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# Proceedings of the Central and Arctic Regional Science Advisory Process on the biological characteristics and population assessment of Walleye, *Sander vitreus*, from Tathlina Lake, Northwest Territories

**February 16, 2010**
**Hay River, Northwest Territories**

**Michael Papst**
**Meeting Chairperson**

# Compte rendu du processus de consultation scientifique régionale de la Région du Centre et de l'Arctique sur les caractéristiques biologiques du doré jaune (*Sander vitreus*) et sur l'évaluation de la population du lac Tathlina dans les Territoires du Nord-Ouest

**Le 16 février 2010**
**Hay River, Territoires du Nord-Ouest**

**Michael Papst**
**Président de réunion**

Fisheries and Oceans Canada / Pêches et Océans Canada
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**June 2010** | **Juin 2010**

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 at 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 contenues dans le présent rapport puissent être inexactes ou propres à induire en erreur, elles sont quand même reproduites aussi fidèlement que possible afin de refléter les échanges tenus au cours de la réunion. Ainsi, aucune partie de ce rapport ne doit être considérée 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

The Fisheries and Aquaculture Management Sector of Fisheries and Oceans Canada (DFO) has requested science advice on the current status of Walleye *Sander vitreus* from Tathlina Lake, NT and a recommendation for a total sustainable harvest level. Additionally, advice for long-term monitoring of the fishery was requested. The commercial fishery collapsed in 2001 and experimental gill netting was conducted on Tathlina Lake between 2001 and 2007 to collect biological and catch/effort data for assessment purposes. A Regional Advisory Process (RAP) meeting was held at the DFO office in Hay River on February 16, 2010 to review the scientific information and develop the science advice. The participants included DFO Science, DFO Fisheries and Aquaculture Management, Dehcho biologist, and external experts from Ontario and Alberta. Participants agreed with the interpretation of an improvement in the status of the population and supported a conservative quota for the fishery. Long-term monitoring will include continued commercial plant sampling, periodic experimental gill netting, a traditional knowledge study and collection of water quality parameters that are correlated with Walleye productivity. Key documents expected from the RAP meeting will include a Research Document, Stock Advisory Report and proceedings.



## SOMMAIRE

Le secteur de la Gestion des pêches et de l'aquaculture de Pêches et Océans Canada (MPO) a demandé que soit formulé un avis scientifique sur l'état actuel du doré jaune (*Sander vitreus*) dans le lac Tathlina, T.N.-O. ainsi qu'une recommandation concernant le total des prélèvements durables. Il a de plus demandé un avis sur la surveillance à long terme de la pêche. La pêche commerciale s'est effondrée en 2001. On a mené une pêche expérimentale au filet maillant dans le lac Tathlina entre 2001 et 2007 afin de recueillir des données sur la biologie et les prises/effort à des fins d'évaluation. Une réunion du processus de consultation scientifique régional (PCSR) a eu lieu au bureau du MPO à Hay River, le 16 février 2010, afin que l'on puisse examiner l'information scientifique et formuler un avis scientifique. Parmi les participants, mentionnons des représentants des secteurs des Sciences ainsi que de la Gestion des pêches et de l'aquaculture du MPO, un biologiste de la Première nation Dehcho et des experts externes de l'Ontario et de l'Alberta. Les participants se sont dits d'accord avec l'interprétation selon laquelle il y a eu amélioration de l'état de la population et soutiennent l'établissement d'un quota prudent pour la pêche. La surveillance à long terme doit comprendre la poursuite de la collecte d'échantillons aux usines, la tenue d'une pêche expérimentale au filet maillant périodique, l'étude des connaissances traditionnelles et la collecte d'échantillons afin de mesurer les paramètres de la qualité de l'eau en lien la productivité du doré jaune. Les documents clés qui devraient découler de la réunion du PCSR comprennent un document de recherche, un avis scientifique sur le stock et un compte rendu.

## INTRODUCTION

A peer review meeting was held at Fisheries and Oceans Canada in Hay River on February 16, 2010. The purpose of this meeting, as described in the Terms of Reference (Appendix 1), was to review scientific information used to assess the status of the Walleye *Sander vitreus* population from Tathlina Lake, Northwest Territories. Although the original plan was to hold the meeting in the community of Kakisa, this was cancelled at the request of the community on February 16. The meeting proceeded in Hay River without the direct participation of the commercial fishermen. Meeting participants (Appendix 2) included DFO Science, DFO Fisheries and Aquaculture Management, Dehcho biologist, and external experts from Ontario and Alberta. The information from the assessment was used to recommend a sustainable harvest level for Walleye that are harvested in the commercial fishery. Additionally, sources of information useful for long-term monitoring of the fishery were discussed.

## REVIEW AND DISCUSSION

A presentation of the historical landings of Walleye from the commercial fishery, and the results from commercial plant sampling and an experimental gill netting program was made to the participants. Following the presentation, the draft research document and stock advisory report were reviewed. Issues and important points of discussion brought up during the meeting are presented.

### ASSESSMENT OF WALLEYE FROM TATHLINA LAKE

Presenter: Colin Gallagher, DFO Science

Abstract:

The commercial Walleye fishery in Tathlina Lake, Northwest Territories, collapsed in 2001 from a quota of 20,000 kg per year. The total catch of Walleye has fluctuated multiple times since commercial fishing began in the 1950s and past quotas do not appear to have been sustainable. The interaction between harvest levels and the abiotic conditions of the lake is poorly understood and likely has an important effect on recruitment of Walleye to the fishery as Tathlina Lake is large, shallow and turbid, with one documented case of winterkill in the 1940s. Biological and catch-per-unit-effort information from experimental gill netting conducted between 2001 and 2007 were used to assess the status of the Walleye population. Additionally, commercial plant sampling data collected between 1990 and 1998 were examined. Between 2001 and 2007, the status of the stock appears to have improved although the extent of recovery was unknown. The mean fork length, weight, age and catch-per-unit-effort of Walleye increased among years. Additionally, the proportion of Walleye in the total catch increased. The growth rate of Walleye between 2001 and 2007 did not demonstrate significant changes among sampling years. Compared to results from experimental gill netting in 1946 and 1979, Walleye in Tathlina Lake appear to have increased in mean length, age and length-at-age. A recommendation was made to open the fishery with a conservative quota (≤5000 kg). Additional recommendations were made regarding approaches to monitoring the fishery and environmental conditions that likely influence Walleye production.

## DETAILED DISCUSSION

Comment: It was pointed out that it was incorrect to state that the fishery was closed in 2001. The document should read that it was 'not opened'. Kakisa has always been voluntarily closed and the community has always been the first to recommend reducing the harvest.

Comment: A participant asked whether the ups and downs in the harvest history, were a 'real' representation of fish presence/abundance or is it reflective of the variability in fishing effort.

Discussion: A participant confirmed that it represents abundance. If the fish were there, they were fished. The peaks in harvest usually mean that the fishing was better. They went on to mention that during the test fishery in 2003 fishermen caught more beaver than Walleye and that in general fishing effort is heavily determined by overflow conditions on the lake which can make travel and transportation dangerous.

Comment: The catch-per-unit-effort (CPUE) doesn't account for net depth, or water column which changes from winter to summer therefore can't compare the CPUE data from different seasons. Winter nets were 2 feet deep (special nets for shallow water) and set with an articulated jigger board for shallow water.

Response: It has already been mentioned that CPUE should only be compared between similar seasons. This will be changed in the document. In addition the depth information which was not originally included, will be (i.e., the experimental gill net were 2 feet deep).

Comment: One participant mentioned that the 1997 plant sample ages do not appear correct, particularly due to the absence of older aged fish which are abundant in 1995 and 1996. Another person stated that the person who had been doing the ageing for DFO would have retired at about this time. If someone else aged this sample, it may not have been done in a consistent manner.

Response: A sub-sample will be re-aged for quality assurance purposes.

Comment: It's possible that northern Walleye populations would probably have underestimated ages. Otoliths are far better for aging and a study should be done comparing spines, otoliths, scales for northern populations.

Response: A recommendation will be made to compare results among ageing structures of Walleye from Tathlina Lake.

Comment: Some participants asked why experimental gill nets were only set in the western area of the lake and not in the east.

Discussion: One of the participants mentioned that only areas where commercial fishermen fished were examined. An attempt was made to set a net out in the middle of the lake in 2002 but was not successful. Fishermen might say that you wouldn't catch many Walleye in the eastern area during the winter. In addition, it is difficult to fish in many areas due to bad ice conditions. One participant commented that a random stratified sampling would be a better approach.

Comment: Mortality is very high, even though no commercial fishing is occurring (2001-2006 data) and other data suggests improvement in the stock.

Discussion: One participant mentioned that it could be an artefact of ageing errors. Another person stated that larger/older fish may congregate in certain areas and bias the sample towards older individual and these results may suggest a sampling artefact.

Comment: the 4.5” (114 mm) mesh size selects more females than males. Do many fishermen use the 4.5” mesh?

Discussion: One participant stated that to his knowledge fishermen have always used 4.25” (108 mm) since the 1990s and not the 4.5” mesh (114 mm).

Participants were in agreement with the general methods used to analyse the information.

Participants agreed with the conclusion that the status of the stock had improved between 2001 and 2007 and that opening the fishery to a conservative quota would pose a low risk to the population.

## RECOMMENDATIONS

- The fishery should be re-opened with a conservative quota that would pose a low risk to the population (≤5,000 kg);
- Subsistence harvest levels should be reported;
- Fishers should use log books to record catch and effort information (e.g., mesh size, net length, location, depth, fishing duration, species, discards);
- Continued plant sampling or direct purchasing of Walleye in order to obtain biological information;
- A traditional knowledge project lead by the community that includes information on Walleye ecology, the lake and the history and importance of the fishery would be beneficial;
- Water quality variables that have a strong correlation with Walleye productivity (e.g., secchi depth, total dissolved solids, temperature) should be measured;
- Experimental gill netting consistent with methods between 2001 and 2007 should continue, although sampling should occur throughout the lake;
- Year-class strength and climate information should be examined in order to determine if environmental conditions influence recruitment;
- The 2007 sample should be re-aged and an ageing study should be conducted using multiple ageing structures (e.g., spines, scales, otoliths, pelvic fin ray) of Walleye from Tathlina Lake in order to investigate whether there are any differences in ages among structures.

# APPENDIX I

## TERMS OF REFERENCE

### Tathlina Lake Walleye - Regional Advisory Meeting

### February 16, 2010

Kakisa, Northwest Territories

### Meeting Chairperson: Michael Papst

**Background**

The commercial fishery for Walleye (*Sander vitreus*) on Tathlina Lake, NT, has been closed since 2000 after a decline in catch-effort. Commercial fishing of Tathlina Lake Walleye began in 1953 and has subsequently demonstrated multiple periods of sustained yields followed by poor harvest in the 1960s, 1970s, 1980s, and 1990s. Various quotas have been established for the commercial fishery but have not been sustainable. Since the closure of the fishery in 2000, there has been periodic scientific experimental gill netting between 2001 and 2007 in order to collect biological and catch-effort information of Walleye. The Walleye from Tathlina Lake were last assessed by Roberge *et al*. (1988) using information collected from experimental sampling in 1979 and commercial plant sampling between 1975 and 1986. Tathlina Lake is also quite shallow (1 meter in depth on average) and therefore may be more susceptible to environmental changes in water level, ice thickness, dissolved oxygen levels, temperature, etc.

Fisheries and Aquaculture Management Sector of Fisheries and Oceans Canada has requested science advice on the current status of the stock, recommendations on a total sustainable harvest level for 2010/11, and the development of a long-term monitoring plan for the fishery.

**Objectives**

The following objectives will be addressed:

- Assess and report on the current status of the Tathlina Lake Walleye stock including a review of any new information;
- Highlight major sources of uncertainty in the assessment, and where appropriate, consider alternative analytical formulations of the assessment;
- Provide a total sustainable harvest level recommendation for the 2010/11 fishery (i.e. the total sustainable level of harvest from all sources).
- Develop a plan to assess the long-term sustainability of the commercial fishery (i.e. identify the information needs, timeframes, etc. including environmental monitoring protocols relevant to the sustainability of the fishery).

**Products**

The meeting will generate a proceedings report summarizing the deliberations of the participants. This will be published in the Canadian Science Advisory Secretariat (CSAS) Proceedings Series. There will be a CSAS Research Document produced in relation to the working papers presented and reviewed at the meeting. The advice from the meeting will be published as a Science Advisory Report.

**Invited Participants**

Members of the community of Kakisa, DFO Science and Fisheries Management, and external experts.

**References**

Roberge, M.M, Low, G. and Read, C.J. 1988. An assessment of the commercial fishery and population structure of Walleye in Tathlina Lake, Northwest Territories. Can. Tech. Rep. Fish. Aquat. Sci. 1594. v + 54 p.

## APPENDIX II

## List of participants

| | |
|---|---|
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| George Low (Dehcho First Nations)* | |

* not able to attend the meeting yet reviewed the working paper and provided comments which were discussed at the meeting.