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Proceedings of the Maritimes Region Science Advisory Process on the Assessment of St. Mary's Bay Longhorn Sculpin

20 June and 9 October 2008

Bedford Institute of Oceanography
Dartmouth, Nova Scotia

Mark Showell
Meeting Chair

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April 2009

Compte rendu de la réunion du Processus consultatif scientifique de la Région des Maritimes au sujet de l'évaluation du stock de chaboisseau à dix-huit épines de la baie St. Mary's

Les 20 juin et 9 octobre 2008

Institut océanographique de Bedford
Dartmouth (Nouvelle-Écosse)

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Président de la réunion

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avril 2009

Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings include research recommendations, uncertainties, and the rationale for decisions made by the meeting. Proceedings 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.

Avant-propos

Le présent compte rendu a pour but de documenter les principales activités et discussions qui ont eu lieu au cours de la réunion. Il contient des recommandations sur les recherches à effectuer, traite des incertitudes et expose les motifs ayant mené à la prise de décisions pendant la réunion. En outre, il fait état de données, d'analyses ou d'interprétations passées en revue et rejetées pour des raisons scientifiques, en donnant la raison du rejet. Bien que les interprétations et les opinions contenus dans le présent rapport puissent être inexacts ou propres à induire en erreur, ils sont quand même reproduits aussi fidèlement que possible afin de refléter les échanges tenus au cours de la réunion. Ainsi, aucune partie de ce rapport ne doit être considéré en tant que reflet des conclusions de la réunion, à moins d'indication précise en ce sens. De plus, un examen ultérieur de la question pourrait entraîner des changements aux conclusions, notamment si l'information supplémentaire pertinente, non disponible au moment de la réunion, est fournie par la suite. Finalement, dans les rares cas où des opinions divergentes sont exprimées officiellement, celles-ci sont également consignées dans les annexes du compte rendu.

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SUMMARY

A Maritimes Region Science Advisory Process (SAP) meeting was held on 2 days, 20 June and 9 October 2008, at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, to assess the status of longhorn sculpin (*Myoxocephalus octodecmspinosus*) in St. Mary's Bay, Nova Scotia. Participation in this meeting included Fisheries and Oceans Canada (DFO), non-DFO scientists, Nova Scotia Department of Fisheries and Aquaculture, fisheries representatives, and non-governmental organizations. The results of this meeting are expected to inform decisions related to the management of the longhorn sculpin resource.

SOMMAIRE

Une réunion a été tenue dans le cadre du Processus consultatif scientifique de la Région des Maritimes en deux fois, soit les 20 juin et 9 octobre 2008, pour évaluer l'état du stock de chaboisseau à dix-huit épines (*Myoxocephalus octodecmspinosus*) de la baie St. Mary's, en Nouvelle-Écosse. Y participaient Pêches et Océans Canada (le MPO), des scientifiques de l'extérieur du MPO, le ministère des Pêches et de l'Aquaculture de la Nouvelle-Écosse, des représentants des pêcheurs et des organisations non gouvernementales. Les résultats de cette réunion devraient servir à éclairer les décisions au sujet de la gestion du stock de chaboisseau à dix-huit épines.

INTRODUCTION

The meetings were convened on 20 June and 9 October 2008, both at 9:00 AM. After welcoming participants (Appendix 1) and performing a round of introductions, the Chair of the meeting, M. Showell, provided a brief introduction to the meeting. The Chair noted that this was first and foremost a science peer-review meeting, meaning that the first responsibility of participants was to provide an objective review of the information that would be presented by the Population Ecology Division (PED) assessment team, which had been responsible for the work. To assist in this review, 2 formal reviewers had been invited to attend the meeting: Mr. David Kulka (DFO Emeritus) and Ms. Shelley Armsworthy (PED). In addition, the Chair encouraged other DFO Science staff to provide a critical review of the information presented. The Chair noted that there were a number of other invited participants with expertise and knowledge about longhorn sculpin and the sculpin fishery, and encouraged active participation in the discussions. Secondly, the Chair noted that this was a DFO science advisory meeting, and the final product would be a Science Advisory Report (SAR) representing DFO Science Branch advice to the Fisheries and Aquaculture Management (FAM) Branch.

The Terms of Reference (TOR) for the meeting were reviewed (Appendix 2), including the objectives of this meeting, which were to:

- Describe biology of the species, based upon studies both in the Maritimes and elsewhere, including (to the extent possible):
    - Distribution of the resource and comment on relationship of sculpin inside and outside of St. Mary's Bay.
    - Growth characteristics, including size at maturity, generation time, longevity, etc.
    - Role in ecosystem including predators and prey.
    - Habitat preferences.
- Describe the directed fishery, including:
    - Gear used.
    - Catch by area and season.
    - Size composition of landings by area and season.
- Description of sculpin catches from other fisheries.
- Evaluation of abundance trends and current status using fishery indices and surveys, if available.
- Estimation of exploitation rate.
- Evaluation of impact of the sculpin fishery on the ecosystem (to the extent possible), including:
    - Description of bycatch.
    - Description of the area of Bay affected with comment on the predominant benthic communities.

To address these objectives, several working papers were prepared, with the intention to proceed to a single research document once reviewed and accepted. This proceedings report is the record of the discussion. A Science Advisory Report (SAR) was also produced out of this meeting (DFO 2008).

The Agenda (Appendix 3) was reviewed, with no further additions or corrections.

REVIEW OF THE STATUS OF ST. MARY'S BAY LONGHORN SCULPIN

(20 June 2008; Day 1)

Working Paper: Review of the St. Mary's Bay Longhorn Sculpin Fishery. CSA Working Paper 2008/014.
Presenters: P. Comeau and J. Tremblay
Rapporteurs: H. Stone and M. Fowler

Presentation Highlights

A directed fishery for longhorn sculpin in St. Mary's Bay began in 1999 and was stopped after the 2006 fishery, pending review. The fishery takes place over a 6 week period in April-May and is limited to 4 license holders. Observer coverage is required and has varied by year from 25% to 100% coverage. While fishing for sculpin, vessels are permitted to use a 90mm diamond mesh codend. Average annual landings in the directed sculpin fishery are 98t, with a high of 152t in 2001 and a low of 52t in 2004. Commercial catch rates showed a decline after the first 2 years, but have remained relatively stable since. Catch rates from the DFO Research Vessel (RV) survey increased from the late 1970's to 1993, and have since declined. The industry run Individual Transferable Quota (ITQ) survey shows catch rates consistent with the RV survey. The abundance of mature (>23cm) longhorn sculpin have declined in the directed fishery. The neighbouring RV survey stratum has shown a decline in mean length of sculpin. Exploitation rate estimates were calculated using several estimates of population abundance. Although a precise estimate of the exploitation rate was not available, the within-season exploitation rate of sculpin in St. Mary's Bay is thought to be substantial. There is insufficient information to determine if the high exploitation rate is sustainable. At-sea observers provided estimates of bycatch within the directed sculpin fishery. The most abundant bycatch species caught in the directed sculpin fishery from 1999–2006 were lobster, winter flounder, crabs, and sea raven. Although lobster bycatch is high, all animals are released, and less than 1% were reported to be damaged or dead. The habitat where the directed sculpin fishery takes place is in an area that is highly energetic and of low bottom complexity. As a result, the impact of the sculpin fishery on the sea floor is expected to be low.

Questions and Comments

<u>Fishery</u>

The longhorn sculpin fishery is essentially a lobster bait fishery conducted in April and May. The fishery has been restricted to 4 vessels greater than 40' LOA (length over all; note - vessels less than 40' are not allowed to fish for groundfish in St. Mary's Bay), and took place from 1999-2006. The timing of the sculpin fishery corresponded with a high demand for sculpin as bait to attract large lobsters to the trap fishery. In 2007, there was no directed sculpin fishery and, therefore, no observer coverage. Vessels fished for 2 weeks in 2007 using normal flounder gear, but the St. Mary's Bay fishery was shut down early.

The St. Mary's Bay sculpin fishery essentially uses standard redfish bottom trawl gear, i.e., a balloon trawl with 5" rollers and 90mm diamond mesh cod end. Diamond mesh is preferred because fishers do not want to lose fish, and this gear is considered to cause less damage to lobsters. Tows are generally less than 1 hour in length, and vessels fish from 6 AM-6 PM daily. Industry pointed out that tows of less than 1-hour tow duration cause less damage to lobsters. There have been relatively few modifications made to the gear from 1999 to 2006; the only major change was a switch to 6.5" diamond mesh in the body of the trawl, but the same cod end has been retained over the duration of the fishery.

Annual catch rates for sculpin increased from 1999 to 2000, declined in 2001, but have remained relatively stable subsequently, with a small standard error about the mean. These trends in catch rates appear consistent with a relatively unexploited localized, sedentary stock subjected to fishing pressure.

Fishers can legally discard sculpin, dogfish, and skate in the groundfish fishery. This happens during most of the year, unless there is a market for these species. For some areas, there is good information on bycatch reported by at-sea observers, while for other areas, there is very little information.

A strong decline in ocean pout abundance was apparent in the catch rates from the observed longhorn sculpin trips, and may be of concern. It was noted that the ocean pout decline occurs in other surveys as well. Sturgeon also occurred in the bycatch and may also be of concern, because they are considered to be at low levels of abundance.

With regard to winter flounder, not many were caught on a daily basis, so the total catch was generally considered to be low. All catches of winter flounder were landed, so information is available on reported landings, as well as estimates from at-sea observers. It was recommended that the catches of all bycatch species should be summarized in a table and that invertebrate bycatches sponges should be included, since they are now considered to be of interest ecologically.

Industry noted that most discards are alive when released. However, while some bycatch species likely survive after capture in the sculpin fishery (i.e., lobsters and crabs), others may not (i.e., sea ravens).

It is likely that species identification is a problem in some cases. The sudden appearance of little skate bycatch in the recent period may be a result of misidentification, since they are very similar to winter and thorny skate, especially at smaller sizes. Observer estimates of Jonah and rock crab may also have been misidentified, as reporting is inconsistent between years. Instances where sculpin were not identified to the species level were also noted. Feedback on these identification issues should be provided to the Observer contractor for remedial training.

Although there is a USA fishery in New England for longhorn sculpin, few details were available. It was suggested that USA catch statistics reported to Northwest Atlantic Fisheries Organization (NAFO) may provide a sense of scale relative to the Canadian fishery, but it was noted that the USA has not reported their landings to NAFO in recent years.

Other Fishing Activities in St. Mary's Bay

Other fisheries that capture sculpin include the flounder fishery, scallop fishery, lobster fishery, and groundfish fishery. Sculpin bycatches from these fisheries are small, but observer coverage is low or non-existent for most. There was a recommendation to summarize information (i.e., fishing effort) from the other fisheries in St. Mary's Bay (i.e., lobster, scallop, groundfish). This could be done by examining the number of licenses and the number of days fished for each species.

Landings

The demand for sculpin was low prior to 1999, since there was not much of a market until 1999 and later. The lower catches in recent years were also considered to be market driven;

however, according to one fisher, it was also related to gear problems, which resulted in a loss of fishing time for 1 of the vessels.

Surveys

DFO summer bottom trawl surveys generally indicate higher abundance of longhorn sculpin in the 1970's, particularly in the Gulf of Maine area. A recommendation was made to examine the minimum trawlable biomass in Stratum 490 to compare with catches in the fishery, so that calculations of relative F (or some proxy for exploitation rate) could be obtained. While RV biomass trends in Stratum 490 are highly variable, the series could be smoothed to minimize this problem. There was also a recommendation to calculate minimum trawlable biomass using sculpin catch data from the "inshore groundfish survey" conducted by Simon and Campana in the 1980's.

Another recommendation was made to calculate size-specific (mature versus immature) catch rates for sculpin using data from the RV survey and directed fishery, in order to determine if the declines in mean length observed could be attributed to recruitment or the loss of larger animals in the population.

A recommendation was made to look at the DFO RV series for 1979-1984 (when spring, summer, and fall surveys were conducted annually in the Bay of Fundy-Scotian Shelf area) to evaluate spatial/temporal changes in distribution. A further recommendation was to conduct special sampling for sculpins during the DFO March and summer surveys.

Biology

Growth rates for longhorn sculpin are available only for southern New England, (close to Cape Cod) from a study conducted during the late 1990's, but the ages have not been validated. The assumption is that growth rates in the Gulf of Maine area would be similar. Not much is known about the population age structure of longhorn sculpins in the Bay of Fundy/Scotian Shelf region.

In terms of information on sculpin maturity, work by Beacham in the 1980's is the only study available, which showed that the age maturity is age 3, or approximately 23cm. These findings are considered to be somewhat questionable, as it was not clear what criteria were used to assign maturity stage. Further, age of maturity may have changed in 30 years, as has been seen for many other species on the Scotian Shelf. Nor would maturity data from the surveyed area necessarily apply to St. Mary's Bay, which is outside the survey area. The size composition of sculpins from the commercial fishery tends to be unimodal at 24-27cm.

Generally, it is considered that the longhorn sculpin has low fecundity, but the eggs are large and so there may be a trade-off here (i.e., fewer eggs are produced, but they are larger in size and have a better chance of hatching). Eggs are demersal and adhere to the bottom substrate. This would greatly limit the distribution of eggs prior to hatching. Questions were raised about the duration of the larval stage, and if there is local depletion of fishable stocks, could they recruit from outside? After hatching, larval longhorn sculpin are thought to drift for 2 months, which would provide some opportunities for dispersion. A recommendation was made to examine the Scotian Shelf Ichthyoplankotn Program (SSIP) and Fisheries Ecology Program (FEP) data sets for information on larval distribution.

There may be studies on other members of the sculpin family (i.e., shorthorn) which would have similar maximum size, which would provide further insight into longhorn sculpin size at maturity.

It was recommended that consideration be given to collecting new maturity information and aging material for longhorn sculpin on the DFO summer survey.

Environmental Impacts from Sculpin Fishery and Other Comments

Underwater video surveys for lobster were conducted in St. Mary's Bay in 2006 and 2007, and document the presence of various fish species, as well as lobster and crab. Individual counts for fish species have not been conducted, since there would be a high cost involved in extracting this data. While there has been a recommendation to look in more detail at benthic invertebrates from these surveys, this work remains to be done as well. Longhorn sculpin can spawn on a variety of substrates - sand, gravel, mud, all of which were observed within survey area during the underwater video survey.

It was noted that there may be impacts on mud burrows from bottom trawling activity. Underwater video showed the presence of mud burrows in the area of the directed sculpin fishery, some of which appeared to contain lobsters.

The underwater videos also provided some evidence of "trawl" marks on the bottom; however, these marks could have originated from other types of fishing gear (i.e., scallop drags) and not the bottom trawls used in the directed sculpin fishery. Noteworthy is that there are many different fisheries in the St. Mary's Bay area. The presence of hard bottom in centre of the bay limits trawling activity in this region.

The 11t of lobster bycatch from the sculpin fishery may involve catching the same animals repeatedly, yet observer reports indicate minimal damage to lobsters over the course of the day. The potential for recapture of lobsters is likely quite high, since the sculpin fishery occurs within a very small area and involves repeated tows. It was proposed that a tagging study be conducted to investigate the potential for multiple recaptures of lobster in the directed sculpin fishery. It was suggested that acoustic tags could be used on lobsters to determine if mortality occurs (transmitters are $500 and receivers would be needed as well).

Sculpin fishers commented that they had put bands on lobsters to see if they would be recaptured. They found that very few banded lobsters were recaptured locally, but were caught in other areas outside of where they were fishing for sculpins.

It was noted that there could be physical oceanographic features that make St. Mary's Bay a productive habitat for sculpins. McCracken (1954) documented seasonal movements of winter flounder in St. Mary's Bay, and may have discussed the importance of this area as well. It was recommended that this earlier publication should be reviewed to determine if the St. Mary's Bay area has any special importance as winter flounder habitat.

No other fisheries in St. Mary's Bay have observer coverage other than the directed sculpin fishery. The question was raised about how much sculpin is captured in the lobster fishery, but as there is no observer coverage, it is not possible to estimate this bycatch. There are approximately 71 lobster licenses fishing in St. Mary's Bay. Fishers reported high abundance of sculpins this year in the lobster fishery on MacDermand's patch at the mouth of St. Mary's Bay, but some of these "sculpins" may have been sea ravens.

Recent stomach content analyses on sculpins collected from National Marine Fisheries Service (NMFS) and DFO surveys could provide more up to date information on sculpin diet, and should

be examined. Some of the stomach contents of sculpins collected from recent surveys have been analyzed by staff from the Fishermen & Scientists Research Society (FSRS).

Question: Why is longhorn sculpin a preferred bait for the lobster fishery?

The predominant bait used for the lobster fishery at the beginning of the season (fall) is herring, mackerel, and groundfish cuttings. As the water warms in April/May, fishers start using gaspereau, winter flounder, yellowtail flounder, and sea ravens. Longhorn sculpins are used in late spring as "large" lobster bait, as they seem to attract larger lobsters. Historically, the lobster fishery has used a lot of herring, but there has been a switch to using sculpin to catch larger lobster. This practice occurs inshore in Lobster Fishing Area (LFA) 34, but not offshore.

Research Recommendations

- Examine SSIP and FEP databases for information on larval sculpin distribution (for Day 2).
- Summarize and tabulate total catches of all bycatch species (for Day 2).
- Examine the minimum trawlable biomass in Stratum 490 to compare with the fishery, so that calculations of relative F (exploitation rate) can be made (for Day 2).
- Examine the sculpin catch rates by size to see if immature and mature fish follow similar trends (for Day 2).
- Growth model – needs to be updated and validated.
- Look at DFO surveys from 1979-1985, when spring, summer, and fall surveys were conducted, to examine changes in distribution with season.
- Document estimates of longhorn sculpin bycatch in other fisheries on the Scotian Shelf.
- Pursue development of maturity indices; conduct new sampling during RV surveys for maturity and age material.
- Conduct a tagging study using acoustic tags to investigate the potential for multiple recaptures of lobster in the directed sculpin fishery.
- Examine NAFO landings of sculpin for past trends and size of USA fishery.
- Examine dynamics of sculpins overall, i.e., shelf-wide, using RV survey data to see what the "big picture" is beyond St. Mary's Bay.

REVIEW OF DRAFT SCIENCE ADVISORY REPORT

(20 June 2008; Day 1)

- Add local stomach content knowledge.
- Determine if St. Mary's Bay is an important spawning area.
- Describe fishery management measures for St. Mary's Bay sculpin fishery, years of operation.
- Include a figure showing Stratum 490 at beginning of document.
- Use just one figure on distribution showing all years of surveys combined.
- Clarification for Figure 21 – change in set-selection protocol.
- Recommendation to complete review by correspondence.

REVIEW OF THE STATUS OF ST. MARY'S BAY LONGHORN SCULPIN

(9 October 2008; Day 2)

Working Paper: Review of the St. Mary's Bay Longhorn Sculpin Fishery. CSA Working Paper 2008/014 - Amendment.
Presenters: P. Comeau and A. Cook
Rapporteurs: T. Worcester and M. Showell

Questions and Comments

Larval Distribution

Information on longhorn sculpin larvae is available from the Scotian Shelf Ichthyoplankotn Program (SSIP, 1978-1981) and Fisheries Ecology Program (FEP, 1983-1985). While neither project sampled the St. Mary's Bay area, larval longhorn sculpin were collected in the March through May period, and distributed in shallow water south of Yarmouth, in the Browns Bank, Trinity Ledge/Lurcher area. Sculpin are not expected to drift as much as cod and haddock, since the eggs are demersal rather than pelagic, and, thus, the opportunity for movement is more limited. This may explain gaps in larval distribution between Browns Bank and the various other banks.

Diet and Feeding

Based on almost 6,000 stomachs sampled in NAFO Division 4X between 1995 and 2008, longhorn sculpin were consumed by Atlantic cod, halibut, winter skate, and sea raven; although at a low frequency. Most sculpin consumed as prey were small individuals.

Stomach contents from 249 longhorn sculpin from Div. 4X were examined. Sculpins appear to be opportunistic feeders, with various crabs, fish, shrimp, euphausiids, and amphipods seen in stomach contents. While crabs were the predominant prey item in most areas, some spatial trends were seen, with fish common in areas near St. Mary's Bay, and krill in deeper strata.

Industry noted that longhorn sculpin group together by size, and that this might be related to cannibalism. However, of the stomachs examined, cannibalism was noted in only one single instance.

Mature Biomass

A decline in mean length has been noted for both the sculpin fishery and RV catches in Stratum 490, which might be attributed to removal of larger fish in the population, or signs of increased recruitment. However, this decline is also seen when the analysis is restricted to mature fish only (>23cm). Further, examination of RV survey length frequencies reveals few signs of recruitment, suggestion of local depletion of the mature fish is occurring.

Industry noted that smaller sculpin are found in deeper water, and that size distribution can vary with short changes in location. The fishery does not target larger animals, as size is not an important factor when longhorn sculpin is used as bait.

Exploitation Rate

No direct estimates of sculpin biomass are available for St. Mary's Bay, as the summer RV survey does not sample that area. However, minimum trawlable biomass can be calculated for

Stratum 490, although the small number of sets in this stratum results in high inter-annual variability. Together with an assumed catchability of 0.6+25% and adjusted for the number of trawlable units in St. Mary's Bay, exploitation can be estimated by dividing the annual catch by the estimated absolute biomass. Unfortunately, these estimates of exploitation are too high to be believed (averaging almost 700%), indicating that the assumed q is too high. While these estimates of exploitation are difficult to interpret, it was noted that reducing q to a fraction (1/3) of the initial value still produces high (10-70%) exploitation rates.

Exploitation was also estimated from commercial fishery data. The fishery is fairly standardized, with only 4 vessels participating, using similar gear and techniques. Swept area was calculated from reported trawl wingspread and tow duration. Trawlable area for the fishery in St. Mary's Bay was approximated using maps of catch location, allowing the number of trawlable units to be calculated. These were multiplied by the average observed catch rate (110kg/hr) to produce a minimum trawlable biomass of 48mt, which is remarkably close to the estimate from the RV survey calculation. If a q of 0.3 is assumed, this produced an exploitation rate of 30%. Such an exploitation rate would be considered as high for most species, but in this case, it is likely that only a portion of the population is being exploited.

No conclusions could be made regarding what level of fishing mortality might be sustainable for this species, notwithstanding the fact that the current fishery exploits only a small portion of the population, and local depletion is likely occurring. Some insight might be drawn from species with a similar life history and maturity schedule, but yield per recruit calculations would be required for proper estimation.

REVIEW OF DRAFT SCIENCE ADVISORY REPORT

(9 October 2008; Day 2)

- Label St. Mary's Bay on map.
- Include information on larval distribution.
- Include local diet information where possible, not USA data.
- Check addition in landings table.
- Remove 5Y5Z landings from landings table.
- Figure 3 – add units and latitude.

CONCLUSIONS AND NEXT STEPS

Presenters were thanked for their excellent presentations, and for all the hard work that went into this assessment, including work that was completed during breaks at the meeting. Participants were thanked for their willingness to engage in the discussion, and for helpful comments and suggestions.

Appendix 1. Lists of Participants

Assessment of the Status of Sculpin St. Mary's Bay
Maritimes Region Science Regional Advisory Process

George Needler II Boardroom
Bedford Institute of Oceanography, Dartmouth, NS
20 June 2008 (Day 1)

ATTENDEES

Name	Affiliation
Armsworthy, Shelley	DFO Maritimes / PED
Boudreau, Cyril	NS Fisheries and Aquaculture
Bundy, Alida	DFO Maritimes / PED
Campana, Steve	DFO Maritimes / PED
Claytor, Ross	DFO Maritimes / PED
Comeau, Peter	DFO Maritimes / PED
Denton, Stacy	LFA 34
Docherty, Verna	DFO Maritimes / FAM
Fowler, Mark	DFO Maritimes / PED
Frail, Cheryl	DFO Maritimes / PED
Giroux, Brian	Scotia-Fundy Mobile Gear Assn.
Hansen, Jorgen	DFO Maritimes / FAM
Kulka, Dave	DFO Scientist Emeritus
Marshall, Ian	DFO Maritimes / SWNS
Rowe, Sherrylynn	DFO Maritimes / PED
Saulnier, Hubert	MFU/UFM, NS
Showell, Mark	DFO Maritimes / CSA
Silva, Angelica	DFO Maritimes / PED
Simon, Jim	DFO Maritimes / PED
Spinney, Ashton	LFA 34
Stone, Heath	DFO Maritimes / SABS
Sweeney, Anne	DFO Maritimes / SWNS
Theriault, Edward	Generalist Association
Thurber, Roy	Generalist Association
Tremblay, John	DFO Maritimes / PED
Worcester, Tana	DFO Maritimes / CSA

Assessment of the Status of Sculpin St. Mary's Bay
Maritimes Region Science Regional Advisory Process

Hayes Boardroom
Bedford Institute of Oceanography, Dartmouth, NS
9 October 2008 (Day 2)

ATTENDEES

Name	Affiliation
Boudreau, Cyril	NS Fisheries and Aquaculture
Bundy, Alida	DFO Maritimes / PED
Campana, Steve	DFO Maritimes / PED
Comeau, Peter	DFO Maritimes / PED
Cook, Adam	DFO Maritimes / PED
Fowler, Mark	DFO Maritimes / PED
Hansen, Jorgen	DFO Maritimes / FAM
Rowe, Sherrylynn	DFO Maritimes / PED
Showell, Mark (Chair)	DFO Maritimes / CSA
Simon, Jim	DFO Maritimes / PED
Sweeney, Anne	DFO Maritimes / SWNS
Theriault, Edward	Generalist Association
Thurber, Roy	Generalist Association
Worcester, Tana	DFO Maritimes / CSA

Appendix 2. Terms of Reference

Maritimes Region Science Advisory Process
Assessment of the Status of Sculpin in St. Mary's Bay

Bedford Institute of Oceanography, Dartmouth, NS
20 June and 9 October 2008

TERMS OF REFERENCE

Context

A sculpin fishery has been underway in St. Mary's Bay since 1999 with annual landings in the order of 50 – 150 t. An evaluation of the sustainability of these catch levels has been requested as well as the impact of the fishery on the Bay's benthic community and bycatch species, lobster in particular.

Objectives

The following issues will be addressed in order to develop scientific consensus through peer review:

- Describe biology of the species, based upon studies both in the Maritimes and elsewhere, including (to the extent possible):
    - Distribution of the resource and comment on relationship of sculpin inside and outside of St. Mary's Bay.
    - Growth characteristics, including size at maturity, generation time, longevity, etc.
    - Role in ecosystem including predators and prey.
    - Habitat preferences.
- Describe the directed fishery, including:
    - Gear used.
    - Catch by area and season.
    - Size composition of landings by area and season.
- Description of sculpin catches from other fisheries**.**
- Evaluation of abundance trends and current status using fishery indices and surveys if available**.**
- Estimation of exploitation rate.
- Evaluation of impact of the sculpin fishery on the ecosystem (to the extent possible), including:
    - Description of bycatch.
    - Description of the area of Bay affected with comment on the predominant benthic communities.

Outputs

CSAS Science Advisory Report
CSAS Proceedings summarizing the discussion
CSAS Research Document

Participation

DFO Science, DFO Fisheries and Aquaculture Management
Fishing industry
NS and NB provincial representatives
Aboriginal communities / organizations
Non-governmental organizations

Appendix 3. Draft Agendas

Maritimes Region Science Advisory Process
Assessment of the Status of Sculpin St. Mary's Bay

George Needler II Boardroom
Bedford Institute of Oceanography, Dartmouth, NS
20 June 2008 (Day 1)

DRAFT AGENDA

09:00 – 09:30	Welcome and Introduction (Chair)
09:30 – 10:00	Biology and Distribution
10:00 – 10:15	Break
10:15 – 11:00	The Fishery
11:00 – 11:30	Indices of Abundance and Fishing Mortality
11:00 – 12:00	Ecosystem Impacts
12:00 – 13:00	Lunch
13:00 – 15:00	Review of Draft of Science Advisory Report
15:00 – 15:15	Break
15:15 – 17:00	Review of Draft of Science Advisory Report
17:00	Adjournment

Maritimes Region Science Advisory Process
Assessment of the Status of Sculpin St. Mary's Bay

Hayes Boardroom
Bedford Institute of Oceanography, Dartmouth, NS
9 October 2008 (Day 2)

DRAFT AGENDA

09:00 – 09:15	Welcome and Introduction (Chair)
09:15 – 09:30	Review of Previous Meeting
09:30 – 10:00	Bycatch
10:00 – 10:15	Break
10:15 – 11:00	Indices of Abundance
11:00 – 11:30	Exploitation Rate
11:30 – 12:00	Discussion
12:00 – 13:00	Lunch
13:00 – 15:00	Review of Draft of Science Advisory Report
15:00 – 15:15	Break
15:15 – 17:00	Review of Draft of Science Advisory Report
17:00	Adjournment