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Population and Habitat of the Amur Tiger in the Russian Far East

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ABSTRACT

In the beginning of 19th century, the range (areal) of *Panthera tigris altaica* included the forest part of the Korean Peninsula, the northern provinces of China, and the left bank of the Amur River in Russia and approached Transbaikalia and Yakutia. By the late 1930s, the number of tigers in Russia had decreased to 20–30 individuals. Protections against hunting (1947), the entrapment of tiger cubs (1965), and a lack of a market for tiger derivatives contributed to growth in tiger numbers. By the 1960s, the tiger population in Russia had increased to 100–110 individuals. According to a count in 1970, the population of tigers had reached 140–150 individuals. At this point in time, the range covered the forest territory of Primorsky Krai and southern Khabarovsky Krai. The last two total counts (1995–96 and 2004–05) revealed a further increase in the numbers to 450–500 animals and a range of 156,000 km^2. The latest recordings have confirmed the maximum numbers of tigers in the Sikhote-Alin and Lazovsky reserves and adjacent territories. However, the small areas of the reserves and their territorial separation preclude the maintenance of or increases in the population to or beyond 400–500 adult animals, which in genetic terms, would ensure the long-term conservation of the tiger. Further conservation of the region requires the assignment of two protective zones of 45,000–50,000 km^2 with centres in the Sikhote-Alin and Lazovsky reserves. Within these protective zones, economic development involving any type of forest felling or ungulate hunting should be fully prohibited. The creation of protective zones is the only route to preserving the natural complex of the Sikhote-Alin, including the Amur tiger in Russia.

At the beginning of the last century, the border of the area of the Amur tiger (*Panthera tigris altaica*) covered the entire Korean peninsula. In China, the geographic habitat of the tiger occupied the basins of the Songhua River and Little and Great Khingan. Furthermore, the boundary followed to the east along the left bank of the Amur River to cross the Zeya River and then crossed the Amur River again (below the mouth of the Gorin River). The boundary of the geographic range extended to the mouth of the Samarga River and to the shores of the Sea of Japan.

In the north-eastern part of the habitat, the number of tigers was relatively stable. At that time, tigers were common on the left bank of the Amur River, on the ridge of the Shuah-Pokto and Bira and Bijan river valleys, in the Ussuri river basin and on the eastern slopes of the Sikhote-Alin (Abramov, 1970). According to Silantyev (2013), in the Ussuri region in the 19th century, 120–150 tigers were hunted annually.

Although they were not permanently residents, tigers were often noted in Trans-Baikal. In 1820, one predator was shot in the Nerchinskii district, and another was killed in 1841 in the Onon river basin. Subsequent cases occurred again 1845 near Nerchinsk, close to the Agun River and three miles from the Argunskaya station (Cherkasov, 1990; Selsky, 1856).

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In the beginning of the 20th century, tiger approaches occurred significantly less frequently in Trans-Baikal, which is likely attributable to a general decline in the tiger population in the Russian Far East. In the 1930s, this animal appeared in the upper reaches of the Zeya and Argu rivers.

According to the hunting specialist D. Chugunov, in 1931, the Fedorovs brothers hunted a tiger in the Amur Region (Chokchagur Mountain). In 1934, N.A. Khomenko saw a tiger in the Zeya area of the Amur region. In the same area, a frozen tiger was found a on the northern slope of the Stanovyi ridge. Occasionally tiger tracks were observed on Dzhagdy ridge and in the Argali river valley in the Amur region (Abramov, 1974). Below the Gorin River, along which Amur tigers had not always been present, some approaches have been observed to the east of the Nizhne-Tambovskoe village (Salmin, 1941).

In the beginning of the last century in the Amur–Ussuri region, the number of tigers decreased rapidly likely due to the decreases in ungulate, particularly wild boar, populations. Ungulate populations were particularly reduced after the snowy winter of 1914. That year, the boars disappeared almost completely. According to Kaplanov (1948), the number of elk decreased by more than 1500 individuals. The tiger population might have declined for this reason.

By 1916, the tigers had disappeared from the eastern slopes of the Sikhote-Alin, and by the 30s of the 20th century, it became impossible to talk about a continuous tiger area. During this period, tigers were most common in the eastern part of the Girin province of China (PRC) to the east of the ridge of Laolin and the Little Khingan Mountains (Baikov, 1925). In the territories of Amur and Primorye, tigers remained in small groups that were isolated from each other along the Bureya, Bijan, Tyrma, Chur, Urmi, Khor, Bikin, Big Ussurka, and Ussuri rivers and in the south-western districts of Primorye. Currently, the majority of tiger sighting occur in the upper reaches of the Big Ussurka where 2–3 predators were hunted annually prior to the establishment of the Sikhote-Alin Reserve (1935).

By 1938–39 the tiger population had decreased even further in the Russian Far East. L. G. Kaplanov noted that the tiger population gradually decreased due to the capture and shooting of young adult tigers. At this time, tigers were most common in the Sikhote-Alin Reserve (10–12 individuals), and there were only 20–30 individuals in the Far East of Russia (Kaplanov, 1948).

By the 50s of the last century, tigers had disappeared from the southern part of the Korean Peninsula. The southern border of the tiger habitat was probably somewhere to the south of Pyongyang (Abramov, 1970). The area that was appropriate for tiger habitation along the Ussuri River and its main tributaries also decreased. In the remaining northern part of the area, the boundary shifted to the south. However, in the Russian Far East, local groups had been gradually merging, and a single area that covered the Anuy, Khor, Bikin, Big Ussurka, Malinovka, Zhuravlevka, Arsenievka basins and the rivers of the eastern Sikhote-Alin to the Malinovka River in the south began forming.

In the south-western areas of Primorye bordering China, tigers were observed along the Borisovka, Nezhinka, Ananievka, Amba, Barabashevka and Narva rivers. Single tigers appeared periodically in the Prikhankaysky border areas.

By the mid-1950s, the entrapment of young tigers had significantly increased. The main places of capture were the Dalnerechensky, Chuguevsky, Krasnoarmeysky and Kirovsky districts. The capturing of tigers was permitted without any restrictions. Essentially, all of the observed tiger cubs were being caught. Additionally, despite the official ban on tiger hunting, shootings by poachers continued to occur due to the existing demand for tiger skins and derivatives in China. This situation posed a threat to increases in the population and the existence of tigers. For example, from 1950 to 1960, in Primorye alone, at least 23 tigers were captured. The tiger population in the Russian Far East (i.e., the Primorsky and Khabarovsk Territories) did not exceed 58–60 individuals (Abramov, 1960).

In 1956, radical measures were taken to conserve the tiger. Specifically, a complete ban was placed on the capture of cubs. This measure was needed because the Primorye Zoologic Base could not provide the required conditions and professional personnel to maintain the animals. Consequently, another significant reduction in the number of trapped tigers occurred. Thus, in the winter of 1955–56, 15 tiger cubs were captured, and 13 died during maintenance and transportation to the central zoologic base (Moscow).

To streamline the economic use of tigers and their protection, the keeping of animal records was initiated in the winter of 1958–59. Abramov (1961) was the first to develop a methodology for tiger accounting and proposed the use of the width of the big subunguis ("heel") of the predator's forelimb as the primary parameter. As proposed by K. G. Abramov, the width of the "heel" remains the key indicator that is used for all counts of the Amur tiger. Additionally, the size of the "heel" is used for the specific identification of different individuals and assessments of their ages and genders (Miquelle et al., 2006; Pikunov et al., 2010, 2014).

K. G. Abramov found that by the end of the winter of 1959 in Primorsky Krai, the tigers were remaining in the Pozharsky, Dalnerechensky, Krasnoarmeysky, Terneisky, Chuguyivsky, Olginsky, Partizansky, Shkotovsky, Yakovlevsky, Khasansky, Khankaisky, Dalnegorsky and Kavalerovsky districts of the Primorye Territory. At the same time, tigers were recorded in the Sikhote-Alin, Lazo and Ussuri Reserves. In 1959, it was found that there were 60–65 tigers in the entire territory of Primorsky Krai that included 12 adult males, 16 females (both with broods and single), 23 cubs, and 12–14 individuals of unknown gender and age (Abramov, 1962, 1965).

According to a regional hunting inspection in the Khabarovsky Krai at the beginning of 1959, there were approximately 36 tigers. Several individuals lived in the Amurskaya oblast where they penetrated from the adjacent regions of the PRC. In Transbaikal, tigers were not observed in this period. Thus, at the beginning of 1959, the total number of individual tigers in the Russian Far East was estimated to be 100–110 individuals.

In the subsequent four years (1960–63), the tiger distribution exhibited some changes. In the northern parts of the area, the population density significantly decreased, particularly in the basins of the Bikin and Big Ussurka rivers. This decrease was likely due to the extensive development of the forests in the basins of these rivers and to significant decreases in the numbers of wild boar due to years of poor harvests of their main feed and snowy winters.