

March 29, 2010

**FORMAL ADJUDICATION:
MARINE STEWARDSHIP COUNCIL PROPOSED
CERTIFICATION OF ROSS SEA ANTARCTIC TOOTHFISH
FISHERY**

**OBJECTOR'S SUPPLEMENTARY DOCUMENTATION PURSUANT TO
MSC OBJECTIONS PROCEDURE SECTION 4.7.4**

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I. INTRODUCTION

The Marine Stewardship Council (MSC) has proposed to certify the Ross Sea Toothfish fishery as “sustainable”. Objector, the Antarctic and Southern Ocean Coalition (ASOC) has challenged this decision as we do not believe that important substantive problems raised by stakeholders and peer reviewers have been properly addressed by the Certification Body. We are submitting this document and attachment pursuant to MSC Objections Procedure 4.7.4. This information supplements evidence previously submitted in the Notice of Objection, as well as in comments submitted to the Certification Body during the assessment process.

ASOC is raising substantive, procedural, and scoring deficiencies by Moody Marine, the Certification Body. Taken together, these deficiencies provide a compelling basis for the Independent Adjudicator to remand the certification decision.

II. BACKGROUND

A. There is a Lack of Fundamental Data about the Ross Sea Toothfish Fishery

1. Moody Marine’s own certification report highlights these huge uncertainties

In its Draft Certification Report Moody Marine acknowledged the profound lack of information about Antarctic toothfish and the Ross Sea ecosystem:

"The preliminary nature of the information on life history, and in particular reproduction and recruitment, the understanding of the impacts of oceanography on the population are hypothetical (Hanchet et al 2008)."¹

"Because there are no observations at low stock abundance, there is inadequate data to fit a stock recruitment relationship."²

"The spawning **appears** to take place during winter and spring, and **may extend** over a period of several months. Depending on the exact location of spawning, eggs and larvae become entrained by the Ross Sea gyres, and **may** either move west settling out around the Balleny Islands and adjacent Antarctic continental shelf, south onto the Ross Sea shelf, or eastwards with the eastern Ross Sea gyre settling out along the continental slope and shelf to the east of the Ross Sea in Subarea 88.2....However, **there is currently no information on the distribution of larvae and eggs** although a programme using continuous plankton recorders will commence in the 2008/09 season which may provide some data on eggs and early larval development [emphasis added]."³

"Abundance is monitored through a tagging programme carried out by the commercial fishery. However, **most tagging data has been rejected** due to unexplained differences in recaptures among fleets. Only the New Zealand data are currently used. The use of only the New Zealand tag data set results in an underestimated yield in the model. Partly as a result of this, the tagging data set is very small. **No other abundance index is available apart from the tagging data.**

¹ Moody Marine Ltd. 2009. Final Report for Ross Sea Toothfish Longline Fishery, 21.

² Ibid, 22.

³ Ibid, 10. Note this is an unattributed quote from Hanchet et al. 2008.

The CPUE index is not used as the Working Group considered that CPUE indices were not indexing abundance at the current time [emphasis added]."⁴

"The working group appears to have faith only in New Zealand vessel tagging programme, which were the only data used as inputs for the base-case stock assessment model (WG-FSA-07/37). However, it has been reported that data from all vessels undergoing this certification would be used in future. **The size of the tagging data set, and lack of alternative abundance indices, is of concern [emphasis added]."**⁵

2. The Antarctic toothfish fishery remains exploratory because there is insufficient information to determine if it meets the Principles of the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR)

The Ross Sea Antarctic Toothfish fishery is located in CCAMLR/FAO Statistical Areas 88.1 and 88.2 and is managed by CCAMLR. The fishery is currently categorized by CCAMLR as "exploratory," and commenced in the 1996/97 fishing season. Under CCAMLR Conservation Measure 21-02, "an exploratory fishery shall continue to be classified as such until sufficient information is available:

- (a) to evaluate the distribution, abundance and demography of the target species, leading to an estimate of the fishery's potential yield;
- (b) to review the fishery's potential impacts on dependent and related species;
- (c) to allow the Scientific Committee to formulate and provide advice to the Commission on appropriate harvest catch levels, as well as effort levels and fishing gear, where appropriate."

CCAMLR does not consider the fishery to have obtained sufficient data to be managed as a full fishery. Considering that the 'spawning biomass' is the central aspect of CCAMLR management models, the most significant gaps in knowledge of the Ross Sea Antarctic toothfish population are:

1. basic aspects of toothfish biology such as frequency of spawning, location of spawning and uncertainties about eggs and larvae;
2. age at maturity and natural mortality of the fish as a function of age-size;
3. impacts on toothfish predators such as seals and cetaceans (dependent species); and
4. uncertainty over the tagging programme and the problems with tag rates and recovery rates of different vessels and nationalities, especially as there is no means of assessment independent of the tagging programme (i.e. no valid measure of CPUE);⁶

⁴ Ibid, 20.

⁵ Ibid, 20.

⁶ The SC-CAMLR XXVIII report stated: "The Working Group also noted that the paper indicated that only smaller toothfish (<100 cm) were tagged in this tagging program, since these could be landed without being gaffed. The Working Group emphasised that this practice is at variance with the conservation measure and previous recommendations by the Scientific Committee and its working groups, which require that fish be tagged by length in proportion to their size distribution in the catch. While the Working Group recognised there may be a reluctance of commercial fishers to tag and release large fish, they stressed the importance of tagging the full size range of fish, and that it is a requirement under the rules of access."

3. Illegal fishing further undermines the reliability of existing data

Under CCAMLR's present management rule for this fishery, fishing may reduce the spawning biomass to 50% of its initial size in 35 years.⁷ Despite not knowing what 'initial size' was prior to CCAMLR management in 1996, the population is currently thought to be at about 85% of its original level.⁸ These figures are at best a guess, given the uncertainties described in this document, including that illegal, unreported, and unregulated (IUU) fishing has unknown impacts on the fishery.

The problem of IUU fishing has been widely acknowledged to present significant problems for the management of fisheries. In many parts of the world, particularly those where there is little capacity to monitor fisheries and enforce the rules such as the Antarctic, IUU fishing has caused fish stocks to decline. IUU activity often renders carefully thought out management decisions meaningless, and complicates the collection of key fishery data such as biomass estimates. Since the beginning of this fishery in 1996/97, IUU catches have been estimated to have been low or even nonexistent in some years, but it is impossible to confirm these estimates as no party to CCAMLR conducts comprehensive surveillance of the area, nor is it expected that any country has the resources to do so.

Prior to CCAMLR management of this fishery, however, IUU take of toothfish in the Southern Ocean was estimated to exceed the legal catch. IUU fishing does occur in the Ross Sea area (e.g., interception of a gillnet boat in the northern part of Area 88 in November 2009, and discovery of a gillnet in an area just to the west of Area 88 in 2008), adding additional uncertainty to biomass estimates.

4. Toothfish are highly vulnerable to depletion

The life history and population structure of toothfish is widely acknowledged by scientists and CCAMLR to present significant challenges to determining a sustainable, long-term harvesting strategy. Both Patagonian and Antarctic toothfish are long-lived and very slow to reach sexual maturity, making it critical that the oldest, most fecund adults are not depleted. Recent findings presented to CCAMLR's Working Group on Fish Stock Assessment in 2009 show that the **age of sexual maturity is roughly double the figure used in the fishery model - 16 rather than 8 years of age.**⁹ Mature toothfish may not spawn every year, especially smaller, younger individuals. Older, larger female fish likely produce more eggs than younger fish. Thus taking

⁷ Pinkerton, M. S.M. Hanchet, and J. Bradford-Grieve. 2007. Finding the role of Antarctic toothfish in the Antarctic ecosystem. *Water and Atmosphere* 16(1): 20-21.

⁸ Ibid.

⁹ "Previous Antarctic toothfish assessments assumed a 50% maturity at 100 cm (with range 85–115 cm) with a logistic relationship by length, and converted the length-based relationship to an age-based relationship via the von Bertalanffy curve for both sexes combined. In 2009, estimates of maturity, based on hindcasting from the presence of post-ovulatory follicles in the ovaries and forecasting from the assessment of oocyte developmental stage, suggested the mean age and length at 50% spawning for females on the Ross Sea slope region were 16.6 y and 133.2 cm and for the mean age and length at 50% maturity for males were 12.8 y and 120.4 cm (Parker & Grimes 2009)." Ministry of Fisheries, Science Group (Comps.) 2009: Report from the Mid-Year Fishery Assessment Plenary, November 2009: stock assessments and yield estimates. 209p. (Unpublished report held in NIWA Greta Point library, Wellington.)

the largest fish is extremely problematic for long-term sustainability because the evolutionary strategy of this species requires adults to live as long as possible since maturity is delayed and spawning infrequent.¹⁰

Recent research into the resilience of fish species to fishing pressure has produced results indicating that many of the assumptions on which fisheries management is based need to be revised for species like toothfish. According to one study, “large body size and late maturity are the best predictors of vulnerability to fishing...[and] there is no evidence that high fecundity confers increased resilience.”¹¹ Species meeting these criteria will be less resilient in the face of fishing pressures than others.¹² Highly vulnerable fish are thus more prone to commercial extinction as a result of fishing. Toothfish is one such species and is listed in the FishBase¹³ database as having a “very high vulnerability” of 81 out of 100.¹⁴ Another study found that for long-lived fish, older maternal age was associated with higher larval survival, leading the authors to conclude: “age truncation commonly induced by fisheries may, therefore, have severe consequences for long-term sustainability of fish populations.”¹⁵ In long-lived fish, such as sturgeon, regulations often prohibit the taking of both smallest and largest fish.

Fishery reports available from CCAMLR suggest that in recent years the fishery has increasingly targeted larger, older toothfish (Figure 1). The effects of this practice may not show up in data for years, as was the case in the now depleted and closed rockfish (*Sebastes* spp.) fishery off the North American West Coast¹⁶ but as described above, it can be expected to have a negative impact on the toothfish population, particularly since the estimated spawning biomass will be reduced by 50% within 35 years.¹⁷

¹⁰ Beamish, R.J., G.A. McFarlane, A. Benson. 2006. Longevity overfishing. *Progress in Oceanography* 68: 289–302

¹¹ Reynolds, J.D., N.K. Dulvy, N.B. Goodwin, J.A. Hutchings. 2005. Biology of extinction risk in marine fishes. *Proceedings of the Royal Society B* 272: 2337-2344.

¹² Cheung, W.W.L., R. Watson, T. Morato, T.J. Pitcher, D. Pauly. 2007. Intrinsic vulnerability in the global fish catch. *Marine Ecology Progress Series* 333: 1-12.

¹³ FishBase is an online database created by fisheries biologists that compiles peer-reviewed research to provide species information for over 30000 fish species.

¹⁴ This score was calculated by FishBase staff using the methodology in Cheung, W.W.L., T.J. Pitcher and D. Pauly 2005 A fuzzy logic expert system to estimate intrinsic extinction vulnerabilities of marine fishes to fishing *Biol. Conserv.* 124:97-111.

¹⁵ Berkeley, S.A., C. Chapman, S.M. Sogard. 2004. Maternal Age as a Determinant of Larval Growth and Survival in a Marine Fish, *Sebastes melanops*. *Ecology* 85(5): 1258 – 1264.

¹⁶ Clark, W.G. 2002. F35% revisited ten years later. *North American Journal of Fisheries Management* 22: 251–257; Dorn, M.W. (2002) Advice on west coast rockfish harvest rates from Bayesian meta-analysis of stock-recruit relationships. *North American Journal of Fisheries Management* 22, 280–300; Ralston, S. (2002) West coast groundfish harvest policy. *North American Journal of Fisheries Management* 22, 249–250.

¹⁷ Dunn, A. & S.M. Hanchet. 2007. Assessment Models for Antarctic Toothfish (*Dissostichus Mawsoni*) in the Ross Sea Including Data From the 2006/07 Season. CCAMLR WG-FSA-07/37; Pinkerton, M., S. Hanchet, J. Bradford-Grieve. 2007. Finding the role of Antarctic toothfish in the Ross Sea ecosystem. *Water & Atmosphere* 15: 20-21.

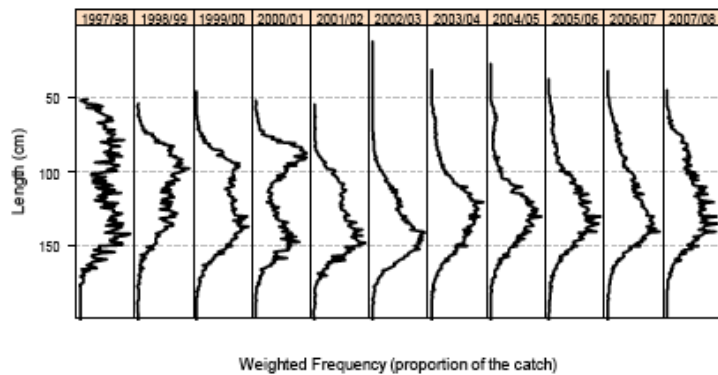


Figure 2: Catch-weighted length frequencies for *Dissostichus mawsoni* in Subarea 88.1 (source: observer, fine-scale and STATLANT data).

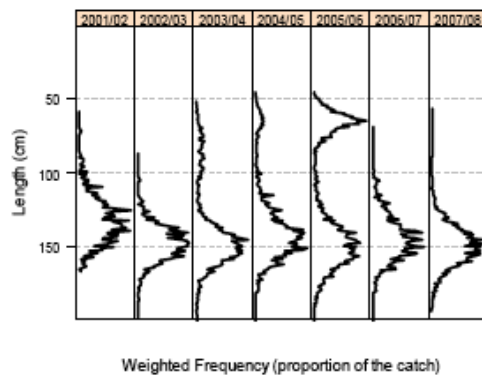


Figure 3: Catch-weighted length frequencies for *Dissostichus mawsoni* in Subarea 88.2 (source: observer, fine-scale and STATLANT data, and the length-weight relationship was taken from observations on *D. mawsoni* in Subarea 88.1).

Figure 1. Catch-weighted length frequencies for toothfish catches in 88.1 and 88.2.¹⁸

Since suddenly increasing in popularity with commercial fishing interests in the 1980s, toothfish populations of both species have been subjected to high levels of both legal and illegal exploitation, with disastrous results. Illegal catches of toothfish constituted as much as half of the entire catch before CCAMLR began to introduce measures to control the problem.¹⁹ The extent of past and present illegal removals of both Patagonian and Antarctic toothfish is unknown. Indeed, the current Area 88 toothfish population appears to be composed of smaller fish, i.e. very few fish older than the high 20s are being caught in the legal fishery,²⁰ a strange pattern for a species otherwise known to live into the 40s. Where those older fish are is an unknown. Even the most scrupulously managed toothfish populations remain vulnerable.

One 2006 study of the South Georgia Patagonian toothfish population, which is certified by the

¹⁸ CCAMLR. 2008. Fishery Report: Exploratory Fishery for *Dissostichus* Spp. in Subareas 88.1 and 88.2.

¹⁹ Lack, M. 2008. *Continuing CCAMLR's Fight against IUU Fishing for Toothfish*. WWF Australia and TRAFFIC International.

²⁰ Hanchet, S.M., M.L. Stevenson, A. Dunn. 2007. A characterisation of the toothfish fishery in subareas 88.1 and 88.2 from 1997/98 to 2006/07. CCAMLR Document WG-FSA-07/28.

MSC, found that the average size of fish caught has decreased and the number of immature fish in the catches has increased, indicating overfishing.²¹ The study concluded that “[i]t seems to be very probable that the process of rejuvenation and, respectively, of a decrease in the population density and biomass of the population is irreversible in the case of continued long-line fishing of toothfish in region 48.3.”

Environmental change, particularly climate change, is predicted to adversely impact Antarctic toothfish, which have a strong preference for colder water. Even mild increases in ocean temperature are predicted to restrict their range,²² and Antarctic deep water has shown a dramatic change in temperature during recent years.²³ Under a “strong” warming scenario, Antarctic toothfish populations could become much reduced in as few as thirty years even without fishing.

5. The conditions proposed by Moody Marine reflect the dramatic uncertainty associated with the fishery

The conditions proposed by Moody Marine further indicate the immense amount of data that is currently lacking in the fishery. The conditions below from the final report illustrate the astonishing scope of research required, and inappropriateness of such conditions under these circumstances:

Condition 1. Knowledge of biology and ecology of the target stock

Action required: There is a lack of adequate knowledge on the life history and population characteristics of the target stock. Whilst there is information adequate to achieve a conditional pass against the MSC standard, the lack of knowledge increases uncertainty in the status of the population and so the effects of the fishery. An appropriate research plan to test the life-history hypothesis (including older fish) should be developed and implemented so as to provide key information.

Timescale: An outline research plan should be available by the first annual audit. Implementation of the research programme should be begun by the third annual audit and results to reduce key uncertainties available within the lifetime of the current certificate.

Relevant Scoring Indicators: 1.1.1.2, 1.3.1.1

Condition 2. Improved stock assessment through wider tagging programme

Action required: Tagging appears the only appropriate strategy to obtain an abundance index on the stock. Currently, the tagging programme is considered appropriate to the management of the fishery, but relies on NZ vessels to provide data in which managers and scientists have sufficient confidence. It is understood that UK vessels tagging data is to be used in the near future. To improve the quality of the tagging programme, any vessels joining the Unit of Certification should be verifiably undertaking tagging at a level sufficient to be used in the stock assessment, or other appropriate amendments to the stock assessment should be undertaken. To reduce uncertainty in the stock assessment, companies within the MSC certified group should liaise with stock assessment scientists to maximise the efficiency of the

²¹ K.V. Shust and Kozlov, A.N. 2006. Changes in Size Composition of the Catches of Toothfish *Dissostichus eleginoides* as a Result of Longterm Long-line Fishing in the Region of South Georgia and Shag Rocks. *Journal of Ichthyology* 46(9): 752-758.

²² Cheung, W.W.L., V.W.Y. Lam, D. Pauly. 2008. Modelling Present and Climate-Shifted Distribution of Marine Fishes and Invertebrates. *Fisheries Centre Research Reports* 16 (3).

²³ Jacobs, S. 2006. Observations of change in the Southern Ocean. *Philosophical Transactions of the Royal Society A*, doi:10.1098/rsta.2006.1794, Published online; Jacobs, S.S., C.G.Giulivi, P.A. Mele. 2002. Freshening of the Ross Sea during the Late 20th century. *Science* 297: 386–389.

tagging programme. Companies should also promote, within CCAMLR, the compliance with requirements of the tagging programme among the whole fleet.

Timescale: Full cooperation with the tagging programme by vessels within the unit of certification should be demonstrated by the time of the first annual audit post joining the MSC certified group. Liaison with stock assessment scientists should be carried out by first surveillance audit and implemented within the next season, or other appropriate revisions to stock assessment undertaken over the same timescales. Promotion, through CCAMLR, of active participation in the tagging programme throughout the fleet should be undertaken by first surveillance audit.

Relevant Scoring Indicator: 1.1.1.6, 3A.6.1

Condition 3. Knowledge of benthic habitat

Action required: The potential for longline fishing activity to significantly impact upon benthic habitats is generally regarded as being low. However, research should be directed at locating areas of complex benthic habitat, particularly biogenic features, within the areas exploited by fishers. If such areas are found, and are considered vulnerable to impacts from fishing gear, then measures to protect these from gear impacts should be implemented.

Timescale: Initial mapping of areas of complex benthic habitat in areas where fishing may occur should be carried out within three years following certification (or earlier if sufficient information is collected). This should also be considered in relation to potential impact from current and possible future fishing activity. Measures to protect vulnerable habitat should be implemented (at least within the MSC client group) within the lifetime of the certificate.

Relevant Scoring Indicators: 2.1.1.1, 2.1.5.3

Condition 4. Trophic effects

Action required: Overall, there do not appear to be unacceptable impacts (given exploitation rates) of the fishery on ecosystem interactions. However, there are uncertainties remaining, notably in relation to pre-recruits. Research is therefore required on major predators and prey of toothfish at sizes below that which recruit to the fishery and to reduce uncertainty of the dependence of top predators on larger toothfish.

Timescale: An outline research plan should be available by the first annual audit. Implementation of the research programme should be begun by the third annual audit and results to reduce key uncertainties available within the lifetime of the current certificate.

Relevant Scoring Indicators: 2.1.1.2

Condition 5. By-catch

Action required: An assessment of the risk posed by the fishery to populations of significant by-catch species (initially skates/rays and macrourids) should be undertaken to address elements of uncertainty in the operation of the fishery. The risk assessment should be updated in light of future research on the species concerned (e.g. 'Year of the Skate' and information in Pinkerton et al 2007). Should unacceptable levels of risk be identified, then appropriate mitigation measures should be implemented as soon as possible.

Timescale: An initial risk assessment should be undertaken by the first annual audit and updated thereafter as appropriate.

Relevant Scoring Indicators: 2.1.5.2

Condition 6. Closed areas Action required: The client should promote and/or cooperate with relevant processes to determine necessary closed areas against objective biological criteria. Where a need for closed areas is identified, operations of vessels within the MSC client group should be consistent with the aims and objectives of such closed areas.

Timescale: By the first annual audit the client group should identify the process or processes most relevant to the identification of closed areas related to the fishery and provide information on associated timetables. By the second annual audit, the client should demonstrate ongoing support for appropriate

initiatives reviewing closed area requirements against objective biological criteria. Within the lifetime of the certificate, the client group should demonstrate that ongoing operations are consistent with the aims and objectives of any such closed areas.

Relevant Scoring Indicators: 3A.7.2²⁴

These present a sobering picture of how much remains to be done by CCAMLR and its member governments, including New Zealand and the United Kingdom that sponsor this exploratory fishery, before it should be considered as fully assessed under CCAMLR rules. The letter in support of the Objection filed by 39 independent marine scientists (FORSE), who have been working in the Ross Sea for decades, describes the very ambitious research scenarios that would satisfy the data needs, requiring many millions of dollars, considerable researcher time and experience, and a research icebreaker.

The MSC and Moody Marine have no jurisdiction over CCAMLR or its management of the broader Antarctic toothfish fishery, and no direct influence over the other vessels in the fishery that are not going for MSC certification. Therefore, the responsibility of meeting the conditions proposed would fall entirely on the vessels to be certified and their sponsoring governments. Yet Moody Marine provides no assessment of the likelihood that these conditions can be met. In fact, there is evidence to the contrary. The NZ government proposed to CCAMLR in 2008 that commercial New Zealand vessels could begin to gather particular data, such as towing a continuous plankton recorder in the prospective spawning area during winter, but CCAMLR rejected the proposal when it was also indicated that a large tonnage of fish (150 tonnes) would be caught and retained during the cruise to pay for the research in addition to those released after being tagged.²⁵ The presence of ice and winter conditions meant that there would be a low likelihood of achieving the research objectives.

To move forward with MSC certification in the face of these huge unknowns, and to imagine that that the vessels to be certified, or their sponsoring governments, can even begin to make a dent in filling in the missing information, is completely unrealistic. Indeed, this approach of trying to set conditions to meet the most basic and fundamental data needed to evaluate sustainability turns the MSC's principles upside down.

III. INTERESTS OF OBJECTOR AND RECORD PRODUCTION

The Antarctic and Southern Coalition (ASOC) is a non-profit coalition of organizations interested in conservation and environmental protection in Antarctica and its surrounding Southern Ocean. Founded in 1978, ASOC is the only accredited environmental NGO in the Antarctic Treaty System and attends Antarctic Treaty Consultative Meetings and meetings of the Commission on the Conservation of Antarctic Marine Living Resources (CCAMLR) as an official observer. ASOC monitors a wide variety of issues related to Antarctic environmental protection, including tourism regulation, climate change, cetacean conservation, and fisheries management. ASOC has played a critical role in the adoption of stricter environmental regulations for the region. ASOC's team of experienced scientists and policy experts, in

²⁴ Final Report, Appendix C.

²⁵ New Zealand (2008) Application to undertake Winter Scientific Research in CCAMLR subarea 88.1 (SSRUs 88.1B, 88.1C and 88.1G) in the 2008/09 Season. WG-FSA-08-62.

conjunction with its organizational members, develops policy positions and advocates for conservation at Antarctic Treaty System meetings.

During the initial explosion of interest in fishing for Patagonian toothfish, ASOC was part of the campaign "Take a Pass on Chilean Seabass," which raised public awareness about the high levels of illegal fishing for Toothfish. The campaign led to a decrease in illegal fishing. Today, ASOC continues to work to ensure that the species is managed in a precautionary way, and as a result of that concern participated in the MSC's assessment of the Ross Sea fishery.

ASOC has no financial stake in the outcome of this certification process or the objection. ASOC's only goal is to ensure that the resources of the Southern Ocean are protected and managed sustainably. Although ASOC's sole interest is in ensuring that the fishery's assessment adheres to MSC principles, ASOC has been required to pay a substantial fee of 15,000 pounds just to participate in this objection.

ASOC notes that the record provided to Objectors is incomplete. Although several PIs are scored based in part upon the results of interviews conducted with various stakeholders, Moody Marine has not provided notes for these meetings. The minimum standard for any meeting whose notes are used as the basis for conclusions about the fishery, whether in scoring or in general descriptions of the fishery, should be a typewritten account covering major points. Since stakeholders do not have access to the information that fishing operators and government officials do (such as unpublished data), it is especially critical that meeting notes are complete and available for review.

In this case, there were also unpublished New Zealand Ministry of Fisheries documents, both Internal Assessments of the fishery and Fishery Working Group reports, which were not made available to ASOC even after submitting a document request approved by the Independent Adjudicator.

Moreover, when Moody Marine's own peer reviewers repeatedly asked for specific reference to support certain statements in the certification, the certifier responded negatively, saying that it wasn't writing a scientific paper and so that sort of substantiation was not required (see also the discussion below). If these documents were provided to the certification body, they must be available as part of the record. Using secret documents compromises the transparency of the MSC assessment process. The documents not provided are listed below:

1. Interview with New Zealand Ministry of Fisheries, which was used in the assessment and in scoring PI 2.1.2.4.
2. Interview with the client fishery, which was used in the assessment and in scoring PIs 2.1.2.4 and 2.1.5.3.
3. Unpublished Industry Toothfish Committee Briefing Paper 2007/08, which was used in scoring PI 2.1.2.5.
4. Interview with MRAG, which was used in the assessment and in scoring PI 2.1.5.3.
5. Unpublished New Zealand Antarctic Fisheries Working Group documents, which were used in scoring PI 3A.6.1. *We received one document entitled "Joint Officials-Toothfish Industry*

Postseason meeting dated March 28, 2008" but it includes only the agenda of the meeting and participants - there are no notes of what occurred there. We received a similar document for the meeting on November 13, 2007, also without any notes of what occurred there.

6. Unpublished New Zealand Ministry of Fisheries Internal Assessments, which were used in scoring PI 3B.5.2.

ASOC submits that if the certifying agency refuses to provide all the documents on which it relied in evaluating and scoring the fishery, then the Independent Adjudicator should refuse to uphold the certification. The principles and criteria of MSC state: "Their successful implementation depends upon a system which is open, fair, based upon the best information available and which incorporates all relevant legal obligations."²⁶ Further the management system should "contain a consultative process that is transparent and involves all interested and affected parties so as to consider all relevant information."²⁷ The process to date has been neither open nor fair to stakeholders.

IV. ARGUMENT

A. The Certification Body Did Not Consider Information Available To It During the Assessment, and This Information Was Material To The Outcome of the Assessment

1. The Information Was Available to the Certification Body During the Assessment Period

Several papers are identified in the ASOC objection that were not included in the Moody Marine list of data sources consulted but were all published in 2008 or earlier, and so were available to Moody Marine during the assessment. Several were specifically mentioned in the stakeholder comments on the public comment draft report, and some were CCAMLR working group papers. If Moody Marine had consulted with CCAMLR scientists other than those from NZ and UK, as Moody Marine's peer reviewers suggested, or had followed the suggestions of stakeholders, these documents would have been available to the assessment team, which would have caused scores to have been reduced:

2. The Information Would Have Made a Material Difference to the Outcome of the Assessment

With respect to "Background of the Fishery" (and certain PIs: 1.2.1.2, 2.1.1.1, 2.1.1.3), and whether rapidly changing ocean conditions is an issue regarding sustainability of current management strategy, Moody Marine stated that "...the fish occur near the bottom where ocean climate is stable" and therefore there is little concern for how habitat change will affect the stock. Peer Reviewers pointed out the dearth of information presented by Moody Marine in this section. It is well known that conditions in surface waters of Area 88 are changing very rapidly according to Stammerjohn et al. (2008),²⁸ and this supposedly is where eggs and larvae are to be found (to

²⁶ Marine Stewardship Council. 2002. MSC Principles and Criteria for Sustainable Fishing, 2. http://www.msc.org/documents/msc-standards/MSC_environmental_standard_for_sustainable_fishing.pdf/view

²⁷ Ibid, 4.

²⁸ Stammerjohn, S.E., D.G. Martinson, R.C. Smith, X. Yuan, D. Rind. 2008. Trends in Antarctic annual sea ice retreat and advance and their relation to El Nino-Southern Oscillation and Southern Annular Mode variability . *Journal of Geophysical Research* 113, C03S90, doi: 10.1029/2007JC004269.

wit: the proposed towing of a continuous plankton recorder through ice covered seas in winter: one of the certification conditions). However, Jacobs (2002), Jacobs et al. (2006), and Russell et al. (2006) point out profound changes underway to the temperature and salinity of deep Southern Ocean waters in general, and Area 88 waters in particular, where the oldest members of the targeted toothfish population reside.²⁹ As Stammerjohn et al (2008) point out further, the changes in the Ross Sea sector complement (but in the opposite direction) those occurring in the Scotia Sea (one of the most rapidly warming ocean areas on earth). Sea ice is increasing in the Ross Sea, but Circumpolar Deep Water is getting warmer. Lower salinity in the Ross Sea Shelf Waters allows this warmer water to penetrate onto the shelf. All of these factors will likely impact toothfish eggs and larvae, and thus the uncertainties over their location are not minor. Moody Marine cannot, therefore, dismiss the modeling of Cheung et al. (2008), which projects significant repercussions for Antarctic toothfish in the immediately approaching decades owing to significant changes to their habitat. Moreover, the conditions that Moody Marine placed on the certification could only provide a snapshot of a moving target with respect to the relationship of the Antarctic toothfish in Area 88 to its habitat, because of these rapid changes.

This issue actually brings to the fore the issue of what little is known about Antarctic toothfish, upon which to then hypothesize how climate or fishery might affect stocks. While the fishery takes its fish, from which the fishery scientists take their samples, from seas lacking in ice cover, studies by non-fishery scientists indicate that under dense ice cover, adult Antarctic toothfish occur almost to the surface.³⁰ These discrepancies reflect the uncertainties over whether spawning occurs near the bottom, where fishing occurs, or near the surface under ice cover. The answer has hugely significant bearing on where this fish lies in the Area 88 trophic structure (predator or prey at different life stages), and what environmental factors are important in adaptation to changing conditions owing to fishing and climate change.

With respect to the discussion on the stock assessment (and PIs 1.1.1.1, 1.1.3, 1.1.6, 1.1.2.3, 1.1.6.1, 1.3.1.2), had Moody Marine consulted scientists outside of those from NZ and UK, it would have been directed to studies that identify serious issues with the tag-recapture currently being used to assess status of the stock and other parameters, such as the Brooks and Ashford (2008) paper,³¹ which identifies numerous problems with the tagging program including sampling error that renders much of the data obtained from the program prone to error. Furthermore, Moody Marine does not appear to have reviewed recent information suggesting that species such as toothfish are especially vulnerable to overfishing. Consistent with its ecotype, the Antarctic toothfish is well known to be significantly sensitive to adult mortality, which therefore must be well-quantified before determining whether or not a fishery is sustainable.³²

²⁹ Fuiman, L.A., R.W. Davis, T.M. Williams. 2002. Behavior of midwater fishes under the Antarctic ice: observations by a predator. *Marine Biology*, DOI 10.1007/s00227-001-0752-y; Jacobs, S. 2006. Observations of change in the Southern Ocean. *Philosophical Transactions of the Royal Society A*, doi:10.1098/rsta.2006.1794, Published online; Jacobs, S.S., C.G.Giulivi, P.A. Mele. 2002. Freshening of the Ross Sea during the Late 20th century. *Science* 297: 386–389.

³⁰ Fuiman et al. 2002.

³¹ Brooks and Ashford. 2008. Spatial Distribution and age structure of the Antarctic toothfish (*Dissostichus mawsoni*) in the Ross Sea, Antarctica. CCAMLR FSA 08/x.

³² Cheung et al. 2007.

With respect to issues involving the effects of longlines on benthic habitats (PI 2.1.3.1), the paper by Eastman & Barry (2002), representing the only attempt by anyone to ascertain how Antarctic toothfish interface with their benthic habitat, demonstrated that large toothfish are shown to be hiding among the 1000 year old benthic ‘forest’ of invertebrates (such as sponges and fans) that cover the bottom in many places.³³ Whether they are hiding from predators or prey remains to be determined. Nevertheless, the importance of how longlines may impact this invertebrate cover should not be underestimated.

The information described above is clearly material to the outcome of the assessment.

B. The Certification Body Committed Several Procedural Errors, And These Errors Were Material To The Outcome Of The Assessment

1. The Certification Body Did Not Provide Substantive Responses to Peer Reviewer Comments

Peer review is an important part of the assessment process. According to the Fisheries Certification Methodology, “external review and scrutiny” is a “guiding principle” of full assessment (the stage at which the public draft report is written).³⁴ It was therefore inappropriate for Moody Marine to dismiss the concerns of their experienced peer reviewers, especially since in many cases they did so without addressing the merits of their arguments or identifying to them the source of data to back up conclusions. Some key examples are given below and further examples were given in the original Objection submitted by ASOC.

In response to Peer Reviewer A’s comment that Moody Marine should have consulted with the scientists who are members of CCAMLR’s Working Group on Fish Stock Assessment, the assessment team replied that “through discussions with MFish (New Zealand) and MRAG (UK) scientists, the assessment team considered that it had ample opportunity to a) gain access to the relevant information produced by CCAMLR and others and b) to understand the context of this information.”³⁵ This response completely ignores the point of the Reviewer’s comments, and the purpose of having independent peer review, which is that it would be useful to the assessment team to gain the perspective of scientists experienced with a wide range of fishery science in the Antarctic, who provide advice on the management of the fishery and have no financial or career stake in it. The reviewer made the point that the team consulted with the client fishery, NGOs, and scientists from the two countries involved in the client fishery, but the WG-FSA scientists would provide a useful complement to this information. WG-FSA scientists have a broader perspective than that of the New Zealand and UK scientists, because they can provide an impartial opinion on the data as they did not produce it themselves. This comment is substantive, and the response of the certification body is not adequate to explain why this reasonable step was not taken.

In another comment Peer Reviewer B refers to the issues with the tagging programme identified by WG-FSA:

³³ Eastman, J.T. and J. P. Barry. 2002. Underwater video observation of the Antarctic toothfish *Dissostichus mawsoni* (Perciformes: Nototheniidae) in the Ross Sea, Antarctica. *Polar Biology* 25: 391-395.

³⁴ Marine Stewardship Council. 2006. Fisheries Certification Methodology Version 6.

³⁵ Final Report, Peer Reviewer A, p.2.

I am concerned that the abundance of toothfish is said to be monitored solely through a small subset of New Zealand tagging data, which apparently leads to underestimate of yield in the model (how to know, with no other indices?). With a recapture rate of around 3% (both for NZ and all vessels), and given the uncertainties associated with any quantitative estimates from tagging studies, biomass or exploitation trends are bound to be extremely tentative.³⁶

Moody Marine responded:

The abundance of toothfish is estimated based on a small New Zealand tagging data set and this is of some concern. The underestimation of the yield is relative to using the other available tagging data. New Zealand has the highest recapture rates. This has been clarified in the text. The consistent choice of the highest recapture rates, while it may introduce estimate bias, is clearly the more precautionary action that can be taken in the face of the uncertainty as outlined by the reviewer, and is considered appropriate.³⁷

Again, this response misses the point that the reviewer is making, which is that the geographic range estimates are partially based on the tagging programme, which has many problems in practice:

- The tagging programme is significantly less “extensive” than implied by Moody Marine because so much of the data is not considered reliable enough to use.
- The condition mentioned does not even begin to address the problems with the tagging programme as it requires that vessels joining the unit of certification tag at a certain level, though inconsistencies in the data and a bias in size of tagged fish are the problem, not the level of tagging.³⁸
- The condition does not specifically address these issues but makes vague references to the need to “maximize the efficiency of the tagging programme.”³⁹ Again under PI 1.1.1.5, the reviewer notes that the “understanding of the relationship between recruitment and the parental stock is limited.”⁴⁰ Moody Marine responded that “the level of recruitment is estimated,”⁴¹ ignoring the reviewer’s point that these estimates do not have a firm basis in data.
- In any event, only a relatively modest number of vessels and countries fishing for Ross Sea Toothfish will have to comply with the condition because only a portion of the active fishery is covered by the certification request.

³⁶ Final Report, Peer Reviewer B comments section.

³⁷ Final Report, Peer Reviewer B comments section.

³⁸ ³⁸ The 2009 CCAMLR Working Group on Fish Stock Assessment (see paras 3.53-3.54, 5.13-5.20, 5.92-5.93) and 2009 Scientific Committee has a discussion of the problem of vessels failing to tag the same size frequency of fish that they are retaining and the problems that this has for stock assessments.

³⁹ Final Report, Condition 2.

⁴⁰ Final Report, Peer Reviewer A, p.2.

⁴¹ Final Report, Peer Reviewer A, p.2.

Several of Peer Reviewer B's comments and critiques were similarly dismissed. For example, under a section about Modeling and Current Stock Status, the reviewer discussed problems with the model and explains ways to remedy it. Moody Marine responded that "it is beyond the scope of this assessment to carry out a technical review of the stock assessment."⁴² This statement is puzzling given that there are many PIs that require evaluation of the data, including stock assessments that are used to manage the fishery. ASOC is very surprised that Moody Marine implies that its role is limited to merely repeating what management bodies have reported.

In another comment on the scoring of PI 1.1.1.5, peer reviewer B made comments similar to those of peer reviewer A about the lack of data available to support the score given, but Moody Marine merely referred to their response to the other peer reviewer and notes that the scoring text was changed to better support their score. However, this reviewer has made somewhat different comments from the first, emphasizing that "it is not possible to quantitatively estimate biological reference levels (the purpose of this question)."⁴³ Moody Marine did not provide either an explanation of how the reviewer is incorrect about the purposes of the PI, or how the available information is sufficient for the purposes of the PI. Thus, although the peer reviewers raised many important substantive concerns, Moody Marine did not give them any substantive consideration and ignored them in its scoring.

Moody Marine repeatedly implies that its own peer reviewers have greatly misunderstood the purpose of PIs, or the scoring rationale. To merely state, as Moody Marine does, that peer reviewers are more biased than the assessment team since they work alone is very puzzling. While the certification body is not required to accept all peer reviewer suggestions, it must provide reasoned explanations for not doing so. Dismissing peer reviewer comments makes the process essentially meaningless. It is fundamentally wrong for Moody to ignore the important inputs provided by the peer reviewers in this case. In our view, that constitutes an abuse of the MSC's process.

If Moody Marine had more fully considered the comments of the peer reviewers, suggesting that scores should be lowered and that scores were not justified by the rationale and available data, several scores would have been revised downwards, which would have made a material difference to the outcome of the assessment. In several cases, the peer reviewers recommended scores of 60, which would have either generated conditions or caused the fishery to fail to achieve the required average score for a Principle, resulting in a material difference to the outcome of the assessment.

2. Moody Marine Employs a Citation Format That Makes the Rationales for Its Scoring Decisions Non-transparent and Impossible to Follow

The Fisheries Certification Methodology instructs certifiers to conduct an open, transparent assessment process. Yet Moody Marine makes it impossible to understand the rationales for its scoring decisions in many cases because it groups all references together instead of citing in-text or as footnotes. It is nearly impossible even for someone familiar with many of the works cited to

⁴² Final Report, Peer Reviewer B, section 4.

⁴³ Final Report, Peer Reviewer B.

determine the source justifying specific assertions. Stakeholder submissions from NGOs following release of the draft report have also raised this issue of poor referencing, and the peer reviewers repeatedly asked for specific sources to back up statements.

In response to a peer reviewer complaint about lack of specific citations, Moody Marine responded that it does not intend to write “scientific papers.”⁴⁴ However, it is rarely acceptable even in non-scientific papers not to cite assertions directly, and certainly should not be acceptable for MSC certifications. In its response to a similar critique in the ASOC objection to the krill fishery certification document, Moody Marine claimed that its references are consistent with Fisheries Certification Methodology (FCM) v6, Appendix 1, Section 3.2.⁴⁵ However, Section 3.2 concerns what information should be covered in discussions of fishery management, not procedures for citing references.⁴⁶ The FCM does not appear to list a specific format for citations. Citing sources in this way completely compromises the transparency of the scoring, and transparency is a key requirement for the MSC process.

In Moody Marine’s response to ASOC’s Notice of Objection, the process of assessing a fishery is described thus: “As a team, these experts receive and review information on a fishery, discuss the fishery in relation to the Performance Indicators and Scoring Guideposts and agree on a score for each PI. These discussions are critical in the team reaching a balanced and fully informed position on the performance of the fishery against the MSC standard, and so minimizing subjectivity.”⁴⁷

On the contrary, this process of using discussions to arrive at conclusions invites subjectivity and bias. Only by the use of rigorous referencing could it be ensured that the results of these “discussions” are supported by adequate evidence and not merely some general sense that the assessment team members derived from the available information. To fulfill basic requirements of professionalism and transparency, the assessment team must make their rationale as clear and easy to understand as possible. It also adds to problems in interpretation of recommendations for corrective action or if a new certifier is appointed by the unit of certification.

C. The Scores Given By the Certification Body For Several of the Performance Indicators Cannot Be Justified, and Those Errors Are Material To the Outcome of the Assessment

Moody Marine scored many performance indicators (PIs) too highly, based on the limited information and scientific data available. For some of these PIs, the evidence justifies a score of 60 or below, which would make a material difference to the outcome of the assessment. As described above, in several instances the peer reviewers challenged the certification body’s assertions and scoring decisions, yet their comments were ignored or not fully addressed by the assessment team.

The Ross Sea toothfish fishery is characterized by a significant lack of knowledge regarding such

⁴⁴ Peer Reviewer A, p. 2.

⁴⁵ Moody Marine Ltd. 2010. Certification Body Response to Notice of Objection to Aker BioMarine Krill Fishery, 3.

⁴⁶ Marine Stewardship Council. 2006. Fisheries Certification Methodology Version 6.

⁴⁷ Moody Marine Ltd. 2010. Certification Body Response to Notice of Objection, 2.

basic data as the age of sexual maturity, frequency of spawning, the timing and location of spawning, and the geographic range of the stock. Because of these critical gaps in knowledge, the scores awarded for several PIs should have been much lower, and in some cases, the fishery should have failed to achieve SG 60, resulting in the fishery being denied certification.⁴⁸

1. A Score of 70 for PI 1.1.1.2 Cannot be Justified Because There is no Verifiable “Information” on Major Spawning and Nursery Areas

For PI 1.1.1.2, Moody Marine has assigned a score of 70. To meet scoring guidepost (SG) 60, “the basis of the life history [must be] understood...[t]here is some information on major spawning and nursery areas.”⁴⁹ To meet SG 80, “[t]he life history of the species is documented and generally understood...[t]he major spawning and nursery areas are adequately well described.” As evidenced by CCAMLR's designation of the fishery as “exploratory,” only some basic information about Ross Sea toothfish population is available. Critical gaps include those related to spawning and reproduction. Eggs and larvae, for example, have never been found. Spawning possibly occurs in ice-covered areas not accessible to research vessels, and therefore while researchers have a hypothesis of their locations, due to finding some post-spawning fish in the catch, they have not been able to confirm them. There is also still considerable uncertainty surrounding frequency of spawning. Toothfish likely produce relatively few large eggs and are considered to be of low fecundity, in part because of the late age at which maturity is reached, and therefore at greater risk of overfishing.

In the scoring comments, Moody Marine admits “[l]ocation of spawning sites is not known”, and that the available information on toothfish spawning is based on a hypothesis derived from the GSI Index and that there is “no direct evidence” for this hypothesis. A very generous interpretation of this available information would indicate a score of 60, but Moody Marine has granted a higher score of 70, indicating that the available information exceeds SG 60 but does not quite meet SG 80. SG 60 is highly debatable as there is admittedly “no direct evidence” for the proposed spawning and nursery locations. The use of the word “information” in SG 60 suggests that data or facts are required, and neither of these is available. In Hanchet et al. 2008: it is noted that “the theories [presented previously in the document] on the reproductive behaviour and fish and larval movement at present **can only be inferred rather than determined by direct observation** [emphasis added].”⁵⁰ The paper makes it clear that these results are tentative until direct evidence is obtained:

[S]pawning **appears** to take place during winter and spring, and **may** extend over a period of several months. **Depending** on the exact location of spawning, eggs and larvae **may** become entrained by the Ross Sea gyres, and **may** either move

⁴⁸ Discussion of additional PIs to which Moody Marine assigned inappropriate scores is in ASOC's Notice of Objection.

⁴⁹ Final Report, 2. For all discussion of performance indicators, the page numbers cited correspond to the page numbers in the scoring section, unless noted otherwise. The scoring section numbering restarts at 1. The Audit Trace References for this PI list the CCAMLR Working Group version of this paper, which was later published in CCAMLR Science. We have used the latter version.

⁵⁰ Hanchet, S.M., G.J. Rickard, J.M. Fenaughty, A. Dunn, and M.J.H. Williams. 2008. A hypothetical life cycle for Antarctic toothfish (*Dissostichus mawsoni*) in the Ross Sea Region. *CCAMLR Science* 15: 50.

west settling out around the Balleny Islands and adjacent Antarctic continental shelf, south onto the Ross Sea Shelf, **or** eastwards with the eastern Ross Sea gyre settling out along the continental slope and shelf to the east of the Ross Sea [emphasis added].⁵¹

Furthermore, Hanchet et al.'s hypothetical life history has other uncertainties, such as how long it will take post-spawning fish to regain the weight they lose as a result of migration to spawning grounds.⁵² It remains uncertain how often toothfish spawn, and this is a critical gap for a species of generally low fecundity. Therefore the “information” on which the score of 70 is based is in fact just an unproven hypothesis. It is unreasonable to have given this fishery a score of 70, as it clearly does not even meet the requirements for SG 60.

2. A score of 90 for Performance Indicator 1.1.1.3 Cannot be Justified Because There Is Significant Uncertainty Surrounding the Geographic Extent of the Stock

SG 80 for this PI requires a “reliable estimate of the geographic range of the stock” and SG 100 requires that “[t]he complete geographic range of the stock...is estimated.” SG 60, however, indicates a “management unit approximating the stock is used with some biological justification.”⁵³ While it is obvious that the fishery does not meet the standards for SG 100, it is also clear that it does not meet SG 80 either, and should in fact have been scored below 60. In scoring this PI at 90 Moody Marine seems to be relying on what it describes as an “extensive tagging programme” and the fact that “[n]o tags have been reported outside the area 88.” This statement is disingenuous in light of the fact that the areas immediately adjacent to 88, 88.3 and 58.4.1(H) are currently closed to fishing. There are no legal Antarctic Toothfish fisheries nearby in which tags could be recovered.

As noted below, the tagging programme has not produced high quality information. The report of the 2008 meeting of the Scientific Committee urged fishing vessels to tag a greater number of larger fish to be in compliance with conservation measures and to provide more useful information on biomass. This request was also repeated in 2009 with more extensive analysis of the problems of failing to tag and release the same size as the fish retained. Tagging smaller fish can lead to overestimates of biomass since fewer will be recovered over time. There are also issues with the reporting of tagging data, which has resulted in much of the tagging data from the fishery being thrown out.⁵⁴ Underreporting recovered tags also inflates biomass estimates.

New Zealand's own stock assessment reports uncertainty about the stock's geographic distribution. Citing a 2004 study, the 2008 report states that there is “weak genetic variation” between the stocks in areas 48.1 and 88.1 and Division 58.4.2.⁵⁵ The report further notes that “the stock affinity of the assessed stocks with toothfish in surrounding areas is not well understood.”⁵⁶ This is inconsistent with the assessment team's conclusion that the “geographic

⁵¹ Ibid, 49.

⁵² Ibid, 49.

⁵³ Final Report, 3.

⁵⁴ Dunn, A. and S.M. Hanchet. An Updated Descriptive Analysis of the toothfish (*Dissostichus* spp.) tagging programme in subareas 88.1 and 88.2 up to 2005-06. CCAMLR WG-FSA-06/34.

⁵⁵ New Zealand Ministry of Fisheries. 2008. 134

⁵⁶ Ibid, 134.

range of the stock is well estimated through the tagging study and genetic studies.” At best this PI should have been scored at 60, and due to the SG requirement that the management unit should be “based upon a sufficiently robust estimation of the geographical range,”⁵⁷ could also have been scored lower. At a score of 60, a condition would have been generated, making a material difference to the assessment.

3. A Score of 80 Cannot Be Justified for PI 1.1.1.5 Because There Is Insufficient Information on Recruitment

The recruitment model used for the stock is, as noted by Peer Reviewer B, “a default stock-recruitment model” and not one developed from stock-specific information. The requirements for SG 80 state that “adequate indices of recruitment and spawning stock are estimated and used. Sufficient years of data are available to establish a general relationship between stock and recruitment.”⁵⁸ SG 60 states that “Indices of recruitment levels and recruitment ages, and corresponding stock levels are available and used as appropriate.”⁵⁹ Peer Reviewer B further explains that “it is not possible to quantitatively estimate biological reference levels (the purpose of this question)” based on the available information, and recommends that “a score of no more than 60 is indicated.”⁶⁰ An analysis by the New Zealand government concludes that a minimum of 8-10 years of high quality data are needed before “a precise estimate of survivorship [could be attained]. After this time the risk of failure to detect a stock decline rate of 0.05 or greater was less than 5% over all initial stock size assumptions.”⁶¹

Peer Reviewer A also commented on this PI, noting that the “understanding of the relationship between recruitment and the parental stock⁶² is limited. Refer to theoretical paper by Hanchet et al. (2008).” Indeed, Hanchet et al. (2008) conclude, “**Much of the hypothesized life history is speculative as the data used in this study have been restricted in a seasonal and geographical extent...the theories on the reproductive behavior and fish and larval movement at present can only be inferred** [emphasis added].”⁶³ Available data thus is not “adequate” or “sufficient” for a score of SG 80. It would be more accurate to score this PI at or below 60, which would either cause a condition to be generated or cause the fishery to fail certification, making a material difference to the outcome of the assessment.

4. A Score of 75 for PI 1.1.1.6 Cannot be Justified Due to Insufficiencies in the Current Tagging Programme

The SG 60 requirements for this PI are that “qualitative information exists supporting the appropriateness of the indices as relative indicators of stock size.”⁶⁴ The requirements for SG 80

⁵⁷ Final Report, scoring, 3.

⁵⁸ Final Report, 4.

⁵⁹ Final Report, 4.

⁶⁰ Final Report, Peer Reviewer B Comments, Pages unnumbered.

⁶¹ Hanchet, S.M. and R.L. O’Driscoll. 2004. Approaches to Monitoring and Assessing Toothfish in New and Exploratory Fisheries, with Particular Reference to Subarea 88.1.WG-FSA-SAM-04/8; Sullivan, K.J.; McL. Smith, N.W.; McKenzie, J.; Hanchet, S.M. 2003. A feasibility study for stock assessment of *D. mawsoni* in the Ross Sea (Subareas 88.1 and 88.2) using a tag and recapture experiment. *WG-FSA-SAM-03/10*. 22

⁶² Final Report, Peer Reviewer A Comments, p.6.

⁶³ Hanchet et al. 2008, p. 50.

⁶⁴ Final Report, 5.

are “Uncertainties have been analysed and any uncertainties addressed in ways which allow trends to be determined from the indices...Indices are suitable, either independently or in conjunction with other analyses, to provide a high degree of confidence in the evaluation of stock abundance trends.”⁶⁵ For this toothfish fishery it is clear that SG 80 is not met. Given the many problems with the tagging programme - currently the only source of data for information on the fishery - it not demonstrated that the fishery meets SG 60 either.

The current tagging programme for the Ross Sea is considered by CCAMLR to be highly problematic. The programme began in the 2000/2001 fishing season and data through 2006/07 was used in the 2008 stock assessment prepared by New Zealand and used by CCAMLR. Thus far 7786 fish were tagged by New Zealand vessels and in total 14945 Antarctic toothfish have been tagged.⁶⁶ Only New Zealand tags or a modified subset of tags from vessels dominated by New Zealand vessels are currently accepted by CCAMLR for data analysis.⁶⁷ Recapture rates vary widely between vessels, which has raised concerns about data quality and the subsequent use of only New Zealand data. Furthermore, the tagging programme has not been conducted according to CCAMLR requirements, as noted by the Working Group on Fish Stock Assessment in 2008:

The Working Group also noted that the paper indicated that **only smaller toothfish (<100 cm) were tagged in this tagging program**, since these could be landed without being gaffed. The Working Group emphasised that this practice is at variance with the conservation measure and previous recommendations by the Scientific Committee and its working groups, which require that fish be tagged by length in proportion to their size distribution in the catch. While the Working Group recognised there may be a reluctance of commercial fishers to tag and release large fish, they stressed the importance of tagging the full size range of fish, and that it is a requirement under the rules of access (paragraphs 5.12 to 5.17) [emphasis added].⁶⁸

This is also confirmed in the CCAMLR WG-FSA 06/34:

Few large fish (>120 cm) have been recaptured after more than one season at liberty, probably a reflection of the low proportion of large fish tagged in the early years... In the early years of the tagging programme the smaller fish were targeted for tagging and release... in 2006, New Zealand vessels greatly increased the size of toothfish being tagged so that for the first time the size distribution of the tagged fish in the Ross Sea was very close to the size composition of the landed catch... [nevertheless] In SSRU 88.2E, most landed fish are in the range 140–160 cm and the size distribution of the tagged fish is smaller than this for all vessels... For modelling purposes it is important that the size distribution of the assumed numbers scanned for tags, particularly in the smaller size classes, is unbiased.... Recapture

⁶⁵ Final Report, 5.

⁶⁶ New Zealand Ministry of Fisheries. 2008. Antarctic toothfish stock assessment.

⁶⁷ SC-CAMLR 2008 and 2009. Reports of the Working Group on Fish Stock Assessment. SC-CAMLRs XXVIII and XXIV.

⁶⁸ CCAMLR. 2008. Report of the Working Group on Fish Stock Assessment SC-CAMLR XXVIII.

rates (tags per scanned fish) from the all vessels data set (0.035%) was slightly lower than for the New Zealand vessels data set (0.040%). The reason for this is unclear, but may reflect a tendency for New Zealand vessels to fish the same grounds each year...For the tagging programme to be successful it is important that tags are released throughout the area of the fishery.⁶⁹

Another working group paper explained inconsistencies in measured parameters thus:

Fisheries observers performed all biological sampling, thus subjecting the data to sampling error. The lack of a clear and rigorous sampling design is a major flaw of the CCAMLR observer program. Observers are often not adequately trained or instructed in random sampling. Thus they may sample opportunistically or simply out of convenience or may be selected based on fish size versus taking a random sample. Hauls were not always adequately and equally sampled. There were often wide discrepancies between the number of fish caught and the percentage sampled. Maturity data were often not recorded. Because of these data gaps, results may have become skewed toward haul lines and spatial areas that were more thoroughly sampled. These biases may have also contributed to the data departures from normality. Nonetheless, in remote areas like the Ross Sea, fishery-dependent data are the only data available, and they can still be utilized to draw important conclusions regarding Antarctic toothfish and their habitat. In the future, a rigorous sampling design should be implemented for the fisheries observer program to ensure data are random and representative of the entire fished population.⁷⁰

Thus the data being collected by the tagging programme, even that which is considered to be less prone to error, is unlikely to provide accurate information. One peer reviewer notes that it “is not demonstrated” that the tagging programme monitors stock abundance.⁷¹ But uncertainties associated with the data have not been “addressed” by Moody Marine except to throw out data from non-New Zealand-flagged vessels, decreasing the size of the data set. How this can contribute to a score just under that indicating a “high degree of confidence” is incredible, and not supported by the numerous problems with the programme. This PI should have been scored at SG 60 or below.

5. A Score of 80 for PI 1.1.1.7 Cannot be Justified Due to Uncertainty and Lack of Data about Environmental Influences on Stock Dynamics

SG 80 for PI 1.1.1.7 requires that “there is knowledge of biological and physical factors affecting distribution, survival and year class strength...Some information is sufficiently robust for use in the stock assessment process.”⁷² SG 60 requires that “some relevant studies have been

⁶⁹ Dunn, A., Hanchet, S. M. (2006a). An updated descriptive analysis of the toothfish (*Dissostichus* spp.) tagging programme in Subareas 88.1 and 88.2 up to 2005–06. WG-FSA-06/34.

⁷⁰ Brooks, C.M. and J.R. Ashford Spatial distribution and age structure of the Antarctic toothfish (*Dissostichus mawsoni*) in the Ross Sea, Antarctica. WG-FSA 08/18.

⁷¹ Peer Reviewer B Comments.

⁷² Final Report 6.

undertaken on the effects of biological and physical factors which could affect the stock...Research is encouraged and ongoing.”⁷³

According to Peer Reviewer B, **“Nothing provided in the assessment suggests that the knowledge of biological and physical factors that affect distribution, survival and year class strength is other than rudimentary...**The only information presented is depth distribution of adults and juveniles, there is nothing on eggs or larvae and, though the R/SSB [Recruitment to Spawning Stock Biomass] relationship is expected to be driven mainly by environmental effects, there appears to have been no attempt to reveal the causal factors [emphasis added].”⁷⁴

The certification body does not provide any references other than Fenaughty 2006, a paper on “Geographical differences in the condition, reproductive development, sex ratio and length distribution of Antarctic toothfish,”⁷⁵ which as the reviewer states, is primarily about differences between toothfish found on the Ross shelf and those on seamounts, showing that there are more juveniles in the south. Without information on eggs and larvae, however, it is clear there is insufficient knowledge on the factors affecting distribution, survival, and year class strength. The available information clearly supports a score of SG 60 at most, which would materially change the outcome of the assessment by generating a condition on the fishery or to fail certification.

6. A Score of 100 for PI 1.1.6.1 Cannot be Justified Because There is No Information Presented on Fishing Mortality

The score of 100 for PI 1.1.6.1 is completely unjustifiable. According to MSC Fisheries Certification Methodology, SG 100 represents “the upper boundary of the scoring and represents the level of performance on an individual performance indicator that would be expected in a theoretically ‘perfect’ fishery.”⁷⁶ PI 1.1.6.1 asks “Is there evidence that stock status is consistent with that providing long-term productivity?”⁷⁷ SG 100 requires that “the stock has a high probability of being consistently at or above its target reference levels,” and SG 80 requires that “the stock has a high probability of being above its limit reference point, and the stock is at, or fluctuating around, its target reference point.”⁷⁸ The problems with the stock assessment, which is based on a small set of tagging data, have been documented above. The scoring text does not support that the fishery is close to perfect.

As noted by both peer reviewers, there is insufficient information to make any estimates about long-term productivity. Peer Reviewer B explains that “though the stock may have been estimated to be well above the biomass limit reference point in 2006/07, we do not know the rate at which it is being fished down. With a slow growing relatively unproductive species, it is to be expected that changes in the overall length frequency distribution will occur slowly as the unexploited population containing a preponderance of older individuals is fished down...though

⁷³ Final Report 6.

⁷⁴ Peer Reviewer B Comments.

⁷⁵ Fenaughty, J.M. (2006) Geographical differences in the condition, reproductive development, sex ratio and length distribution of Antarctic toothfish (*Dissostichus mawsoni*) from the Ross Sea, Antarctica (CCAMLR Subarea 88.1). *CCAMLR Science* 13: 27-45.

⁷⁶ MSC FCM v6, p. 19.

⁷⁷ Final Report 19.

⁷⁸ Final Report 19.

the stock may currently have a high probability of being at or above its target reference levels, unless fishing mortality is low and recruitment or production responds positively as the stock is fished down, long-term productivity is not assured.”⁷⁹

The peer reviewer also notes that although the PI cites estimates of fishing mortality, these are not provided in the report. Moody Marine responded that the “score measures current rather than future status.”⁸⁰ But without estimates of current fishing mortality, even this threshold cannot be met. Therefore this PI should have been scored at 80 or lower.

7. A Score of 85 for PI 2.1.5.1 Cannot Be Justified Because the Ecosystem Model Has Yet To Be Validated

Performance Indicator 2.1.5.1 asks if “mortality of target stocks [has] unacceptable impacts on ecosystem structure and function.”⁸¹ SG 80 requires that “sufficient information is available on the consequences of current levels of mortality of target species to generally evaluate major impacts, and the information suggests no unacceptable impacts of the fishery on ecological systems.”⁸² SG 60 requires that “the mortality of target stocks could lead to impacts upon ecological systems (applying the precautionary approach where necessary) but there is no evidence that they are seriously detrimental under current fishery conditions. A program is in development to identify these and, if appropriate, reduce these to acceptable, defined limits.”

Moody Marine’s scoring commentary concludes that there is sufficient information to get a general idea of the ecosystem through a “mass-balance model”, even though admittedly there is “substantial uncertainty about details for ecosystem structure and function.” However, the Pinkerton et al. study, which integrated available evidence into a trophic model for the Ross Sea states:

The balanced model presented here has not yet been validated and should be considered a work in progress. The current version of the trophic model suggests that Antarctic toothfish have the potential to exert considerable predation pressure on some species of demersal fish. More information on demersal fish abundance is required to validate this result. Information on what the various species of demersal fish consume is needed to estimate the potential for trophic cascades due to the toothfish fishery. The significance of toothfish in the diets of predators (especially Weddell seal, type-C killer whale, sperm whale) are low in the model, but **the model does not consider sub-populations of predators, or localized dependencies on toothfish as prey. More complete information on the abundances, diets, and population structures of top predators in the Ross Sea are needed to investigate these potential effects** [emphasis added].⁸³

⁷⁹ Peer Reviewer B Comments.

⁸⁰ Peer Reviewer B Comments.

⁸¹ Final report 34.

⁸² Final report 34.

⁸³ Pinkerton, M.H., S.M. Hanchet, J.M Bradford-Grieve. 2007. A balanced trophic model of the Ross Sea, Antarctica for investigating effects of the Antarctic toothfish fishery. CCAMLR WG-EMM-07/18.

The information clearly does not suggest “no unacceptable impacts of the fishery on ecological systems,” as it does not incorporate localized effects on predators and is, as the authors caution, “a work in progress.” At best, there is no evidence that the fishery is “seriously detrimental” to the ecosystem, and thus this PI should have been scored at 60 or lower.

V. CONCLUSIONS

Moody Marine has recommended for certification a fishery that is lacking in critical, basic data, which the management body - CCAMLR - treats as 'exploratory'. Moody Marine has ignored its own peer reviewers, the detailed comments of those scientists with the most knowledge about the Ross Sea, and all inputs from environmental organization stakeholders.

There is inadequate evidence to support the passing scores given to the fishery on numerous performance indicators.

A certification by the MSC is supposed to represent best industry practice in a sustainable fishery. This test is not met here. The Independent Adjudicator should remand the proposed certification, and require Moody Marine to fully consider the information presented here in order to correct its procedural and scoring errors.

VI. TABLE OF ATTACHMENTS

1	Beamish, R.J., G.A. McFarlane. A. Benson. 2006. Longevity overfishing. <i>Progress in Oceanography</i> 68: 289-302
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6	Dorn, M.W. (2002) Advice on west coast rockfish harvest rates from Bayesian meta-analysis of stock-recruit relationships. <i>North American Journal of Fisheries Management</i> 22, 280-300
7	Ralston, S. (2002) West coast groundfish harvest policy. <i>North American Journal of Fisheries Management</i> 22, 249-250
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9	K.V. Shust and Kozlov, A.N. 2006. Changes in Size Composition of the Catches of Toothfish <i>Dissostichus eleginoides</i> as a Result of Longterm Long-line Fishing in the Region of South Georgia and Shag Rocks. <i>Journal of Ichthyology</i> 46(9): 752-758
10	Cheung, W.W.L., V.W.Y. Lam, D. Pauly. 2008. Modelling Present and Climate-Shifted Distribution of Marine Fishes and Invertebrates. <i>Fisheries Centre Research Reports</i> 16 (3)
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13	Stammerjohn, S.E., D.G. Martinson, R.C. Smith, X. Yuan, D. Rind. 2008. Trends in Antarctic annual sea ice retreat and advance and their relation to El Nino-Southern Oscillation and Southern Annular Mode variability. <i>Journal of Geophysical Research</i> 113, C03S90, doi: 10.1029/2007JC004269.
14	Brooks, C.M. and J.R. Ashford. 2008. Spatial Distribution and age structure of the Antarctic toothfish (<i>Dissostichus mawsoni</i>) in the Ross Sea, Antarctica. CCAMLR FSA 08/x.
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