

TRANSLATIONS

Editorial Introduction

The following paper on Horsfield's tortoises in Kazakhstan was originally published in Russian in 1988. The author documents population densities at 15 different localities in the Almaty and Taldyqorghan Districts through the novel approach of counting tortoises visible from an automobile. During the four year study, 408 km of auto routes were driven, during which 12,380 tortoises were counted. Additional surveys on foot extending another 33 km yielded 888 additional tortoises. Average tortoise densities at a single site over the four years ranged as high as 15.1 individuals per hectare, with single season densities as high as 19.2 individuals per hectare. However, most areas had lower tortoise densities, averaging 0.5–7.1 tortoises per hectare. The author cautions that annual harvests of tortoises at current levels of exploitation are not sustainable.

This translation was prepared by Cheryl A. White through the arrangement of James R. Buskirk, with further reworking by the editorial staff.

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Population Density of the Steppe Tortoise in some Regions of the Almaty and Taldyqorghan Districts, Kazakhstan

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The steppe tortoise [*Testudo horsfieldi*] is one of the few reptiles of economic significance in our deserts. In 1932 in Kazakhstan, 27,000 tortoises were collected (Shnitnikov, 1934). Intensive collection in the current period has reached 150,000 per year. In order to protect tortoises and to ensure the most efficient use of them it is most important to calculate their numbers. However, there is little published data on this subject (see summary, Bogdanov, 1960). Most available data pertains to the 1940s through the 1960s. Work from the 1970s cites data for a few areas of Central Asia (Makeyev, 1979; Atayev, 1979; et al.).

We conducted studies of the numbers of tortoises during April and May, 1975–78, in the Balqash, Ili, Qurtinsk, and Talgarsk Districts of Almaty and Kerbulaq, and in the Kirovskiy region of the Taldyqorghan District [Kazakhstan] (see Map). The innovative opportunity to count tortoises from automobiles occurred along roads, in which the width of the study area was 20 m for each census. The extent of 36 auto routes for 38 census days was 408 km. The general area of the census was 1480.2 hectares [ha], in which 12,830 tortoises were counted. In places of high population density, another 33 ha extending 33 km were covered on foot, yielding another 888 of the reptiles. The counts were conducted during the periods of greatest tortoise activity, i.e., during April from 1000–1200 hrs and from 1600–1800 hrs at a mean air temperature of 18.5°C. The actual temperature range, taken from 40 readings throughout the four-year period, was 15–25°C.

In the Kerbulaq Massif, within the area of highest tortoise concentration and most extensive exploitation, we conducted studies over four consecutive years on basically

the same route. Besides Kerbulaq, we surveyed the desert clay plains at a distance of 25 km above Mt. Qapshaghay, along the Ili River, and in the neighborhood of Bozoi village near Qurtinsk Reservoir. The gray earth plains between adjacent sandy areas in the neighborhood of Bakbakti village were also surveyed. In the fine-grained sandy areas and adjacent plains 30–50 km west of Ainabulak Station, at the south end of the Saryshik Otray Sands, a study was also carried out; the Malaisary, Arharli, and Kokshyel Ranges were also surveyed. Vegetation in the study areas consisted of ephemeral grass in association with wormwood (*Artemisia*).

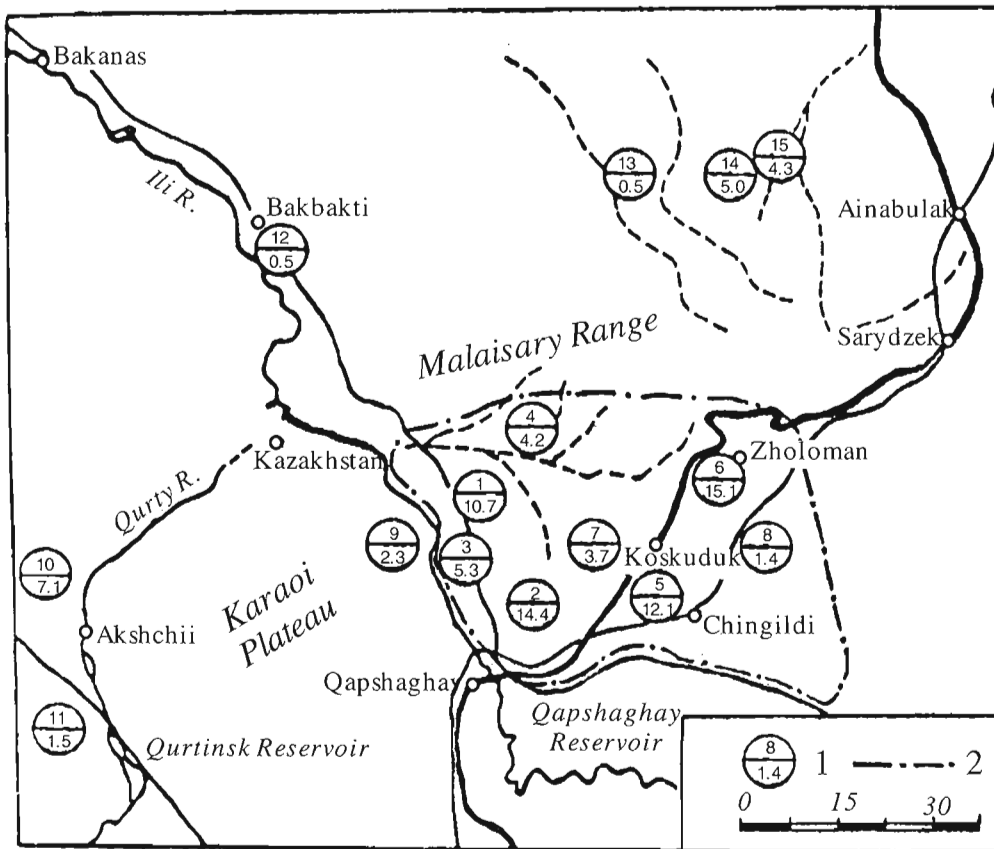
The number of tortoises in various places was unequal, while repeated surveys in those same areas provided a quantitative pattern (Table 1). The largest density of the reptiles was in the southeastern Kerbulaq Massif, in the vicinity of Zholoman village, where tortoises inhabit the narrow plains between the Arharli Range and the fields. An average of 15.1 tortoises per ha were counted here over two years. In the southwestern part of Kerbulaq the average number of animals per year amounted to 14.4/ha, and around Chingildi village there were 12.1 tortoises/ha (four years of data). Here the density of tortoises in 1975 was lower than in the following years because a larger area was covered, much of which was unsuitable for tortoises.

In northern Kerbulaq, the three-year tortoise census came to 10.7 tortoises/ha. With increasingly broken relief and soil rockiness, the number of tortoises diminished, for example, in the southern Malaisary Range, 4.2 tortoises/ha; the western Arharli Range, 1.4/ha; and in a part of western Kerbulaq, along the Ili River where deep, rocky ravines

Table 1. Tortoise numbers in the Kerbulaq Massif, Talgarsk Region of Almaty District.

Site No.	Study Site	1975	1976	1977	1978	Avg. No./ha
1	N Kerbulaq	$\frac{12.6^*}{32.0^*}$	$\frac{10.0}{37.2}$	$\frac{7.3}{11.4}$	—	10.7
2	SW Kerbulaq	—	$\frac{12.1}{121.1}$	$\frac{17.7}{38.2}$	$\frac{15.6}{120.8}$	14.4
3	W Kerbulaq	$\frac{5.3}{58.8}$	—	—	—	5.3
4	S Malaisary Range	—	—	—	$\frac{4.2}{53.2}$	4.2
5	Vic. of Chingildi	$\frac{10.6}{154.8}$	$\frac{12.8}{124.4}$	$\frac{13.2}{64.8}$	$\frac{15.3}{23.6}$	12.1
6	Vic. of Zholoman	—	$\frac{14.1}{75.2}$	$\frac{19.2}{17.2}$	—	15.1
7	Vic. of Koskuduk	—	$\frac{3.7}{37.6}$	—	—	3.7
8	W Arharli Range	—	—	$\frac{1.4}{2.2}$	—	1.4
Total area (ha)		245.6	395.6	133.8	197.6	

* Numerator = Density (tortoises/ha), denominator = study site area (ha).



Map. Steppe tortoise survey areas in the Almaty and Taldyqorghon Districts, 1975-1978: 1 – tortoise density (numerator = study site number [see Tables 1 and 2]; denominator = specimens/ha); 2 – Kerbulaq Massif.

Table 2. Tortoise numbers in some regions of the Almaty and Taldyqorghan Districts.

Site No.	Study Site	1975	1976	1978
Almaty District				
9	Left bank of Ili R., 25 km above Mt. Qapshaghay	—	$\frac{2.3^*}{124.8^*}$	—
10	Vic. of Bozoi	—	—	$\frac{7.1}{14.4}$
11	W bank Qurtinsk Res.	—	—	$\frac{1.5}{16.0}$
12	Vic. of Bakbakti	—	—	$\frac{0.5}{9.6}$
Taldyqorghan District				
13	Fine-grained sands	$\frac{0.5}{124.4}$	—	—
14	Tracts btw. foothill ravines of Mt. Kokshyel and the sands	—	$\frac{5.0}{79.2}$	—
15	NW rim of Mt. Kokshyel	$\frac{4.4}{86.0}$	$\frac{4.1}{35.2}$	—

* Numerator = Density (tortoises/ha), denominator = study site area (ha).

alternate with high plains, 5.3/ha. In southwestern Kerbulaq, the area of greatest collection, the unevenness of tortoise distribution was strongly indicated: for example, on 8 May 1977, 48.5 individuals were counted on a two-hectare section (24.2/ha). According to Paraskiv (1956), up to 41 tortoises per hectare were previously found on the right bank of the middle and lower reaches of the Ili River in clay desert with *Artemisia* vegetation. In this same area today, for a distance of several km, one may come across only scattered, solitary individuals due to the overcollection of tortoises.

North of the Kerbulaq Massif, on the right bank of the Ili River, the 1978 tortoise census near Bakbakti village consisted of only 0.5 tortoises/ha (Table 2). On the left bank, the density amounted to 2.3/ha; near Bozoi village, 7.1/ha (at the southern extremity of the Taukum Desert); and 1.5/ha on the hilly clay plains of the western shores of the Qurtinsk Reservoir.

A density of 5.0 tortoises/ha was noted in the Taldyqorghan District, on the plains adjacent to the sands (see Map and Table 2).

The data collected allow for the following conclusions:

1. The use of automobiles for counting tortoises is advantageous in that it permits coverage of larger areas. For gender determination in these samplings, however, it is necessary to rely upon foot routes as well. The best times for surveys are 1000–1200 hrs and 1600–1800 hrs for the first three weeks after cessation of hibernation (early April).

2. In spite of the broad distribution of tortoises in the Almaty and Taldyqorghan Districts, tortoise density is not high (0.5–7.1 tortoises/ha). Only in certain parts of the Kerbulaq Massif in Almaty District do harvestable numbers occur (10.7–15.1 tortoises/ha).

3. To better preserve the overall tortoise numbers in commercial collecting areas it is necessary to lower the volume of harvested tortoises to 40,000 specimens. In the southwestern Kerbulaq Massif, in the section with the highest tortoise density, it is necessary to establish a preserve for their protection between April and June.

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