



North Pacific Fisheries Commission

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**Fishing for chub mackerel (*Scomber japonicus*) by Russian trawl vessels in 2019 and preliminary results on fishing in 2020**

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Chub mackerel migrate to Exclusive Economic Zone of Russia during feeding migrations and concentrates in the south Kuril area from June to November. Since the second half of the 1980s, no commercial concentrations of chub mackerel have been observed in the EEZ of Russia and adjacent Pacific Ocean due to a decrease in stock abundance. Russia did not conduct specialized fishing for mackerel in the northwestern Pacific Ocean until 2015, and only 420 tons of mackerel were caught as by-catch in 2015.

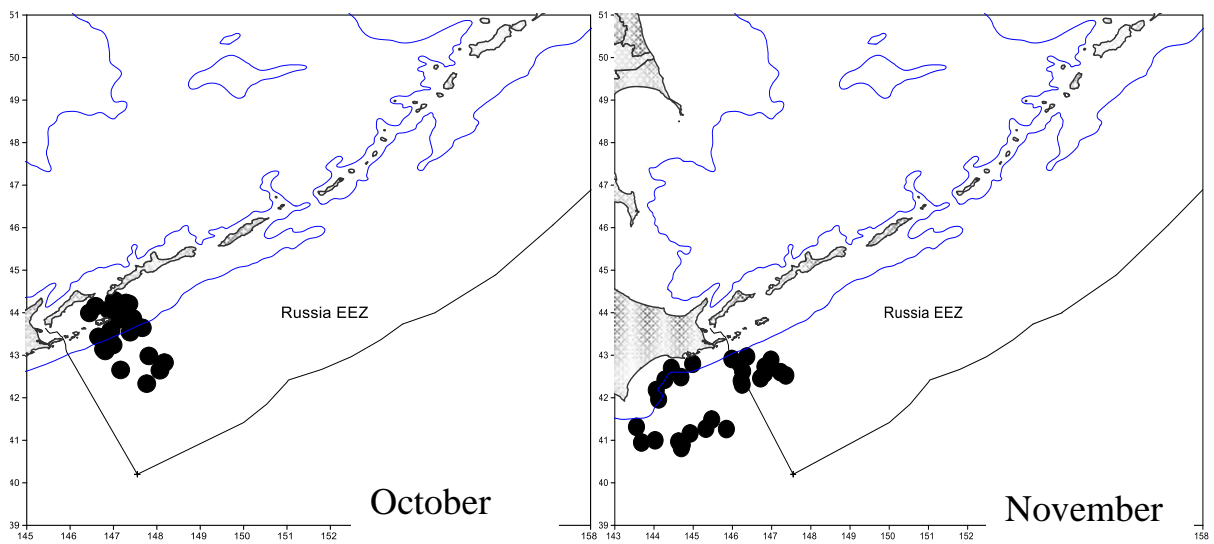
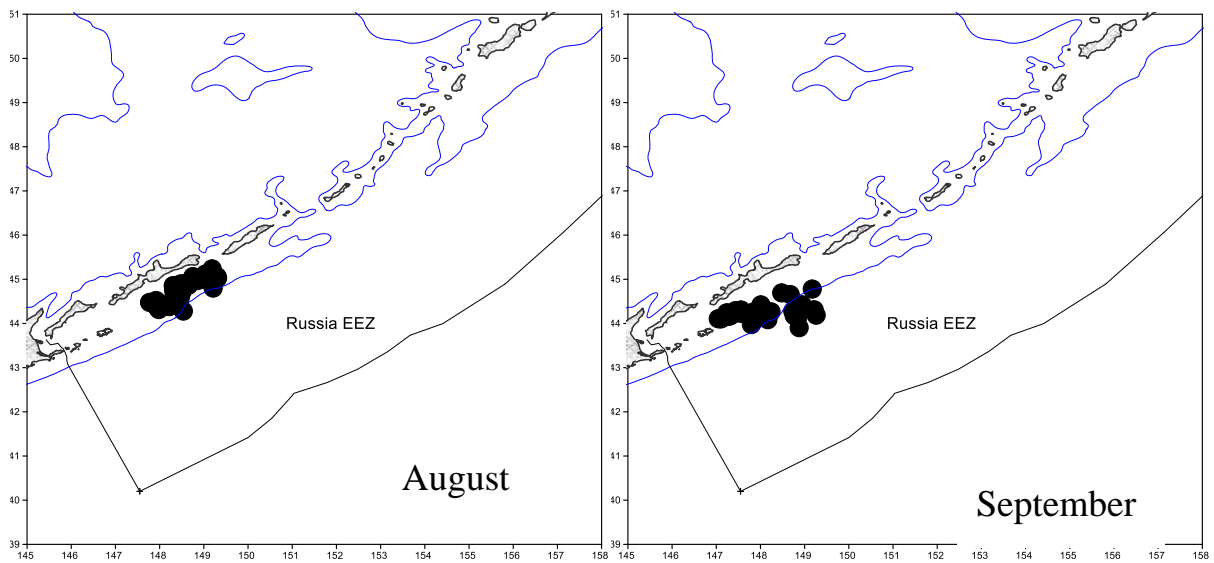
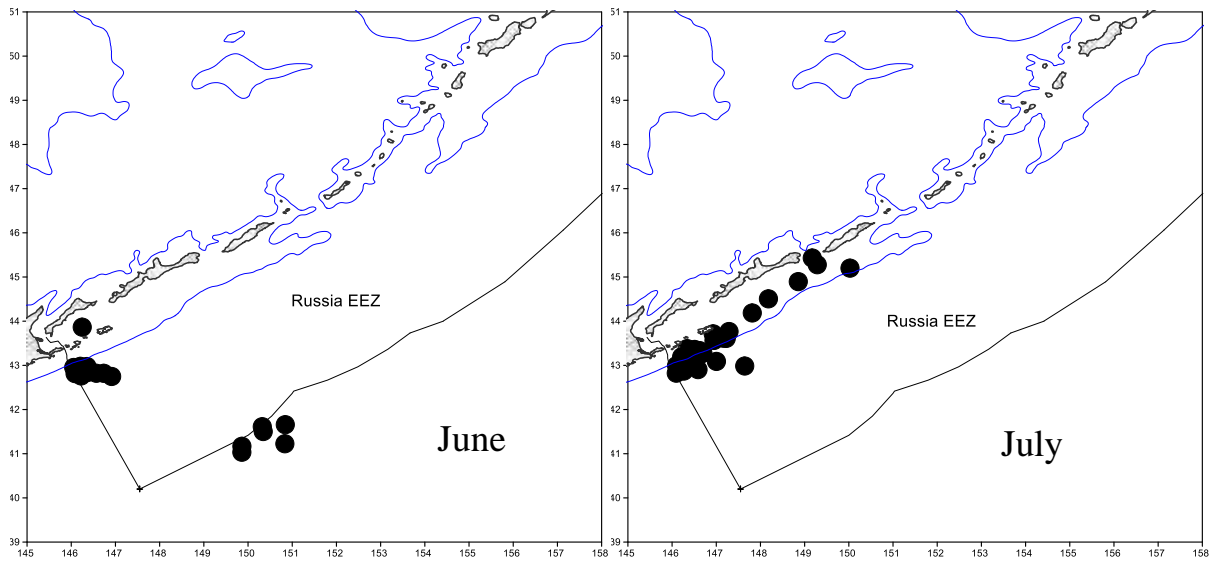
There were 18 vessels, which fished for the common (=Japanese flying) squid, Japanese sardine and chub mackerel off the south Kuril Islands in 2016, of which only 4 vessels trawled purposefully for chub mackerel. The average catch of mackerel per day per vessel (CPUE) was 22 tons during that fishing season. The catch of mackerel in Russian waters peaked in October and remained at a high level in the early November until the mid-November, when main aggregations of mackerel migrated into Japanese waters. The catch of mackerel by Russian vessels reached 9 thousand tons during the fishing season in 2016. Most of the fishing vessels that fished for mackerel were medium-size and equipped with pelagic trawls, and some of them used twin trawls.

In 2017, a total of 26 vessels of different tonnage mostly equipped with pelagic trawls (only 2 of them were with purse seines) took part in the mackerel fishery. Fishing was conducted in the Russian EEZ from July to the early November south and east of the Shikotan Island. Mackerel abundance in Russian waters increased significantly in fall 2017 compared to 2016. CPUE in September was 40-50 tons, in October 70-80 tons, and in the first ten days of November increased up to 100 tons. In the early November, Russian vessels began to enter the EEZ of Japan where they continued to fish. The efficiency of fishing in Japanese waters remained high until the early December. The catch of mackerel in the mid-December 2017 reached 52 thousand tons.

In 2018, aggregations of mackerel were found practically throughout the entire Pacific Ocean waters off the south and central Kuril Islands. Sardine and mackerel remained in the Russian EEZ much longer due to slow cooling of surface waters. The number of fishing days in the 2018 was 2 times as high as in 2017 due to larger number of vessels and longer fishing period. The number of fishing days reached its maximum in November.

The transfer of Russian vessels into the Japanese EEZ for fishing under pelagic fish quotas according to intergovernmental agreement between Russia and Japan began in 2018 2 weeks later than in 2017, in the late November. This happened due to the significantly slower cooling of surface waters and higher concentrations of mackerel in Russian waters. The total catch of mackerel by Russian vessels in the late December 2018 reached 98 thousand tons.

Fishing for chub mackerel in 2019 by Russian vessels began in the late May outside the Russian EEZ. In the mid-June, mackerel were fished within the Russian EEZ south of the Shikotan Island. As long as the surface waters were getting warmer, fishing areas shifted northward in July. In August and September, the mackerel fishery was carried out in mixed waters of the Kuril and Kuroshio currents off the Iturup Island. In October, due to the autumn cooling of surface waters, mackerel aggregations moved southerner, into areas off the Kunashir and Shikotan islands. In the mid-November, some of the fishing vessels moved into the Japanese EEZ to catch mackerel according to exchange quotas under the intergovernmental agreement between Russia and Japan. The remaining vessels continued fishing within the Russian EEZ south of the Shikotan Island. In December, Russian vessels fished mackerel within the Japanese EEZ off Hokkaido and northern Honshu islands (Fig. 1).



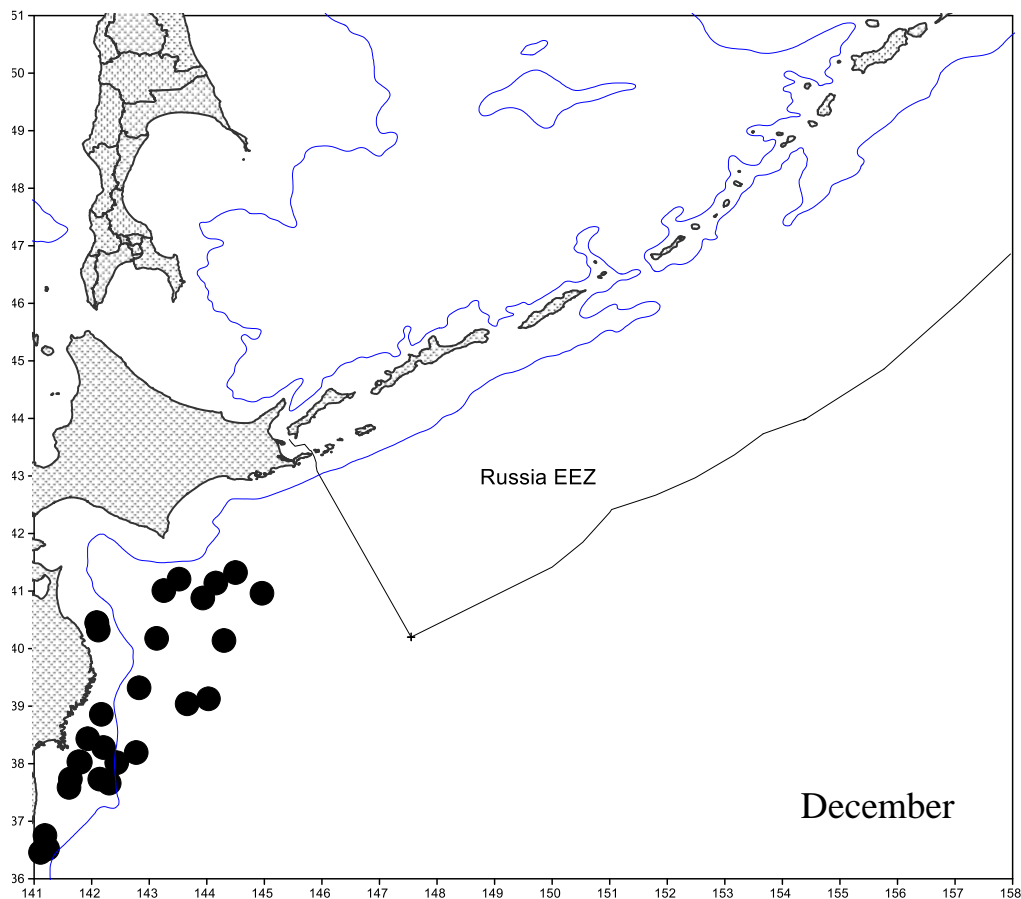


Figure 1. Distribution of fishing grounds for Russian vessels fishing for chub mackerel in the northwestern Pacific Ocean by months in 2019.

The number of fishing days during sardine and mackerel fishery season in waters off the Kuril Islands has increased more than 3 times over the past 4 years (Fig. 2). This is primarily due to 2 factors: an increase in the number of fishing vessels participating in the fishery, and an increase in the length of the fishing period. In 2017, the large-scale sardine and mackerel fishery began in the mid-July, and in the late November, all vessels moved to the EEZ of Japan. In 2019, sardine and mackerel fishery continued in Russian waters from the beginning of June to the mid-December. The maximum number of large- and medium-size fishing vessels in 2019 was 49. However, the maximum number of vessels fishing for sardine and mackerel was 23 in the 1st decade of October. In September 2019, there were strong migrations of the common squid into the area off south Kuril Islands, and most of the fishing vessels switched to squid fishing. The number of fishing days has increased only slightly in 2019 compared to 2018.

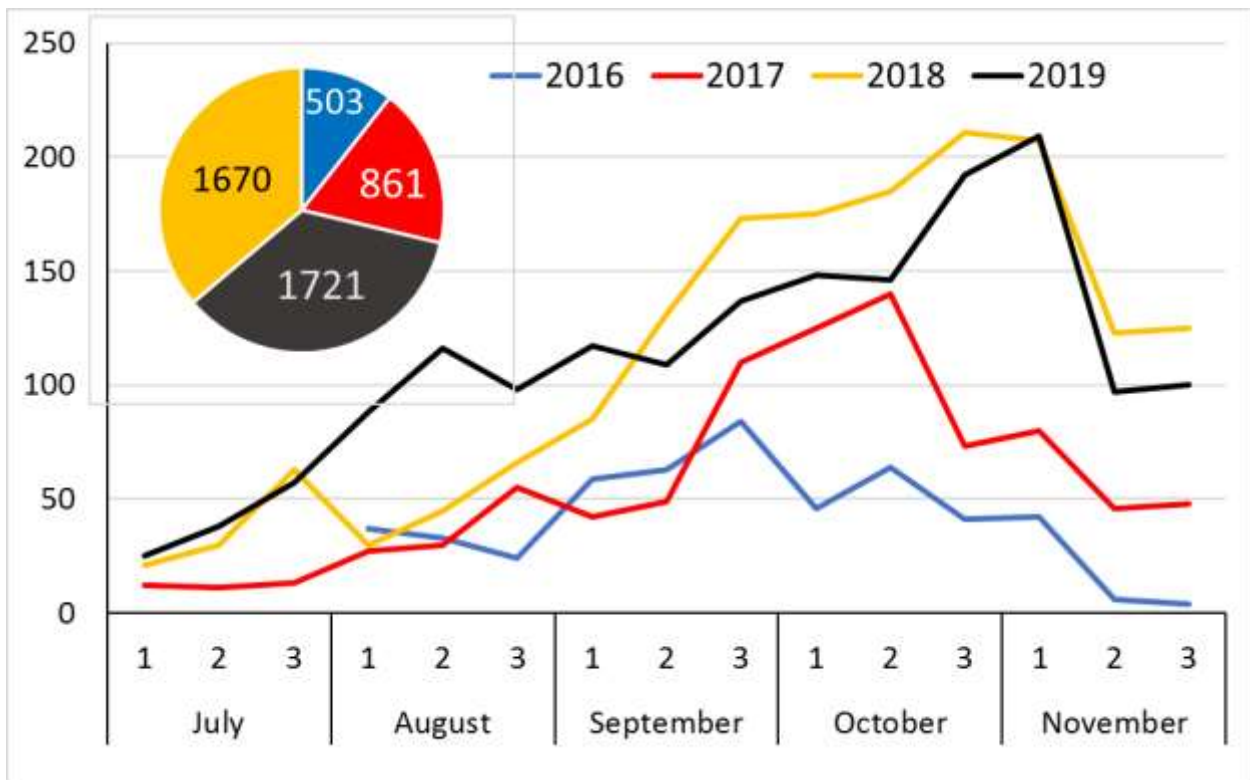


Figure 2. The number of fishing days by decades in 2016-2019

Characteristic feature of the 2019 mackerel fishery by Russian vessels was that, until the 2nd decade of October, catches remained low, and maximum daily catch per vessel was in the 3rd decade of November (Fig. 3). Maximum average CPUE was 39.1 tons in 2018, 38.1 tons in 2017 and 24.6 tons in 2019. Low catches in 2019 were associated with mackerel distribution patterns in summer and autumn. In 2019, mackerel stocks consisted mainly of highly abundant 2018 generation, which just began to recruit into fishery. Most fish foraged in eastern areas outside the Russian EEZ. Commercial aggregations of chub mackerel migrated into the area off the south Kuril Islands only in the late autumn, which was the reason for a significant increase in catch only in the 3rd decade of October (Fig. 4).

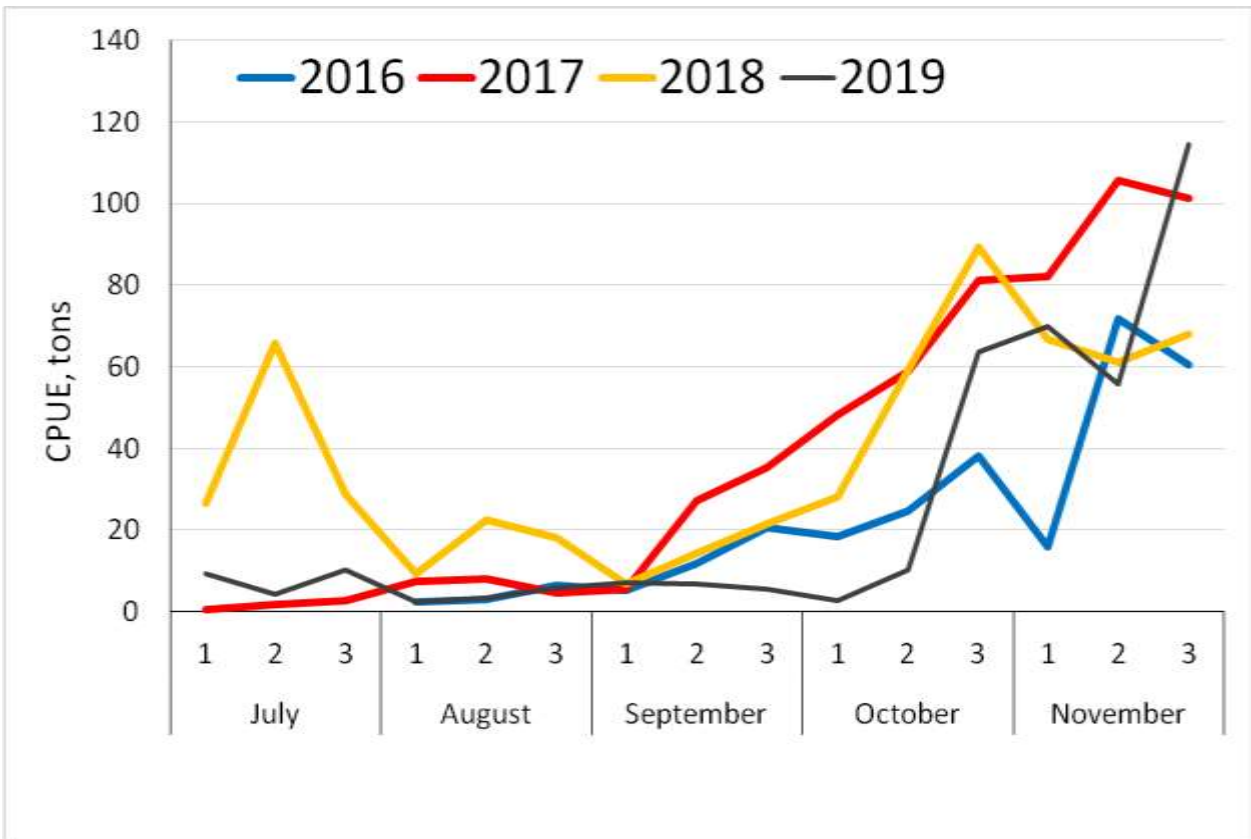


Figure 3. CPUE for mackerel in 2016-2019 by decades, tons

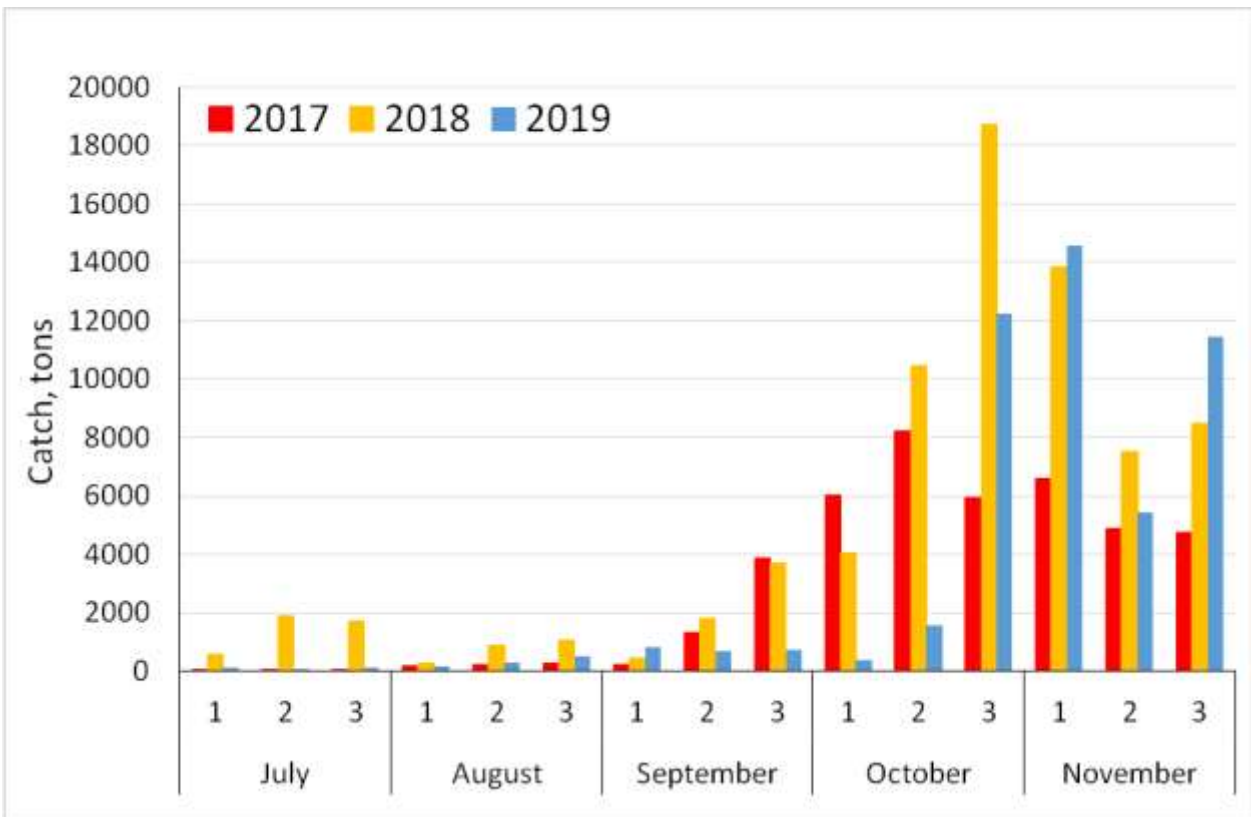


Figure 4. Chub mackerel catch by decades in 2017-2019

Maximum chub mackerel catch by Russian vessels was 99 thousand tons in 2018, and 86 thousand tons in 2019 (Fig. 5).

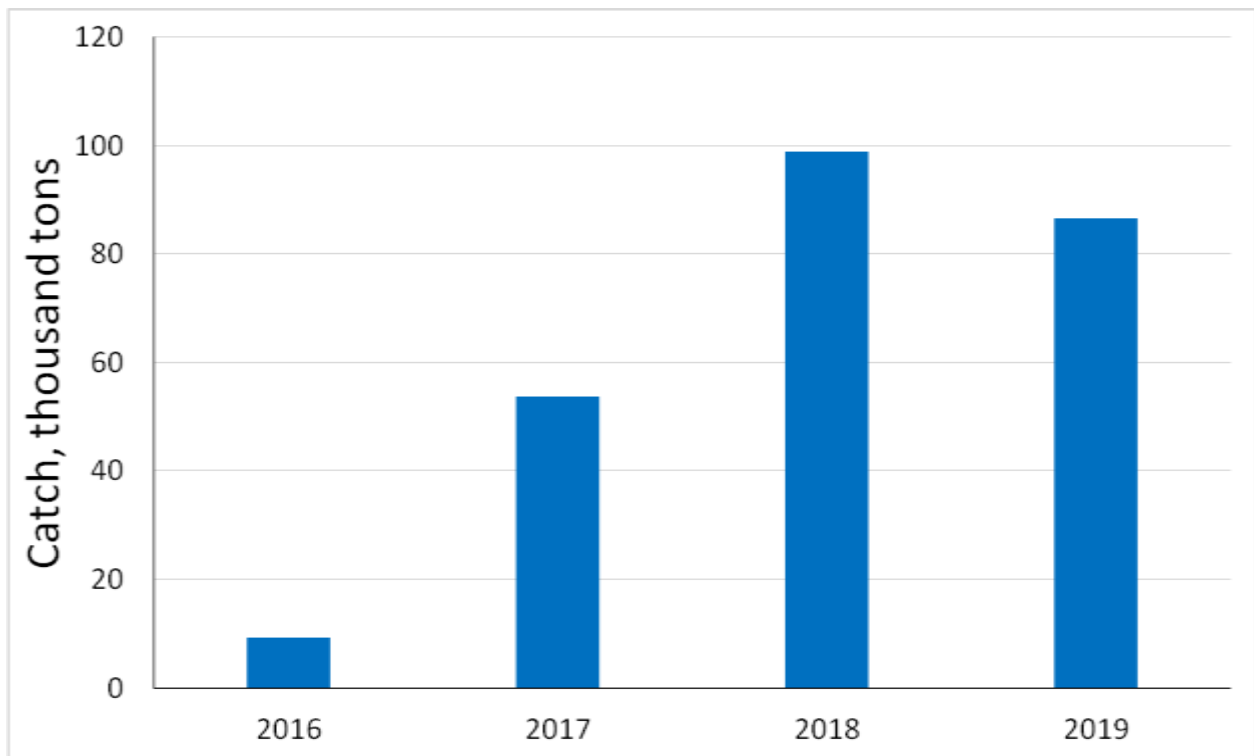


Figure 5. Chub mackerel catch in 2016-2019

The trawl survey was carried out in the upper epipelagic layer off the south Kuril Islands within the Russian EEZ in August and early September 2020. Foraging mackerel were observed practically throughout the entire research area, except for the Oyashio Current during maximum warming of surface water (Fig. 6). Maximum chub mackerel catches were associated with high-density concentrations of zooplankton in the northeast part of the survey area in the northern Subarctic Front.

Japanese sardine and chub mackerel were predominant (in terms of biomass) species of subtropical-boreal fauna in pelagic communities off the Kuril Islands, accounting for 2.023 million tons (48%) and 1.654 million tons (39%), respectively (Fig. 7, 8),\*

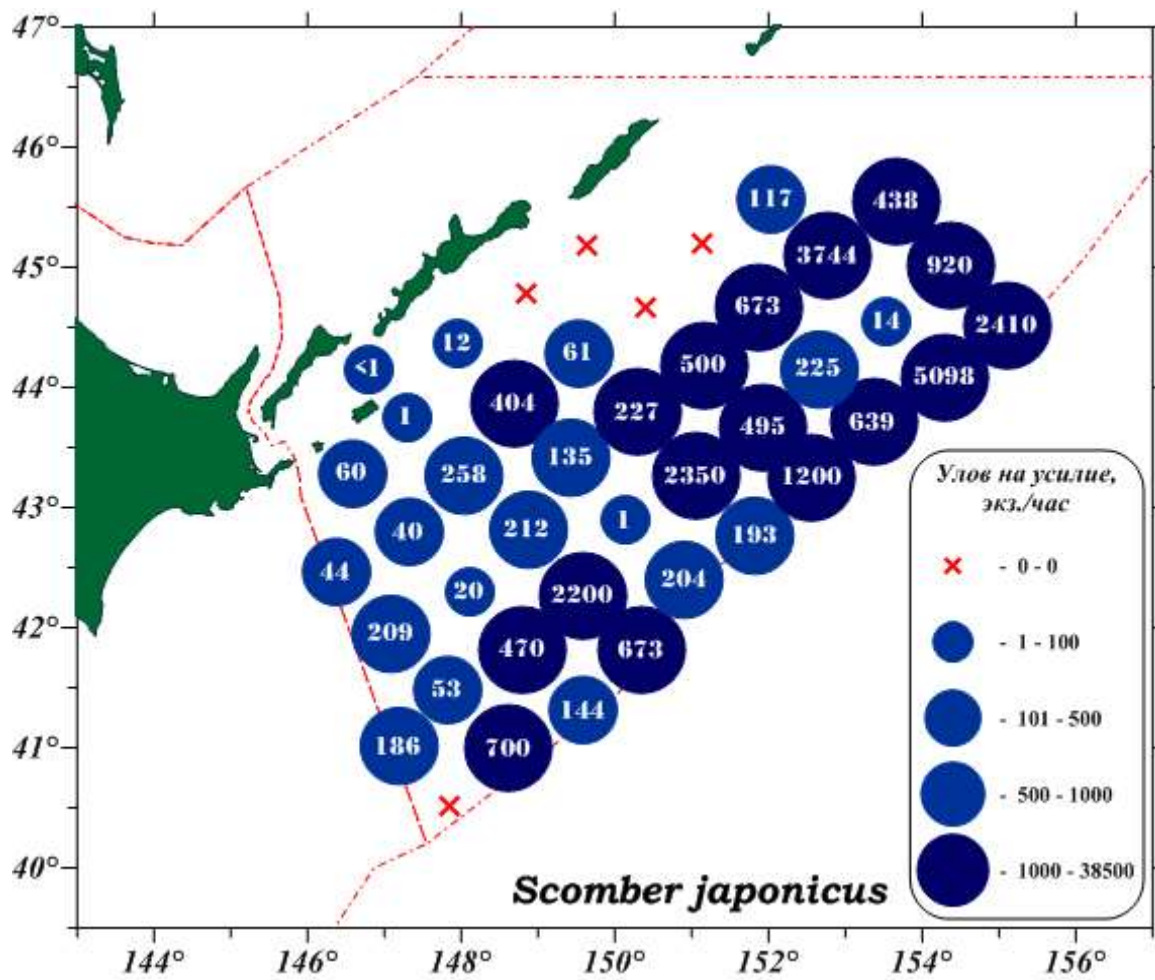


Figure 6. Chub mackerel catch (specimens per hour trawling) off the Kuril Islands in August 2020, based on the pelagic trawl survey. Figure in the center of each circle indicate catch (kg per per hour trawling).



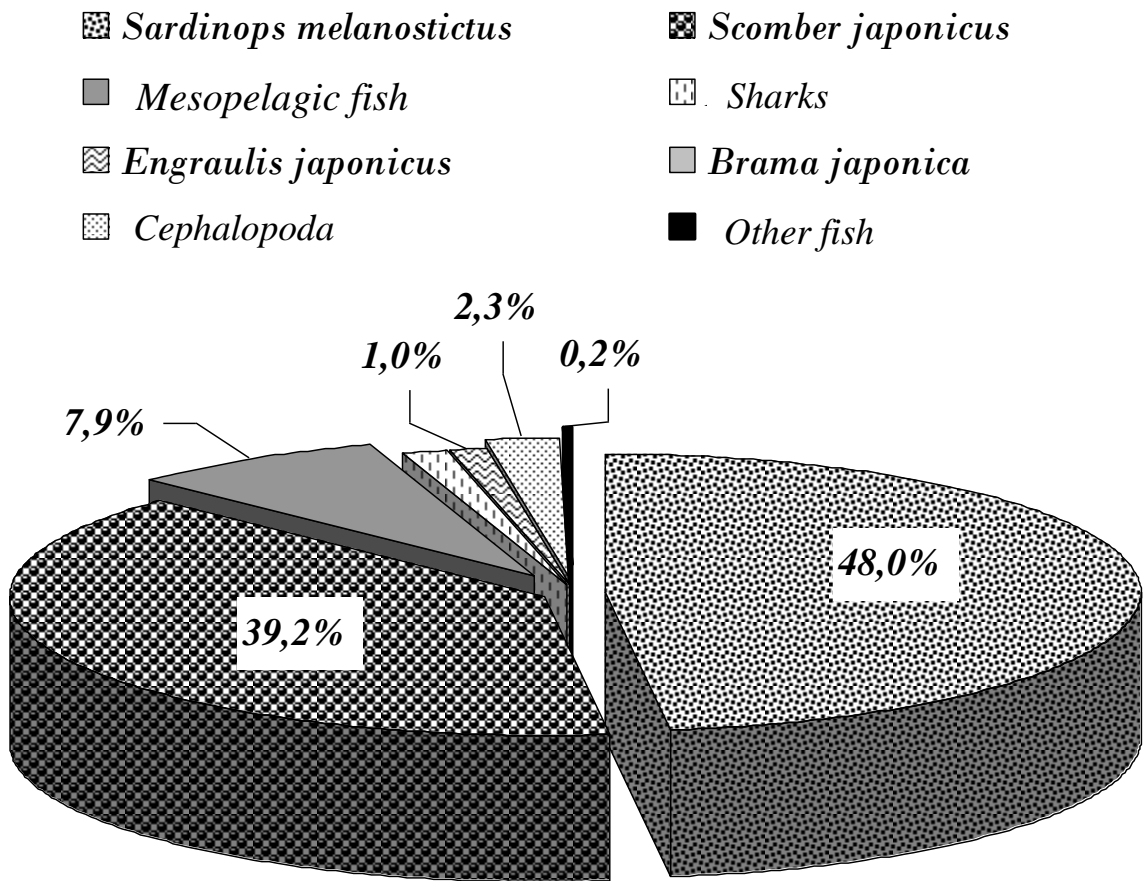


Figure 7. The structure of nekton community (percentage of the total nekton biomass) in the upper epipelagic zone off the Kuril Islands in August 2020

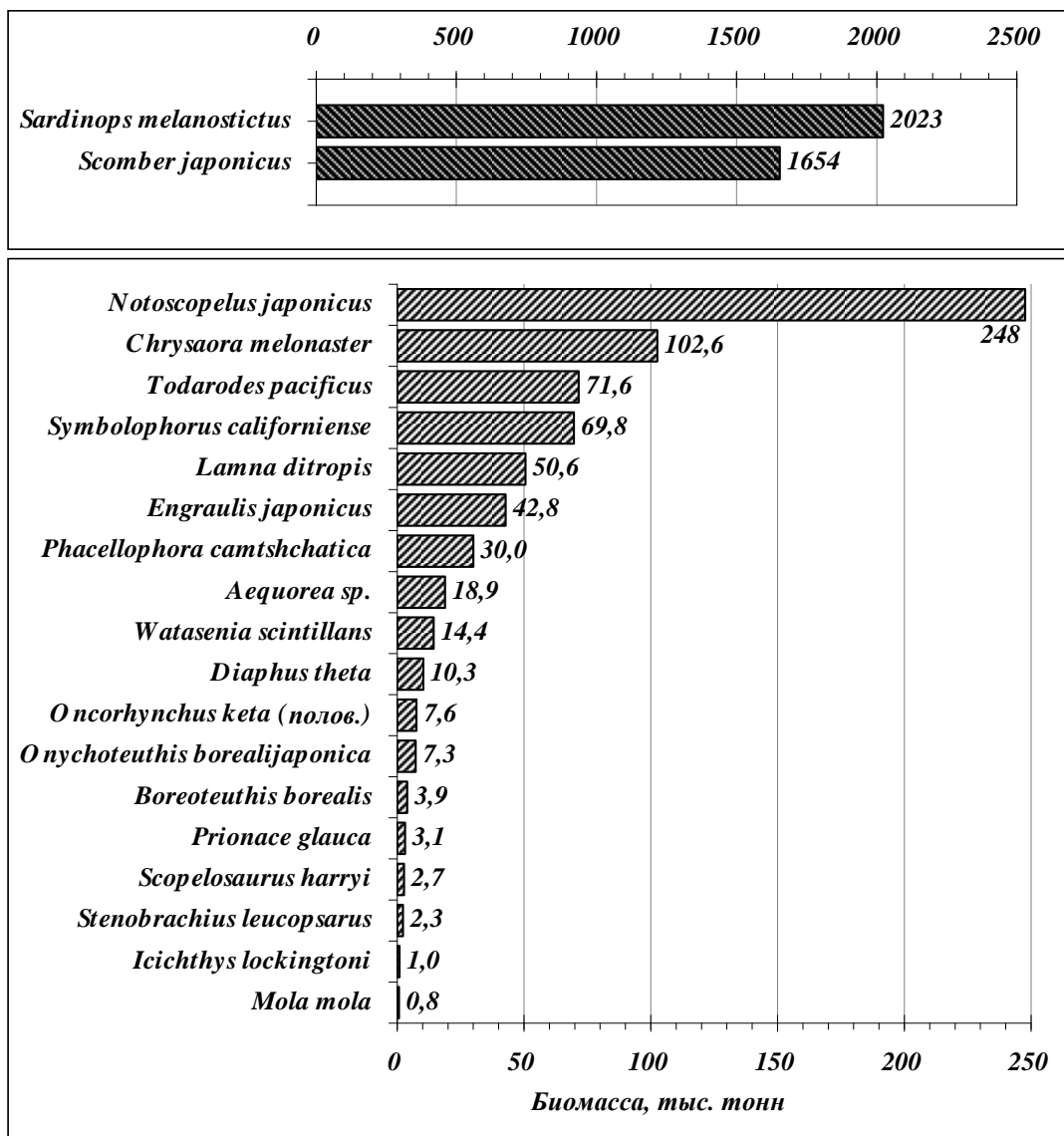


Figure 8. The list of nekton species versus their estimated biomass (thousand tons) in the upper epipelagic zone off the Kuril Islands in August 2020

In 2020, only one Russian vessel began fishing mackerel in the mid-May in open ocean waters off the south Kuril Islands. That vessel moved to the Russian EEZ in the early June, and 12 vessels participated in fishing later. Fishing efficiency during this period was low, and the average catch was 3.1 tons per day per vessel. In July, catches were low, and CPUE was 5.6 tons per day per vessel. The number of fishing vessels was 13. Fishing was conducted to the east of Iturup Island. In August, fishing was unstable, and main aggregations of chub mackerel were feeding in the eastern area of the Russian EEZ, which was observed by the RV “Professor Kaganovsky” survey. At that time, commercial vessels were fishing close to the Kuril Islands, where there were aggregations of sardine. The average catch per day per vessel was 3.0 tons. The number of fishing vessels increased up to 24 units.

In September, fishing conditions remained practically the same as in August. Fishing fleet moved to the south, but still operated near the Kuril Islands in the frontal zone of the Oyashio Current. The average catch per day per vessel in September was 4.8 tons. The total catch of mackerel by Russian vessels in the late September 2020 was 16,250 tons, of which 3,850 tons were caught within the Russian EEZ.

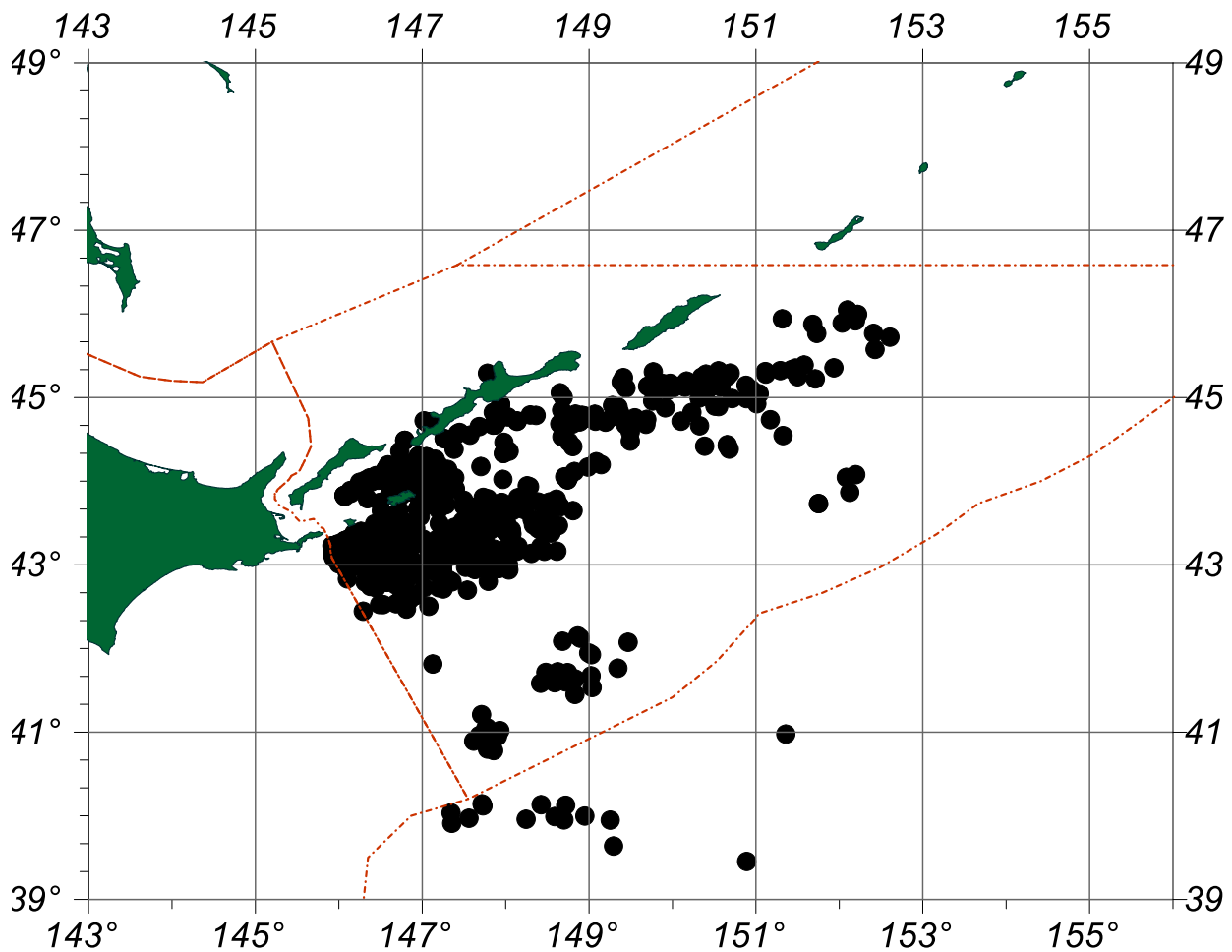


Figure 9. Chub mackerel fishing grounds for Russian vessels in the northwestern Pacific Ocean in May-September 2020