Ministry of Fisheries
Te Tautiaki i nga tini a Tangaroa

New Zealand National Report on Fishing and Research Activities in the SPRFMO Area during 2009

1. Description of Fisheries

1.1 Pelagic Fisheries

New Zealand conducted no pelagic fishing in the SPRFMO Area during 2009.

1.2 Bottom Fisheries

The New Zealand high seas bottom trawl and line fisheries are described in detail in the impact assessment '*New Zealand Bottom Fishing Activities by New Zealand Vessels Fishing in the High Seas in the SPRFMO Area during 2008 and 2009'* (New Zealand Ministry of Fisheries 2008b) available at http://www.southpacificrfmo.org/benthic-impact-assessments/. Bottom fishing activities conducted during 2009 continued as described in that document, and were conducted in accordance with the impact assessment and management measures described in the assessment.

New Zealand vessels have been bottom fishing in the SPRFMO Area since before 1990. Specific high seas fishing permits for the SPRFMO Area were only implemented in 2007-08 following adoption of the SPRFMO interim measures in May 2007. The total number of New Zealand vessels permitted to fish in the SPRFMO Area and with the capability for bottom fishing and the numbers of vessels which actually bottom fished in the Area since 2002 are shown in Table 1[1]. The vessel size distribution (length overall) of the permitted vessels from 2007-08 to 2009-10 are shown in Table 2. The main areas fished by New Zealand vessels are shown in Figure 1.

Table 1. Summary of the number of New Zealand vessels permitted to bottom fish in the SPRFMO Area and with the capability for bottom fishing, and the number of vessels which actually fished in the Area per year with either bottom trawl or line, since 2002.

Year	No. Vessels Permitted to Fish SPRFMO Area	No. Vessels Actively Bottom Fished in the SPRFMO Area	Bottom Trawling	Bottom Lining
2002	41*	23	23	
2003	55*	22	19	3
2004	66*	24	17	7
2005	60*	28	17	11
2006	58*	22	12	10
2007	38	12	8	4
2008	25	7	4	3
2009	21	10	6	5

(* There were no specific high seas permits for the SPRFMO Area prior to 2007 These were the numbers of New Zealand vessels issued with general high-seas permits, and that indicated that they had the capability to bottom trawl.)

The declining trend in bottom trawl fishing effort (vessels and tows) from 2002 to 2008 levelled off, with an increase to 6 bottom trawl vessels actively fishing in the SPRFMO Area in 2009. There continues to be an increased focus of bottom trawling in the West Norfolk Ridge and southern Lord Howe Rise fishing areas, with relatively little effort in historical target areas such as the Northwest Challenger Plateau and Louisville Ridge.

[1] Vessel information is reported in Tables 1 and 2 for the New Zealand high seas fishing permit year of May – April. All other information on catch and effort is reported by calendar year, January – December.

Table 2. Distribution of vessel size (length overall, m) for New Zealand vessels permitted to bottom fish in the SPRFMO Area for the permit years 2007-08 and 2008-09.

Length Overall (m)	Fishing Permit Year (May - April)		
	2007 - 08	2008 – 09	2009 - 10
<= 11.9			
12 - 17.9	1	1	1
18 - 23.9	6	4	2
24 - 29.9	8	3	1
30 - 35.9	3	3	3
36 - 44.9	8	8	5
45 - 59.9	2		
60 - 74.9	8	4	7
>= 75	2	2	2
Total	**38**	**25**	**21**

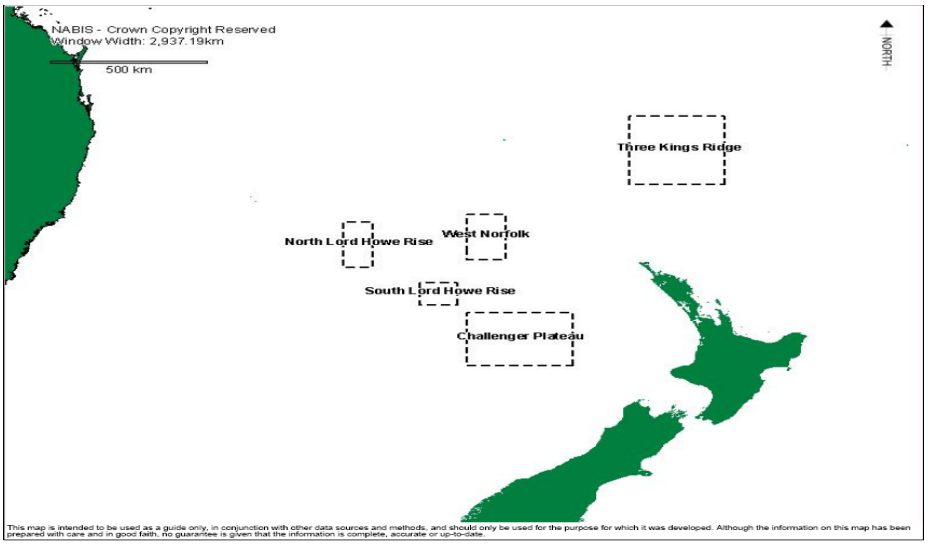

Figure 1. The main areas bottom fished by New Zealand vessels in the SPRFMO Area in 2009 (from the National Aquatic Biodiversity Information System - http://www.nabis.govt.nz).

2. Catch, Effort and CPUE Summaries

2.1 Bottom Trawl Fishery

The annual fishing effort (number of vessels and number of bottom trawl tows which recorded a catch) and landed catch of the main bottom trawl target and bycatch species is summarised in Table 3. The number of bottom trawl vessels fishing declined from 23 in 2002 to 4 vessels in 2008, increasing to 6 vessels in 2009. Similarly, the number of trawl tows declined from 2,944 to 208 in 2008, and increased to 545 in 2009.

Table 3. Annual fishing effort (number of vessels and tows) and catch (t) of the main target and bycatch species by New Zealand vessels bottom trawling in the SPRFMO Area from 2002 - 2009 (see Appendix 1 for list of species codes and names).

Year	No. Vessels	No. Tows	ORY	BOE	EPI	ALF	SSO	RIB	RTX	SCK	All Species
2002	23	2,944	2,578	121	159	17	50	43	61	37	3,180
2003	19	2,928	1,973	62	226	94	25	92	84	56	2,937
2004	17	1,952	1,697	90	42	85	91	46	34	8	2,188
2005	17	2,186	1,597	268	189	26	75	63	67	5	2,395
2006	12	1,135	1,415	57	21	28	6	33	27	15	1,652
2007	8	415	866	151		2	22	9	5	1	1,076
2008	4	208	837			2	<0.5	3	<0.5	1	846
2009	6	545	928		16	5	<0.3	7	<0.3	2	958

(Note: Number of tows reported here is the number of tows which recorded a fish catch, and excludes tows which made no catch.)

Orange roughy (*Hoplostethus atlanticus*) continues to be the main bottom trawl target species, contributing an increasing proportion of total bottom trawl catch in recent years, from 67% in 2005 to 99% in 2008 and 97% in 2009. Other species making minor contributions to catches include oreos, cardinalfish and alfonsino.

The decline in orange roughy catch since 2002 has been associated with declines in fishing effort and catch in the main historical target areas of the NW Challenger Plateau and Louisville Ridge, and a shift in effort to the Lord Howe Rise and West Norfolk Ridge. In 2008 there was very little fishing in the Challenger area, and half the bottom trawl effort was expended in the West Norfolk Ridge area. In 2009 there was a return to fishing the Northwest Challenger Plateau, where 24% of the total number of tows were conducted. The remaining bottom trawl effort was equally distributed between the southern Lord Howe Rise and the West Norfolk Ridge.

Trends in orange roughy catch from 2002 - 2009 in the four main fishing areas are summarised in Table 4 and shown in Figure 2.

Table 4. Distribution of total annual catch (t) of orange roughy between the main areas fished by New Zealand bottom trawl vessels fishing in the SPRFMO Area from 2002 - 2009.

Year	Challenger	West Norfolk	Lord Howe	Louisville	Other	All Areas
2002	1,460	432	96	568	22	2,578
2003	868	25	218	859	3	1,973
2004	347	106	132	1,106	5	1,697
2005	425	327	190	623	33	1,597
2006	202	670	29	493	22	1,415
2007	36	515	34	280		866
2008	31	426	380			837
2009	261	233	403		31	928

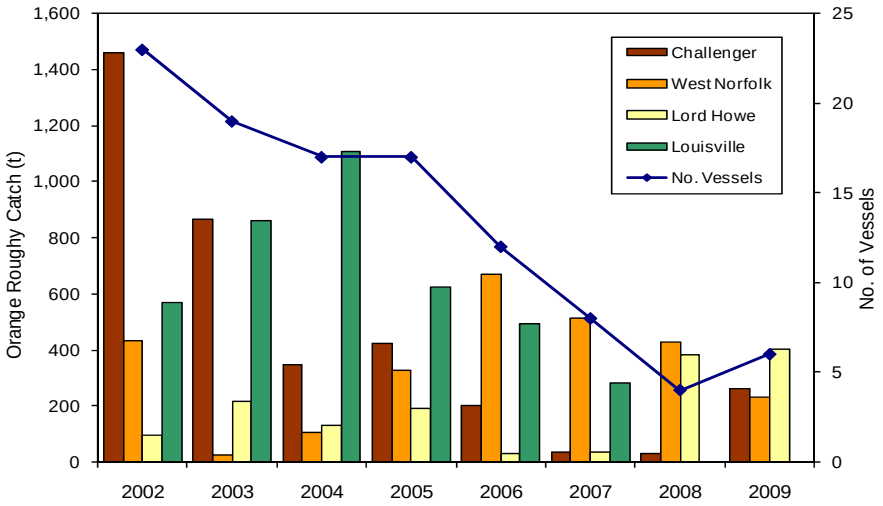

Figure 2. Trends in annual number of bottom trawl vessels and total landed orange roughy catch in the four main areas fished by New Zealand bottom trawl vessels in the SPRFMO Area from 2002 - 2009.

2.2 Bottom Line Fishery

The annual fishing effort (number of vessels and hooks fished) and landed catch of the main bottom line target and bycatch species is summarised in Table 5. Ninety-six percent of the effort in 2007 was bottom longline, with some dahn line effort. All bottom line effort in 2008 and 2009 was bottom longline. The number of active line vessels increased from 3 in 2002 to 11 in 2005, declined to 3 vessels in 2008, and increased to 5 vessels in 2009.

There has been a similar decline in hooks fished, with the number of hooks in 2009 being 47% of the peak of effort in 2006. Bluenose (*Hyperoglyphe antarctica*) continues to be the main bottom line target species, contributing 67% of the total catch since 2003. There was an increased contribution by wreckfish (*Polyprion oxygeneios, P. americanus*) in 2008 to make up 35% of the catch, but the contribution by these species declined again to 26% of the catch in 2009. Other species making minor contributions to bottom line catches include spiny dogfish and king tarakihi.

Table 5. Annual fishing effort (number of vessels and hooks fished) and catch (t) of the main target and bycatch species by New Zealand vessels bottom lining in the SPRFMO Area from 2002 - 2009 (see Appendix 1 for a list of species codes and names.).

Year	No. Vessels	No. Hooks	BWA	HAU	DGS	MOW	RXX	YTC	ROK	TOP	All Species
2002											
2003	3	53,438	6	7	1	1				1	17
2004	7	268,809	116	24		6	2	1		3	154
2005	11	384,031	102	31	13	10	2	3	1		163
2006	10	501,810	271	95	6	6	2	2	2		385
2007	4	423,420	144	31	4	5	3	3	1		202
2008	3	302,310	67	43	1	2	1	1	8		123
2009	5	236,146	58	23	7	1	<1		<1		89

The increase and subsequent decrease in fishing effort and bluenose catch since 2002 is summarised in Table 6 and shown in Figure 3. Apart from the high catch of bluenose reported from the NW Challenger Plateau in 2004, trends in effort and bluenose catch have been similar between areas, with a slightly higher proportional contribution from the West Norfolk Ridge area over the past two years.

Table 6. Distribution of total annual catch of bluenose between the main areas fished by New Zealand bottom line vessels fishing in the SPRFMO Area from 2002 – 2009.

Year	Challenger	West Norfolk	Three Kings	Louisville	Other	All Areas
2002						
2003		5	1			6
2004	103	12			1	116
2005	38	27	24		14	102
2006	91	114	48		19	271
2007	59	47	39			144
2008	24	33	8	2		67
2009	13	29	16			58

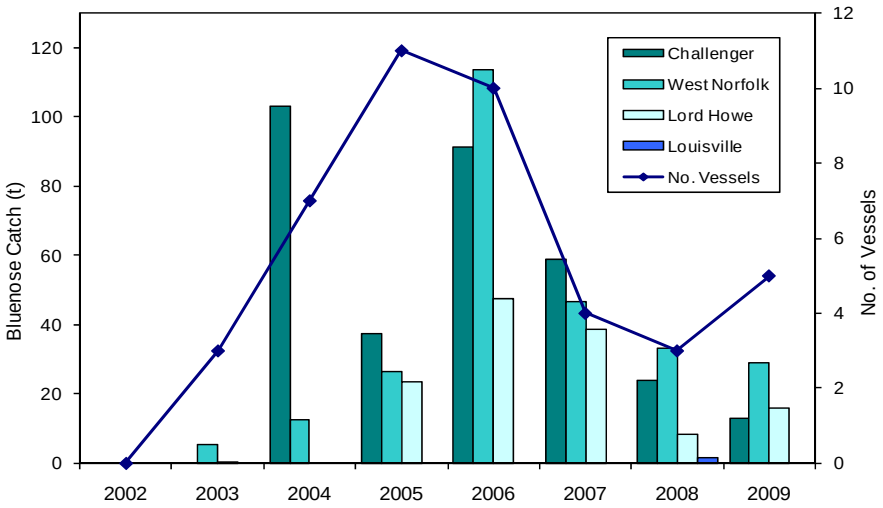

Figure 3. Trends in number of bottom line vessels and total landed bluenose catch in the four main areas fished by New Zealand bottom line vessels in the SPRFMO Area from 2002 - 2009.

3. Fisheries Data Collection and Research Activities

3.1 Fisheries Catch & Effort Data Collection Systems

The data collection systems implemented on New Zealand high seas bottom trawl and line fishing vessels is described in detail in Ministry of Fisheries (2008b). Detailed tow-by-tow catch and effort data for all high seas fishing operations was collected for all fishing activities during 2007, 2008 and 2009 using the at-sea catch and effort logbooks and landings recording forms described therein.

In addition to the vulnerable marine ecosystem (VME) evidence forms used by observers in the move-on areas, detailed observer Benthic Materials forms have been completed on all observed bottom trawls to record all benthic bycatches to lowest possible taxonomic level.

3.2 Estimation of Orange Roughy Sustainable Catch Limits

During 2009 the Ministry of Fisheries commissioned a research project on '*Development of Estimates of Annual Sustainable Catches, and of Sustainable Feature Limits, for Orange Roughy Bottom Trawl Catches in Specific Fishing Sub-Areas in the Proposed Convention Area of the South Pacific RFMO*'. A final research report for this project has been provided as an information paper to the 9th SPRFMO SWG meeting (Clark *et al*. 2010, SWG-09-INF-01. A summary of the results of this work has been provided as a paper to the Deepwater Sub-Group (Penney *et al*. 2010a, SWG-09-DW-02).

Figure 4 shows a summary of the trends in orange roughy catch (t), CPUE (t/tow, with standard errors) and estimated Maximum Constant Yield (MCY), Maximum Annual Yield (MAY) , ½MB_0 and 2002-2006 average catch reference levels from Clark *et al*. (2010) for the Lord Howe Rise, West Norfolk Ridge, Northwest Challenger Plateau, Northern, Central and Southern Louisville Ridge fishing areas (from Penney 2010a).

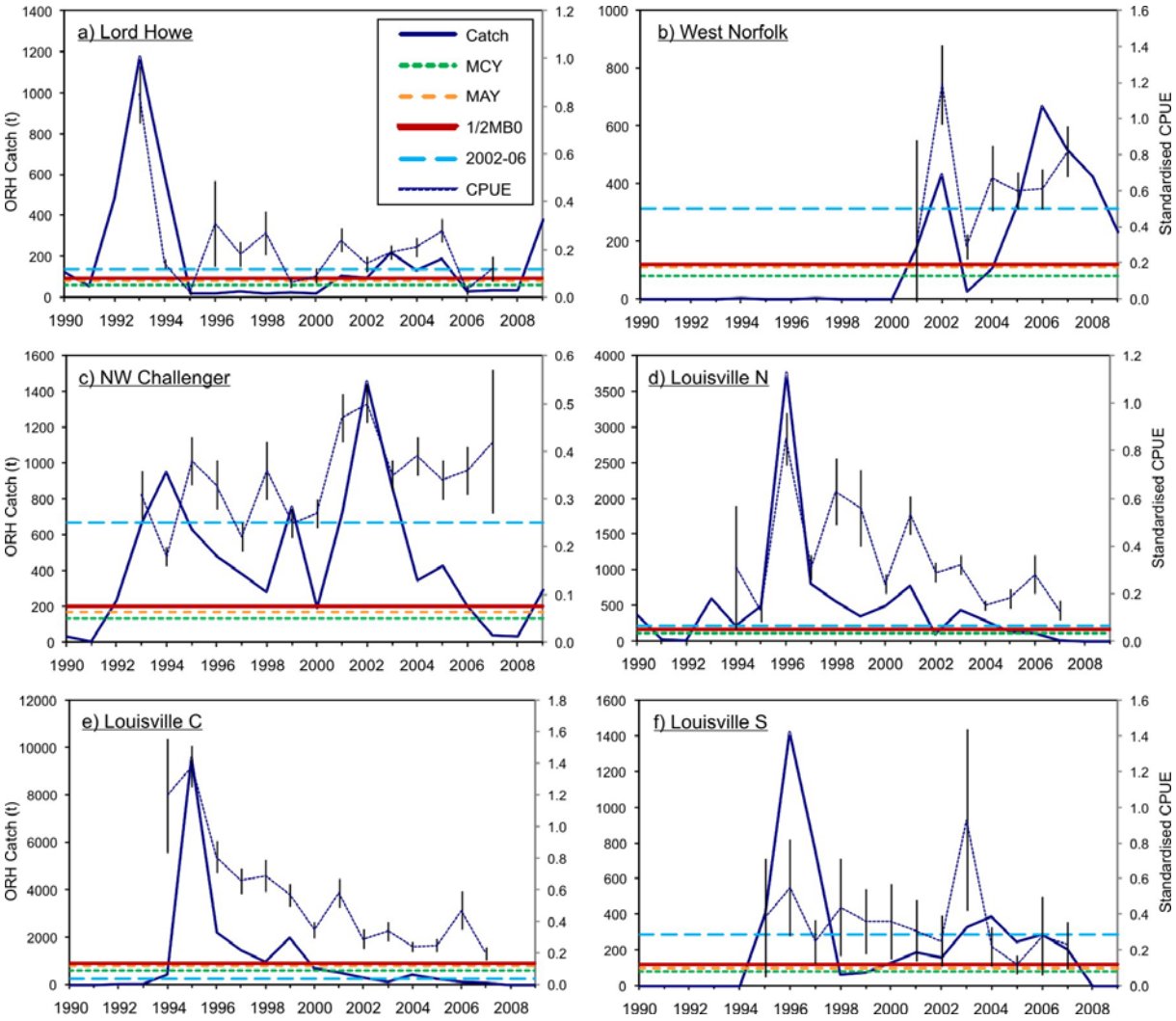

Figure 4. Summary of trends in total orange roughy catch (t), CPUE (t/tow, with standard errors) and estimated MCY, MAY, ½MB0 and 2002-2006 average catch reference levels for each fishing area (from Penney 2010a).

The Ministry of Fisheries is currently conducting consultations with stakeholders regarding establishment of orange roughy catch limits for New Zealand vessels operating in the SPRFMO Area.

3.3 Challenger Plateau Orange Roughy Trawl and Acoustic Surveys

Due to stock sustainability concerns, the fishery on straddling orange roughy stock in the extreme southern part of the Challenger Plateau area was closed in 2000. Since 2005 a programme of trawl and acoustic surveys has been conducted to re-assess the status of this stock.

The most recent trawl and acoustic surveys were conducted in 2009 and 2010, from which the biomass in 2009 has been conservatively estimated to have increased to 22,700 t, which is approximately 25% of B_0. This is above the soft limit reference point of 20% B_0 established in the New Zealand Harvest Strategy Standard for re-opening of the fishery (Ministry of Fisheries 2008a). The fishery was re-opened on 1 October 2010 with a total allowable catch (TAC) limit of 525 tonnes (see Section 6). Copies of the final research reports for these surveys will be provided to the SPRFMO SWG as they become available.

3.4 Geospatial Prediction and Mapping of VMEs

New Zealand continues to develop geospatial data files on seabed bathymetry, fishing footprints and VME distribution for provision to the SPRFMO Secretariat and inclusion in the SPRFMO Geospatial Database.

Following publication of the first global habitat suitability models for scleractinian corals (Tittensor *et al*. 2009, 2010), the Ministry of Fisheries has also initiated work to evaluate the potential for using such predictive habitat models to evaluate the likelihood of encountering VMEs in the SPRFMO Area. A methods paper describing potential approaches to using geospatial data and habitat prediction models to evaluate likelihood of occurrence of VMEs in the SPRFMO Area has been submitted to the SWG Deepwater Sub-Group (Penney 2010b, SWG-09-DW-03)

4. Biological Sampling and Length / Age Composition of Catches

A summary of the length-frequency sampling conducted in 2009 is provided in Table 7. Ninety-eight percent of the fish measured were orange roughy, which was the target species in all tows. The number of other species measured increased over 2008, with 199 alfonsino, cardinal fish and ribaldo being measured in 2009. Plots of the length-frequency distributions of these species are provided in Figure 5.

Table 7. Summary of length-frequency sampling conducted by observers aboard New Zealand bottom trawlers in the SPRFMO Area during 2009.

Scientific Name	Common Name	Measure Used	Length (cm)			Number Measured
			Min	Mean	Max	
Hoplostethus atlanticus	orange roughy	standard	17	35.5	55	8,346
Beryx splendens	alfonsino	fork	24	34.8	50	113
Mora moro	ribaldo	total	47	56.2	69	31
Epigonus telescopus	cardinal fish	fork	47	58.0	65	55
				Total		8,545

Gonad maturity was determined for orange roughy measured during length-frequency sampling.

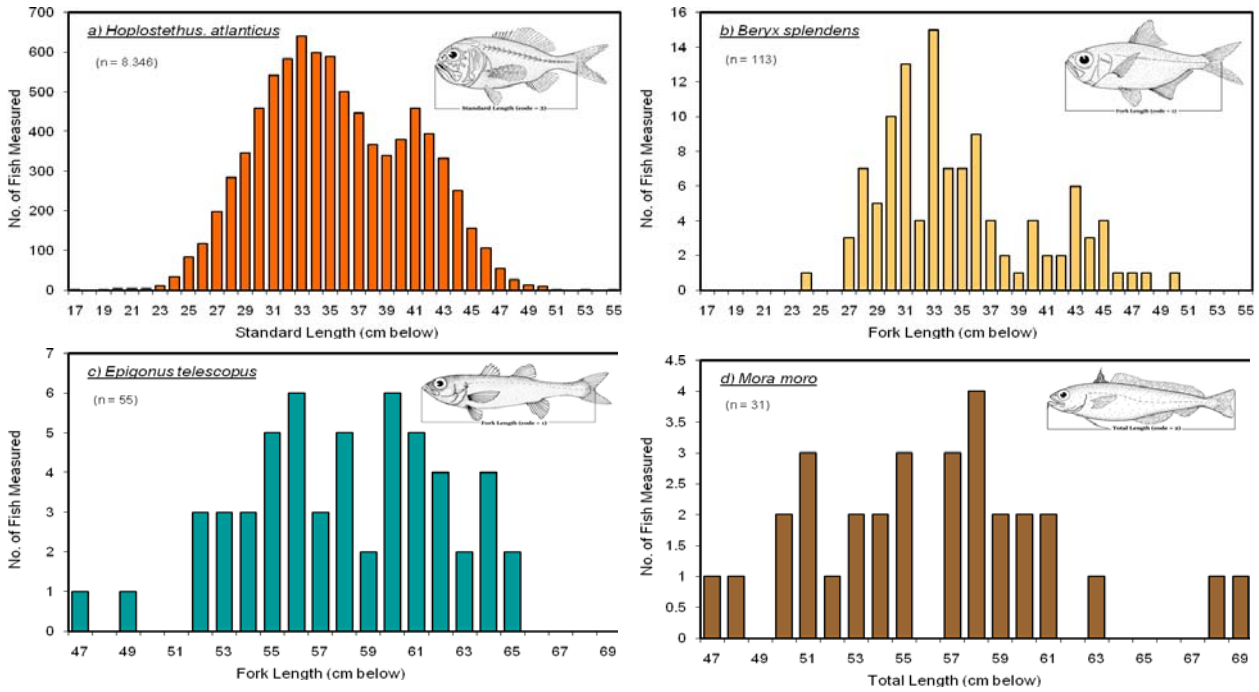

Figure 5. Length frequency distributions of a) orange roughy (*Hoplostethus atlanticus*) standard length; b) alfonsino (*Beryx splendens*) fork length; c) cardinal fish (*Epigonus telescopus*) fork length and d) ribaldo (*Mora moro*) total length measured by scientific observers aboard New Zealand bottom trawl vessels fishing in the SPRFMO Area during the 2009 calendar year.

5. Summary of Observer Programmes

Detailed summary tables describing New Zealand observer programme activities in the SPRFMO Area during 2009 are included in the New Zealand SPRFMO Annual Observer Implementation Report for 2009.

New Zealand vessels conducted 10 bottom trawling trips on 6 separate vessels (one vessel did not catch any fish) in the SPRFMO Area during 2009. These vessels conducted 648 tows in total (including tows with no catch) during 190 observed vessel fishing days at sea in the SPRFMO Area. Thirty-nine percent of this effort was fished on the West Norfolk Ridge area, 35% on the Lord Howe Rise and 24% on the NW Challenger Plateau. Scientific observers were deployed on all vessels and all trips, observing 98% of the tows and measuring fish on 20% of the tows (Table 8). The total weight of fish sampled was about 12.6 t, or 1% of the estimated 1,032 t retained catch. A total of 8,545 fish were measured, 98% of which were the target species, orange roughy.

Five bottom longline vessels conducted 217 sets in the SPRFMO Area during 70 fishing days in 2009. An observer was deployed on one of these trips, during which the vessel fished for 7 days in the Area. The observer coverage for 2009 was therefore 20% by vessel, 10% by fishing days and 3% by set. No fish were sampled on this trip.

Table 8. Summary of bottom trawl fishing effort, observer coverage and sampling coverage in the SPRFMO Area during 2009.

Method	No. of Vessels	Vessel Days	Total Tows / Sets	Tows / Sets Observed	Tows / Sets Measured	Retained Catch (t)	Measured Catch (t)	No. Fish Measured
Trawl	6	190	648	637	131	1,032	13	8,545
Line	5	70	217	6	0	0.5	0	0

(Note: Catch weights shown here are onboard estimates, and not final landed weight data. Tows reported are all tows conducted, including those which made no catch, and so exceeds the 545 tows which made a catch, as reported in the effort summary table.)

6. Implementation of Management Measures

6.1 Description of Management Measures

A detailed description of New Zealand's implementation of the SPRFMO interim conservation and management measures adopted in 2007 can be found in New Zealand Ministry of Fisheries (2008b) and Penney *et al*. (2009). The management approach is summarised below:

High seas bottom trawling measures were established in the SPRFMO Area in the form of high seas fishing permit conditions, imposed from 1 May 2008. The key elements of these permit conditions include:

- Schedules designating open, move-on and closed bottom trawling areas within the historical (2002 – 2006) New Zealand high seas bottom trawl fishing footprint, and prohibiting bottom trawling within closed areas and everywhere else on the high seas.
- The move on rule VME Evidence Process for bottom trawling within move-on areas, with the requirement to report to the Ministry of Fisheries and move on 5nm where the VME Evidence threshold is reached.
- A requirement to carry at least one observer on all bottom trawling trips. Observers are provided by the Ministry of Fisheries and cost recovered from industry.

The effect of these measures has been to close bottom trawling in 41% of the total 217,463 km^2 New Zealand bottom trawl footprint surface area, with 30% made subject to a move-on rule, and 29% left open to bottom trawling. The open area represents 0.13% of the entire SPRFMO Area.

The interim measures adopted in 2009 were implemented through high seas fishing permit conditions that came into effect in February 2010. Fishing for Trachurus species and the use of gillnets is prohibited, and notice to the Ministry of Fisheries is required in advance of transiting the SPRFMO Convention Area with gillnets.

6.2 Implementation of the VME Evidence Process and Move-On Rule

The VME Evidence Process and Move-On Rule implemented within move-on blocks in the bottom trawl fishing footprint are described in Ministry of Fisheries (2008b) and Parker *et al*. (2009). Scientific observers deployed on New Zealand bottom trawling trips in the SPRFMO Area are required to complete VME Evidence Process forms for each tow conducted within a move-on area.

New Zealand trawl vessels conducted 14 tows within move-on blocks during 2009, nine of which reported no benthic taxa, four of which reported benthic taxa but did not exceed the

VME move-on score, and one of which triggered a vessel move-on. During January to September 2010, New Zealand trawl vessels conducted 44 tows within move-on blocks, 22 of which reported no benthic taxa, 20 of which reported benthic taxa but did not exceed the move-on score and 2 of which triggered a vessel move-on.

6.3 Re-Opening of the Challenger Plateau Straddling Orange Roughy Fishery

The fishery on the straddling orange roughy stock on the Challenger Plateau, which was closed from 2000 – 2009, was re-opened on 1 Oct 2010 following assessments that indicated that the biomass has increased above the reference level (20% B_0) for re-opening of the fishery (Ministry of Fisheries 2008a) (see Section 3). Applying a harvest strategy consistent with that implemented for orange roughy fisheries within the New Zealand EEZ would have indicated a TAC of 1,022 t for this stock. However, a cautious approach was taken to ensure continued re-building towards B_{MSY} levels, and it was reopened with a total allowable catch (TAC) of 525 t. The TAC is comprised of a 500 t total allowable commercial catch (TACC) and an allowance of 25 tonnes for other sources of fishing-related mortality. This TAC may only be taken inside the EEZ as the high seas area where the stock straddles is outside of the New Zealand bottom trawl footprint and therefore closed.

7. References

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Appendix 1. List of Species Codes, Scientific Names and Common Names Used

Scientific Name	Common Name	FAO Code	NZ Code
Hyperoglyphe antarctica	Bluenose	BWA	BNS
Allocyttus niger	Black oreo	BOE	BOE
Dalatias licha	Seal shark	SCK	BSH
Beryx splendens, B. decadactylus	Alfonsino & Long-finned beryx	ALF	BYX
Epigonus telescopus	Deepsea cardinalfish	EPI	CDL
Polyprion oxygeneios, P. americanus	Wreckfish (Hapuku & Bass)	HAU	HPB
Seriola lalandi	Kingfish	YTC	KIN
Nemadactylus sp.	King tarakihi	MOW	KTA
Hoplostethus atlanticus	Orange roughy	ORY	ORH
Dissostichus eleginoides	Patagonian toothfish	TOP	PTO
Macrouridae (Family)	Rattails	RTX	RAT
Mora moro	Ribaldo	RIB	RIB
Rexea spp.	Gemfish, southern kingfish	RXX	SKI
Squalus spp.	Spiny dogfish, northern spiny dogfish	DGS	SPD
Helicolenus spp.	Sea perch	ROK	SPE
Pseudocyttus maculatus	Smooth oreo	SSO	SSO