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INITIAL SUBMISSION ON: REVIEW OF DEEPWATER SUSTAINABILITY MEASURES AND OTHER MANAGEMENT CONTROLS FOR THE 2010-11 FISHING YEAR

The Environment and Conservation Organisations of NZ (ECO) is the national alliance of 66 groups with a concern for the environment. ECO has been concerned at the state of marine management and the impacts of fishing on threatened species for over 20 years.

Thank you for the opportunity to make submissions on these proposals.

A. SUMMARY

Black Cardinalfish (CDL2)

- Note that the assessment in 2009 estimated the stock for CDL2-4 at about 11.9 percent Bo with a 41% probability of being below 10%Bo.
- Based on forward projections, catches since 2009 are likely to have reduced the stock further and now has an even chance of being below 10% Bo which should cause consideration of closing the fishery.
- Recommend reduction in catches in all areas assessed ie CDL2 and CDL 3 and 4;
- Reject options 1 and 2 proposed by the Ministry of Fisheries/MAF.
- Either close the fishery by setting a 3 tonne TACC for CDL 2,3, and 4; or Reduce the TACC to 180 tonnes for CDL2 to CDL 4 combined which has a less than 20% probability of being below 10 percentBo..
- Catch reductions will reduce impacts on benthic biodiversity of bottom trawling.

- Catch reductions will reduce potential bycatch of seabirds and marine mammals from scampi trawlers.
- Reduce catch to a TAC of 200 tonnes and a TACC of 180 tonnes.
- That an assessment be carried out in CDL1.

Hoki (HOKI)

- Welcome the estimated increase in the stock size of hoki in both Western and Eastern stocks.
- Note that an increase in stocks above 50% Bo is supported and that it will increase catch rates and lower environmental and financial costs of fishing.
- Review the incidental mortality allowance for hoki – both direct and unseen mortality;
- Reduce the catch in the Western end of the Chatham Rise so as to further reduce the catch of small hoki.
- Apply measures to reduce the juvenile catch to under 20 percent of the catch in any “fishery”, in particular on the Chatham Rise.
- Note the impact of any increase on the West Coast on fish bycatch species including ling, silver warehou and hake.
- Note the absence of progress in reducing the rate of seabird bycatch per tow.
- Note the absence of progress in reducing the rate of fur seal bycatch and the impact of the fishery on the West Coast fur seal colonies.
- Strengthen measures to reduce both the rate and number of seabirds and marine mammals caught by vessels catching hoki.
- Recommend maintaining the current TAC and the TACC and accept option 1.

Orange Roughy (ORH3B):

- Reject the Ministry of Fisheries proposed reduction strategy as being inadequate given the state of the stocks.
- Note the NW Chatham Rise was last assessed in 2006 at 11%Bo (CI 8-16%) with a CAY of 410 tonnes and “about as likely as not (40-60%)” to be below 10% (the “hard limit”).
- Note the decline in the East and South Chatham Rise “stock” which is now assessed in the range of 7 to 18 %Bo with the highest unfished estimate has a mean Bcurrent of 9.6%, and “about as likely as not (40-60%)” to be below 10% (the “hard limit”)
- Note the ongoing decline in the NE Chatham Rise spawning plume.
- Note the decline in catch rates on hill/seamount features in the East Chatham Rise including Andes, Big Chief, and Hegerville complexes.
- Note the uncertainty over orange roughy spawning success and recruitment.
- Note the decline in catch rates in the southern/sub-Antarctic fisheries with the lowest catches in 20 years.
- Given that stock are assessed as around the hard limit” and taking a precautionary approach, cut the ORH3B catches to:
 - North West Rise reduced to 1 tonnes;
 - East and South Chatham Rise reduced to 1 tonnes.
 - Allow a Chatham Rise research component of 100 tonnes.

- Puysegur maintain a catch limit of zero.
- Sub-Antarctic research of 100 tonnes.
- Other source of mortality at 20 tonnes.

Set the other sources of mortality at 10 percent of TACC.

This produces a TACC of 200 tonnes and a TAC of 220 tonnes for 2010-11.

Orange Roughy East Coast North Island (ORH2A, 2B, and 3A)

- Reject the Ministry of Fisheries proposed reduction strategy as being inadequate given the state of the stock.
- Note the current assessment of the mid-east coast (MEC) stock using natural mortality M at 2.5% (M2.5) run estimates B_{current} at 9.0%B₀ and provides the best fit to the trawl survey index when compared to EstM run.
- Note the range of two runs but that the trawl survey index is a more reliable index of biomass than the CPUE index.
- Note the 2010 trawl survey estimate is about half the estimates of the early 1990s.
- Note that this assessment uses deterministic recruitment which assumes constant recruitment which underestimates the uncertainty over orange roughy spawning success and recruitment.
- Note the M2.5 run forward projections indicate that the stock will decline under the current TACC to 5%B₀.
- Note that East Cape stock was estimated in 2003 at 24%B₀ (CI20-32%) but catch rates have declined in recent years.
- Note area catch limits have been exceeded by up to 34% in recent years.
- Given that MEC stock are assessed as around the hard limit” and taking a precautionary approach, cut the ORH2A, 2B and 3A catches to:
 - 2A South, 2B and 3A reduced to 1 tonnes respectively;
 - Maintain the East Cape at 200 tonnes but take measures to ensure this limit is not exceeded.
 - Allow a MEC research component of 100 tonnes.

Scampi (SCI2):

- Note the current TAC is 210 tonnes and the average catch for the last 5 years is only 79 tonnes.
- Note that the current biomass is estimated at about 40 percent B₀.
- Catch reduction to 79 tonnes maintains the stock closest to 40 percent B₀ over the next 5 years.
- Catch reductions will reduce impacts on benthic biodiversity of bottom trawling.
- Catch reductions will reduce potential bycatch of seabirds and marine mammals from scampi trawlers.
- Reduce catch to a TAC of 79 tonnes and a TACC of 75 tonnes.

Deemed Values

Adjust deemed values to reduce the incentive to overfish catches for stocks that meet the review criteria and stocks under review.

Yours sincerely,

Barry Weeber
Co-Chairperson
Environment and Conservation Organisations

1. INTRODUCTION

Thank you for this opportunity to comment on the proposed sustainability measures and management controls for the 2010-11 Fishing Year.

B1. GENERAL PRINCIPLES

Our main submissions on the Ministry's IPPs are:

1. The proposals do not consider all the obligations on a decision-maker under sections 5, 8 to 10, and 11 to 14 of the Fisheries Act 1996.
2. The decision should be to achieve the purpose of the Fisheries Act (s8) subject to:
 - the considerations of Sections 9 (Environmental Principles);
 - a clearly articulated Precautionary Principle in section 10;
 - the relevant provisions of Sections 11, 13, 14 etc;
 - the section 5 obligations include New Zealand's international obligations which take in the UNCLOS requirements of an unqualified obligation to "preserve and protect the marine environment" (Art 192).
 - the UN Fish Stocks Agreement.
3. Currently there is little consideration of international obligations (section 5) and section 9 obligations, especially marine biodiversity and habitat of particular significance to fisheries management.
4. The Ministry needs to consider how environmental considerations are better integrated with pure single stock assessment considerations. Every year the inclusion of bycatch, adverse effects of fishing, maintenance of biodiversity, etc, tend to be after-thought considerations rather than central issues to setting catch limits. The Ministry could learn from the approaches taken by CCAMLR in this regard. ECO looks forward to the publication this year of an Aquatic Environment Plenary Report – the first since 1995.
5. The Ministry needs to consider the obligations on future generations and the need to avoid, remedy or mitigate the effects of fishing on the marine environment.
6. International agreements and measures have further articulated the precautionary approach. Section 5 of the Fisheries Act requires decision makers to act in a manner consistent with "New Zealand's international obligations relating to fishing". These obligations include the UN Fish Stocks Agreement and the South Pacific RFMO text and interim measures in the case of Challenger (ORH7A) and Patagonian toothfish.
7. Amongst these obligations is the United Nations Food and Agriculture Organisation (FAO) Code of Conduct on Responsible Fisheries (1995) which states that:

"6.5 States and subregional and regional fisheries management organizations should apply a precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment, taking account of the best scientific evidence available. The absence of adequate scientific information should not be used as a reason for postponing or failing

to take measures to conserve target species, associated or dependent species and non-target species and their environment.”

8. Article 7.5 of the Code of Conduct further set out what constitutes precautionary management in fisheries.¹
9. The United Nations Implementing Agreement on High Seas Fisheries and Straddling Stocks² includes a requirement on “*coastal States and States fishing on the high seas [to] apply the precautionary approach in accordance with article 6.*” Article 6 includes requirements for:
 - “1. *States shall apply the precautionary approach widely to conservation, management and exploitation of straddling fishstocks and highly migratory fishstocks in order to protect the living marine resources and preserve the marine environment.*
 2. *States shall be more cautious when information is uncertain, unreliable or inadequate. The absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures.*”
10. Therefore, where information is uncertain or unknown about the state of a stock or biological information, the decision should favour lower catch limits or more environmentally stringent regulations.
11. As the High Court has stated:

“If one considers the purpose of the Act as stated in s 8(1)... then I accept that utilisation is subject to the over-riding objective of sustainability.”

¹ **7.5 Precautionary approach**

- 7.5.1 States should apply the precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them and preserve the aquatic environment. The absence of adequate scientific information should not be used as a reason for postponing or failing to take conservation and management measures.
- 7.5.2 In implementing the precautionary approach, States should take into account, inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities, including discards, on non-target and associated or dependent species, as well as environmental and socio-economic conditions.
- 7.5.3 States and subregional or regional fisheries management organizations and arrangements should, on the basis of the best scientific evidence available, inter alia, determine:

stock specific target reference points, and, at the same time, the action to be taken if they are exceeded; and stock-specific limit reference points, and, at the same time, the action to be taken if they are exceeded; when a limit reference point is approached, measures should be taken to ensure that it will not be exceeded.
- 7.5.4 In the case of new or exploratory fisheries, States should adopt as soon as possible cautious conservation and management measures, including, inter alia, catch limits and effort limits. Such measures should remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment should be implemented. The latter measures should, if appropriate, allow for the gradual development of the fisheries.
- 7.5.5 If a natural phenomenon has a significant adverse impact on the status of living aquatic resources, States should adopt conservation and management measures on an emergency basis to ensure that fishing activity does not exacerbate such adverse impact. States should also adopt such measures on an emergency basis where fishing activity presents a serious threat to the sustainability of such resources. Measures taken on an emergency basis should be temporary and should be based on the best scientific evidence available.

² The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (in force as from 11 December 2001).

Coromandel Scallop Fishermen's Association v Minister of Fisheries and others
CP182/99, 13 September 1999 at p22.

12. "It follows my view (and this is plain from the international agreements) that when in doubt decision makers must favour the fishing stock."
Roaring Forties Seafoods Ltd and Chatham Islands Fishermans Co-operative Co Limited v Minister of Fisheries, Wellington CP 64/97, 1 May 1997.
13. Six key issues regarding the management of fisheries-related impacts on the aquatic environment were identified through the Strategy on the Management of the Environmental Effects of Fishing consultation process undertaken by ECO and Forest and Bird in 2001. These issues describe problems relating primarily to the institutional, legal and policy frameworks under which fisheries-related impacts on the aquatic environment are managed. The key issues identified were:
 - Limited opportunities for public participation in fisheries management;
 - Gaps in information, monitoring and research capacity;
 - Lack of precaution and environmental assessment in decision-making;
 - Lack of spatial and ecotype approach to policy and planning;
 - Dominance of private property rights approach;
 - Lack of recognition of non-extractive use values.
14. A recent review of application of the FAO Code of Practice³ indicates that New Zealand needs to do a lot more to implement the code, particularly in the area of stock management, impacts of fishing, and bycatch and habitat effects.
15. Where scientific information is uncertain, unreliable, or inadequate, ensure that conservation and management measures be established consistent with the precautionary approach, including measures to ensure that fishing effort, fishing capacity and catch limits, as appropriate, are at levels commensurate with the long-term sustainability of such stocks.

B2 HARVEST STRATEGY STANDARDS

16. ECO does not accept the targets in the harvest strategy standard as appropriate or consistent with domestic and international law.
17. ECO notes that at the World Summit on Sustainable Development in Joannesburgh in 2002 New Zealand committed itself to, amongst other things, to:
"Encourage the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem¹⁵ and decision V/6 of the Conference of Parties to the Convention on Biological Diversity;"
To achieve sustainable fisheries, the following actions are required at all levels:

³ Pitcher T, D. Kalikoski, G. Pramod and K.Short (2009) Not honouring the code *Nature* **457**, 658-659 (5 February 2009) | doi:10.1038/457658a; Published online 4 February 2009
and

Pitcher T, D. Kalikoski, G. Pramod and K.Short (2009) Safe Conduct? Twelve years fishing under the UN Code (WWF) Available at: <http://assets.panda.org/downloads/un.code.pdf>

- a) *Maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015;*
 - b) *Ratify or accede to and effectively implement the relevant United Nations and, where appropriate, associated regional fisheries agreements or arrangement....,*
 - c) *Implement the 1995 Code of Conduct for Responsible Fisheries, taking note of the special requirements of developing countries as noted in its article 5, and the relevant international plans of action and technical guidelines of the Food and Agriculture Organization of the United Nations;*
18. The legislation requires the Minister to: “*set a total allowable catch that - Maintains the stock at or above a level that can produce the maximum sustainable yield, having regard to the interdependence of stocks;*”
19. And it defines:
‘Maximum sustainable yield’, in relation to any stock, means the greatest yield that can be achieved over time while maintaining the stock’s productive capacity, having regard to the population dynamics of the stock and any environmental factors that influence the stock:
20. The provisions then require stocks which are greater than Bmsy to be maintained at or above this level having regard to:
- Interdependence of stocks;
 - Population dynamics of a stock;
 - Environmental factors that influence the stock.
21. None of these extra considerations direct that stock be reduced below Bmsy rather they are added reasons to be precautionary with a larger stock size.
22. It is then unreasonable to interpret these provisions as legally permitting a decision maker to allow a stock to be reduced below Bmsy other than for stocks that were below this level prior to the Act coming into force (eg several snapper stocks) or where new information indicates that the stock is in a much worse state than previously predicted.
23. We see no evidence of consideration of the non-extractive uses of fishery resources – yet these are clearly envisaged in the Purpose definition of ‘utilisation’ which includes “use” not “extractive use”, and is clearly contemplated in the reference to the needs of future generations (which is also not qualified to be only harvest), and in the reference to social, economic and cultural needs.

B3 OPPORTUNITY COSTS AND CATCH VALUES

24. Economic considerations cannot be only focused on the losses to industry. The opportunity costs on harvesters fails to acknowledge that “saving” the stock for future years generates benefits for society for greater non-harvest values, ecosystem functions, and recovery. There may be no net social loss from “excessive” caution which may be cancelled by non-harvest benefits. Further, savings are reversible as soon as it is deemed safe. The converse is not true for over-harvest.

25. Private gains are to the harvesters which society suffers continued losses not only in the year of overharvest but also in subsequent years of lower fish numbers, higher per tonne harvest costs, lower market and non-market values. It is not acceptable to consider only harvest values.
26. Using the loss of biomass under the Bmsy or target level can be used as a proxy for loss of natural value. Using port price, export or ACE value can be used to calculate an NPV value for loss of natural value.
27. Economic considerations must consider the annual loss in natural capital which could be conservatively valued for ORH3B at \$317 m (port price x biomass lost below Bmsy or 30%Bo) or \$264 million (ACE value x biomass lost below Bmsy or 30%Bo). Given that reducing the stock below Bmsy is an adverse effect, it can be mitigated by an immediate catch reduction.
28. Similar calculations on loss of natural value can be calculated for other orange roughy stocks and for black cardinalfish in the deepwater or snapper, bluenose and other species in the inshore or southern bluefin tuna etc in highly migratory species.

B.1. Effects of fishing

1. We support the implementation of the Strategy for the Environmental Effects of Fishing (SMEEF) and are disappointed that there has been little progress in applying it since it was published in 2005.
2. The Ministry needs to consider the SMEEF including:
 - *Emphasises the need to assess the effects of fishing on all parts of the aquatic environment, not just respond to obvious adverse effects.*
3. Further *Principles relevant to the Strategy as a whole are:*
 - *Avoid, remedy, or mitigate any adverse effects of fishing on the aquatic environment.*
 - *Give effect to the purpose of the Fisheries Act 1996 (to provide for the utilisation of fisheries resources while ensuring sustainability), and the overall fisheries outcome set out in the Ministry of Fisheries Statement of Intent 2005–2008 (value is maximised).*
 - *Meet New Zealand’s international obligations.*
 - *Clearly define roles, responsibilities, and accountabilities.*
 - *Adopt a “learning culture” to support improvement of environmental effects management over time.*
 - *Use best available information.*
 - *Take into account wider (non-fisheries) New Zealand government priorities.*
 - *Monitor and assess effects of fishing on an ongoing basis.*
4. New Zealand has a range of international obligations that are relevant to marine management. These obligations mean New Zealand:
 - has an obligation to protect and preserve the marine environment (UNCLOS Article 192);

- is committed to an ecosystem based approach to managing the use of natural resources;
 - is committed to the precautionary approach to minimising risk to the environment;
 - is committed to the concept of inter-generational equity.
5. This includes measures to maintain marine biodiversity and avoid, remedy or mitigate the adverse impacts of commercial scale bottom impacting methods including trawling on benthic species (see reviews in *Conservation Biology* December 1998 (Vol 12, No 6)).

B.2. Research needs

6. We are concerned that the Ministry is not undertaking adequate research to manage most of the species under the Quota Management System. Less than 15 percent of the stocks in the quota management system have estimates of current biomass or yield estimates.
7. ECO notes that the Worm et al (2009)⁴ paper only accepted 19 assessments which in total cover 18 quota stocks out of the 629 fish stocks quota management system. This indicates that the Ministry of Fisheries needs to know much more about our fisheries if that is all of our stock assessments the international fisheries science community will accept.
8. We note that this report also recommends that stocks be maintained above Bmsy: *"In fisheries science, there is a growing consensus that the exploitation rate that achieves maximum sustainable yield (u) should be reinterpreted as an upper limit rather than a management target. This requires overall reductions in exploitation rates, which can be achieved through a range of management tools.*
9. New Zealand is undertaking less trawl surveys and fisheries research than it was 15 years ago. We would endorse the comments of McKoy (2006)⁵ that New Zealand has a fisheries management regime which has:
- *"Insufficient research resources, people, equipment and funding;*
 - *Limitation of scientific method and theory to tackle many questions;*
 - *An inadequate understanding of the dynamics of New Zealand marine ecosystems;*
 - *A management system which provides very strong perverse incentive to keep research funding low;*
 - *A management system which treats the QMS as the whole of the system and which has not been able to develop any coherent management objectives on which to base*

⁴ Worm B, R Hilborn, J K. Baum, T A Branch, J S Collie, C Costello, M J Fogarty, E A Fulton, J A Hutchings, S Jennings, O P Jensen, H K Lotze, P M Mace, T R McClanahan, C Minto, S R Palumbi, A M Parma, D Ricard, A A Rosenberg, R Watson, D Zeller (2009) Rebuilding Global Fisheries *Science* 31 July 2009: Vol. 325. no. 5940, pp. 578 – 585 DOI: 10.1126/science.1173146

⁵ McKoy J (2006) Fisheries resource knowledge, management, and opportunities: Has the Emperor got no clothes? p35-44. In New Zealand's ocean and its future: knowledge, opportunities and management. Proceedings of a conference organised by the Royal Society of New Zealand, 16 November 2006, Miscellaneous Series 70.

decisions about the effectiveness of management or the allocation of scarce resource such as research resources.”

10. The long echoed comment in Antarctic fisheries management (CCAMLR) first echoed by the former UK representative, John Heap, of “no data, no fish”, should be taken to heart in the New Zealand fisheries management regime.
11. ECO is concerned that the proposals for additional deepwater research should be undertaken by research without conflict of interests with the fishing industry. Any project should be contracted to the Ministry of Fisheries so that they are subject to the normal requirements of transparency and accountability including the Official Information Act and the Ombudsman Act.
12. ECO is concerned at the delay in reporting industry funded research could affect the decisions made by the Minister of Fisheries. This is an inappropriate and unsatisfactory situation. The incentives that exist on the fishing industry are different from those that exist on the Ministry. The conflicts of interest that exist should be strenuously avoided.

B.3. Effects of Climate change

13. The effects of climate change on fisheries and the emissions of greenhouse gases from the fishing industry needs to be included in the considerations of the Ministry of Fisheries. This includes the consideration of the impacts of acidification of the marine environment on fisheries.

C. General Issues:

C.1 Impacts of Trawling

1. These submissions are relevant to the proposals for changes to all deepwater species.
2. There has been growing concern over the impact of deepwater bottom trawls on seamount biodiversity (including hill features) since the mid-1990s (eg Probert *et al* 1997, Koslow and Gowlett-Holmes 1998, MoF 1998). Deepwater in many discussions is any fishery below 200m⁶. At the same time there is growing recognition of the impacts of trawling and dredging on the marine benthic environment (eg Dayton *et al* 1995, Auster *et al* 1996, Turner *et al* 1999). Recent studies have described a range of impacts of trawl gear including physical, sedimentological, and geochemical (eg Tuck *et al* 1998, Schwinghamer *et al* 1998, Pilskaln *et al* 1998).
3. ECO consider that wider action needs to be taken to recognise the impacts of trawling on the marine environment, this includes:

⁶ Internationally, deepwater fisheries have been defined as fisheries that occur beyond the continental shelf break. DEEP SEA 2003 defined the deep sea as 200 m and deeper. At the International Council for the Exploration of the Seas (ICES) 400m and deeper has been used to define deepwater fisheries (ICES 2003).

- All trawling and dredging should be prohibited in at least 40 percent of the trawled EEZ and areas untouched should be declared off-limits. These areas must include places currently trawled with high productivity (e.g. Western Chatham Rise) and biodiversity, and must protect biodiversity in hot spots assemblages like the cold-water corals, sensitive habitats, and seamounts (including hills and ridges).
 - Only a limited number of seamounts⁷ are protected of the about 680 in the area New Zealand manages.
 - Areas of high biodiversity or high productivity for example on the Western end of the Chatham Rise should also be protected;
 - All types of seamounts should be protected, including representatives of those found on the Macquarie ridge and the Hikurangi Plateau;
 - Many of the current closed areas should be converted into marine reserves eg the world heritage areas around the Sub-Antarctic Islands.
4. A scientific review is needed of all the areas currently impacted by trawling and the industry should move to other methods of commercial fishing which don't require bottom trawling, eg jigging for squid or the use of pots.
5. The key points in any approach to manage the impacts of trawling on the marine environment should include:
- A strategy of reducing the adverse effects of trawling on all seamounts and special areas so as to avoid, remedy or mitigate the adverse effects of fishing of the marine environment, including implementing the Strategy for the Management of the Environmental Effects of Fishing (SMEEF);
 - Restriction of trawl fishing to the current fished areas and avoiding new areas;
 - There should be a reversal of the burden of proof (Dayton 1998) consistent with the precautionary approach before considering whether fishing should continue;
 - Consultation and agreement on a national standard and classification systems to be used to create representative protected areas in the New Zealand EEZ including marine reserves.
6. The best understood (and possibly the most severe) effects of trawling on the benthos are those that alter the physical structure of the seabed. Auster et al (1996) found trawls and dredges reduced habitat complexity in the Gulf of Maine by direct removal of biogenic structures (eg bryozoans, sponges, amphipod tubes), by smoothing sedimentary structures (eg sand depressions, sub-aqueous dunes and ripples), and by the removal of organisms that create ephemeral structures by their presence and activity on the seabed (eg crabs, bivalves). Auster (1998) showed that seabed structural complexity is reduced

⁷ In this submission "seamounts" refer to any feature with vertical elevation of at least 100m which is the definition used in the Ministry of Fisheries draft Strategy to Address the Impacts of Fishing on Seamounts, 1999, Rowden et al 2005, and O'Driscoll and Clark 2005.

by trawl fishing effort, and that the more complex a habitat initially, the greater its decline in complexity after fishing.

7. As habitats with three dimensional structure are relatively rare on the seafloor they tend to have elevated biodiversity (eg Probert et al 1979, Collie et al 1997) it is important that they be mapped and protected. These areas the marine equivalent of the terrestrial biodiversity hotspots described by Myers et al (2000).
8. Deepwater fishing for a range of species including orange roughy and oreos use bottom trawls. While deepwater fisheries initially targeted flatter areas there has been an increasing trend towards targeting seamounts or hill features. According to Clark and O'Driscoll (2003) between 1980 and 1984 less than 30 percent of tows were associated with seamounts or hill features. By the 1990s this had risen to 60–70 percent.
9. The impact of trawling on “flat” areas has also been highlighted in a 2002 review of the impact of bottom trawling for scampi, tarakihi and gemfish in depths of 200–600m in the Bay of Plenty by Cryer *et al* (2002). They found a significant impact on a range of benthic biodiversity based on research trawls undertaken over three years. They considered the impact to be indicative of the effects of trawling occurring throughout the fisheries management area. There has been no management action in response to these results. The Ministry of Fisheries in 2001 refused to consider the impacts of trawling, but has foreshadowed future attention to this issue (Ministry of Fisheries 2001).
10. The UN General Assembly resolution 64/72 and resolution 61/105 and the FAO Deep Sea Guidelines are relevant considerations for the Ministry.

C.2. “Benthic Protected Areas”

1. The so-called Benthic Protection Areas cannot be considered as being the basis for avoiding, remedying or mitigating the impacts of trawling on the marine environment. Over 84 percent of the areas proposed were deeper than 1500m - out of reach of most bottom trawls. Fifty percent of the area was in the Kermadec region – an area that is too deep to trawl and includes the Kermadec Trench which is up to 10,047 m deep.
 - a. **Low Conservation Value:**
2. A report prepared by NIWA for the Department of Conservation shows that areas the fishing industry proposes to close to bottom trawling are of low conservation value⁸.

Key passages from the 2006 NIWA report are:

3. *"With respect of the BPAs [Benthic Protection Areas] proposed by the fishing industry, our results indicate that implementation of these would produce low returns in terms of demersal fish conservation. We emphasise that our analysis will have over-estimated these returns because the BPA proposal only precludes the use of bottom trawling in those areas, while allowing continued harvesting using other methods. **On the basis of our results we conclude that, despite their large geographic area, the focus of this***

⁸ Leathwick J, Julian K and Francis M (2006) Exploration of the use of reserve planning software to identify potential Marine Protected Areas in New Zealand's EEZ. Report prepared for the Department of Conservation. NIWA DOC06213, June 2006.

proposal on existing areas that have both very low fishing value and low fish diversity, makes it a poor option for the long-term protection of demersal fish diversity in New Zealand's EEZ." (page 28)

4. *"The benthic protection areas...comprise 14.3% of the area of trawlable depth within the EEZ. However, they also coincide strongly with areas of low biodiversity"* (page 28)
5. In the report trawlable depth is defined as down to 1950m which is much deeper than typical orange roughy or deepwater oreo fisheries.
6. *"The average protection for all species provided by the 14 % of the EEZ [at trawlable depth] contained within the proposed BPAs (9.26%) is less than a quarter of the protection that would be provided by an equivalent area chosen solely for its biodiversity values (39.2%). The disparity for endemic species is even more pronounced, with the BPAs providing average protection of 6.8% compared with protection of 56.7% that would be provided with unconstrained selection of sites."* (page 23)
7. *"The benthic protection areas proposed by the fishing industry indicates that these proposed reserves are predominantly located in parts of New Zealand's EEZ that have very low current value for fishing and for the protection of demersal fish diversity. As a consequence, the setting aside of these areas would provide a much lower level of protection for demersal fish than would implementation of any of the other reserve scenarios we demonstrate."* (page v)
8. *"Note: that only 27.7 percent of the BPAs fall within the depth range sampled by research trawls [down to 1950m] – the remaining 72.3 percent falls within areas in which depths are beyond those currently regarded as trawlable."* (page 7)

b. Unrepresentative of seamount diversity:

9. Previous NIWA research published in 2005⁹ has divided seamounts into 12 classes for our EEZ and surrounding waters. The industry proposals do not protect two types of seamounts identified inside the EEZ and two types found only outside the EEZ.
10. There are no representatives of two types of seamounts identified by Rowden et al (2005) (Hikurangi Plateau, east of Hawkes Bay, and Macquarie Ridge) included in the current 19 seamounts protected or the BPAs.

c. Level of endemism:

11. A large number of researchers have noted a high degree of endemism associated with seamounts. De Forges et al (2000) noted that:
"Seamounts comprise a unique deep-sea environment, characterized by substantially enhanced currents and a fauna that is dominated by suspension feeders, such as corals."
"Low species overlap between seamounts in different portions of the region indicates that the seamounts in clusters or along ridge systems function as 'island groups' or 'chains,' leading to highly localized species distributions and apparent speciation between groups or ridge systems that is exceptional for the deep sea. These results have

⁹ Rowden AA, Clark M R and Wright I C (2005) Physical characterisation and a biologically focused classification of "seamounts" in the New Zealand region. NZ J of Marine and Freshwater Research. Vol 39: 1039-1059.

substantial implications for the conservation of this fauna, which is threatened by fishing activity.”

12. This endemism is likely to mean that the classification system devised by Rowden et al (2005) will under-estimate the biodiversity on seamounts. For example, fish species diversity on some seamounts has also been reviewed by NIWA scientists (Tracey et al 2004)¹⁰. Tracey et al (2004) found there was clearly different fish fauna on seamounts north and south of 41°S and that in 10 seamount complexes there was different species richness. Even within a seamount complex they found different species dominating different seamounts.

d. Impact on bycatch

13. Bottom trawling for orange roughy has had significant impacts on target and commercial bycatch species and associated marine biodiversity. It has yet to be proven that these fisheries are sustainable (Clark 2001). This is true worldwide. The Australian Minister for the Environment proposed last month that orange roughy be listed as an endangered species under the Australian Environment Protection and Biodiversity Conservation Act 1999 (see <http://www.deh.gov.au/biodiversity/threatened/nominations/orange-roughy-listing.html>).

¹⁰ Tracey D M, Bull B, Clark M R, and Mackay K A (2004) Fish species composition on seamounts and adjacent slope in New Zealand waters. NZ J of Marine and Freshwater Research. 38:163-182.