

Current status and catch of Siberian taimen (*Hucho taimen*) in the lower Amur River

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Abstract. Siberian taimen, *Hucho taimen* (Pall.), is a common species in the Khabarovsk region, and it occurs nearly throughout the Amur River watershed (Pacific Ocean basin) and the upper tributaries of the Lena River (Arctic Ocean basin). Taimen only inhabits two coastal rivers – the Uda and Tugur. Commercial fishing for taimen has never been prohibited in the lower and central Amur River drainage basin. This species is a valuable food fish, and is especially attractive to recreational and sport fishing. Before the Second World War, taimen catches in the lower part of the Amur River were as high as 20 tons per year, but during the war, all bans on fishing were lifted, and the taimen catch increased to 100 tons per year. The period that is probably the most revealing for estimating the taimen population in the lower Amur River watershed is 1946-1969 when harvests ranged from 15 to 35 tons. In the 1970s, taimen catches declined probably because water temperatures in the Amur River increased. In the 1980-2005 period, illegal fishing increased, commercial fishing decreased, and catch statistics became unreliable. The best taimen rivers now are located in unpopulated areas in the Amur River drainage basin and inaccessible upper regions of the Lena River drainage basin.

Keywords: Amur, catch, distribution, fishing, taimen

Historically, Siberian taimen, *Hucho taimen* (Pall.), was widespread in the Caspian, Arctic, and Pacific drainage basins of northern Eurasia, a region encompassing vast areas of the Russian Federation and parts of Kazakhstan, Mongolia, and China (Holčík et al. 1988, Vander Zanden et al. 2007). The distribution of Siberian taimen has been seriously diminished by dam construction, water diversion, pollution, poaching, and overfishing (Holčík et al. 1988, Gilroy et al. 2010). The highest Siberian taimen population diversity is found in the Khabarovsk region. The aim of this short paper is to present the state of the Siberian taimen population in the lower Amur River. All material for this overview was obtained from published papers, official statistics on Amur River catches, and field reports from the Khabarovsk Branch of the TINRO-center (KhfTINRO). Several taimen groups are associated with the Pacific Ocean in the Uda and Tugur rivers of the Amur River watershed and with the Arctic Ocean in the Aldan, Uchur, and Maya tributaries of the Lena River in the Khabarovsk region (Berg 1948; Fig. 1). The Uchur, Maya, Uda, and Tugur rivers are located in sparsely-populated watersheds, and taimen abundance there is high. Taimen is distributed unequally in Amur River tributaries, and, historically, the abundance of this species has always been lower in the central part of the Amur River drainage basin than in the lower part of it (Antonov

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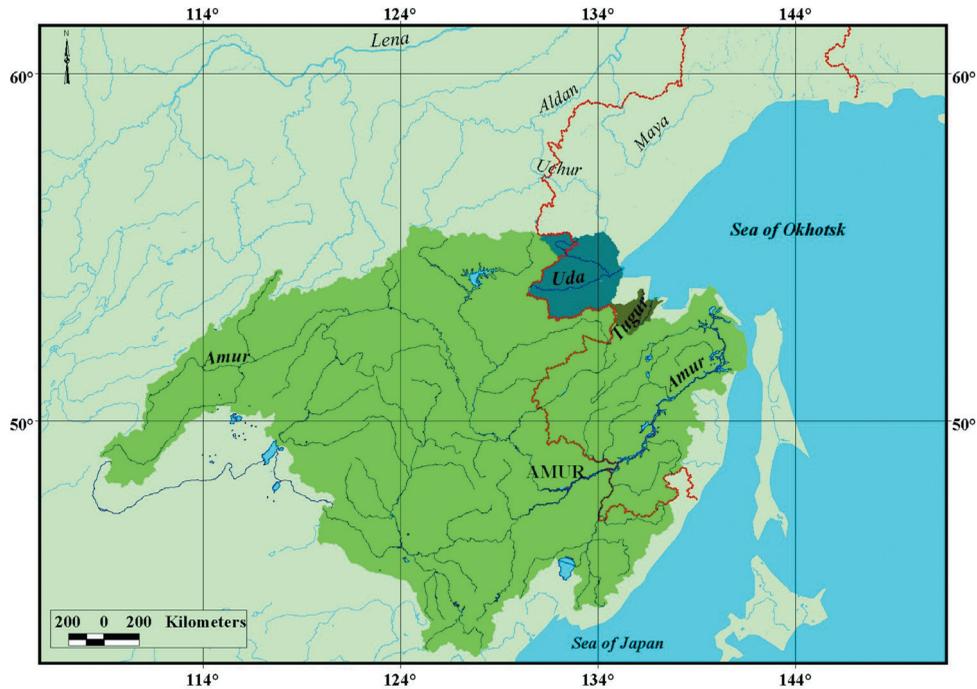


Figure 1. Study area in the lower Amur River watershed of the Khabarovsk region in the Russian far east.

2012). In 1881, taimen catches of nearly 25 metric tons (t) were recorded in central part of the basin, while in the lower part of it they were close to 125 t (Kryukov 1884). Based on catches during the twentieth century in the central Amur River watershed from the mouth of the Ussuri River to that of the Zeya River, taimen abundance was 15 times lower than in the lower part of the watershed from the mouth of the Ussuri River to the mouth of the Amur. Taimen occurs rarely on the Chinese side of the Amur River drainage basin (Kuang You-Yi et al. 2006).

No mature taimen individuals are observed in short tributaries of up to 50 km in length, but the average density of mature individuals in medium-sized rivers from 51 to 199 km in length is 281 ind. km^{-2} , which is 3.5 times higher than that in large rivers exceeding 200 km in length (P.B. Mikheev, KhFTINRO, personal communication). Commercial taimen fishing has never been prohibited in the central and lower areas of the Amur River watershed, because this species is a valuable food fish, especially to the recreational and sport fisheries (Jensen et al. 2009). There is no targeted commercial fishing for taimen,

so during its fall migration period in the Amur River, taimen is considered as bycatch in commercial harvests of other species. Some taimen are caught in the winter by locals for personal consumption. Before WWII, taimen catches in the lower part of the Amur River were as high as 20 tons per year. During WWII, all bans on fishing were lifted, and the taimen catch increased to 100 tons per year. The period that is probably the most revealing for estimating the taimen population in the lower part of the Amur River is that of 1946-1969 when harvests ranged from 15 to 35 tons. In the 1970s, declines in taimen catches probably occurred as a consequence of higher Amur River water temperatures. During *perestroika* in the 1980-2005 period, illegal fishing increased, commercial fishing decreased, and catch statistics became unreliable (Fig. 2).

Taimen sales were recorded monthly at the central market in Khabarovsk for 14 years from 1999 to 2012. Over a ten-year period from 1999 to 2008, taimen was observed at the market only three times – in August 1999, January 2000, and December 2005, and over this period prices for 1 kg increased

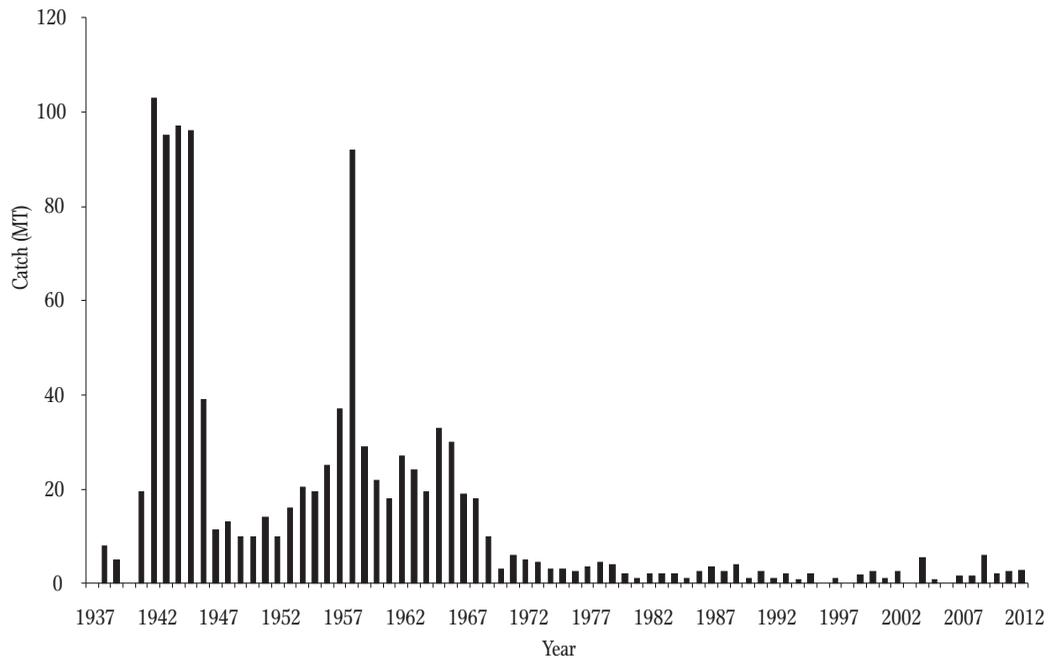


Figure 2. Siberian taimen (*Hucho taimen*) catch (in metric tons) in the lower Amur River during the 1937-2011 period.

five-fold from 50 to 250 rubles. During the 2009-2012 period, taimen was observed at the market more regularly, and the price for 1 kg increased 18 times in comparison to that of 1999, reaching 900 rubles, or \$30 US.

After 2005, federal fisheries monitoring was augmented, the Law of the Russian Federation „On Fisheries“ was passed, and catch statistics began to improve. However, official statistics still do not fully reflect the real taimen catch since they are based on the bycatch data of other species in the fall-winter period, and, consequently, total taimen abundance in these records is low. According to the Khabarovsk Branch of the Fisheries Research Institute (KhFTINRO), the biomass of the Amur River taimen population was about 55 t in the 2006-2011 period.

The Khabarovsk Branch of the Fisheries Research Institute monitors the taimen population in the lower and central Amur River watershed, and it is responsible for setting total available catch (TAC) limits for commercial fishery. With an average age of maturity of 7+, the allowable catch is 18.6% of the population. Total allowable catch is 18.6% of the stock, or 10 metric tons, of which Khabarovsk TINRO recommended catches of 0.6 tons in the

middle segment of the Amur River, and 9.4 tons in the lower segment.

According to data from P.B. Mikheev (personal communication), the age structure and biological characteristics of taimen in the 2006-2011 period indicate that the minimum age at which the fish caught reached maturity was 6+ at a length of 70 cm. The age of maturity of 50 % of the females is 7+, and reproduction does not occur every year. The instantaneous natural mortality rate for taimen is $M = 0.396$, and the instantaneous coefficient of total mortality (Z) is 0.642. The exploitation rate in the Khor River, which is in a tributary of the Ussri River in the city of Khabarovsk in the Khabarovsk region, is $u = 0.182$, and the fishery mortality rate = 18.2 %. The low value of the exploitation rate suggests that most harvested taimen are not reflected in the catches statistics.

The biological parameters (average weight of ~1 kg of individuals in research catch and average weight of mature individuals of ~ 6 kg) and the age structure show that the proportion of individuals older than 7+ decreased significantly. This could have resulted from large-scale illegal fishing using gillnets. Additionally, all fishing tour operators advertise taimen sport fishing, and the use of

helicopters have made the last, remote refuges of taimen accessible. There is concern that angler behavior and the gear they use are threatening taimen. Fishers use spoons with large, barbed, treble hooks. Catch and release sport fishing is only promoted by a few large tour companies (Novomodny et al. 2004).

In summary, taimen, with its widespread occurrence in the lower Amur River in the Khabarovsk region, is currently in danger: small population sizes are currently subjected to increasing gillnet and other fishing pressure. Taimen, one of the largest fish in the Amur River drainage basin, remains a species about which we know little. Experience has indicated that administrative efforts, such as penalties, commercial fishery bans, or Red book listings, are powerless in the fight against illegal catches and can do little to protect taimen under current conditions in Russia. Effective protection requires funding for target programs, grants to support group initiatives, and co-operation among government fisheries managers. There are five salmon hatcheries in the Amur River drainage basin that can help produce taimen fry.

References

- Antonov A.L. 2012 – Diversity of fishes and structure of ichthyocenoses in mountain catchment areas of the Amur Basin – *J. Ichthyol.* 52: 149-159.
- Berg L.S. 1948 – The freshwater fishes of the USSR and adjacent countries, Vol. 1 – Akademia Nauk USSR, Moscow & Leningrad (in Russian).
- Gilroy D.J., Jensen O.P., Allen B.C., Chandra S., Ganzorig B., Hogan Z., Maxted J.T., Vander Zanden M.J. 2010 – Home range and seasonal movement of taimen, *Hucho taimen*, in Mongolia – *Ecol. Freshw. Fish.* 19: 545-554.
- Holčík J., Hensel K., Nieslanik J., Skácel S. 1988 – The Eurasian Huchen, *Hucho hucho*. Largest salmon of the world – Dr. W. Junk Publishers, Dordrecht, Boston and Lancaster, 242 p.
- Kryukov N.A. 1894 – Some data on fisheries in Priamursky krai region – St. Peterburg, 87 p. (in Russian).
- Kuang Y.Y., Tong G.X., Yin J.S., Liang L.Q., Sun X.W., Ma B. 2007 – AFLP analysis of genetic diversity of *Hucho taimen* in Huma River – *J. Fish. Sci. China* 14: 615-621.
- Jensen O.P., Gilroy D.J., Hogan Z., Allen B.C., Hrabik T.R., Weidel B.C., Chandra S., Vander Zanden M.J. 2009 – Evaluating recreational fisheries for taimen, *Hucho taimen*, in Mongolia – *Can. J. Fish. Aquat. Sci.* 66: 1707-1718.
- Novomodny G., Sharov P., Zolotukhin S. 2004 – Amur Fish: Wealth and Crisis – Publishing House Apelsin, Vladivostok, 52 p.
- Vander Zanden M.J., Joppa L.N., Allen B.C., Chandra S., Gilroy D., Hogan Z., Maxted J.T., Zhu J. 2007 – Modeling spawning dates of *Hucho taimen* in Mongolia to establish fishery management zones – *Ecol. Appl.* 17: 2281-2289.