

Short communication

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Resource fishes of Lake Baikal what we lost during 200 years of their use

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ABSTRACT. The ichthyofauna of Lake Baikal consists of 58 species: 54 native and 4 introduced. 22 species, about 38%, belong to resource fishes that are used for economic activity in Lake Baikal. Resource species can be divided into 3 categories: 1) commercial species - 10 species; 2) limited fishing, or by-catch - 3-4 species; 3) economically insignificant value - 9 species. A retrospective analysis of 200-year old history shows the replacement of salmonid fish by cyprinids as the primary target of resource fishing.

Keywords: resource fishes, Lake Baikal, commercial species, salmonids, sculpins

Lake Baikal is inhabited by 58 species of fish, of which 54 are native and 4 are introduced. Of all native fish, 19 species are used in economic activity. The 4 introduced assimilated fish, 3 of the species have commercial value. *Resource fish* is a term used to describe fishes which have been used by humans in economic activity. In the ichthyofauna world, resource fish make up 10% of the total number of all known marine and freshwater species. In Lake Baikal, resource fish species that are of economic importance account for 38% (Fig. 1) of all lake fish (Sideleva, 2020). Resource fishes habitat is at a depth of 3-300 m, which makes up 23% of the total lake area.

As the result of this enormous effort, only 3 commercial species were assimilated into the lake: bream, carp, and catfish. As a new commercial subject, there was a recommendation of 3 species of cottoid fish (*Cottocomephorus grewinkii*, *C. inermis* and *Procottus major*) that had never been used in fisheries before. As a result of these measures, the total number of commercial fish increased by 20 species. Of these, not counting the introduced species, 18 species were caught during the Second World War. The time between 1942-1944 was characterized by the maximum exploitation of the resource fishes of Lake Baikal.

The total catch in 1942 amounted to about 14400 tons of fish (Kozhov and Spelit, 1958). The catchment of white-fish (omul) amounted to 64%. Fish harvest during the war years was at a higher rate than the reproductive potential of the species. The rate of fish harvest decreased in 1999, as compared to the rate in 1942, by a factor of 4.8, while the total harvested mass amounted to only 2977 tons altogether, of both target and by-catch species.

Commercial fishes. In the 19th century the list of commercial fishes (with crucian carp and introduced species), counted totals 10 species (Pezhemsy, 1853; Foundations..., 2015). The gross catch of commercial species in 2014 amounted to about 1825 tons. The qualitative composition of commercial objects changed in the direction of the dominance of cyprinid fish. The catch of roach and perch fishes in 2014 amounted to 44% of the total fish harvest, which is almost twice the amount in 1942.

Incidental commercial fish are currently represented by species that accidentally get into the gill-net and are recorded as by-catch. This group of fish is represented by 3-4 species: white-fish (1-2 species), grayling (2 species). In a pair of white-fish species, *Coregonus baicalensis* dominates, while in a pair of grayling, *Thymallus brevipinnis* dominates. In the 19th century these species were considered commercially

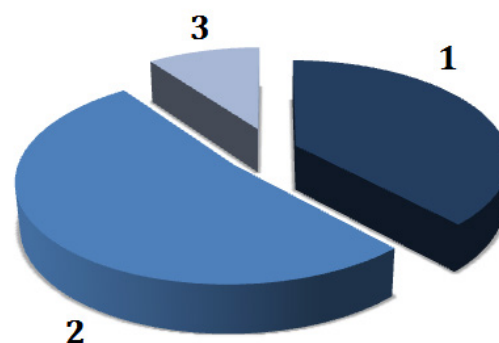


Fig.1. The number of species (in %) of fish in three categories: 1 - resource species; 2 - endemic cottoid fish; 3 - others.

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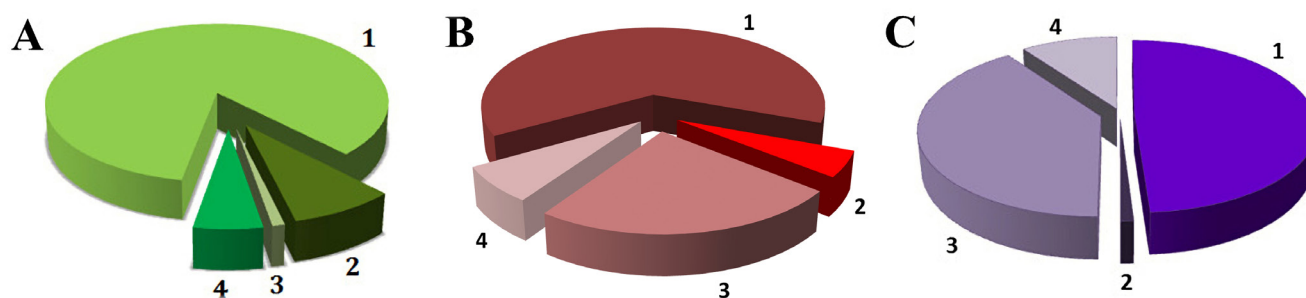


Fig.2. Catches of resource fish in Lake Baikal, 1853: 1 – white-fish (omul); 2 - sturgeon and salmonids; 3 - roach; 4 - others. Years: 1853 (A); 1942(B); 2014 (C).

viable. While in the 21st century their numbers have decreased; they are incidental species in fish harvest. Their share in the fishery is only 0.3-0.6% of the total biomass.

Fishes have lost resource importance. This group of fish is represented by 8 species from 6 families. Of the fish that have lost their resource importance, 4 species belonged to valuable fishing objects, their number is so small that they have conservation status. The Baikal population of sturgeon (*Acipenser baerii*) is listed in the Red Books of Russia (2000) and the Republic of Buryatia (2013) (Appendix II CITES). In the family, Salmonidae has lost the resource importance of both species living in Lake Baikal: taimen (*Hucho taimen*) and lenok (*Brachymystax lenok*). Taimen has a conservation status (EN, Endangered species). Species (*B. lenok*) is listed in the Red Book of Buryatia (2013) with the conservation status of VU (Vulnerable species).

All commercial species of cottoid fishes have lost resource importance. Species of the genus *Cottocomephorus* and *Procottus major* have a low population number and their fishing is financially unprofitable. Fishermen collected specimens of *Comephorus baicalensis* on shores of Lake Baikal when they were beached out after strong storms. In the 20th century, this phenomenon stopped.

Conclusion

For 200 years, the Baikal Omul has remained as the dominant resource species (excluding periods of a restriction on its fishing). In the 19th century, it accounted for 80-85% of the catch of all fish, in the 20th century - 62-70%; in the 21st century - 48% (Fig.

2). A decrease in the catch of Omul is accompanied by an increase in the catch of low-importance fish (roach, perch, etc.). The share of low-importance fish in the total catch in the 19th century was 2.5%, at the end of the 20th century - 32%, in the 21st century - 50%.

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