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SNOW SHEEP (*OVIS NIVIKOLA ALLENI* MATSCHIE, 1907), WILD REINDEER (*RANGIFER TARANDUS* LINNAEUS, 1758) AND BROWN BEAR (*URSUS ARCTOS* LINNAEUS, 1758) IN THE TOKO-STANOVIK NATIONAL PARK AND ITS ADJACENT TERRITORY

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The Toko-Stanovik National Park covers about 257 thousand hectares. It was established at the end of 2019 in the north of Amur Region, next to where its boundary meets Yakutia and Khabarovsk Krai. This territory is highly important for preservation of *Ovis nivikola alleni* Matschie, 1907, which is a rare and insufficiently explored subspecies of bighorn sheep, listed in the Red Data Books of Amur Region and Yakutia. In the Amur territory they inhabit a relatively narrow area of 5-15 km of the Toko-Stanovik highlands (the eastern part of the Stanovik Ridge) that stretches along the northern boundary of the region, from the Okonon River source in the west to the Maya River source in the east. Moreover, the bighorn sheep are common species on the Dzhugdyr Ridge, from the Ayumkan River source (right inflow of the Maya River) to the Bolshiye Inagli and Lucha Rivers sources (left inflows of the Kupuri River; Podolskiy et al., 2009). The most of the bighorn sheep's population in the Amur Region can be found within the national park. Information on their spatial distribution, abundance, sex and age that we present in the article was obtained during four expeditions in 1993, 2009, 2018 and 2020. The main part of this work is based on the data for July-August 2020, when along with the data on bighorn sheep we collected some for the wild reindeer and brown bear. The results of our observations generally indicate the conditions of the national park territory are favorable for bighorn sheep, reindeer and brown bears. Within this specially protected nature area, according to our estimations, the animals' number is as follows: 250-300 snow sheep, 700-800 reindeer, 50-60 brown bears. However, we should note that the potential risks for the sheep population are increasing due to intensifying anthropogenic activities. A quick development of road system, mining and lumbering activities take place close to the main habitats of bighorn sheep. Trophy hunting intensifies, damaging their population in the Toko-Stanovik region; we have already registered a decrease in the amount of adult males and young sheep. To preserve this population group a special protection of the sheep's key habitats is organized, primarily of the large salt licks. Besides, it is necessary to create a protected zone of the national park and establish a specially protected federal area in the adjacent territory of Yakutia.

Keywords: snow sheep, bighorn sheep, wild reindeer, brown bear, trophy hunting, negative impact, population, population density, protected area.
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The Toko-Stanovik National Park was established in December 20, 2019. This new specially protected natural area covers 257 thousand hectares in the north of Amur Region, next to where its boundary meets Yakutia and Khabarovsk Krai. This territory is highly important for preservation of a snow (bighorn) sheep, the subspecies of which (*Ovis nivikola alleni* Matschie, 1907) inhabits the Toko-Stanovik and is listed in the Red Data Books of Amur Region (2009, 2020) and Yakutia

(2003). Snow sheep are the most insufficiently explored ungulates of Amur Region. Most of the local population is gathered within the National Park (Podolskiy et al., 2019).

In the Aral Region the bighorn sheep inhabit a relatively narrow area of 5-15 km of the Toko-Stanovik highlands (the eastern part of the Stanovik Ridge) that stretches along the northern boundary of the region, from the Okonon River source in the west to the Maya River source in the east (Gotvansky, Podolskiy, 2000). Moreover, they are common species on the Dzhugdyr Ridge, in the territory stretching from the Ayumkan River source (right inflow of the Maya River) to the Bolshiye Inagli and Lucha Rivers sources (left inflows of the Kupuri River; Podolskiy et al., 2009). A complex terrain with a lot of rocky areas, alternating with alpine vegetation, provides favorable conditions for these particular mountain ungulates. However, the shortage of feeding sources during winter, as well as the sheep's specific way of defense in response for possible disturbance from people and predators, significantly limit their choice of biotopes (Fil, Mosolov, 2010).

In the recent years the negative anthropogenic impact on the population of bighorn sheep has been continuously increasing. The western part of the Toko-Stanovik is intersected by the Ulak-Elga railway and highway, which make it possible for cross-country vehicles to intrude into the sheep's habitats. In Yakutia to the north there is the Elga coal deposit, developing since 2000. From the southwest the sheep's habitats are approached by forest cutting activities. In the east there is a large geological exploration of the nickel deposit (the Ayumkan River mouth and the Kun-Manye River basin) about to be completed, after which its development should start. The rapidly growing popularity of trophy hunting for mountain ungulates in Russia has become a serious problem as well (Zheleznov-Chukotsky, 2007). Meanwhile, due to the remote dislocation and hard accessibility of the habitats, it is not yet possible to provide full protection of the sheep's population in the Amur Region.

To guarantee an effective protection it is necessary to have sufficient information about the bighorn sheep's distribution, number, areas of their maximum population density and their specific ecology. In this work we present the census data for the bighorn sheep of the Toko-Stanovik, which was obtained during four expeditions with the help of the Zeya Nature Reserve crew in 1993, 2009, 2018 and 2020. In 2020 we have additionally collected data on other animals' number for such large mammals as wild reindeer (*Rangifer tarandus* Linnaeus, 1758) and brown bear (Ursus arctos Linnaeus, 1758).

Materials and Methods

The data presented in the article on the abundance, sex and age composition of snow sheep were collected in 1993, 2009, 2018 and 2020. In August 1993 we monitored the area of Mount Ayumkan. Nowadays this territory lies within the eastern part of the National Park. During September and early October 2009 our observations took place to the east of Lake Okonon, at the western border of the sheep's (*Ovis nivikola alleni* Matschie, 1907) range, where the current northwestern border of the National Park and the border of the "Vostok" resource reservation (Yakutia) meet. In 2018 and 2020 we monitored the watershed of the upper reaches of the Zeya and B. Tuksani Rivers in the central part of the sheep's range.

The main part of the data was obtained from 23.07.2020 to 21.08.2020 inclusively. We monitored the area round the sources and upper reaches of the Zeya and B. Tuksani Rivers in the territory of the Toko-Stanovik National Park in Amur Region and in its adjacent territory of the "Vostok" resource reservation in Yakutia. Our main aim was to record the numbers, sex and age composition of bighorn sheep using the method of visual observations. We have also collected data on the wild reindeer and brown bear along the way.

Census on the plots. Our main method to determine the density of the bighorn sheep's population was visual registration, carried out on the census plots in the openings of slopes and ridges. It was based on N.K. Zheleznov-Chukotsky's methodology (1994). We used it in the Toko-

Stanovik in 2020 as follows: we selected 12 plots (Fig. 1) after defining their areas on a topographic map at a scale of 1:100000, without taking the relief into account. These plots are described below.

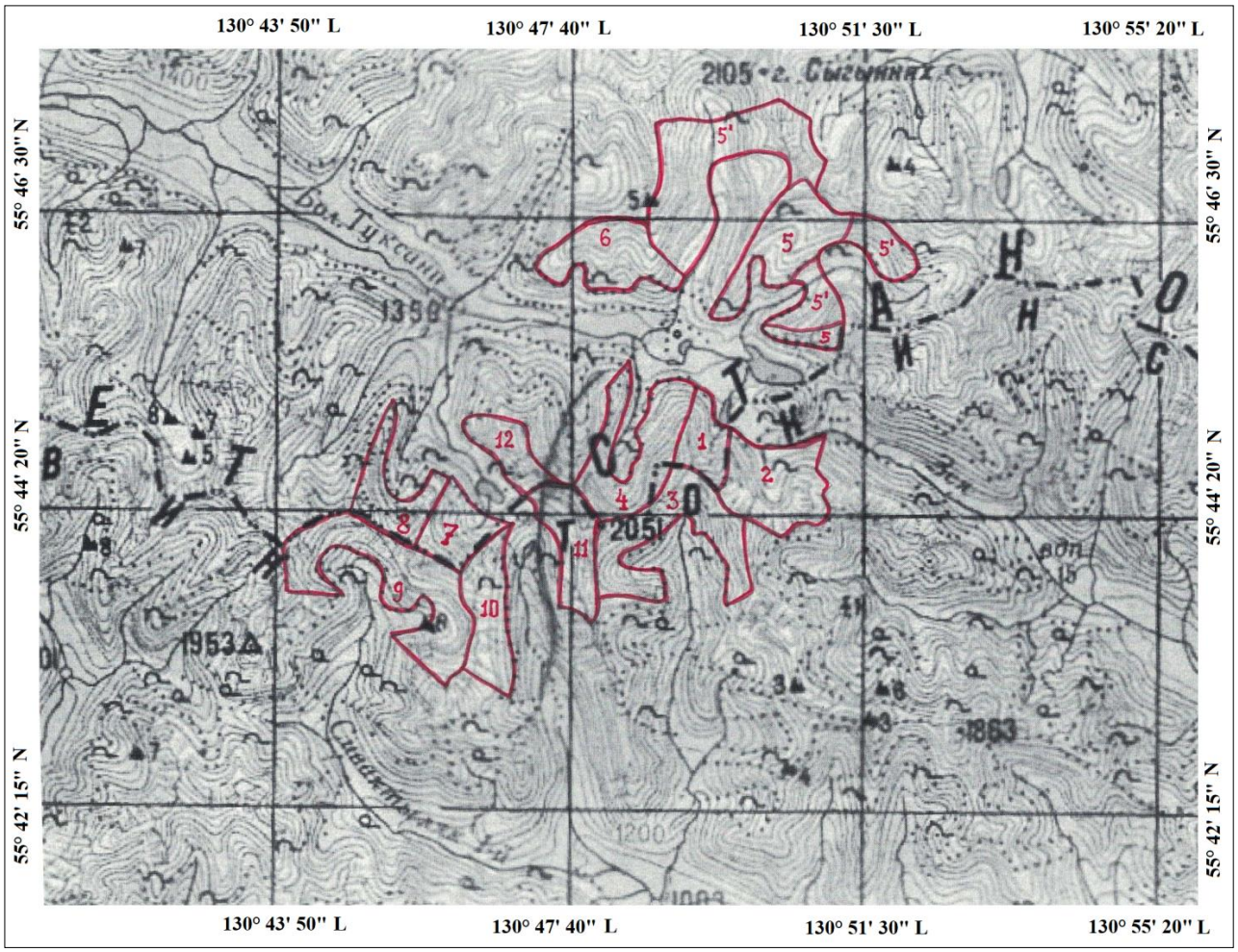

Fig. 1. Location of census plots (1-12) on the topographic map of Toko-Stanovik (east part of the Stanovik Ridge), Scale 1:100000.

Census plot No. 1. Cirque of the 1st left inflow of the B. Tuksani River (including the main natural salt lick) – 73 ha.

Census plot No. 2. Cirque of the Zeya River source – 141 ha.

Census plot No. 3. Cirque of the left source of the 1st Sivaktylyak River – 196 ha.

Census plot No. 4. Cirque of the 2nd left inflow of the B. Tuksani River – 166 ha.

Census plot No. 5 (multiple censuses). Cirque of the 1st right inflow of the B. Tuksani River – 197 ha.

Census plot No. 5` (single census). Cirque of the 1st right inflow of the B. Tuksani River with the adjacent territory – 508 ha.

Census plot No. 6. Slopes of the right bank of the B. Tuksani River (from the 1st right inflow to the mouth of the left bank inflow of the Perevalny Spring) – 101 ha.

Census plot No. 7. Cirque of the left bank source of the Perevalny Spring – 77 ha.

Census plot No. 8. Cirque of the left inflow of the Perevalny Spring – 79 ha.

Census plot No. 9. Cirque of the right source of the 1st Sivaktylyak River – 235 ha.

Census plot No. 10. Slopes of the right bank of the middle source of the 1st Sivaktylyak River – 109 ha.

Census plot No. 11. Slopes of the left bank of the middle source of the 1st Sivaktylyak River – 93 ha.

Census plot No. 12. Slopes of the right bank of the Perevalny Spring – 62 ha.

We examined the plots both from the separate observation sites and during our routes. The main requirements for sites and routes are as follows: they should have the widest possible viewing angle and fine lighting, and provide the relative ease and safety of the movement for the researchers without any special climbing equipment. Most of those sites were located in the upper reaches (mainly treeless) of river valleys, relatively gentle passes and easily practicable ridge crests. We started our observations at 5-6 in the morning (when the sheep were the most active) and ended them at the end of the route, or after the dusk (if the census was started from a stationary observation site). The plots were inspected every 15 minutes with binoculars of 8x and 10x magnification, with anti-reflective coating. Moreover, they were also recorded with cameras, equipped with long-focus lenses, so, in that case, the number, sex and age of the animals were specified according to the photo-results. The inspections took place only when the entire plot was free of clouds or fog. The census on most plots was carried out multiple times over several days. To calculate the population density we used the total number of individuals, encountered within the plot for the entire period of census, as well as the plot area, multiplied by the number of census days. The results for bighorn sheep for 2020 are presented in Table 1.

Considering that most of the animals were observed from a distance of more than 500 meters, we limited ourselves to three classifications in order to avoid any mistakes: 1) adult males, 2) females with young animals of 1-2 years old, 3) 1-year-old lambs. The "adult males" conditionally included all male individuals over 2 years old that could be distinguished at any distance. The "females with young animals" included not only the adult females and males, but also the young ones of 1-2 years old (Photo 1-4). The data on their sex and age structure are presented in Tables 3 and 4.

Additionally, while moving along the open slopes and ridges, we counted the large mammals visually by their encounters on the transects of indefinite width. Aside from the bighorn sheep, this method included the wild reindeer and brown bears. The width of a census strip was determined for each species by their average detection distance. The obtained data were analyzed separately for the "high mountains", "middle mountains" and the entire territory of our research (Table 2).

Biotope differentiation of the surveyed territory. To obtain the initial information on the distribution of large mammals in the biotopes, as well as to provide convenience of data collection and processing, we distinguished the main types of habitats. Each of them received a serial number, a letter and a conditional name.

1) A – «alpica» – alpine meadows, mountain tundra, bald mountains, stone runs, rocks (Photo 5).

2) Sa – «subalpica» – alternating subalpine meadows, mountain bogs and bushes of dwarf pine (Photo 6);

3) D – «dwarf pine» – bushes of dwarf pine (Photo 7);

4) R – «rivers» – river mouths and riverside bushes (Photo 8);

5) F – «floodplain meadows and bogs» – floodplain meadows, bogs, icy clearings and other open and semi-open valley biotopes, including those around lakes (Photo 9);

6) V – «valley forests» – larch, spruce and fir-small-leaved valley forests (Photo 10).

Data on the indices of the animals' number were also analyzed separately for large high-altitude elements of terrain, such as high and middle mountains.

The "high mountains" of the studied territory conventionally include the treeless ridge crests, slopes, watersheds and ancient glacial circuses. The following habitats are common for this type: 1) A – "alpica", 2) Sa – "subalpica", 3) D – "dwarf pine". They are mainly located in the 1500-2100 m above sea level range. The "middle mountains" conventionally include the pronounced river valleys and lacustrine basins, located below 1500 m above sea level. The following habitats are common for this type: 4) R – "rivers", 5) F – "open meadows", 6) V – "valley forests".

Table 1. Population indices, age and sex composition of the snow sheep on the census plots around the inflows and upper reaches of the Zeya and B. Tuksani Rivers.

No.	Plots	S (ha)	Days of census	ΣS (ha)	N (ind.)	P (ind./ 10 km^2)	Sex, age			
							♂Ad	♀ Ad, ♀Sad, ♂ Sad	Juv	Sp
1	Cirque of the 1st left inflow of the B. Tuksani River (including the main natural salt lick)	73	23	1679	40	23.8	0	33	7	0
2	Cirque of the Zeya River source	141	5	705	1	1.4	0	1	0	0
3	Cirque of the left source of the 1st Sivaktylyak River	196	6	1176	5	4.3	0	3	2	0
4	Cirque of the 2nd left inflow of the B. Tuksani River	166	3	498	2	4.0	0	1	0	1
1-4	Plots near the main natural salt lick	576	–	4058	48	11.3	0	38	9	1
5	Cirque of the 1st right inflow of the B. Tuksani River (multiple censuses)	197	10	1970	4	2.0	4	0	0	0
5`	Cirque of the 1st right inflow of the B. Tuksani River with the adjacent territory (single census)	508	1	508	3	5.9	3	0	0	0
6	Slopes of the right bank of the B. Tuksani River (from the 1st right inflow to the mouth of the left bank inflow of the Perevalny Spring)	101	2	202	0	0	0	0	0	0
7	Cirque of the left bank source of the Perevalny Spring	77	2	154	0	0	0	0	0	0
8	Cirque of the left inflow of the Perevalny Spring	79	2	158	0	0	0	0	0	0
9	Cirque of the right source of the 1st Sivaktylyak River	235	2	235	1	4.3	0	0	0	1
10	Slopes of the right bank of the middle source of the 1st Sivaktylyak River	109	2	218	0	0	0	0	0	0
11	Slopes of the left bank of the middle source of the 1st Sivaktylyak River	93	2	186	2	10.8	0	0	0	2
12	Slopes of the right bank of the Perevalny Spring	62	2	124	0	0	0	0	0	0
5-12	Plots with minimal sunlight	1461	–	3755	10	2.4	7	0	0	3
1-12	Total	2037	–	7813	58	7.2	7	38	0	4

Table 2. Results of the large mammal censuses, carried out by the physical encounters during the routes around the sources and upper reaches of the Zeya and B. Tuksani Rivers.

Terrain elements	Habitats types / Lm, route length (km)	ΣLm, total route length (km)	Species											
			Snow sheep				Wild reindeer				Brown bear			
			N, ind.	Lo aver., average detection distance (m)	S, area of the census zone (km^2)	P, population density (ind./ 10 km^2)	N, ind.	Lo aver., average detection distance (m)	S, area of the census zone (km^2)	P, population density (ind./ 10 km^2)	N, ind.	Lo aver., average detection distance (m)	S, area of the census zone (km^2)	P, population density (ind./ 10 km^2)
High Mountains: ridge crests, slopes, watersheds, saddlebacks from 1500 m to 2100 m above sea level	1. "Alpica": mountain tundra, stone runs, rocks/ 46.5 2. "Subalpica": subalpine meadows and tussocks of dwarf pine/ 34.5 3. "Dwarf pine»: bushes of dwarf pine/ 21.0	102.0	58	751	76.6	7.5	2	100	10.2	2.0	2	800	81.6	0.2

Table 2 continuation.

Terrain elements	Habitats types / Lm, route length (km)	ΣLm, total route length (km)	Species											
			Snow sheep				Wild reindeer				Brown bear			
			N, ind.	Lo aver., average detection distance (m)	S, area of the census zone (km^2)	P, population density (ind./ 10 km^2)	N, ind.	Lo aver., average detection distance (m)	S, area of the census zone (km^2)	P, population density (ind./ 10 km^2)	N, ind.	Lo aver., average detection distance (m)	S, area of the census zone (km^2)	P, population density (ind./ 10 km^2)
Middle Mountains: river valleys and lacustrine basins below 1500 m above sea level	4. "Rivers": mouths and riverside bushes/ 9.0 5. "Floodplain meadows and bogs": meadows, bogs, icy clearings/ 17.0 6. "Valley forests": larch, spruce and fir-small-leaved forests/ 44.0	70.0	0	0	0	0	2	90	6.3	3.2	1	600	42.0	0.2
Total		172.0	58	751	129.2	4.5	2	95	16.3	2.5	3	733	126.1	0.2

Photo 1. Adult male of *Ovis nivikola alleni* Matschie, 1907 in the region of Ayumkan Mountain.

Photo 2. Female snow sheep gives a warning signal by hitting a rock with her hoof.

Photo 3. Female snow sheep with a last year yeanling, walking through the watershed of the Zeya and B. Tuksani Rivers sources.

Photo 4. Female snow sheep with a yeanling round the Tas-Balagan Passing.

Photo 5a. Alpica (1-A) – mountain tundra with grass and dwarf bushes.

Photo 5b. Alpica – bald mountains and rocks along the crests.

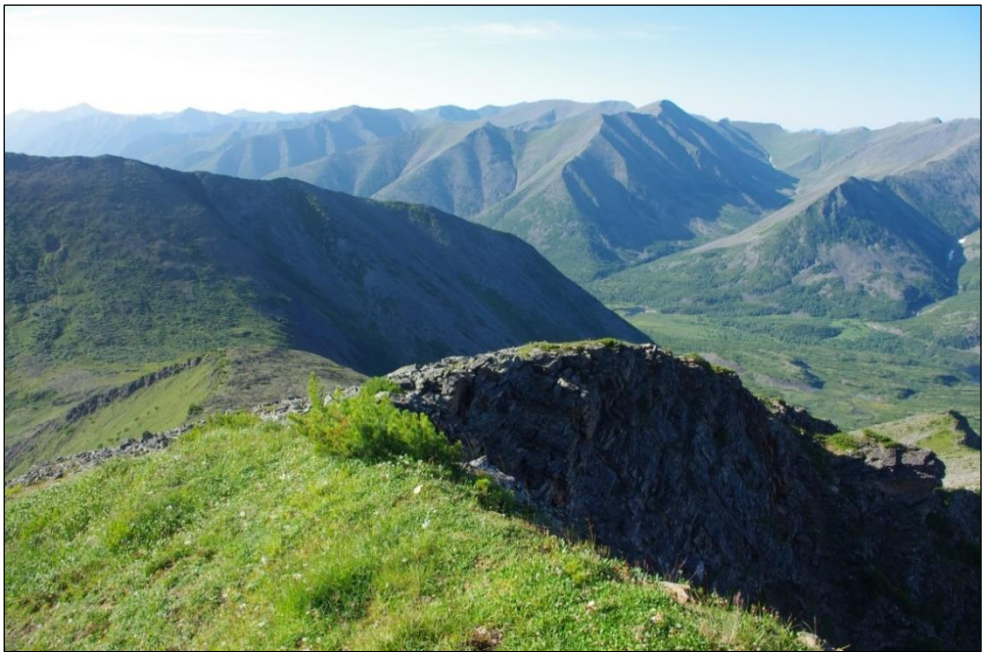

Photo 5c. Alpica – grassy mountain tundra.

Table 3. Population density of the snow sheep in the areas of the Toko-Stanovik during different years, according to the censuses carried out in the plots (specific open and semi-open biotopes).

Year	Season	Part of the mountainous area	Geographical locations	Individuals found	Population density (ind./1000 ha)
1993	August	Eastern	Around the sources of the Ayumkan River (Ayumkan Mountain; watershed of the Ayumkan, Lucha (Zeiskaya), Sargakanda and Idyum Rivers)	10	2.2
2009	September – Early October	Western	Perevalnoe Lake (watershed of the Solokit, Bolshie and Malye Tuksani Rivers); watershed of the Malye Tuksani, Malyi and Sredniy Okonon Rivers	2	1.3
2018	Second half of July	Central	Basin of the upper reaches of the B. Tuksani and Zeya Rivers (sources of the Oyur River; watersheds of the B. Tuksani, B. Okonon and 1st Sivaktylyak Rivers)	27	10.4
2020	Late July – August	Central	Around the sources and upper reaches of the Zeya and B. Tuksani Rivers	58	7.2
Average values		Central			8.7
Average values		National Park			4.1

Table 4. Indices of the sex and age structure of the snow sheep's population in the Toko-Stanovik.

Year	Season	Total		♂Ad		♀ Ad, ♀Sad, ♂ Sad		Juv		Sp	
		abs.	%	abs.	%	abs.	%	abs.	%	abs.	%
1993	August	10	100	4	40	4	40	2	20	0	0
2009	Early October	2	100	0	0	0	0	0	0	2	100
2018	Late July	27	100	4	22.2	13	48.2	8	29.6	0	0
2020	Late July – August	58	100	7	12.1	38	65.5	9	15.5	4	6.7

Photo 6a. Subalpica (2-Sa) – subalpine meadows and tussocks of dwarf pine.

Results

Snow sheep. Most of the encounters were registered in the upper belts of the mountains in the alpine zone (A – "alpica": alpine meadows, mountain tundra, bald mountains, stone runs, rocks). In the subalpine zone (Sa – "subalpica": alternating subalpine meadows, mountain bogs and bushes of dwarf pine) we found only their traces and droppings. The bighorn sheep's distribution in the studied area in the summer of 2020 was highly uneven. The plot No. 1 (cirque of the 1st left inflow of the B. Tuksani River) was the most populated one with the greatest number of sightings (N=40) and the highest population density of 23.8 ind./10 km^2 (Table 2). This happened due to the plot having a large natural salt lick, which was actively visited by bighorn sheep from 23.07.2020 to 09.08.2020 inclusively (Table 1).

Photo 6b. Subalpica – mountain tundra with dwarf bushes, lichen and tussocks of dwarf pine.

Photo 7. Bushes of dwarf pine (3-D).

Photo 8. Rivers (4-R) – stony mouth of the B. Tuksani River.

Photo 9. Floodplain meadows and bogs (5-F) – upper reaches of the B. Tuksani River.

Photo 10. Valley forests (6-V) – larch forests in the valley of the B. Tuksani River.

The salt lick is located near the right source of the first left inflow of the B. Tuksani River. It is formed by the loose volcanic deposits of the left side of the inflow valley. In their search for mineral nutrition, the bighorn sheep have completely destroyed the local vegetation cover by digging too many holes and small caves inside the slope (Photo 11), the walls of which now ooze with water. This salt lick is the center of sheep's activity and one of the key areas for their population group that occupies the catchment basins of the upper reaches of the Zeya and Bolshiye Tuksani Rivers. The area itself and its adjacent territories (plots No. 1-4) are in dire need of special protection. The average population density at these plots is 11.3 ind./10 km^2, which roughly matches the maximal indices for the central part of the Toko-Stanovik (Podolskiy et al., 2019). The plots No. 1 and 4 outside the Tokinsko-Stanovoy National Park should be included in its protected zone, or in the new specially protected federal natural area which is being designed on the territory of the Republic of Sakha (Yakutia). Currently, these plots belong to the southeastern part of the republican resource reservation "Vostok".

On the plots No. 5-12 that do not border on the plot No. 1, where the salt lick is located, the average population density of the bighorn sheep is 2.3 ind./10 km^2, which is almost 5 times lower than it is on the plots No. 1-4 (Table 1). The average density of this species in the central part of the Toko-Stanovik is 7.2 ind./10 km^2 (plots No. 1-12), which is almost 30% lower than 10.4 ind./10 km^2 in 2018 (Table 3). The age and sex structure of this population changed as well (Table 4): the amount of adult males decreased from 22.2% to 12.1%, the amount of lambs dropped significantly from 29.6% to 15.5%.

An extra information on the population numbers of bighorn sheep was obtained after processing the data from the transect census (Table 2). Their population density in the high mountains was 7.5 ind./10 km^2, which is approximately the same with the values from the plots. It is important to

note that the route monitoring made it possible for us to estimate the population density of bighorn sheep for the entire central part of the Toko-Stanovik, without taking the biotopes into account; it turned out to be 4.5 ind./10 km^2.

Photo 11a. Snow sheep at the caves of a large salt lick.

Photo 11b. Snow sheep at the salt lick.

Wild reindeer. Four visual encounters of this animal were registered in total. None were found in the alpine zone (A – "alpica": alpine meadows, mountain tundra, bald mountains, stone runs, rocks). In the subalpine zone (Sa – "subalpica": alternating subalpine meadows, mountain bogs and bushes of dwarf pine) around the passing between the sources of the Zeya and B. Tuksani Rivers we counted 2 animals. The population density in the high mountains was 2.0 ind./10 km^2 (Photo 12). In the valley biotopes we also found 2 of them, with the density being 3.2 ind./10 km^2. The average population density in the central part of the National Park and Toko-Stanovik was 2.5 ind./10 km^2 (Table 2). According to our observations in 1994, 2009 and 2018, these indices are significantly higher in the western and eastern parts. In the western part of the park the population group of wild reindeer is constantly increasing at the expense of stray farm reindeer. In the eastern part (around Ayumkan Mountain) they actively visit the subalpine zone and river valleys, as well as the alpine zone (Photo 13). This lets us preliminarily estimate the total number of wild reindeer in the National Park as 700-800 individuals. With further detailed observation of the entire specially protected natural area, this value can become more precise.

Brown bear. We registered 3 visual encounters. Two animals were sighted in the subalpine zone, and one was found in the river valley. In the mountain tundra on the crest along the watershed of the Zeya and B. Tuksani Rivers we found the droppings of a large bear. The population density in the high and middle mountains was 0.2 ind./10 km^2 (Table 2). The total number of brown bears in the territory of the National Park can be approximately estimated as 50-60 individuals. During the years with plenty of pine nuts from the second half of August to the first half of September the amount of bears can be much higher (Photo 14).

Photo 12. Reindeer in the subalpica near the Tas-Balagan Passing.

Discussion

The decreasing population density of snow sheep and significant changes in the age and sex structure of their population group in the central part of the Toko-Stanovik are likely to be the result

of an intense trophy hunting for the male sheep (Medvedev, Bendersky, 2019; Podolskiy et al., 2019). In the area of our research we discovered 3 permanent sites for the hunters' camps: two of them were found near the watershed of the Zeya and B. Tuksani Rivers, and one was on the passing over the middle source of the 1st Sivaktylyak River. According to the survey we carried out among the helicopter pilots, staff of the airfields and reindeer herders, for the past 3-4 years (2016-2019) the intense trophy hunting in the central part of the Toko-Stanovik was done by several groups of hunters that came in and out by helicopters. Quite often they were shooting animals while still flying over the territory. It was confirmed indirectly when the remains of an adult ram were discovered under a scree near the lakeshore of the B. Tuksani River source. Judging by their location and condition, the dead animal could not crash on the rocks on his own and was not a victim of predators. Most likely, the ram was wounded and lost after a helicopter hunt.

Photo 13. Reindeer on the snow near the top of Ayumkan Mountain.

We should also note that for the past decade any hunting for bighorn sheep in the central part of the Toko-Stanovik has been illegal. The rare bighorn subspecies *Ovis nivikola alleni* Matschie, 1907 that inhabits this territory is listed in the Red Data Books of the Amur Region (2009, 2020) and Yakutia (2003). Moreover, the mentioned part of the Stanovik Ridge is located inside a specially protected natural area. From 2010 to 2019 in the Amur Region there was the Toko-Stanovik Nature Reserve that has been transformed into the Toko-Stanovik National Park in the end of 2019. In Yakutia there are the "Vostok" resource reservation and the "Bolshoye Toko" Nature Reserve located in this territory.

Our observations confirm N.K. Zheleznov-Chukotsky's opinion (2018) about trophy hunting for small and vulnerable populations of bighorn sheep can quickly cause very significant negative consequences. In recent years the proportion of male animals has decreased by 2-3 times, which leads to a drop in the reproductive potential of the bighorn sheep's population group. The latter can be clearly seen in the decreasing amount of underyearling lambs. To prevent these negative trends

from following a catastrophic scenario (a continued decline in the proportion of adult males and lambs, as well as in reproductive potential of the population group, a sharp drop in the number of bighorn sheep), the areas of great importance for the population must be specially protected. Based on the results of our observations, a place for the regular watch of state inspectors has already been built (from late May to mid-late October) in the area of the large salt lick (plot No. 1 and adjacent territories). It is also necessary to create a protected zone of the national park and establish a specially protected federal natural area in the Yakutian territory.

Photo 14. Brown bear among the bushes of dwarf pine.

Aside from the poachers, the predators also threaten the population of bighorn sheep. The main one is the brown bears due to them being numerous among the large carnivores of the National Park. According to the local reindeer herders, bears can purposefully search for the newborn lambs, although the effectiveness of such hunts is unknown, but the death of some lambs caused by bears in spring is undeniable. However, it seems that in summer bears do not pose such danger for all age groups of bighorn sheep. This is evidenced by the fact that for three weeks of our observations no bears approached the salt lick, frequently visited by sheep. On the crest of a spur of the watershed ridge between the basins of the Zeya and B. Tuksani Rivers we found an old litter of a wolf that contained winter fur of a snow sheep. It should be noted that the wolves' number in the high mountains of the central part of the Toko-Stanovik is low, so it is most likely that the wolf does not live there constantly, but visits regularly.

The spatial distribution of the bighorn sheep in the Toko-Stanovik is extremely uneven. Their population density in the optimal biotopes of the central part (7.2-10.4 ind./10 km^2) is obviously much higher than in the west (1.3 ind./10 km^2) and east (2.2-2.6 ind./10 km^2) of this land (Table 3). The maximal density was registered in the territory with the most dissected relief, extreme heights and abundant rocky areas.

Based on how the habitats are used, we can give a preliminary estimate the bighorn sheep's number in the territory of the Toko-Stanovik National Park. The area of their main biotopes (treeless alpine zone, subalpine meadows, scarce forests and the upper part of the dwarf pine belt) is about 50 thousand ha or 500 km^2. The area of high population density of bighorn sheep in the west starts from the sources of the Bolshoy Oyur River. In the east it includes the Zeya River sources basin up to the mouth of the Tas-Balagan River, and the Golets Tas-Balagan mountain range with the adjacent territory of the right-bank of the Lucha (Zeyskaya) River basin. According to Yu.A. Darman's oral report, when he carried out his zoological observations at the Tas-Balagan Pass in the summer of 1991, the bighorn sheep were common there and even numerous in some places. Considering this information, we can assume that the area of bighorn sheep's maximum population density (7.2-10.4 individuals per 10 km^2 of characteristic habitats) is approximately of 10 thousand ha or 100 km^2. In 2018 there were about 100 snow sheep, in 2020 this amount decreased to about 70. To determine the approximate number for the rest of the territory we used the average population density by years, which was 4.1 ind./10 km^2 and was obtained by the registration method on the census plots (Table 4). In 2020 the total number of snow sheep in the Toko-Stanovik National Park is about 250 individuals, although we believe that in 2018 there were about 300 sheep (Podolskiy et al., 2019).

Conclusion

As a result, our research indicates that the Toko-Stanovik National Park has favorable habitat conditions for bighorn sheep, reindeer and brown bears. We preliminarily estimated their numbers within this specially protected natural territory as follows: 250-300 sheep, 700-800 reindeer, 50-60 bears. However, we also have to note the increasing potential risks to the bighorn sheep's population due to the intensification of anthropogenic activities. They include a quick development of road system, mining and spreading lumbering in the forests close to the main habitats of the sheep. The trophy hunting intensifies as well, damaging their population in the Toko-Stanovik region by disrupting the age and sex composition. To prevent this a special protection of their key habitats is already being organized, primarily in the territory of the large salt licks. Moreover, it is necessary to create a protected zone of the National Park and establish a specially protected federal area in the adjacent territory of Yakutia. Preservation of *Ovis nivikola alleni* Matschie, 1907 in the Amur Region will require the state environmental organizations, scientists, ecological community and any concerned people of the entire Amur Region to join their efforts.

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СНЕЖНЫЙ БАРАН (*OVIS NIVIKOLA ALLENI* MATSCHIE, 1907), ДИКИЙ СЕВЕРНЫЙ ОЛЕНЬ (*RANGIFER TARANDUS* LINNAEUS, 1758) И БУРЫЙ МЕДВЕДЬ (*URSUS ARCTOS* LINNAEUS, 1758) В ТОКИНСКО-СТАНОВОМ НАЦИОНАЛЬНОМ ПАРКЕ И НА СОПРЕДЕЛЬНОЙ ТЕРРИТОРИИ

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Токинско-Становой национальный парк площадью около 257 тыс. га учрежден в конце 2019 г. на севере Амурской области – у стыка ее границ с Якутией и Хабаровским краем. Рассматривая территория чрезвычайно важна для сохранения популяции барана Аллена (*Ovis nivikola alleni* Matschie, 1907) – редкого малоизученного подвида толсторога занесенного в Красные книги Амурской области и Якутии. В Приамурье снежные бараны заселяют относительно узкую полосу высокогорий Токинского Становика (восточный участок Станового хребта) шириной 5-15 км, протянувшуюся вдоль северной границы Амурской области от истоков р. Оконон на западе до истоков р. Мая на востоке. Кроме того, толстороги регулярно отмечаются на хребте Джугдыр от истоков р. Аюмкан (правый приток р. Мая) до истоков рек Большие Инагли и Луча – левые притоки р. Купури (Подольский и др., 2009). Основная часть поголовья снежных баранов Амурской области сосредоточена в пределах национального парка. Сведения о пространственном распределении, численности и половозрастном составе снежных баранов, представленные в статье, были получены в четырех экспедициях: 1993, 2009, 2018 и 2020 гг. Информационную основу статьи составили данные собранные в июле-августе 2020 г. Тогда одновременно с толсторогами попутно учитывались также дикий северный олень и бурый медведь. Результаты наблюдений в целом свидетельствуют о благоприятных условиях существования на территории национального парка снежных баранов, диких северных оленей и бурых медведей. Численность этих зверей в пределах данной особо охраняемой территории предварительно оценивается следующим образом: 250-300 снежных баранов, 700-800 диких северных оленей, 50-60 бурых медведей. Однако следует отметить увеличение потенциальных рисков для популяции снежных баранов. Это связанно с интенсификацией антропогенной деятельности. В непосредственной близости от основных местообитаний толсторогов

происходит быстрое развитие дорожно-транспортной сети, добычи полезных ископаемых и лесозаготовок. Нарастает интенсивность трофейной охоты на горных копытных, от которой уже страдает популяционная группировка толсторогов Токинского Становика: отмечено снижение доли взрослых самцов и сеголетков. Для сохранения популяционной группировки организуется специальная охрана ключевых местообитаний толсторогов, в первую очередь крупных солонцов. Кроме того необходимо создание охранной зоны национального парка и учреждение федеральной особо охраняемой территории на сопредельной территории Якутии.

Ключевые слова: снежный баран, охрана, трофейная охота, негативное воздействие, численность, плотность населения, северный олень, бурый медведь, охранная зона.

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