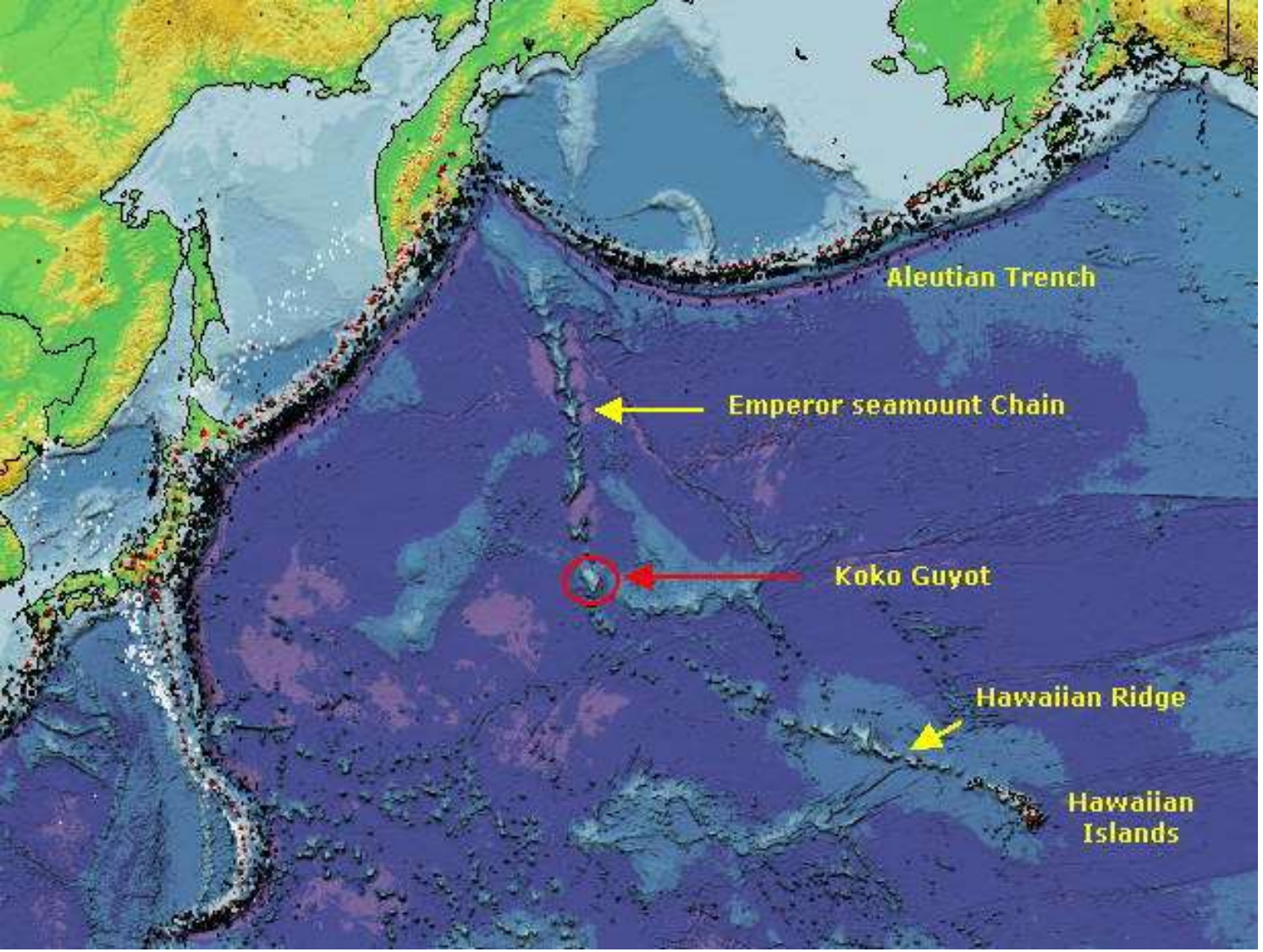
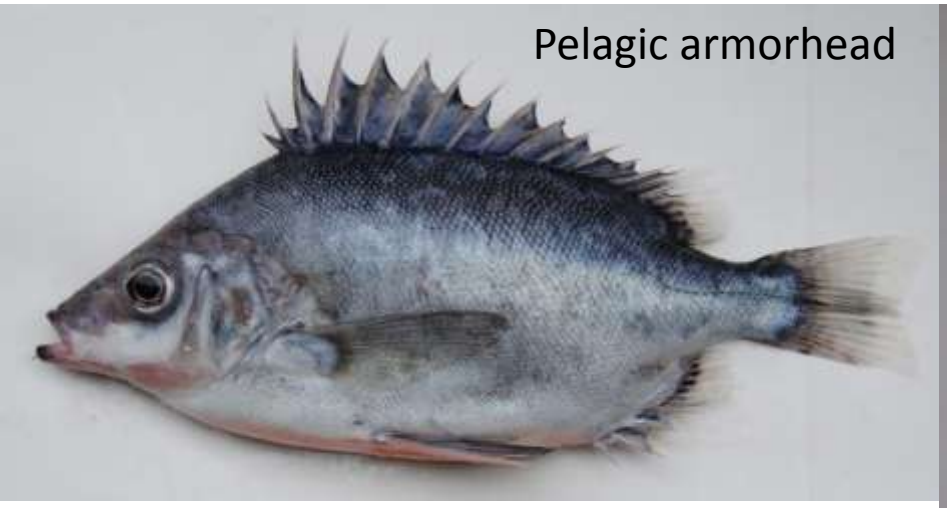
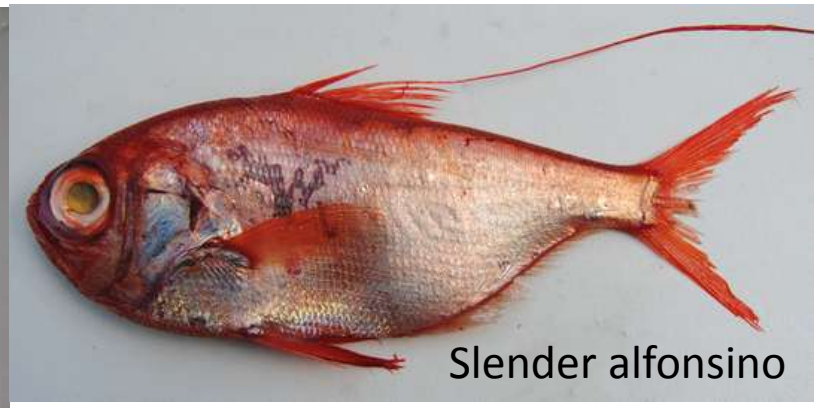
Current state of fishery resources in the southern Emperor Seamounts in the northwestern Pacific Ocean



One of the most poorly studied and underutilized biological resources of the world's oceans are resources of seamounts. The total number of seamount by the latest estimate is almost 100 thousand, and about 50 thousand of them are located in the Pacific Ocean (Roger, 2004). Currently, in the North Pacific, the most studied are seamounts of Emperor and Hawaiian ridges.

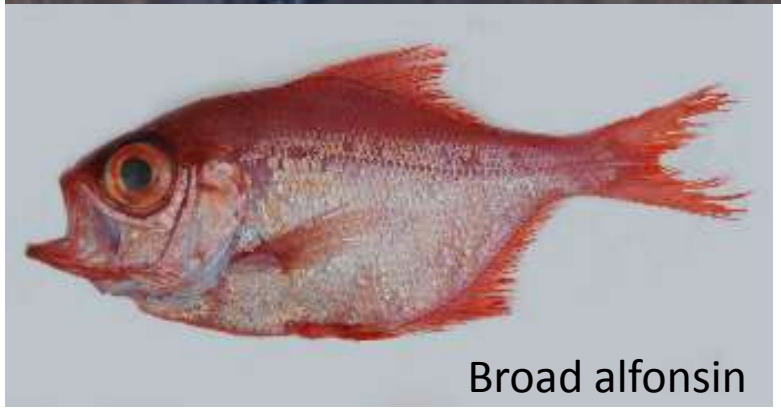




Regular surveys began here in the 1960s when aggregations of pacific armorhead (Pseudopentaceros wheeleri), mirror dory (Zenopsis nebulosa) and slender alfonsino (Beryx splendens) were found. Intensive fishing existed there from 1968 to 1977, and every year, up to 30 large fishing vessels were involved in fishery. More than 20 research and scientific expeditions were carried out during this period. The main target species remained pacific armorhead. Russian (USSR) catch of pacific armorhead gradually reached a maximum value of 170 thousand tons; in addition, up to 35 thousand tons were taken by Japanese fishing vessels.


Japanese butterfish

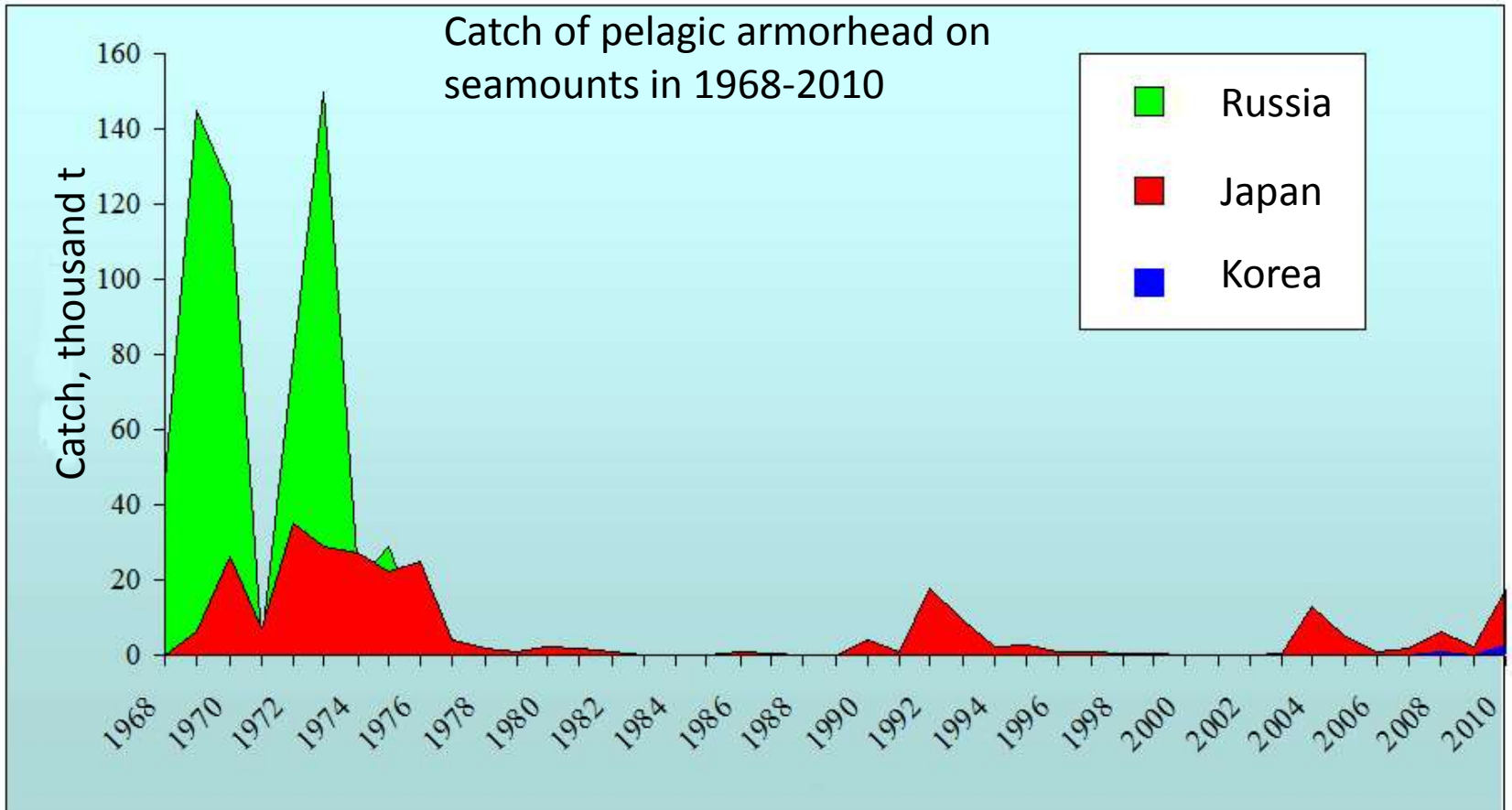

Scorpinfish

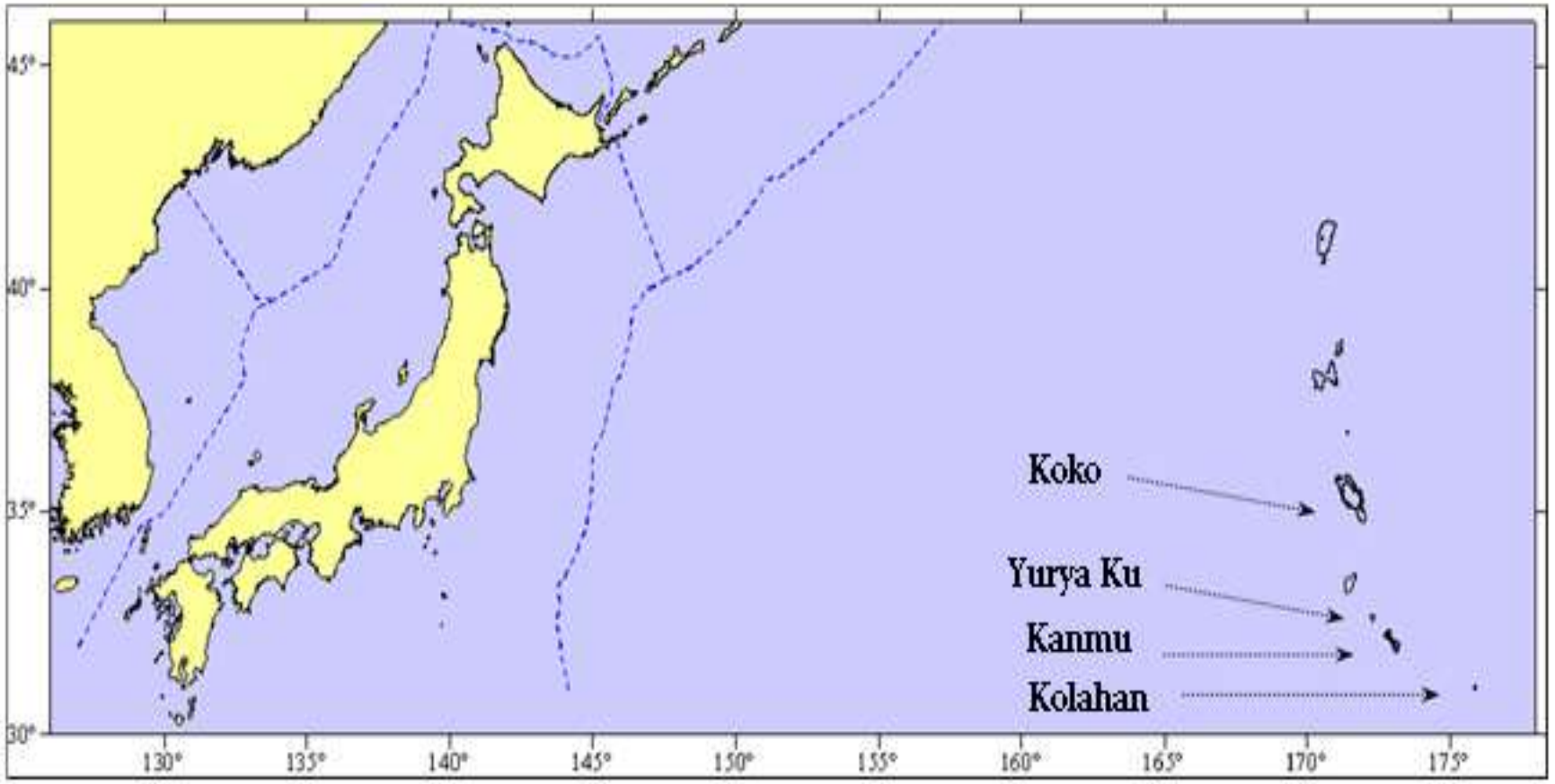

Broad alfonsin


Giant skilfish

The amount of pacific armorhead, the main target species, declined sharply since 1977, and large-scale fishing has been stopped on the Emperor Seamounts. Nevertheless, Japanese vessels continued to catch limited amount of pacific armorhead and other commercial fish species on the Emperor Seamounts from 1978 to nowadays. Several trawlers of Republic of Korea operate in the area since 2004. There are also limited bottom longline fishery and netting. Russian longliners mainly focusing on catching giant skilfish (Erilepis zonifer) have been fishing in the area from 2000 to 2009.

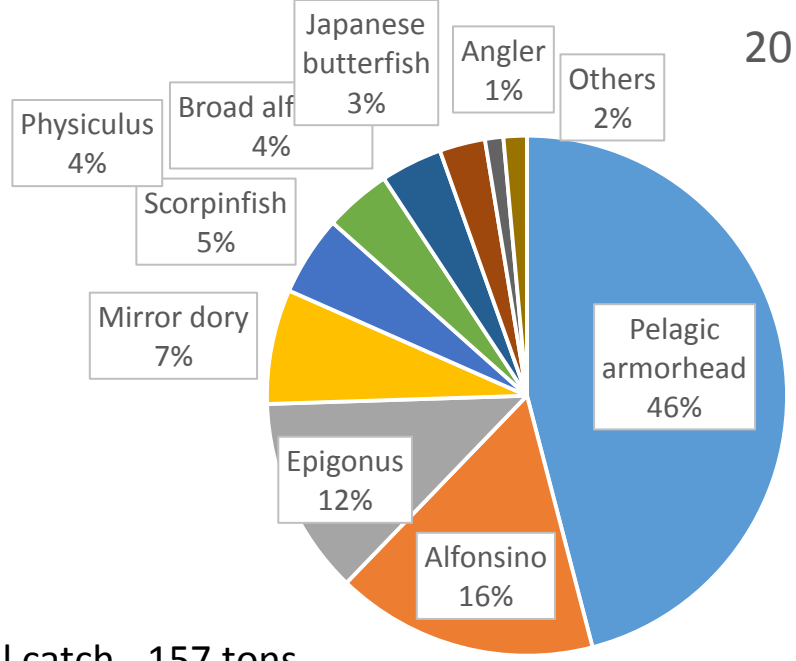
There was an intensification of collaboration between research organizations and fishing companies of the countries in the North Pacific region including Russia and the Republic of Korea in recent years. Russian observers from TINRO-Center collected information on board bottom trawl fishing vessels of Republic of Korea on the Emperor Seamounts in 2011-2013. The collected data allowed our specialists to estimate the state of fishery resources of seamounts in southern part of the Emperor Ridge and to show the impact of fishing on benthic communities during the last 3 years.





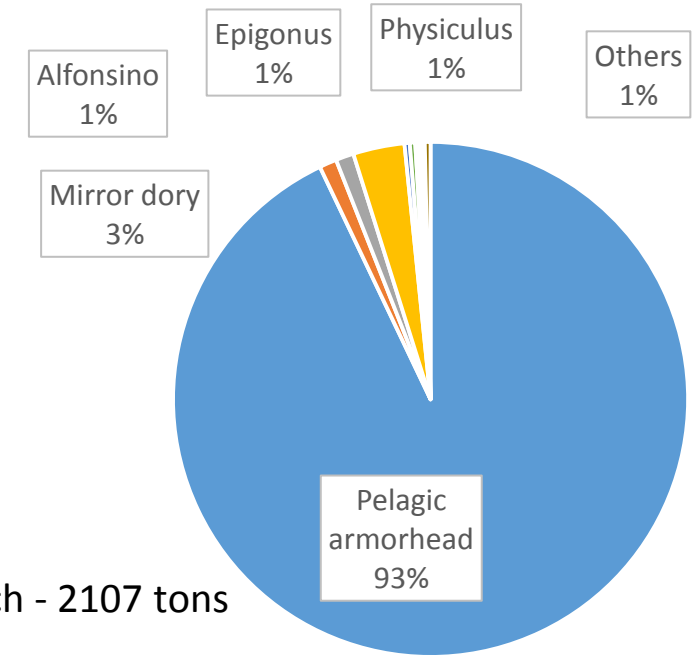
Vessels fished from March to July on three seamounts in the southern part of the Emperor Ridge (Koko, Kanmu, and Yurya Ku), as well as on the mountain Colahan in the northern part of the Hawaiian Ridge. The main target species were pacific armorhead, slender and broad alfonsinos, scorpionfishes, Japanese butterfish, and flowery goosefish.

2011



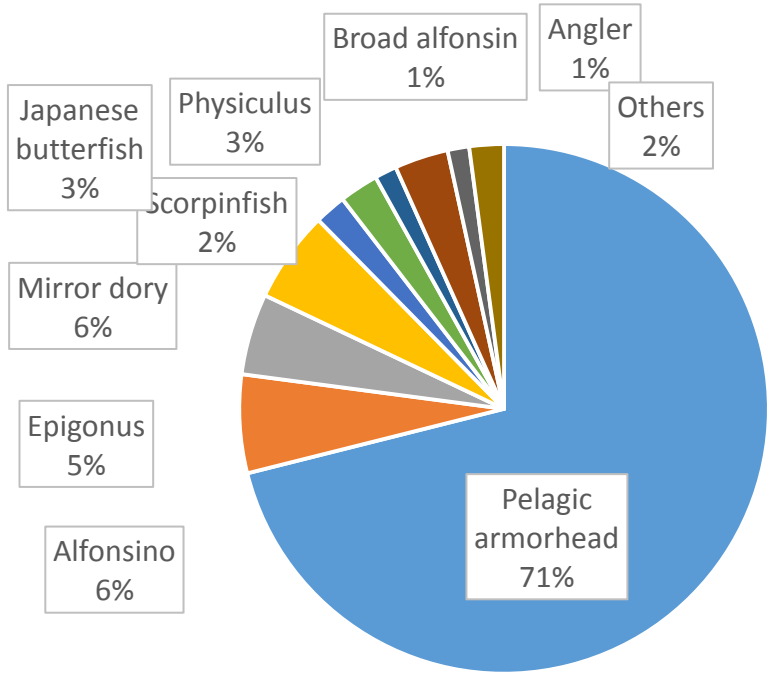
Total catch - 157 tons

2012



Total catch - 2107 tons

2013

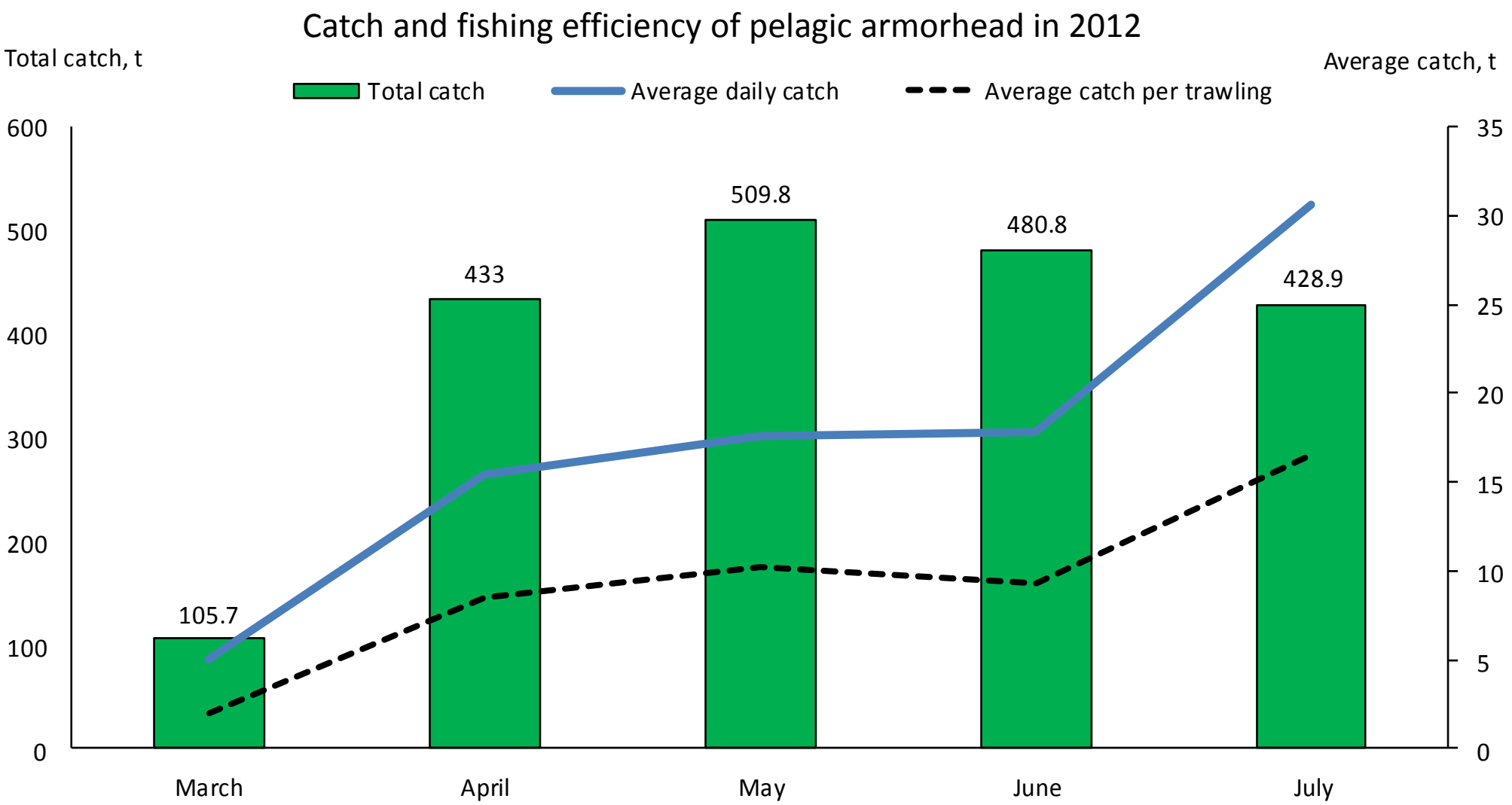


Total catch - 371 tons

Observations taken on board Korean bottom trawlers during 3 years showed that, in trawl catches, there were more than 100 species of benthic and pelagic fish belonging to 60 families; however, only 13 species occurred with a frequency of more than 50%.

Species	%
Pelagic armorhead	69.8
Alfonsino	7.8
Gobbleguts	6.1
Mirror dory	5.3
Scorpinfish	2.4
Physiculus	2.3
Broad alfonsin	1.8
Japanese butterfish	2.1
Angler	0.9
Others	1.3

Pacific armorhead fully dominated the catches by biomass, comprising about 93% in 2012, with an average of 70% during 3 years of observation. Slender alfonsino had the second place by biomass in the catches with a frequency of occurrence of about 8%, and gobbleguts and mirror dory were somewhat less common, with a frequency of 6.1 and 5.3%, respectively.

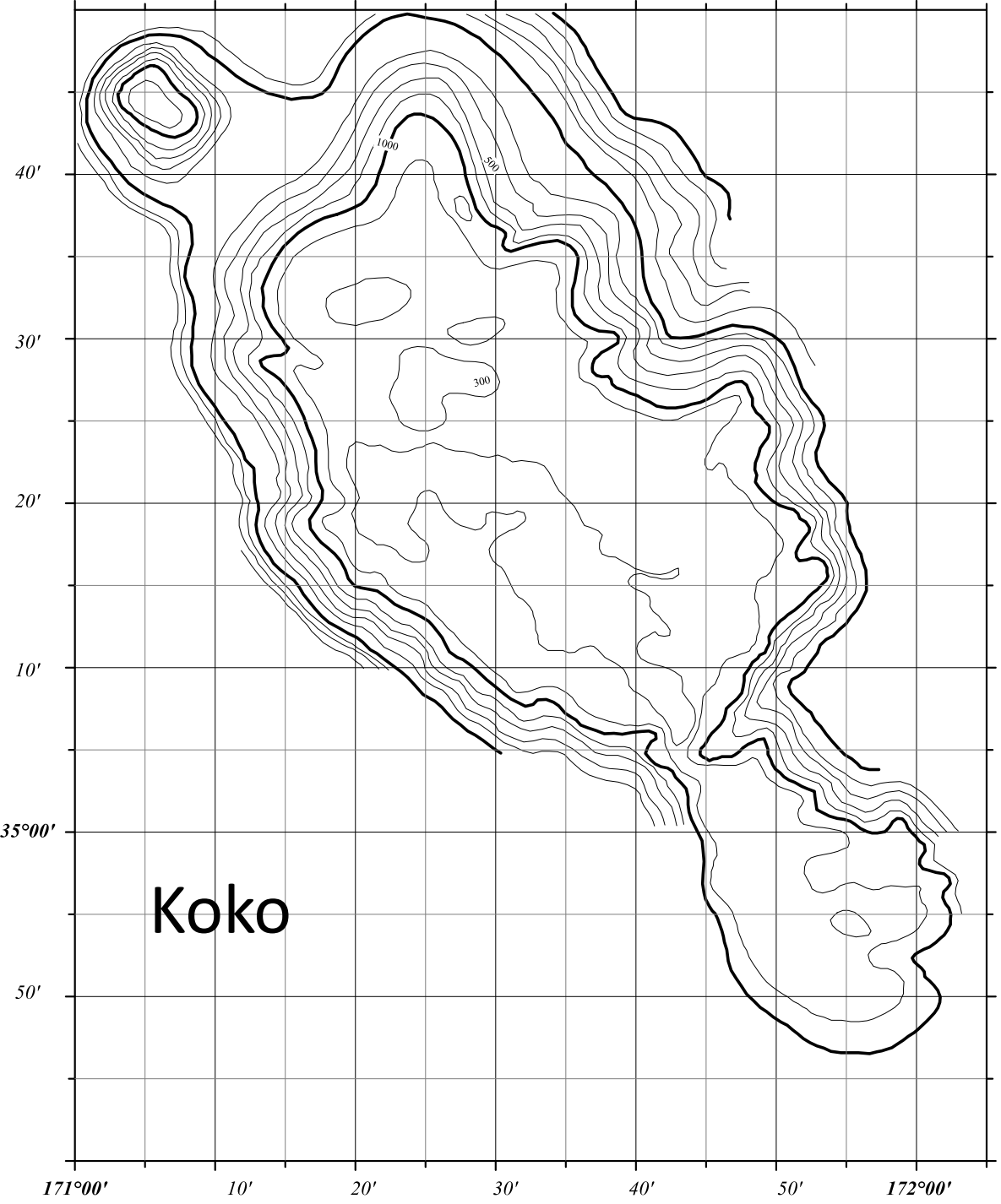


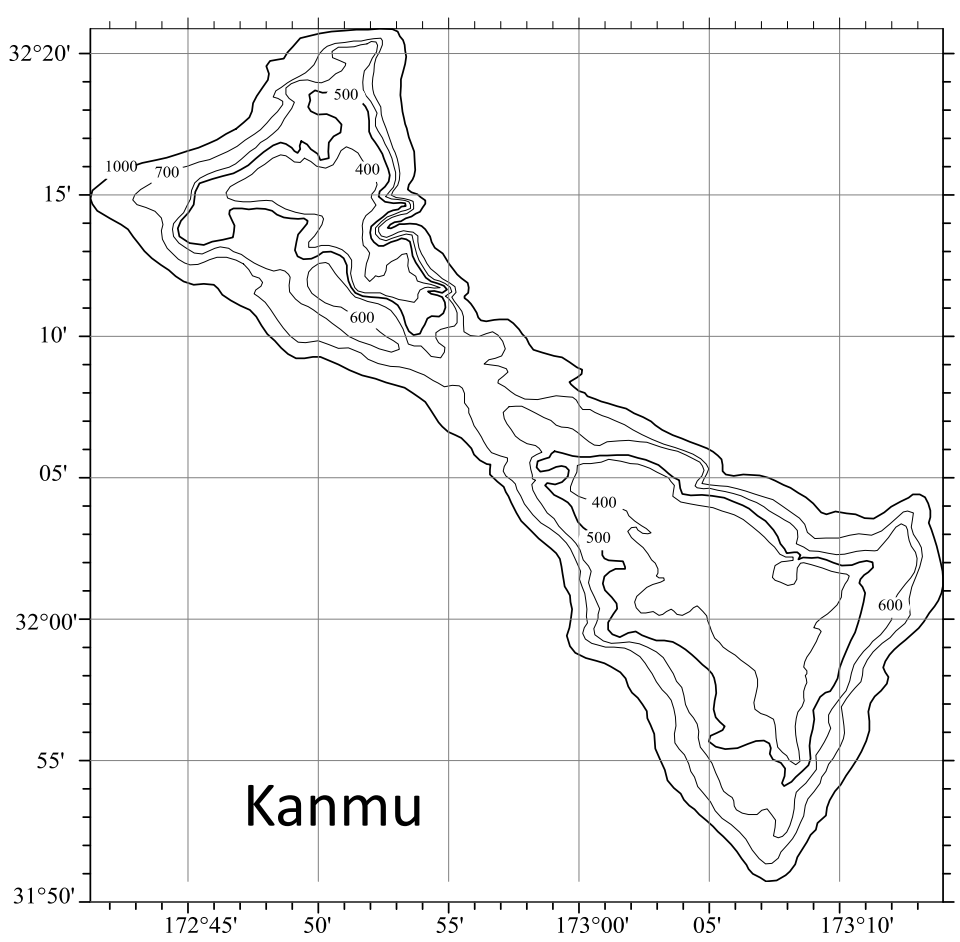
Fishing efficiency increased from March to July during the fishing season and the largest catches of pacific armorhead occurred in May-June. The effectiveness of the fishery and the total catch of pacific armorhead in 2012 significantly exceeded those in 2011 and 2013. The highest catches occurred on the seamount Kanmu. High catches of pacific armorhead were taken on the seamount Colahan in 2013, but it has a small area (only 20 square kilometers) and fish stocks exhaust rapidly there, so long-term fishing pressure is not possible on this seamount, as well as on the seamount Yurya Ku.

Catch efficiency on sea mounts Koko and Kanmu in 2012

Sea mount	Average catch per trawling, t	Average daily catch, t	Average catch per hour of trawling, t
Koko	5.80	12.48	3.43
Kanmu	11.09	19.65	4.23

Therefore, we can say that, in the southern part of the Emperor Ridge, resources on the two seamounts Koko and Kanmu can endure relatively long fishing pressure.





The seamount Koko has the area of about 2.2 thousand km² within the 400-m isobath. It is the largest fishing area among the seamounts in the southern part of the range and fish stocks there are the most significant for fishery. The area of Kanmu within the 400-m isobath is about 150 km ².

The existing data show that in one species - pacific armorhead - significant fluctuation of stocks has been observed. Abundance and biomass of other commercial species within 3 years was at a low but stable level.

Analysis of fishing results in southern Emperor Ridge during 2011-2013 suggests that stock fluctuations of pacific armorhead has rather natural causes and depend on the presence/absence of high-yielding generations of immature and first time maturing individuals. The existing level of fishing probably does not significantly affect the status of stocks of pacific armorhead and other commercial species in the southern Emperor Ridge. It is necessary to continue observations upon the state of biological resources on the Emperor Seamounts to confirm these findings.

Thank you