are presently conducting work on enhancement.

Subcommittee Recommendations

1. Accept paper subject to revisions as outlined in the sub-committee discussion and conclusion sections above.

2. The Subcommittee recommended that a much more encompassing set of genetic protocols, monitoring systems and policies for the management of the lineage and out-planting of offspring from cultured geoduck should be developed. The highest research priority to facilitate aquaculture of geoducks should be to understand the potential interactions and impacts of seeded geoduck on wild population recruitment (is a cultured geoduck

equivalent to a wild geoduck? and what would be the genetic implications of interbreeding on wild populations' general fitness?).

3. Other habitat and ecosystem impacts will also need to be evaluated. However, this will need to be done in conjunction with all interested parties to ensure there isn't unnecessary duplication. Addressing these problems is not solely the responsibility of the aquaculture industry, as the information is needed to manage other impacts such as commercial fishing, fish farm siting, etc.

APPENDIX 1: Working Paper Summaries

Working Paper I2004-03: Potential implications of differential size limits in the Dungeness crab fisheries of British Columbia.
A Phillips, Z Zhang

Dungeness crabs are harvested by commercial, recreational and First Nations fishermen coast-wide. In recent years, intensifying commercial crab fisheries have made it difficult for recreational and First Nations harvesters to catch crabs in many areas. In the past, demands for increased crab fishing opportunities by these two sectors have been dealt with by closing specific areas to commercial harvest. Further closures will begin to impact the viability of some of the coastal commercial crab fisheries.

Differential minimum harvest size limits were investigated as a possible means of providing a crab allocation for the First Nations and recreational harvesters. The limits chosen were 165 mm, measured across the widest part of the shell, for First Nations and recreational harvest, with minimum commercial size increasing to 170 mm. The immediate reduction in commercial harvest using this management action was calculated to vary between 20-60% in total numbers, dependent on the Crab License Area. The likelihood of crabs in the 165-170mm range, if allowed to moult to a larger size, becoming available to the commercial fishery was estimated to be in the range of 4-20% depending on the published mortality rate used in the calculations. The mean expected size increase of these crabs was 20%. Yield-per-recruit analyses were done to predict the long-term effect of differential harvest rates. With harvest rates < 50% by First Nations and recreational sectors, the commercial fishery could stabilize at 75-85% of the current level by numbers of crabs after three years in most areas except in Boundary Bay where the loss will be much higher.

The effectiveness of differential harvest rates in providing First Nations and recreational allocations was also evaluated. Catch in the First Nations/recreational sectors was calculated to be above a minimum acceptable requirement of 2 crabs per trap as measured by research gear.

Working Paper I2004-04: Implications of geoduck aquaculture on the conservation of wild geoduck populations and the harvestable TAC in British Columbia.

C Hand, K Marcus

Geoduck aquaculture is viewed by many as a viable and promising new industry, and there is increasing interest by the shellfish industry to culture and enhance geoduck stocks. Federal and Provincial governments have committed to implement a phased approach to geoduck aquaculture expansion in 2005. This paper was written in response to the need to evaluate the conservation issues for wild geoduck populations and to assess the impact on the commercial fishery that may result from aquaculture activities. The objectives of this paper are to identify the factors that may compromise conservation, to evaluate the potential risks and to make recommendations for consideration in future decision making. A summary of current approaches to assess and manage wild geoduck stocks and the underlying conservation strategy for the commercial fishery is provided, along with relevant available information on genetics of geoducks, and known biophysical requirements for recruitment and growth. A phased approach to expanding geoduck aquaculture is outlined, in which site selection criteria are proposed that allow a ranking of the level of impact on wild stocks and the existing commercial fishery.

To ensure that conservation objectives for natural geoduck populations continue to be met, it is recommended that further expansion of geoduck aquaculture must be fully integrated into current and future stock assessment and management frameworks. In addition, because of the limited stock, fish health and genetics data available, it is recommended that geoduck aquaculture expansion follow a phased approach, and that initial opportunities are used to facilitate the collection of knowledge and the development of sound procedures.

APPENDIX 2: PSARC Invertebrate Subcommittee Meeting Agenda

PSARC Invertebrate Subcommittee Agenda
November 23-24, 2004
PBS Nanaimo Seminar Room

November 23:

1:00	Introduction and review of RMEC comments from the June 2004 Meeting and Overview of the agenda
1:30	Review of working paper, *Potential implications of differential size limits in the Dungeness crab fisheries of British Columbia* – Authors: A. Phillips, Z. Zhang
3:00	Formulation of subcommittee conclusions and recommendations.

November 24:

9:00	Review of working paper, *Implications of geoduck aquaculture on the conservation of wild geoduck populations and the harvestable TAC in British Columbia* – Authors: C. Hand, K. Marcus
11:00	Formulation of subcommittee conclusions and recommendations
12:00	Lunch
1:00	Review of Abalone stock status report
2:00	Review of PSARC requests for the subcommittee meeting in June, 2005
3:00	Other business/further review of previous agenda items as required.

APPENDIX 3: List of Attendees & Reviewers

Subcommittee Chair: J. Boutillier
PSARC Chair: Al Cass

DFO Participants (* Subcommittee Members)	**Nov 23**	**Nov 24**
L. Barton	√	√
B. Pechter*	√	√
J. Boutillier*	√	√
S. Bower		√
D. Bureau	√	√
A. Campbell*	√	√
A. Cass	√	√
L. Convey		√
J. Dunham	√	√
B. Ennevor	√	
K. Fong	√	
H. Gill		√
G. Gillespie	√	√
W. Hajas	√	√
C. Hand	√	√
R. Harbo*	√	√
S. Heizer		√
B. Jubinville		√
B. Koke	√	
R. Lauzier*	√	√
B. Lucas	√	√
K. Marcus		√
J. Morrison	√	
R. Mylchreest*	√	√
M. O		√
G. Parker	√	√
C. Pearce		√
I. Perry*	√	√
A. Phillips	√	
J. Rogers*	√	√
R. Russell		√
D. Rutherford	√	√
J. Toole		√
R. Webb	√	
Z. Zhang	√	
External Participants:		
Bill Heath, BC MAFF	√	√
Paul Rickard, Sports Fish Advisory Board	√	
Wayne Harling, Sports Fish Advisory Board	√	
R. Vowles, Area E Fisher	√	
K. Mauriks, Area H Fisher	√	
Michelle James, UHA		√
Bruce Clapp, UHA		√

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

Chris Pearce	DFO
Stefanie Zaklan	Malaspina University-College
Bob Sizemore	Washington State F&W
Jie Zheng	University of Alaska Fairbanks