DEPTH MATTERS

Submission to DFO reiterating concern regarding the lack of adequate depth representation in the Rockfish Conservation Area Strategy

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Our Two Requests

1. The under-representation of (modelled) deepwater inshore rockfish habitat in the RCA proposal remains an issue of serious conservation concern. A new model is probably necessary. In the interim we are requesting that the DFO-modelled rockfish habitat be represented across depth intervals. The biology of the various inshore rockfish species supports the validity of this request.

2. For the coming year, we are requesting an open technical workshop where experts can pool their expertise into refining current RCA selection methodologies.

If the rockfish working group deems depth representation to be insufficiently important to warrant consideration in the selection of RCAs, then the Pacific Marine Conservation Caucus would request that this decision, and the reasons surrounding it, be communicated to us in writing.

Background

In January 2005 the Marine Conservation Caucus submitted an analysis of the Rockfish Conservation Area (RCA) strategy which demonstrated the lack of habitat representation across various depth strata (Ardron and Wallace 2005). It was hoped that this observation would lead to: (1) an increase in depth representation based on our proposed extensions or (2) an acknowledgment that this finding is important and must be further explored. Instead, there were only a couple of RCAs that showed a small expansion into deeper waters, increasing the value of protection in this depth range from 9.0% to 9.2%. As for the acknowledgement of the importance of depth, it was clear from a follow up conversation with DFO Science Branch that depth representation was not being considered and would not be considered in RCA selection. The explanation given to the authors was that the methodology had already been decided upon. We feel that limiting the discussion to what has already been done flies in the face of scientific rigour and the spirit of adaptive management.

The present model is based on the assumption that some combination of fisheries values and habitat complexity results in *inshore rockfish* habitat. We agree that this combination is a suitable starting point for identifying habitat but by no means should be the final way of looking at this problem. The goal of the sustainability strategy is to protect inshore rockfish habitat. A review of the basic biology shows that although there is considerable similarity in habitat between the inshore rockfish species (i.e., rocky complex reefs), there is also one major difference −depth. It is well documented that each species of inshore rockfish has an affinity to specific habitat based on preferred depth range (Table 1).

Table 1: Preferred depth ranges of inshore rockfish species.

Species	Preferred Depth Range (m)	Source*
China	3-128	Love
Copper	Often <20, up to 90	Love
Quillback	41-60 juveniles, up to 274; 20-90	Yamanaka, Yamanaka and Kronlund 1996
Tiger	>18-298	Love
Yelloweye	90-180; 75-150; 30-170, 50-200	Yamanaka; O'Connell et al. 2001; Yamanaka and Kronlund 1997

*Unless otherwise noted, information is from species description in Love et al. (2002).

The importance of depth as a component of inshore rockfish habitat has been a central component of DFO's own science. DFO science has nearly 20 years of experience identifying inshore rockfish habitat beginning with submersible observations (Richards 1986). Yamanaka and Kronlund (1997) first tried to quantify inshore rockfish habitat by examining depth distributions of rockfish catch. They derived the preferred depth ranges for yelloweye as 30-170 m and 20-90 m for quillback. Yamanaka and Lacko (2002) broke down the distribution of Rockfish Protection Areas (RPAs) by depth presumably to understand habitat coverage.

Quillback and yelloweye rockfish comprise most of the commercial inshore rockfish fishery and are the species of known concern. The scientific basis for the current rockfish conservation strategy is based largely on evidence published in the CSAS Research Document 2001/139 where it is written:

> This document provides evidence of population declines in yelloweye and quillback rockfish at index sites and other areas along the B.C. coast. (Yamanaka and Lacko 2001)

These two species exhibit a preference for different depth ranges. However, the depth distribution of the current RCA proposal omits at least half of yelloweye habitat. Consider, for example, the WCVI management area: Based on the DFO habitat model provided to us, only 1.9% of the 100-200 m depth interval is represented (Table 2).

Table 2: Depth distribution of DFO-modelled rockfish habitat protected under proposed or established RCAs, by management area.

	All RCAs and DFO Proposed 2005 Revisions				
MANAGEMENT AREA	0-50m Habitat	51-100m Habitat	**101-200m Habitat**	>200m Habitat	**All Habitat**
Haida Gwaii	17.5%	17.6%	**10.2%**	9.7%	**15.3%**
North Coast	17.6%	24.7%	**10.9%**	0.0%	**18.5%**
N Central Coast	28.0%	19.6%	**13.0%**	1.5%	**20.0%**
WCVI	15.6%	14.0%	**1.9%**	0.0%	**12.8%**
BC: Outside	18.8%	18.5%	**9.2%**	1.7%	**16.3%**

Bias within the Model

As explained in the earlier submission, the model itself may have a bias towards shallower depths. The complexity component of the model is based on bathymetry data. These data have better coverage in shallower waters. An additional bias may be that areas of high yelloweye catches are underrepresented in the fishing value component of the model.

The model utilizes the catch of rockfish based on Zn logbook and observer data; and, to a lesser degree, halibut observer data. Thus, most of the yelloweye catch by the halibut fleet is not included (Table 3). As a consequence, there is a bias towards selecting shallower habitats representing aggregates 1 and 2 (Quillback, Copper, China and Tiger).

Table 3: Percentage of inshore rockfish catch by species and license type between 1995-2003. Data from DFO Catch Statistics.

Species	**Zn catch (%)**	**L catch (%)**
Yelloweye	47	95
Quillback	36	5
Copper	8	0
China	7	0
Tiger	2	0
Total Agg. 1 and 2	53	5

According to DFO science there is no immediate method of addressing the bias in catch landings due to poor observer coverage in the halibut fleet combined with inadequate halibut logbook data for rockfish species. Until these inadequacies in halibut observer and logbook data are addressed, one stopgap approach would be to represent the various depth strata using the existing DFO habitat model.

In conclusion, it is quite difficult to find a sampling design in fisheries science or marine biology that does not include depth. It is therefore disturbing that the RCA working group has failed to recognize this most basic of biological variables. The overwhelming evidence suggests that *depth matters*.

Literature Cited

Ardron, J. and S. S. Wallace. 2005. Submission to Fisheries and Oceans Canada regarding the proposed rockfish conservation areas in BC's "outside" waters. Pacific Marine Conservation Caucus. 22p.

Love, M.S., M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press. 405 pp.

O'Connell, V., D. Carlile, and C. Brylinsky. 2001. Demersal shelf rockfish assessment for 2002. NOAA-SAFE Report.

Richards, L. J. 1986. Depth and habitat distributions of three species of rockfish (Sebastes) in British Columbia: observations from the submersible PISCES IV: Environ. Biol. Fishes, 17: 13-21.

Yamanaka, K. L. and L.C. Lacko. 2001. Inshore rockfish (*Sebastes ruberrimus*, *S. Maliger*, *S. caurinus*, *S. melanops*, *S. nigrocinctus*, and *S. nebulosus*) stock assessment for the west coast of Canada and recommendations for management. Canadian Science Advisory Secretariat 2001/139.

Yamanaka, K. L. and L.C. Lacko. 2002. Inshore rockfish conservation strategy for the West Coast of Canada. Canadian Science Advisory Secretariat 2002/02.

Yamanaka, K.L. and A. R. Kronlund. 1997. Inshore rockfish stock assessments for the west coast of Canada in 1996 and recommended yield options for 1997. Canadian Technical Report of Fisheries and Aquatic Sciences. 2175: 1-80.