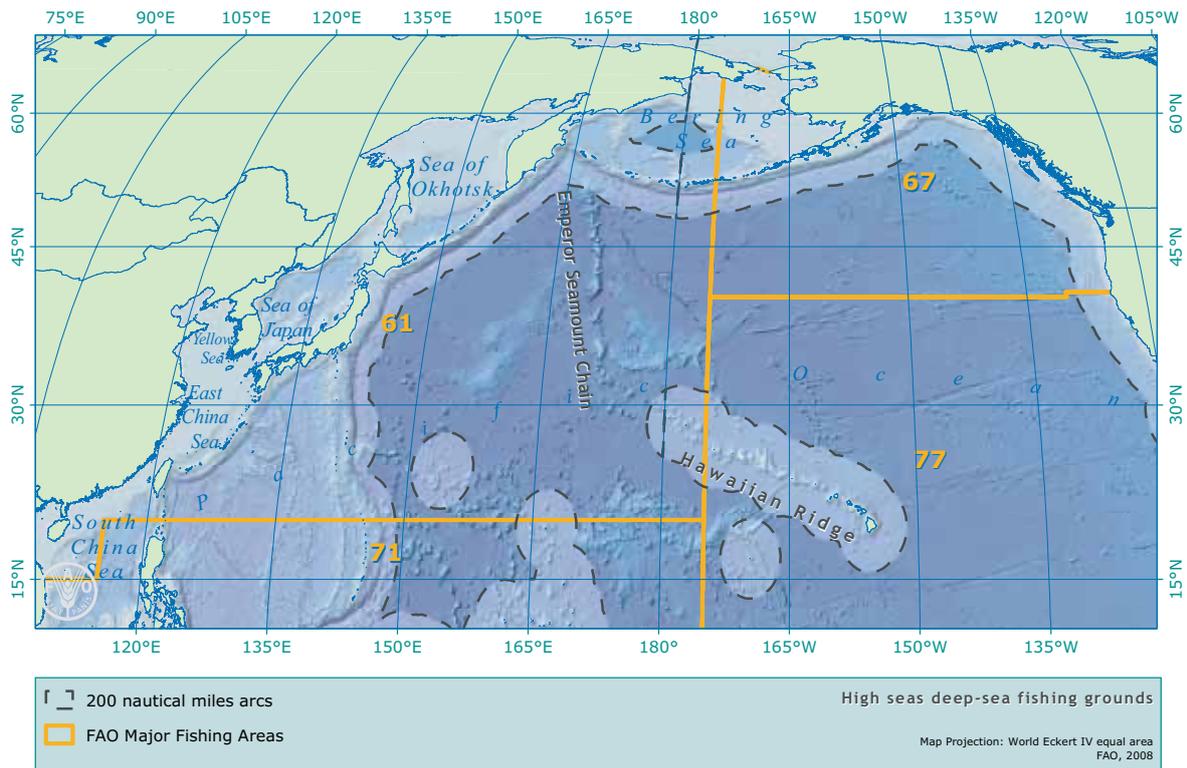


THE PACIFIC OCEAN



MAP 1
High seas deep-sea fishing grounds in the North Pacific Ocean

North Pacific Ocean

FAO Statistical Areas 61 and 67 (and portions of Areas 71 and 77 south of the equator)

GEOGRAPHIC DESCRIPTION OF THE REGION

The Pacific Ocean is the oldest of the world's ocean basins with a total area of 155.6 million square kilometres (km²) – an area larger than the entire land surface of the Earth. The North Pacific Ocean is bounded by Asia to the west, North America to the east and the Aleutian Island chain and Bering Sea to the north (Map 1). The ocean bottom is dominated by a series of fracture zones running roughly east to west in the eastern North Pacific and a series of ridge systems and deep-ocean trenches in the north, central and western portions of the North Pacific.

On the high seas, a prominent submarine ridge, the Emperor Seamount chain, extends over 2 000 kilometres (km) from the Aleutian Island chain south to the Hawaiian Ridge in the Central Pacific (see Map 2). Some of the seamounts, particularly those south of Ojin, are known as areas of aggregation for slender armourhead (pelagic armourhead) (*Pseudopentaceros wheeleri*), alfonsino (*Beryx* spp.) and other species of commercial value. These seamounts have supported trawl, gillnet, longline and pot fisheries.

MANAGEMENT REGIME APPLICABLE TO DEEP-SEA BOTTOM FISHERIES IN THE HIGH SEAS

Regional Fisheries Management Organization/Arrangement

No regional fisheries management organization (RFMO) currently exists to regulate bottom fisheries in the high seas of the North Pacific. However, since August 2006, a multilateral process has been under way to negotiate an agreement for the regulation of high seas bottom fisheries in the North Western Pacific. The area to be covered under the agreement initially corresponded to FAO Statistical Area 61, although more recently there has been a tentative agreement amongst the countries involved to consider extending the area of coverage to the remainder of the North Pacific Ocean, as well as extending the target species to include pelagic species not covered by existing treaties.

Four countries to date have been involved in the negotiations – Japan, the Russian Federation, the Republic of Korea and the United States of America. As part of the negotiating process, the four parties have established a Scientific Working Group and an interim secretariat hosted by the Government of Japan, and have also adopted interim measures for the management of high seas bottom fisheries.

DESCRIPTION OF DEEP-SEA BOTTOM FISHERIES IN THE HIGH SEAS

History of fisheries

Deep-sea fisheries in the high seas in the North West Pacific began in the 1960s. Most of the deep-sea fishing in the high seas targeted seamount peaks along the Emperor and Hawaiian Seamount chains, with the latter feature having been mostly incorporated into the United States of America's exclusive economic zone (EEZ) in 1977. The trawl fisheries over the Emperor Seamount were initiated by vessels from the former Union of Soviet Socialist Republics (USSR) in 1967. In 1969, Japanese trawlers began exploratory fishing operations near the Milwaukee Seamounts (Yuryaku and Kammu). The main target species were slender armourhead and alfonsino. Japanese research vessels conducted extensive surveys in 1972 on the distribution and biology of slender armourhead and alfonsino, which contributed to the development of the trawl fishery on several seamounts, including the Kimmei, Milwaukee, Colahan and Hancock

Seamounts and other seamount groups in the Emperor chain. Other seamounts in the region that are considered too steep to trawl were exploited by bottom gillnet fisheries (Uchida and Tagami, 1984; Yanagimoto and Nishimura, 2007a).

Based on information reported to FAO (FAO, 2008), the total annual landings were, with some exceptions, relatively large during the initial years of the fishery, ranging between some 10 000 to 18 000 tonnes of slender armourhead per year. By the mid-1970s, catches fell dramatically; in the late 1970s, the catch amounted to around 1 000 tonnes per year and, by the mid-1980s, the reported catch was negligible.

However, according to information provided at the second round of negotiations for a North Western Pacific RFMO in January 2007, three to 13 Japanese bottom trawlers have operated in the area over the past 20 years. With the decline of slender armourhead came an increase in catches of alfonsino, with total landings reaching 13 000 tonnes in 1980. From the mid-1980s, the catch in the deep-sea fisheries was primarily composed of alfonsino and oreo, with a few exceptions. However, catches of slender armourhead increased abruptly around 1992 and in 2004. The seamount trawl fishery has been characterized by pulse recruitments of armourhead with a periodic shift in the catch from slender armourhead to alfonsino and vice versa (Yanagimoto and Nishimura, 2007a, 2007b, 2007c).

In assessing the potential impact of fisheries on the seamounts of the North Pacific it is also important to note that a fishery for precious corals nei (red coral) (*Corallium* spp.) existed in the 1960s–1980s on the Emperor Seamount chain using mainly tangle-net dredges (Grigg, 1993; Clark *et al.*, 2007).

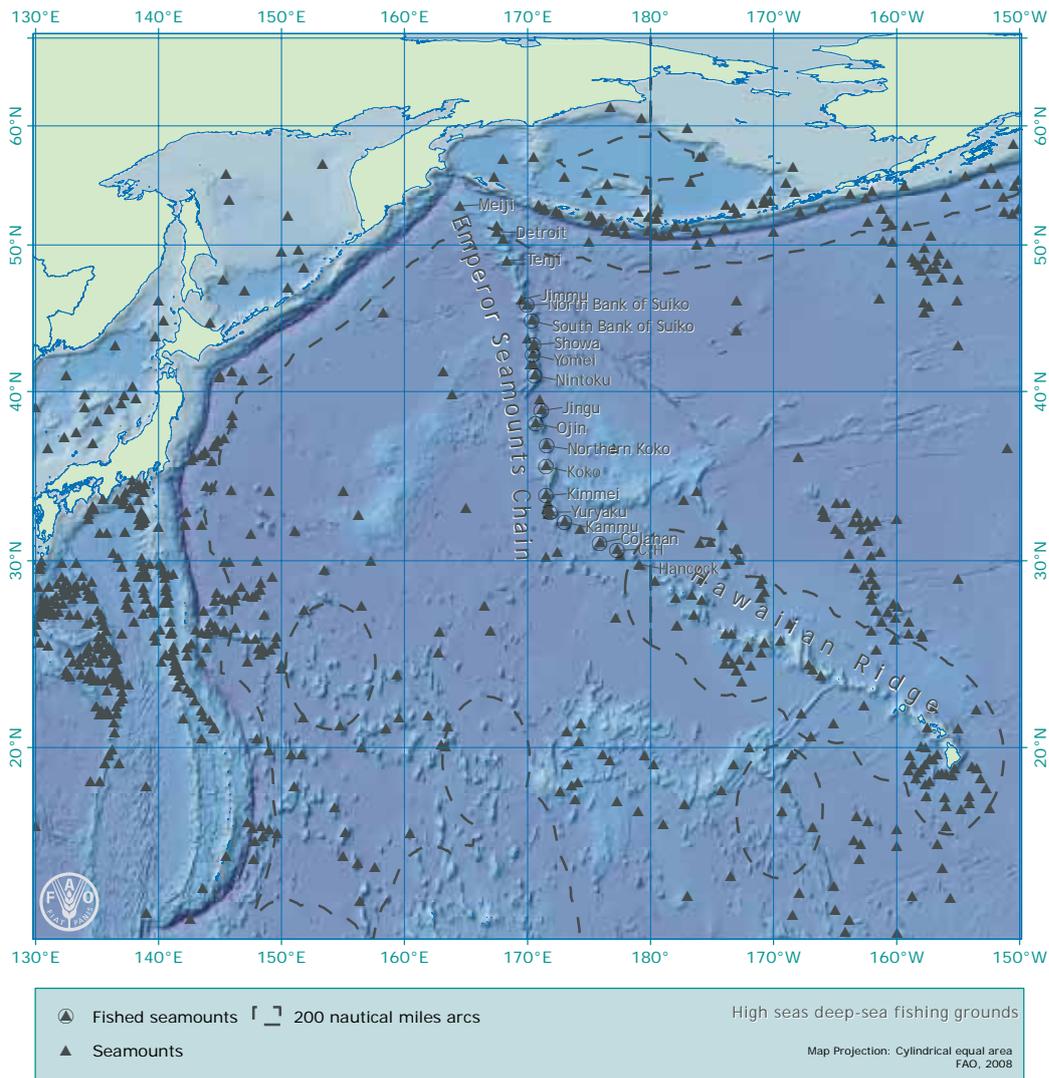
TABLE 1
Main targeted species in the North Pacific

Common name	Scientific name
Main target species – trawl fishery	
Alfonsino	<i>Beryx</i> spp.
Slender armourhead (pelagic armourhead)	<i>Pseudopentaceros wheeleri</i>
Main target species – gillnet fisheries	
Warty oreo	<i>Allocyttus verrucosus</i>
Alfonsino	<i>Beryx</i> spp.
Slender armourhead (pelagic armourhead)	<i>Pseudopentaceros wheeleri</i>
Main target species – trap/pot fisheries	
Deep-sea (red) crabs (<i>Geryon</i> nei)	<i>Geryon</i> spp.
Deep-sea crabs	<i>Paralomis</i> spp. <i>Chionoecetes tanneri</i>
Main target species – longline fisheries	
Deep-sea sharks	
Channeled rockfish (scorpionfish)	<i>Setarches guentheri</i>
Rockfishes nei	<i>Helicolenus avius</i> <i>Hozukius guyotensis</i>
Skilfish	<i>Erilepis zonifer</i>
Other species	
Pacific barrelfish (butterfish/medusafish)	<i>Hyperoglyphe japonica</i>
Pencil cardinal (cardinal fish)	<i>Epigonus denticulatus</i>
Slender frostfish (cutlassfish)	<i>Benthodesmus tenuis</i>
Mirror dory (mirror perch)	<i>Zenopsis nebulosus</i>
Goosefish	<i>Lophiodes micanthus</i>
Morid cods	<i>Physiculus</i> spp.
Pacific grenadier	<i>Coryphaenoides acrolepis</i>
Sablefish	<i>Anoplopoma fimbria</i>
Shortspine spurdog	<i>Squalus mitsukurii</i>

Current fisheries

High seas bottom fishing has occurred in the North West Pacific over the past few years, primarily on seamounts and guyots in the Emperor Seamount chain, including the Nintoku, Jingu, Ojin, Koko, Kimmei, Yuryaku, Kammu, Colahan and C-H Seamounts (see Map 2). The main species targeted in the high seas deep-sea trawl fishery in the North West Pacific are slender armourhead and alfonsino. The gillnet fishery targets slender armourhead, alfonsino and oreo. A trap fishery for deep-sea crabs took place in 2006, a limited longline fishery has targeted deep-sea sharks and rockfishes (Jo *et al.*, 2007) and a current longline fishery targets skilfish (*Erilepis zonifer*) (A. Baitalyuk, personal communication, 2008). Table 1 and Figure 1 show the main species targeted in the different fisheries.

There are no confirmed reports of high seas bottom fisheries in the North East Pacific, nor in the Central North Pacific. Anecdotal information indicates that a deep-sea longline fishery for morwongs (*Nemadactylus* spp.) has developed on seamounts within the



MAP 2
The Emperor Seamount chain and Hawaiian Ridge

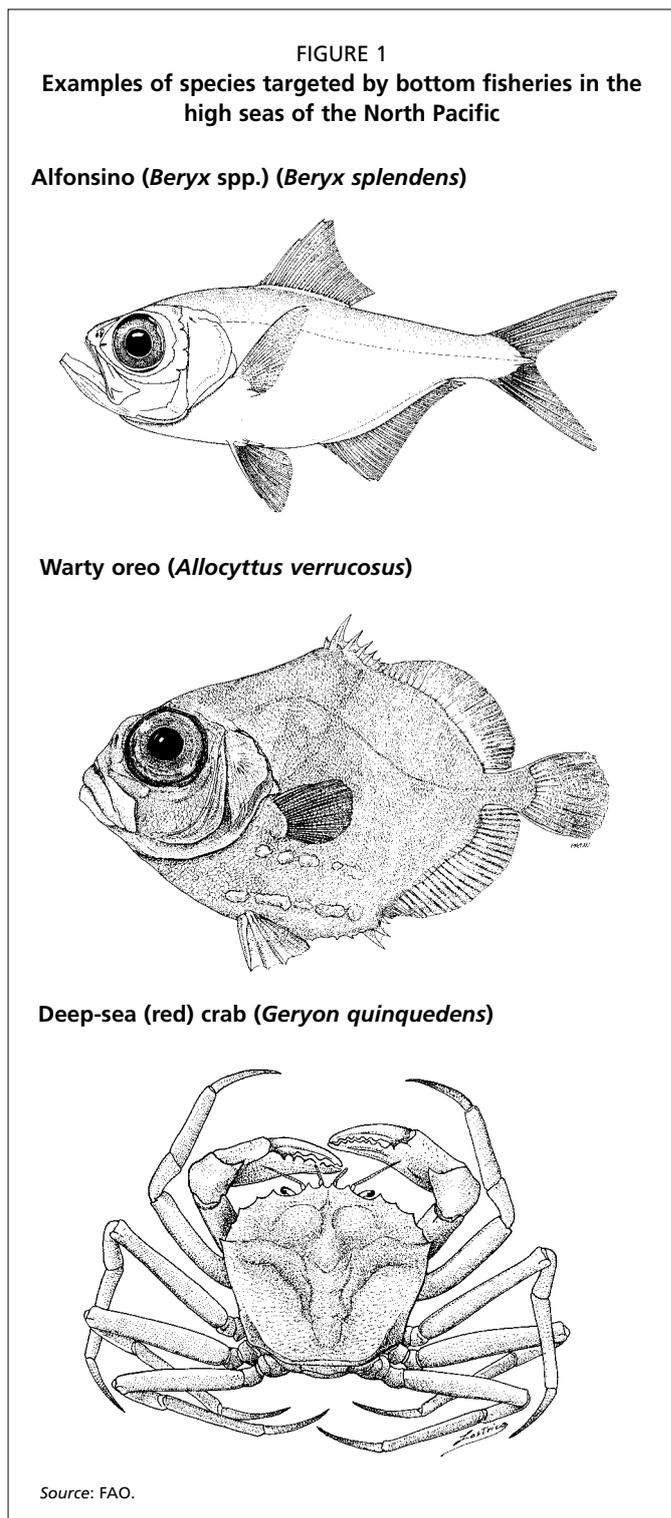
EEZs of one or more Pacific Islands in the Southern North Pacific, suggesting that there may be similar deep-sea longline fisheries in the high seas.

Bottom trawl fishery targeting alfonso and armourhead¹

Japan reports in its response to the 2007 FAO Questionnaire on High Seas Deep-sea Fisheries (hereinafter referred to as the FAO Questionnaire – see Appendix A) that seven vessels were engaged in high seas bottom trawl fishing in the North West Pacific (FAO Statistical Area 61) in 2006.² The *Report of the Second Meeting of the Scientific Working Group* (NWPBT/03/Inf4, 2007) indicates that the catch by the Japanese high seas trawl fleet in the North West Pacific in 2006 consisted of 1 488 tonnes of slender armourhead and 3 656 tonnes of alfonso. There were 973 fishing days in total. Trawling takes place between 250 and 1 200 m depth on various seamounts in the Emperor chain (K. Miyauchi, Fisheries Agency of Japan, personal communication, 2008).

¹ Information in this section, unless otherwise noted, has been provided by the Interim Secretariat, 5th Inter-governmental Meeting on Management of High Seas Bottom Fisheries in the North Western Pacific Ocean, personal communication, 2008.

² Response from Japan to FAO Questionnaire.



Two Korean vessels fished in 2004, with a total catch of 214 tonnes for 90 fishing days. One Korean trawl vessel fished in 2005 and two fished in 2006. In 2005, a commercial trawl vessel caught 750 tonnes for 146 days of fishing (see Table 2). The total catch in 2006 was 460 tonnes for 109 fishing days.

Russian vessels have engaged in high seas bottom trawl fisheries over the past several years. In both 2002 and 2003, one vessel was active and, in 2005, six vessels engaged in trawling in the area with a reported catch of 297 tonnes of alfonsino and 232 tonnes of armourhead.³ No fishing by Russian vessels took place in 2006.

A summary of available data on bottom trawl fisheries is provided in Table 2.

Bottom gillnet fishery targeting alfonsino and oreo

Between one and four Japanese bottom gillnet vessels have operated in the high seas of the North West Pacific since 2000 (Yanagimoto and Nishimura, 2007a). The gillnet fishery takes place primarily between 350 and 1 200 m depth (K. Miyauchi, Fisheries Agency of Japan, personal communication, 2008). The target species are slender armourhead, alfonsino and oreo (Yanagimoto and Nishimura, 2007a). Japan reports that one vessel operated in 2006 for 221 days, with catches of 375 tonnes of alfonsino, 124 tonnes of slender armourhead and 324 tonnes of other species (Interim Secretariat, 5th Inter-governmental Meeting on Management of High Seas Bottom Fisheries in the North Western Pacific Ocean, personal communication, 2008).

Bottom longline fishery

One Korean longline vessel operated for 56 days in 2004. The total catch was 21 tonnes of which approximately 14 tonnes were deep-sea sharks and 2 tonnes were rockfish (SWG3/WP5/K, 2008).

New Zealand reported that one longliner operated in FAO Statistical Area 61 in 2006 for one day, catching 1.8 tonnes.⁴

³ Response from the Russian Federation to FAO Questionnaire.

⁴ Response from New Zealand to FAO Questionnaire.

TABLE 2
Summary of available data on bottom trawl fisheries in the high seas of the North West Pacific Ocean, 2003–2006

Country	Year	No. of vessels	Catch (tonnes)				Fishing effort (days per year)
			Slender armourhead	Alfonsino	Other*	Total catch	
Republic of Korea	2004	2	185	16	13	214	90
	2005	1	141	513	96	750	146
	2006	2	139	289	32	460	109
Japan	2003	3	449	2 005	3 494	5 948	680
	2004	7	9 965	1 357	2 629	13 681	939
	2005	8	5 638	3 877	2 020	11 534	/
	2006	7	1 488	3 656	3 101	8 245	973
Russian Federation	2003	1	/	/	28	28	/
	2005	6	232	297	242	771	/

/ = Unknown.

Source: Information provided by the Interim Secretariat, 5th Inter-governmental Meeting on Management of High Seas Bottom Fisheries in the North Western Pacific Ocean, personal communication, 2008.

* Other species include mirror dory, Pacific barrelfish and rockfishes nei.

TABLE 3
Summary of available data, 2006

Country	No. of fishing vessels and fishing effort (days)				Catch (tonnes)			
	Trawlers	Longliners	Gillnetters	Other	Armourhead	Alfonsino	Other	Total
Japan	7 (993)	0	1 (221)	0	1 612	4 031	3 425	9 068
Republic of Korea	1 (99)	0	0	0	139	289	32	460
Belize	0	0	0	5 ^a	0	0	801 ^b	801
New Zealand	0	1 (1)	0	0	0	0	1.8	1.8
Russian Federation	0	0	0	0	0	0	0	0

^a Listed as "crabs" in the response from Belize to FAO Questionnaire.

^b Listed as "other types of multipurpose vessels – shrimp/crab pots" in the response from Belize to FAO Questionnaire.

The Russian Federation also reported one longline vessel that operated in 2003 and one vessel that operated in 2004, with catches of 5 and 20 tonnes of rockfish, respectively.⁵ The present target species for the Russian longliners in this fishery is skilfish with notable bycatch of Pacific grenadier (A. Baitalyuk, personal communication, 2008).

Pot fishery for deep-sea crabs

Belize reported five vessels fishing with traps for deep-sea crabs in the high seas of the North West Pacific in 2006, with a total catch of 801 tonnes.⁶

The Russian Federation reported two vessels operating in this fishery in 2002 with a total catch of 47 tonnes (43 tonnes of crab and 4 tonnes of other species) and one in 2003 with a catch of 8 tonnes of crab (Interim Secretariat, 5th Inter-governmental Meeting on Management of High Seas Bottom Fisheries in the North Western Pacific Ocean, personal communication, 2008).

Catch and effort summary

Table 3 provides a summary of the catch and effort of the high seas fisheries described.

Illegal, Unreported and Unregulated (IUU) fishing

Fisheries in the northwest Pacific were unregulated by a multilateral mechanism before February 2007. In February 2007, however, vessels flying the flag of

⁵ Response from the Russian Federation to FAO Questionnaire.

⁶ Response from Belize to FAO Questionnaire.

parties to the Second Inter-governmental Meeting on Management of High Seas Bottom Fisheries in the North Western Pacific Ocean (described in the section on Conservation and Management Measures) became subject to an interim measures agreement.

STATUS OF THE STOCKS, BYCATCH AND IMPACTS ON VULNERABLE MARINE ECOSYSTEMS

Status of target stocks

The status of fish stocks is not fully known, but it would appear from a major decline in catch per unit effort (CPUE) data that slender armourhead and alfonsino stocks are overexploited or depleted (Yanagimoto and Nishimura, 2007b; 2007c).

Status of bycatch stocks

No estimate of current bycatch of non-commercial species is available, nor is the status of bycatch species known.

Impacts on Vulnerable Marine Ecosystems (VMEs)

Impacts on VMEs are unknown but likely to occur, including on cold-water corals and other sessile species associated with seamounts and ridge systems in the region. Periodic sampling of the fauna of the seamounts in the Emperor chain has taken place in past decades and evidence of coral, sponges and other benthic habitat forming species has been found. For example, the Aries VII expedition to the Milwaukee Seamount Group sampled a number of unidentified species of coral and sponges (Porifera, Gorgonocephalidae, Isididae and Antipatharia) (Stocks, 2005).

CONSERVATION AND MANAGEMENT MEASURES

As mentioned previously, interim measures for the regulation of the high seas bottom fisheries have been adopted (see Box 1). These measures apply to fisheries conducted in FAO Statistical Area 61 and commit parties (see section on Management regime) to take the following actions as specified in paragraphs 4 and 5 of the agreement.

The measures specified came into effect with the adoption of the agreement in February 2007. The remaining provisions of the interim measures agreement became applicable and operational as of 31 December 2007. The agreement contains additional provisions related to the provision and sharing of scientific information, and the monitoring and control of high seas bottom fishing vessels.

At the Fourth Inter-governmental Meeting on Establishment of a New Mechanism for Management of High Seas Bottom Fisheries in the North Western Pacific Ocean in Vladivostok in May 2008, the parties to the negotiations agreed to define the existing trawl footprint as limited to the summits of the following seamounts in the Emperor chain: Suiko, Youmei, Nintoku, Jingu, Ojin, Koko, Kimmei, Yuryaku, Kammu, Colahan and C-H, and the bottom gillnet footprint to the summits and slopes of the same seamounts (NWPBT/04, 2008).

INFORMATION AND REPORTING GAPS

A number of scientific research surveys and exploratory fishing surveys have been conducted by the Russian Federation, the Republic of Korea, the United States of America and Japan in previous decades. The main objectives of the surveys were to study the spatial distribution of commercially important species, estimate their biomass, collect biological information, study oceanographic conditions, identify changes of species composition, and study bottom topography and the structure of benthic communities (T. Yanagimoto, Hokkaido National Fisheries Research Institute, Fisheries Research Agency [FRA], Japan, and A. Orlov, Russian Research Institute of Fisheries and Oceanography [VNIRO], personal communication, 2007). However,

BOX 1

Establishment of new mechanisms for protection of vulnerable marine ecosystems and sustainable management of high seas bottom fisheries in the North Western Pacific Ocean¹**4. Interim measures**

Each country will take the following interim measures in accordance with its national laws and regulations in order to achieve sustainable management of fish stocks and protection of vulnerable marine ecosystems in the high seas areas of the North Western Pacific Ocean:

A. Limit fishing effort in bottom fisheries on the high seas of the North Western Pacific Ocean to the existing level in terms of the number of fishing vessels and other parameters which reflect the level of fishing effort, fishing capacity or potential impacts on marine ecosystems.

B. Not allow bottom fisheries to expand into areas of the North Western Pacific Ocean where no such fishing is currently occurring, in particular, by limiting such bottom fisheries to seamounts located south of 45 degrees North Latitude and to provisionally prohibit bottom fisheries in other areas of the North Western Pacific Ocean covered by these measures.

C. Notwithstanding subparagraphs A and B above, exceptions to these restrictions may be provided in cases where it can be shown that any fishing activity beyond such limits or in any new areas would not have a significant adverse impact on marine species or any vulnerable marine ecosystem.

D. The participants will work to establish science-based standards and criteria for any determinations pursuant to subparagraph C that any proposed fishing activity will not have a significant adverse impact on marine species or any vulnerable marine ecosystems. It is important that any such criteria be objective, transparent and based on the best available scientific information.

E. Pending the development of such criteria for assessing the impacts of fishing activity on marine species and vulnerable marine ecosystems, no exceptions (as provided in subparagraph C) to the provisions of subparagraphs A and B will be authorized.

F. Upon adoption of such criteria, any determinations, by any flag state or pursuant to any subsequent arrangement for the management of the bottom fisheries in the areas covered by these interim measures, that fishing activity would not have a significant adverse impact on marine species or any vulnerable marine ecosystems, will be made publicly available through agreed means.

G. Further, in areas where, in the course of fishing operations, evidence of vulnerable marine ecosystems, such as coldwater corals or other associated species, is encountered, participants will require vessels flying their flag to cease bottom fishing activities. All such encounters, including the location and the species in question, will be reported to the interim secretariat, who will notify the other parties so that appropriate measures can be adopted in respect of the relevant site.

5. Contingent action

In addition to the interim measures contained in paragraph 4 above, bottom fisheries in the areas where vulnerable marine ecosystems are known to occur or are likely to occur, based on the best available scientific information, shall cease by 31 December 2008, unless conservation and management measures have been established to prevent significant adverse impacts on vulnerable marine ecosystems, consistent with the relevant provisions of the 2006 United Nations General Assembly Resolution on Sustainable Fisheries (A/61/L.38) and such international standards as may be developed pursuant thereto.

¹ http://www.fpir.noaa.gov/Library/IFD/NWPBT_InterimMeasure-1-1.pdf

more complete information on the status of target fish stocks and bycatch species is necessary. Comprehensive assessments of the known or likely distribution of VMEs and the potential impacts of high seas bottom fisheries are now under way.

SOURCES OF INFORMATION

In their reply to the FAO Questionnaire sent to states known as having a high seas deep-sea fishing fleet, Belize, Japan, New Zealand, the Republic of Korea and the Russian Federation officially replied with some information regarding deep-sea fishing in the high seas of the North Pacific. Russian and Japanese experts who attended an FAO workshop provided substantial information and comments. Additional information was drawn from the papers submitted to the First and Second Meetings of the Scientific Working Group and the Second Inter-governmental Meeting on Management of High Seas Bottom Fisheries in the North Western Pacific Ocean, and other sources as footnoted.

SUMMARY TABLE FOR 2006

Main flag states involved in fisheries		Japan, Republic of Korea, Belize, New Zealand, Russian Federation	
Estimated total number of vessels		16	
Total reported catch (tonnes)		10 331	
Main fisheries			
Gear	Target species	Fishing grounds	Regional Area
Bottom trawl	Slender armourhead, alfonsino, oreo	Emperor Seamounts (including Nintoku, Jingu, Ojin, Koko, Kimmei, Yuryaku, Kammu, Colahan and C-H)	FAO Area 61
Pot	Deep-sea red crabs	Emperor Seamount	FAO Area 61
Bottom gillnet	Slender armourhead, alfonsino, oreo	Emperor Seamount	FAO Area 61
Longline	Shark, scorpionfish, slender armourhead, alfonsino, oreo, skilfish	Emperor Seamount	FAO Area 61

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