{273}

AMUR TIGER (Panthera Tigris Altaika) PRESENT SITUATION AND PERSPECTIVES FOR PRESERVATION OF ITS POPULATION IN THE SOVIET FAR EAST

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The Soviet Far East is the only place in the world where the largest population of the Amur tiger has been preserved. This species has been inscribed into the lists of the endangered species in the All-Union and International Red-data Books. In its turn, this imposes a big responsibility on our country to preserve the Amur tiger on the planet.

Many works have been written about the Amur tiger population and its density in the Far East. In order to provide careful examination of this species' population, it is necessary to receive systematic information on this subject. The aim of this report is to evaluate a prospect for survival of the Amur tiger in the Soviet Union based on the existing condition of its population.

Until 1900, the population density of tigers on the entire area of Primorye Territory was very high. It is also known that until 1884 tigers were found as far as Vladivostok. A hundred years later this animal again began to appear in the city, but this time for different reasons.

In order to obtain information about the Amur tiger population and its density on this territory, our country keeps records of its population systematically and at the same time provides the measures to ensure the preservation of this rare species.

The first registration of the tiger population conducted by Kaplanov in 1939-40, showed that this species was preserved only in Primorye Territory and its population was not more than 20 to 30 animals. These data served as the basis for prohibiting the tiger hunt in the Soviet Far East. This law came into force in 1947 on the initiative of Abramov, a well-known specialist of the wildlife management in the Far East. In this way, direct threat to this species was eliminated, but limited trapping of cubs still continued, and from 1947 until 1956 32 cubs were entrapped (Abramov, 1956). This was one of the reasons why the tiger's population grew very slowly. Therefore, later trapping of living animals was prohibited for a period of five years. During 1958-59, a special registration of the tiger's population was conducted that numbered 55-56 tigers (Abramov, 1961). In the mid-1960s, the wildlife management of Primorye Territory registered 70 animals (Kudzin, 1966), but in 1969 their number already reached 110-134 tigers. During the winter of 1969-70, a special registration was conducted that counted 130 animals in Primorye Territory: 29 male tigers, 46 females, 50 cubs and 7 tigers of undetermined sex (Yudakov and Nikolayev, 1972).

During 1978-79 and 1983-84, the author of this paper directed the registration work in Primorye Territory.

METHODS OF RESEARCH

In 1961, Abramov proposed a method of measuring a tiger's front paw pad as the basis to identify tigers. The following categories of tigers were distinguished based on the sizes of their tracks:

1. Cubs with the width of their pads between 6.5 cm and 8.0 cm who are usually attached to their mothers.

2. Adult independent tigers with the width of their pads equal to 9 cm or more.

Since determining the sex was not always possible and if so, only in adults, all tracks with the pads' width of 10.5 cm or more were considered to have been made by males. An animal was considered to be a female if its tracks were followed by small tracks, ones made by cubs (Pikunov and Bragin, 1987).

Beginning in 1961, the author of this paper conducted a long-term field research in different parts of Sikhote-Alin. Therefore, by the beginning of the registration conducted in 1978-79 and in 1983-84, the research group had a fairly clear idea about the distribution of the tigers on the territory, their attachment to certain biotopes, about the sizes of their habitats, the length of their travel routes during a 24-hour period, and about the places of their passages that are invariable for many years.

By the time the 1984-85 registration had been conducted, all existing tigers' passages had been discovered. Every hunting range with the size of 10,000 hectares and every huntsman's route in the reserve or in the wildlife management were provided with a record book that included a map of their territory with a projected itinerary. An itinerary was projected taking into consideration possible tigers' travels.

During the 1983-84 winter, the data on the tigers' passages were corrected. The 1983-84 registration was conducted on the entire area of Primorye Territory from February 10-15, 1984. Some 845 record books were prepared and 520 people participated in the registration work.

Tigers' registration on the Western slope of the Sikhote-Alin was conducted on the entire territory of the slope, while on the Eastern slope only two regions were chosen: North-eastern region with the area of 13,000 km^2 and Southern region with the area of 1,000 km^2 (Figures 1 and 2).

THE RESULTS OF THE RESEARCH

In 1983-84 as well as back to 1978-79, tigers inhabited Primorye Territory mainly in the Sikhote-Alin ridge and in the South-western region of the Territory, the total area of which was 110,000 km^2. In the South-western region, the tiger population increased sharply from 2-3 to 13 animals counting also those tigers who migrated from China (Yudinov and Nikolayev, 1973). In the Sikhote-Alin region, some changes in the tigers' population number and their distribution on the territory were found. Tigers began to appear systematically in the northern and alpine areas of the Sikhote-Alin ridge, while in the western area of the ridge tigers still were not found (see Figure 3).

In 1979 the tiger population was estimated to be 70-195 and the average population density was 2.2 to 2.5 animals per 1,000 km^2. In 1984-85, the tiger population increased to 285-293 animals and the population density had reached 2.6 to 2.7 animals per 1,000 km^2 (Table 1).

DISCUSSION

The results of the registration conducted in 1983-84 showed that though the tigers population on the Western slope of the Sikhote-Alin ridge remained the same, on the Eastern slope of the ridge a considerable increase of the population was registered as compared with 1979.

Estimated number of cubs per one adult female on the Western slope of the Sikhote-Alin ridge was 0.9 animals, while on the Eastern slope it was 1.7. This big difference in numbers points to possible registration errors on this territory.

Annual population increase in the Northern and Southern parts of the ridge fluctuated from 10% to 14%, while in other parts it remained 2% to 3%. The average population density on the entire territory of the Sikhote-Alin ridge, including the Northern and Eastern parts of the ridge, was 2.5 animals per 1,000 km^2, while in the Northern part alone the population density was registered 8.6 tigers per 1,000 km^2. Again this big difference in numbers points to apparent errors.

It is interesting to trace the tiger's population growth beginning from the end of the 1930s. From 1939 to 1959, the population increased by 25 animals, which meant an average increase of 2.4% per year. From 1959 to 1970, the tiger population increased by 75 animals which implied 5% per year. From 1970 to 1979, the increase was 50 to 60 tigers or 3% per year.

Later a considerable decrease of the wild boar population was observed (wild boar is the main food for the Amur tiger). In Primorye Territory its population dropped from 30,000 animals in 1979 to 7,000 animals in 1979. Industrial developments and especially intensive felling of cedar and broad-leaved forests continued on this territory.

This resulted in a conflict situation that appeared between the man and the tiger, which in its turn forced the man to kill or to entrap up to 20 or more tigers per year. In this situation, an annual increase of the tiger's population was not more than 2%.

Based on this, we are inclined to think that the tiger's population on the Eastern slope of the Sikhote-Alin ridge was obviously overestimated. Hence, the total number of the tigers in Primorye Territory in 1984-85 was not 280 to 290 animals as it was estimated before, but just barely 200 to 210 tigers. Then for the whole Soviet Far East, the tiger's population would be 240 to 250 animals, and at present there is a steady tendency to decrease.

CONCLUSION

Investigations conducted in various parts of the Sikhote-Alin ridge showed that from the beginning of the 1980s, the Amur tiger population in the Soviet Union was found to be in a critical condition despite its growing number.

The area of the tiger's permanent habitat has reached 165,000 km^2, while the area of their regular visitations including the left bank of the Amur river has expanded up to 5,000 km^2. At present, the Amur tiger has inhabited all the areas suitable for living in Primorye Territory and on the Southern part of Khabarovsk Territory.

Beginning from 1983, tigers started to appear in absolutely all the populated areas of Primorye Territory and began to attack domestic animals. This situation resulted in compelled killing of up to 20 tigers annually.

To eliminate the emerged conflict between a man and a tiger, the following urgent measures had been worked out:

1. Ungulates hunting was prohibited in Primorye Territory and in the Southern areas of Khabarovsk Territory. It was supposed to allow limited hunting of wild boars and elks only in those hunting managements where their population density would exceed five to six and six to seven animals respectively per 1,000 hectares of a hunting range.

2. In Primorye and Khabarovsk, hunting managements special commissions of experts were formed whose responsibilities included evaluating harmful activities of some big carnivores, and primarily of the tigers, and then in case of necessity, providing measures to render them harmless.

3. Special traps were made to catch alive those animals who got into populated areas or attacked domestic animals.

4. Transportation with further release of the untrapped tigers into distant forests were provided.

5. To ensure operative protection of people and domestic animals from tigers' attacks, Primorye and Khabarovsk Territories were granted the rights to take their decisions about entrapping or even killing some tigers independently after receiving expert conclusions from commissions.

The measures listed above are undoubtedly operative and would not solve the problem of preservation of the Amur tiger in the Soviet Union. Therefore, specialists from the Pacific Institute of Geography of the Far-East Branch of the USSR Academy of Sciences proposed strategic measures for nature protection that in its turn would help to solve "the tigers' problem."

First of all, the Amur tiger should be excluded from the convention #1 resolution that probade to sell rare species. At present, as never before, there is a necessity to entrap those cubs that settled near populated areas. These cubs could and should become a big genetic contribution to the best zoos of the world. In its turn, that might favor considerably in preventing inbreeding that the zoos' populations are experiencing now.

It is necessary to enlarge the areas of Sikhote-Alin and Lazovsk state reserves up to 7,600 km^2 and 3,115 km^2 respectively, by including into them those areas that have maximum population density of tigers and ungulates. Reserve management is the best way to ensure preservation of any genotype, and the tiger, the largest carnivore in the world, has rights for a suitable territory.

It is also important to create Northern and Southern protected zones adjacent to the existing reserves that would constitute together with the reserves 13,238 km^2 and 10,388 km^2 respectively (Figure 4). Forests' felling and ungulates' hunting should be prohibited forever in these protected zones and poaching control should be intensified. The hunting managements that are located on the territories of the projected protected zones should allow only professional hunters to hunt fur-bearing animals. Existing timber industries should be eliminated. The number of people moving into these areas should be limited. Construction of large industrial enterprises on the territories of the protected zones should be absolutely prohibited. In order to limit the tigers' population growth on unprotected territories, we should increase entrapping of cubs. It is also necessary to continue developing more effective methods for entrapping tigers alive using temporary paralyzing preparations. This would reduce the cost of the Amur tigers when selling them to foreign zoos.

In order to ensure constant observation of the Amur tiger's population, it is necessary to carry out regular registrations of their population on the entire territory of the Soviet Union not less than once every five years.

We should collect annual information about the tiger's population from hunting managements and reserves of Primorye Territory. Hunters and foresters should keep their record books regularly, and at the end of a hunting season, the record books should be submitted to the Chief Hunting Administration. Every year not later than April 15, the Pacific Institute of Geography should receive the record books for further processing of the information.

Preservation of the Amur tiger, the largest and integral center of which is located in the Soviet Far East, would be impossible without international cooperation.

Table 1. Distribution and population number of tigers in Primorye Territory.

Area	Population Number (Yudakov and Nikolayev) 1970	(Pikunov) 1979	(Pikunov and Bragin) 1984-85
South-western	3	2	8
Western	4	0	0
Southern	32	40-45	80
Central	41-43	47-59	67
North-eastern	41	71-76	82-90
TOTAL:	134-135	179-195	285-293

Table 2. Demographic data about the Amur tiger in different areas of Sikhote-Alin in 1985.

Area	Female	Male	Young Adults	Undetermined Sex and Age	Cubs per one Female	Density per 1,000 km^2
Eastern slope	26	23	44	5	1.7	4.5
Western slope	40	42	39	24-32	0.9	2.5-2.6
South-western	3	1	4	-	1.3	18-2.6

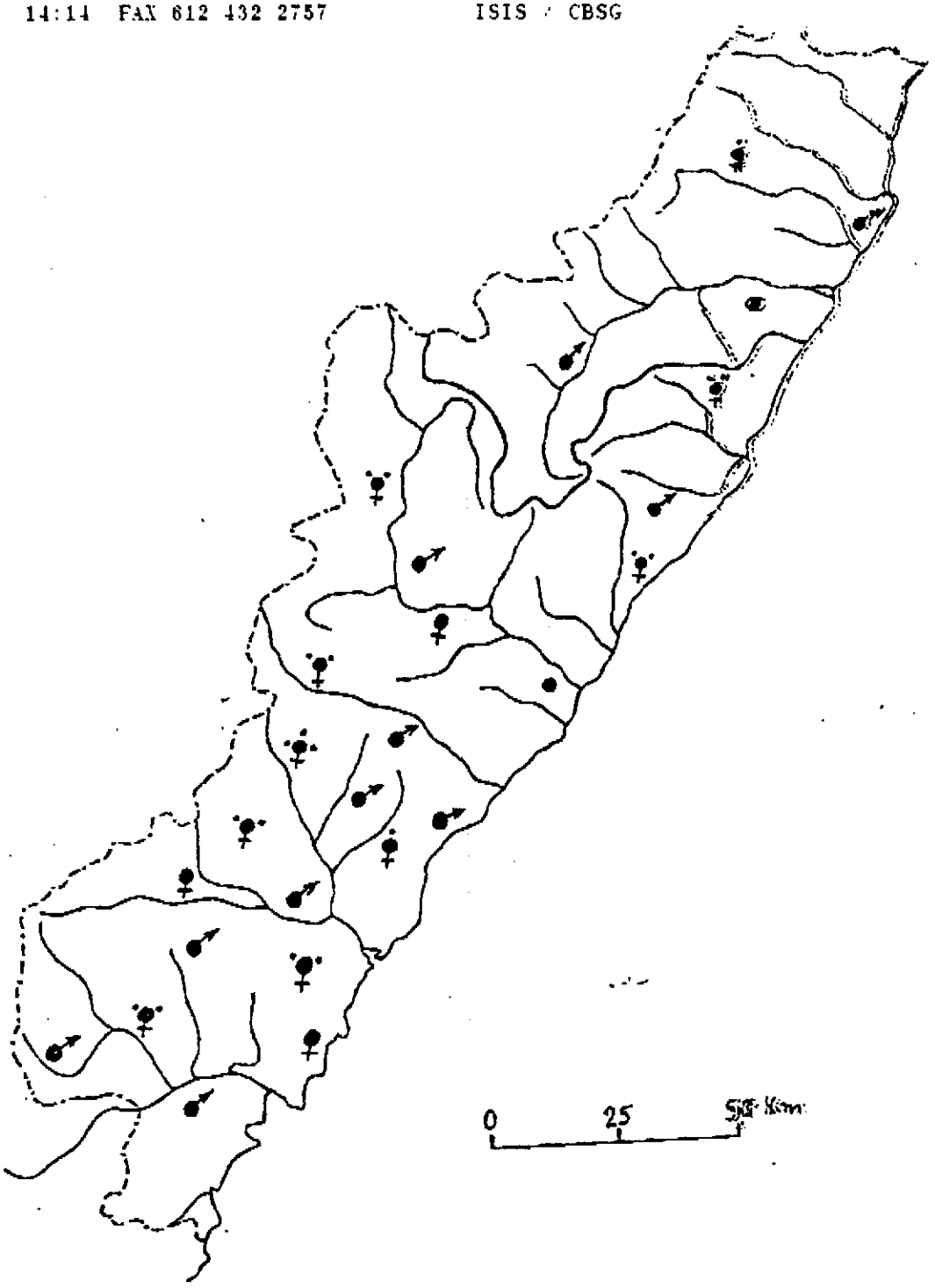

Figure 1. The results of the tiger's registration in the Northern research zone.

♂ -- adult male
♀ -- adult female
♀ -- adult female with two cubs
• -- adult tiger of undetermined sex

(Pikunov and Bragin, 1985)

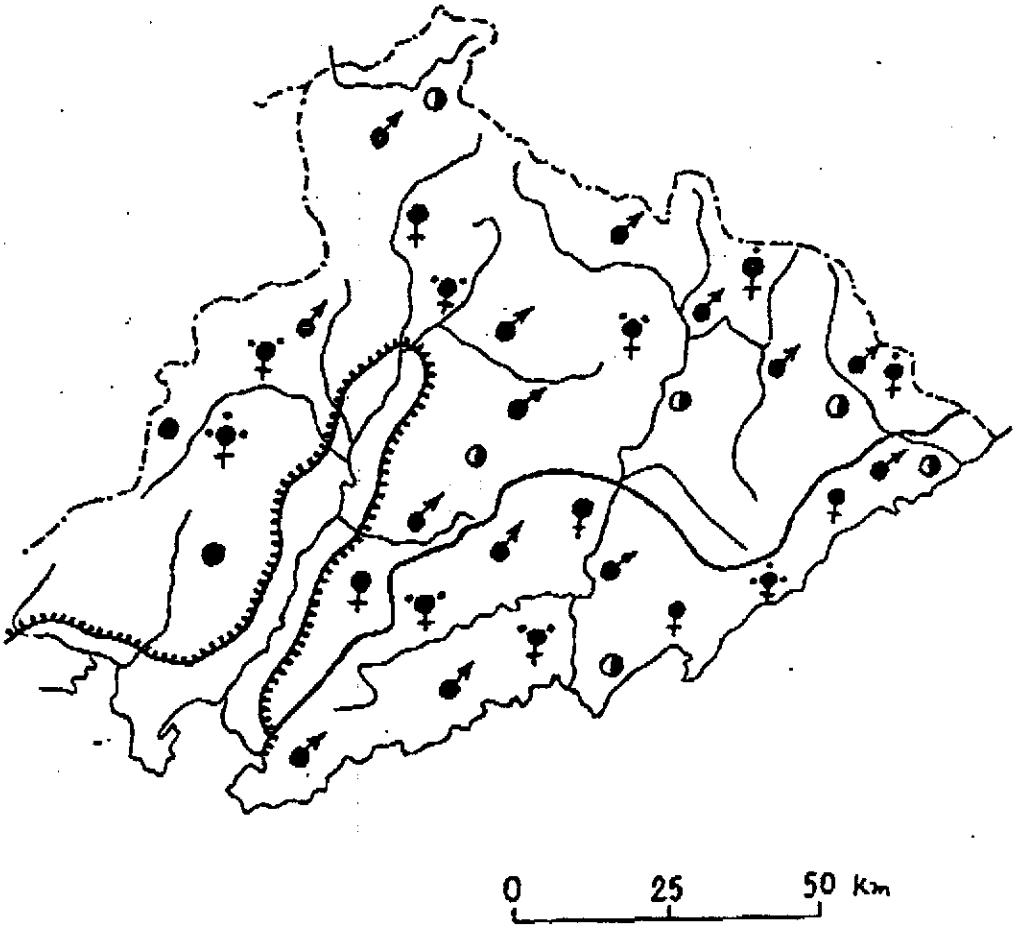

Figure 2. The results of the tiger's registration in the Southern research zone.

♂ -- adult male
♀ -- adult female
♀ -- adult female with two cubs
● -- adult tiger of undetermined sex

(Pikunov and Bragin, 1985)

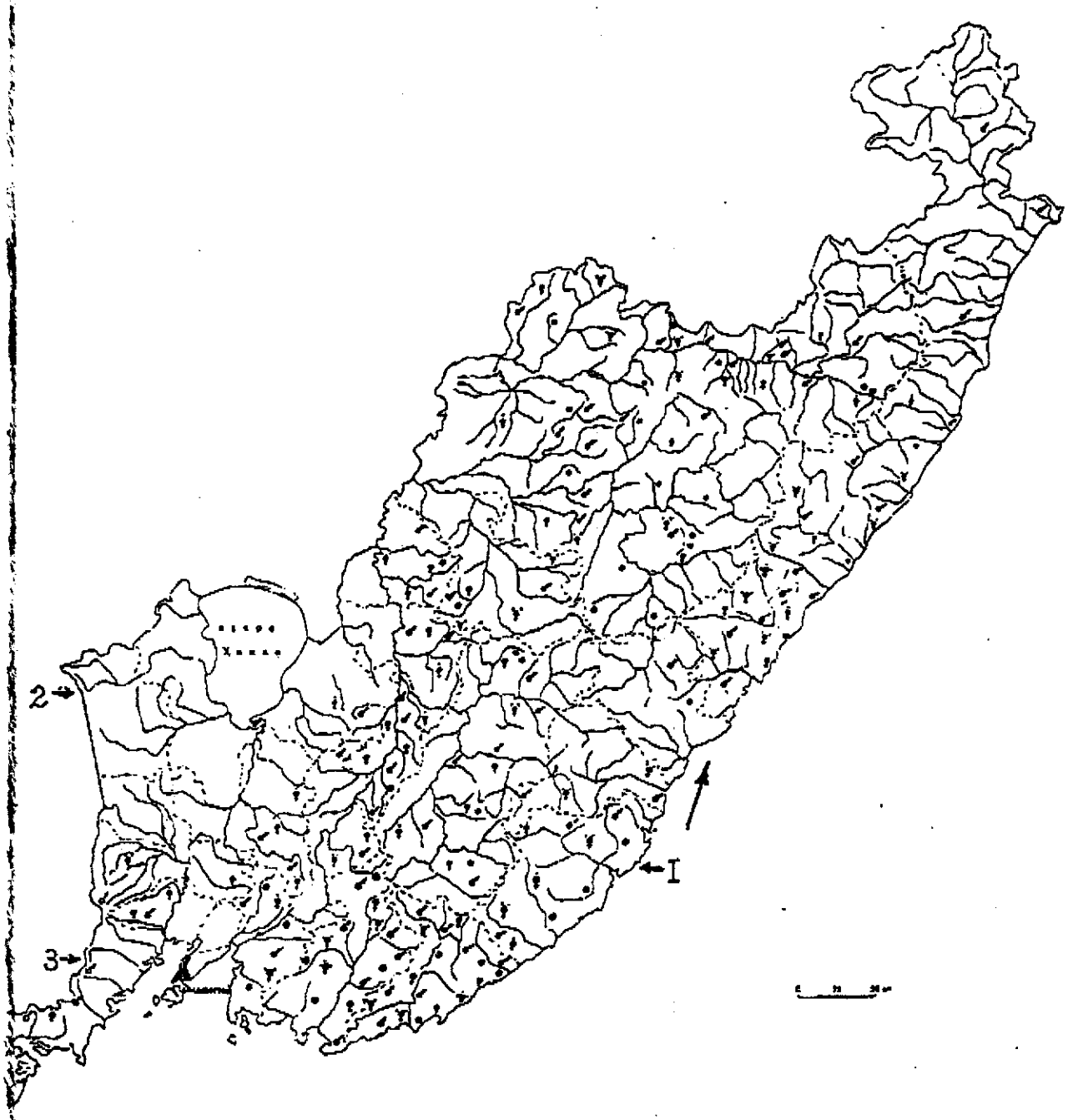

Figure 3. Tiger distribution on the entire area of Primorye Territory in 1984 to 1985.

♂ -- adult male
♀ -- adult female
♀ -- adult female with two cubs
-- adult tiger of undetermined sex
♂♀ -- tigers coming from China

1 -- Sikhote-Alin
2 -- Western
3 -- South-western

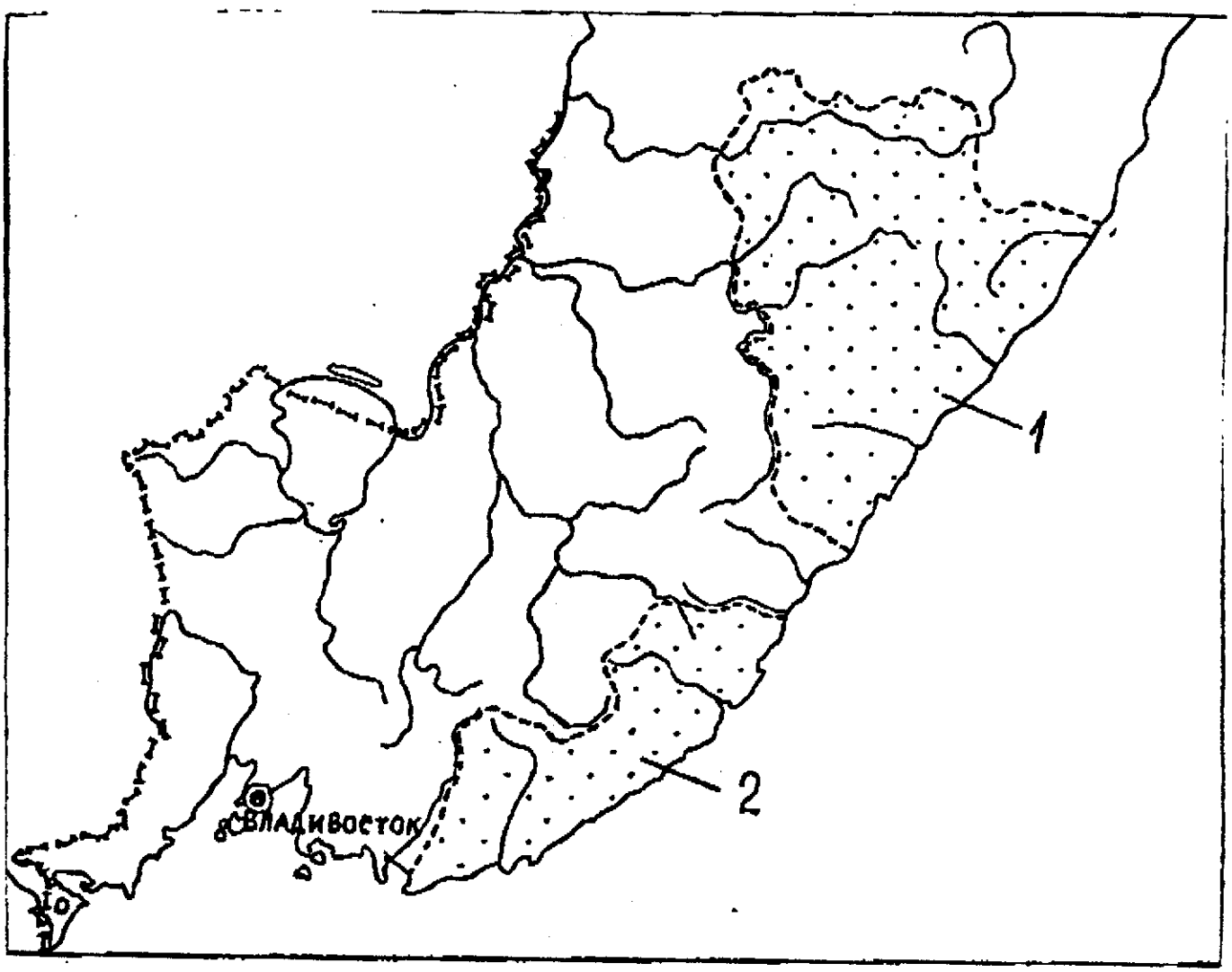

Figure 4. Proposed borders of the Northern (I) and Southern (2) protected zones in Primorye Territory. (Pikunov and Bragin, 1985)