

Depression of the Population of the Steppe Polecat (*Mustela eversmanii*) in the Southern Urals

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Abstract—Long-term monitoring of the abundance of the steppe polecat (*Mustela eversmanii*) in Chelyabinsk oblast is considered. The analysis of the abundance dynamics of Mustelidae was carried out on the basis of monitoring data using the method of winter accounting (WA) conducted annually. Over the past few years, the steppe polecat has not been registered during accounting work in the mountain taiga; i.e., its numbers are either extremely low, or it has disappeared completely. In forest–steppe territories for 12 years, from 2008 to 2020, the abundance of polecats decreased almost 90 times, from 3058 to 34 individuals. The data on the number of the main prey species of the steppe polecat, two species of ground squirrels (*Spermophilus major* and *Spermophilus pygmaeus*) and the groundhog (*Marmota bobak*), are presented. The hypothesis of the possible influence of the American mink on the numbers of the steppe polecat is considered.

Keywords: steppe polecat (*Mustela eversmanii*), Chelyabinsk oblast, abundance dynamics

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INTRODUCTION

On the territory of Chelyabinsk oblast, there are six species of small predators of the family Mustelidae: ermine (*Mustela erminea* Linnaeus, 1758), weasel (*Mustela nivalis* Linnaeus, 1766), pine marten (*Martes martes* Linnaeus, 1758), Japanese mink (*Mustela sibirica* Pallas, 1773), steppe or Eversmann's polecat (*Mustela eversmanii* Lesson, 1827), and the American mink (*Neovison vison* Schreber, 1777). There is no information about the presence of the forest or European polecat (*Mustela putorius* Linnaeus, 1758) in the Southern Urals, although it is believed that this species is present in mixed and deciduous forests, but avoids the actual taiga (Bolshakov, 1977). Among the archival materials about fur harvesting in the 1930s–1960s and in various materials on the number of fur-bearing animals in Chelyabinsk oblast, the European polecat is characterized as a species that has no commercial significance at all. Its skins were absent from fur harvests (*Report...*, 1941). Regarding the territory of the Ural region as a whole, there is modern evidence that the European polecat was found in the mountain dark coniferous taiga 230–270 km north of the previously known border of its range; i.e., the European polecat is presumably spreading to the north (Polyakov and Meshcheryagina, 2016).

The steppe polecat prefers to live in the steppe and forest–steppe, but is also found in mountain forests. In forest areas, it more often chooses the banks of riv-

ers and lakes, where there is a higher abundance of its main food—rodents. It is found in fields and near populated areas (Bolshakov, 1977). According to archival materials, the highest density of the steppe polecat was observed in the forest–steppe, but it was found throughout the region and did not have much economic significance (Ustinov, 1956); for example, in 1941–1946 only about 600 skins were harvested annually (*Report...*, 1941).

In Il'meny-Nature Reserve in the first half of the 20th century, the steppe polecat was found throughout the territory, but its numbers were low. It was often found along the shores of lakes, in mountain river valleys, in spruce–fir forests, and near villages outside the boundaries of the reserve (Ushkov, 1993). The stock collection of the Museum of Il'meny Reserve contains three skulls of the steppe polecat, which were obtained on the territory of the reserve in 1941 and 1951. In the 1980s on the territory of the reserve, the steppe polecat was very often found and caught in the shore biotopes of Argayash Lake (personal report from P. Chashchin).

It is believed that in Western Siberia the distribution of the steppe polecat is closely related to the distribution of the common hamster (*Cricetus cricetus* Linnaeus, 1758) and the Russet ground squirrel (*Spermophilus major* Pallas, 1779) (Ternovskii and Danilov, 1965; Ternovskaya and Ternovskii, 1975). There is no data on the connection between the distribution of the

common hamster and the steppe polecat in the Southern Urals. Until the middle of the 20th century on the territory of the Il'meny Nature Reserve, the common hamster was a common, but not numerous species; it was found even in forest areas in the mountains (Ushkov, 1993); over the past twenty-five years, the hamster has been recorded on the territory of the reserve only twice (Kiseleva, 2021).

The steppe and forest–steppe territories of Chelyabinsk oblast are inhabited by two species of ground squirrels, the Russet ground squirrel (*Spermophilus major* Pallas, 1779) and the gray ground squirrel (*Spermophilus pygmaeus* Pallas 1778). Near the eastern border of Il'meny Nature Reserve, there are a few colonies of the Russet ground squirrel (Kiseleva, 2021). Over the last century, the population of the steppe polecat has declined significantly across Europe, but little is known about its status and distribution due to the lack of systematic research. In the past few decades there has been a significant decline in the numbers of the European polecat, due to which it has ended up in many regions on the verge of extinction (Faibich, 2012; Šálek et al., 2013).

Studies of the steppe polecat within the Southern Urals have not previously been carried out. The proposed work is an attempt to systematize the data available on the species, assess the current state of the species in the region and the trends in its population, and consider the factors influencing its numbers.

MATERIALS AND METHODS

Chelyabinsk oblast is located in the center of the Eurasian continent, in two parts of the world, Europe and Asia. Its area is 87900 km², and its length from north to south is about 490 km (from 51°57' N to 56°22' N) and from west to east, about 400 km (from 57°05' E to 63°25' E). It borders on the Republic of Bashkortostan and in the northern part of Sverdlovsk oblast. The southern border of the forest zone and the northern border of the steppe zone, between which there is a transitional strip of forest–steppe, pass through Chelyabinsk oblast. The northwestern part of the region is represented by mountain ridges ranging in height from 400–600 to 1000–1400 m above sea level, covered with coniferous, deciduous (birch, aspen, alder), and mixed forests. The mountains of the Southern Urals are a system of meridional ridges of different heights from 400–600 to 1000–1400 m above sea level, which are separated by wide intermountain depressions. Mountain taiga occupies about one quarter of the region's territory. In the western part of the region, two sections of the Cis-Ural forest-steppe are wedged into the forest taiga. In the central mountainous part, there are areas with petrophyte-steppe vegetation (Kulikov, 2005).

In the Il'meny-Nature Reserve, birch forests have become significantly stepped; on the southern slopes,

steppe communities are common—shrub, meadow-steppe and petrophytic-steppe communities. Under the canopy of sparse larch-pine forests, steppe shrubs (*Spiraea crenata*, *Cotoneaster melanocarpus*, *Cerasus fruticosa*) and meadow-steppe species of herbaceous plants are often found. Meadow-steppe complexes occupy about 16% of the reserve's territory (Kolesnikov, 1961; Kulikov, 2005).

The data on the abundance of the steppe polecat and American mink presented in this study are based on the results of annual winter route accounting (WA) for the period from 2002 to 2020 (Complex., 2008; State monitoring., 2021), which are carried out annually on the entire territory of Russia in accordance with the “Methodological Guidelines for the Implementation of State Monitoring of Hunting Resources and Their Habitat Using the Method of Winter Route Accounting” (Guidelines..., 2012). The annual winter accounting of game animals in Chelyabinsk oblast covers hunting farms and specially protected areas (national parks, nature reserve, hunting reserves).

In addition to the information obtained during the WA, this work uses the results of many years of field work from 2007 to 2020, during which mustelid excrement was collected, part of which (42 samples) was analyzed using PCR analysis of mitochondrial DNA to determine the species (Kiseleva and Sorokin, 2013). In total, 68 rivers and streams and 15 lakes and open-pit mines (quarries) were examined, including on the territory of Il'meny Nature Reserve, Taganai and Zyuratkul National Parks, and the Arsha State Natural Zoological Reserve.

When traces and excrement of mustelids were detected, camera traps were placed from June to October from 2010 to 2017 to identify the species in the mountain forest belt and forest–steppe. The cameras were installed along the banks of rivers, on their tributaries and streams, and near lakes and open-pit mines. There is always increased activity of wild animals near bodies of water, so placing camera traps along the banks is more effective than in other areas. Animal activity is especially high at the intersections of watercourses and roads. As a rule, camera traps were installed in hidden places at a distance of 0.5–2 m from the edge of the water, no higher than 20–40 cm from the surface of the earth, taking into account the operating parameters of each type of camera. The duration of the exposure of the camera at one point ranged from 6 to 12 days, then it was moved to another place. To attract predators to camera traps, an odor bait was used—excrement of domestic ferrets (*Mustela putorius furo*) (Kiseleva, 2020b). In total, about 3500 trap days were worked out and more than 1000 effective photographs were taken.

In addition to the above methods, hunters, rangers, and local residents were surveyed about finding polecats or their traces. The tracks of polecats on a wet substrate and dust differ quite well from the tracks of other

Table 1. Numbers of the steppe polecat and American mink in Chelyabinsk oblast for the period from 1970 to 1990 (number of individuals) (Matveev and Bakunin, 1994)

Species	Years				
	1970	1980	1987	1988	1990
Steppe polecat	900	1280	2380	2290	2390
American mink	1500	* —	2860	3760	3640

* There are no data.

mustelid species (Sidorovich, 2006), so the information obtained could be very reliable. Interspecific aggressive relationships were observed when mustelids of different species and different origins (wild and caged) were kept in the enclosure conditions of a nursery in Il'meny Nature Reserve (Kiseleva, 2016).

RESULTS

The numbers of steppe polecats throughout Chelyabinsk oblast in the period from 1970 to 1990 was 900–2390 individuals (Table 1) (Matveev and Bakunin, 1994). Over eighteen years, from 2002 to 2020, it increased from 3114 in 2002 to 3598 individuals in 2014 and decreased to 300 individuals in 2020 (Fig. 1; Table 2) (Complex..., 2008; State monitoring..., 2021).

The territory of Chelyabinsk oblast is distinguished by a wide variety of physical and geographical conditions; therefore, the abundance dynamics of steppe polecats in different landscape and geographical conditions are not the same. Over the past few decades, a particularly rapid decline in the numbers of polecats has occurred in mountain forests. While in 2008 there were 284 individuals in mountain forests, since 2009 their numbers have declined catastrophically and sharply (Table 3). In 2013–2014 in two mountainous regions (Satka and Miass), polecats were still found, but over the past five years, polecats have not been recorded during the WA in mountain forests (Table 3).

When determining the species identity of excrement using PCR analysis of mitochondrial DNA, the polecat was not found either; of the 42 samples that were analyzed, 66.6% of the samples belonged to the American mink, 28.6% belonged to the pine marten, and 4.8% related to the river otter (Kiseleva and Sorokin, 2013). The photographs of camera traps recorded seven species of predatory mammals: red fox, raccoon dog and five species related to mustelids (otter, weasel, American mink, ermine, pine marten). The steppe polecat was absent from the photographs (Kiseleva, 2020b).

In the forest–steppe and steppe territories of the region, the steppe polecat is currently still found, but its numbers also decreased over the period from 2008 to 2020, especially significantly in the forest–steppe and somewhat less in the steppe (Fig. 2). For example, in the Troitskii district (forest–steppe) in 2008, according to the WA, there were 1230 individuals, but as early as 2014–2020 not a single animal was found. In the Krasnoarmeiskii region (steppe) in 2008, there were 2364 individuals; during the period from 2018 to 2020, only 14 to 24 individuals were counted (Complex..., 2008; State monitoring..., 2021). Over twelve years, from 2008 to 2020, the numbers of steppe polecats in forest–steppe areas decreased by almost 90 times, from 3058 individuals in 2008 to 26–34 individuals in 2019–2020 (Fig. 2).

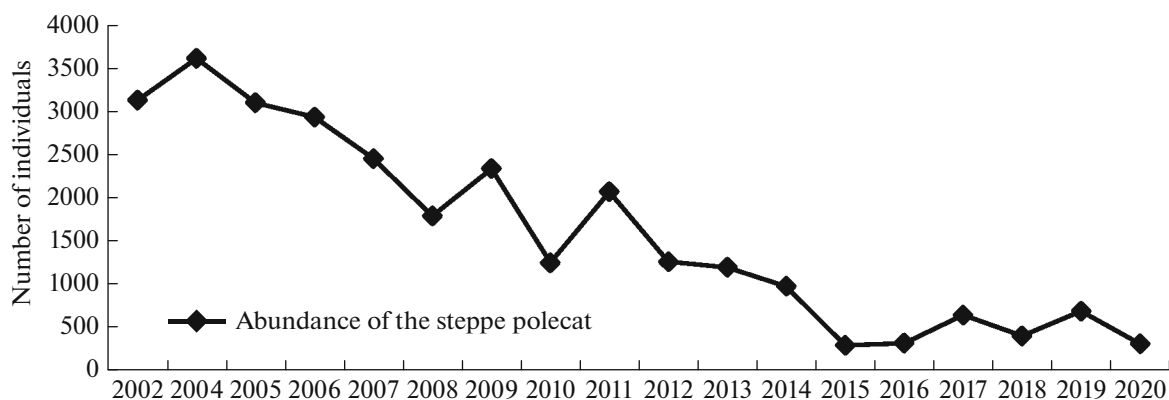


Fig. 1. Long-term abundance dynamics of the steppe polecat (*Mustela eversmanii*) in Chelyabinsk oblast.

Table 2. Numbers of the steppe polecat (*M. eversmannii*) and American mink (*N. vison*) in Chelyabinsk oblast for the period from 2002 to 2020 (number of individuals) (State monitoring..., 2007)

Years	Steppe polecat	American mink
2002	3114	3503
2003	3590	*—
2004	3598	3563
2005	3085	5274
2006	2920	*—
2007	2440	4522
2008	1777	5246
2009	2324	6280
2010	1238	6684
2011	2057	5981
2012	1249	5402
2013	1184	6155
2014	965	5287
2015	282	6072
2016	307	6081
2017	632	12401
2018	391	7542
2019	677	7673
2020	300	7629

* There are no data.

Table 3. Numbers of the steppe polecat (*M. eversmannii*) and American mink (*N. vison*) in the mountain forest belt in Chelyabinsk oblast for the period from 2008 to 2020 (number of individuals)

Years	Steppe polecat	American mink
2008	284	2079
2009	14	3534
2010	0	3741
2011	0	2875
2012	0	2740
2013	21	2467
2014	106	2665
2015	9	2490
2016	0	2559
2017	0	2542
2018	0	2648
2019	0	2561
2020	0	2595

DISCUSSION

The numbers of steppe polecats have decreased significantly over the last century in many European countries, and the decline and fragmentation of its population continued in the early 21st century. The species is assessed as rapidly disappearing in Austria, the Czech Republic, Moldova, Slovakia, and Bulgaria (Šálek et al., 2013).

In Russia for the period 2012–2021, there are also negative abundance dynamics of polecats (European and steppe). In 2021, the total number of polecats was 44000 compared to 47100 in 2020. European and steppe polecats have approximately equal shares in the total number—about 50%. Almost the entire population of European polecats (more than 90%) lives in the Central, Northwestern, and Volga Federal Districts (7500, 5600, and 4100 individuals, respectively). A significant decrease in the indicator (by 55.4%) in 2021 compared to 2020 was noted in the Northwestern Federal District. The numbers of steppe polecats remained at a level close to 2020. The main population of steppe polecats lives in the Southern and Siberian Federal Districts (10600 and 6500 individuals, respectively), which is about 70% of its total number. Perhaps, as for other small mustelids (ermine, Alpine weasel, least weasel), the decline in numbers is the result of undercounting (Characteristics..., 2021).

The main reasons for the decline in the numbers of steppe polecats in Europe are considered to be habitat loss, fragmentation of steppe and grassland habitats, intensive agriculture, depletion of the main prey—the European ground squirrel (*Spermophilus citellus* Linnaeus, 1766) and the common hamster (*C. cricetus* Linnaeus, 1758)—(Matějů et al., 2008), expansion of transport infrastructure (Šálek et al., 2013), and hunting (Enzinger et al., 2006). In Chelyabinsk oblast, these factors are, of course, present to varying degrees, especially in the forest–steppe and steppe. However, it should be noted that in these zones quite large areas are occupied by hunting farms, reserves, and other specially protected areas in which economic activity is not carried out or is largely limited. Thus, the area of protected areas is 219200 hectares in the forest–steppe zone and 145400 hectares in the steppe zone (*Prirodnoe...*, 2012).

Hunting for the steppe polecat has not been practiced in recent decades due to the development of caged fur farming and the lack of demand for its skins. For the mountain forest belt, these factors are much less important, because economic activity in this area is mainly related to logging. The possibility of polecats dying on roads, of course, exists especially in the steppe and forest–steppe zones, but it is unlikely to be catastrophic; the road network is poorly developed in the mountains.

In the steppe and forest–steppe territories of Chelyabinsk oblast, the main prey of the steppe polecat are ground squirrels (Russet ground squirrel and gray

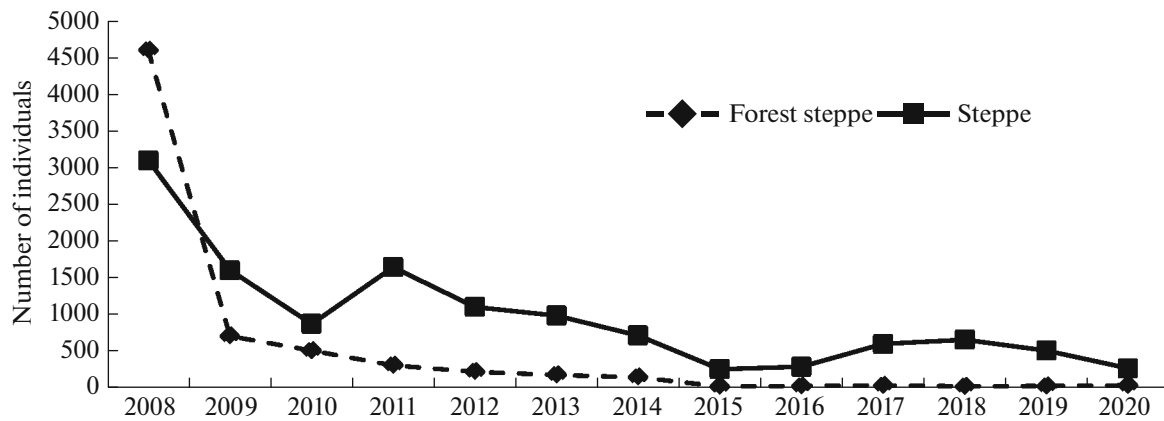


Fig. 2. Long-term abundance dynamics of the steppe polecat (*Mustela eversmanii*) in the forest–steppe and steppe zones of Chelyabinsk oblast.

ground squirrel) and groundhog (*Marvota bobac* Müller, 1776). In recent years, the groundhog has become quite numerous thanks to the organization of the Troitskii State Nature Reserve. Thus, in 2010, the groundhog population was 13806 individuals, and in 2020 it was 22227 individuals, while in some years, for example, between 2015 and 2017, the groundhog population increased to 33796–35279 individuals. The numbers of ground squirrels in the region for the period from 2017 to 2020 ranged from 2055 individuals in 2017 to 3029 individuals in 2020 for the Russet ground squirrel, from 19343 individuals in 2017 to 12541 individuals in 2020 for the gray ground squirrel (State monitoring..., 2021). The abundance of these species in two districts of Chelyabinsk oblast—Krasnoarmeiskii district (forest–steppe) and Troitskii district (steppe)—in which a sharp drop in the numbers of steppe polecats has been recorded in recent years (see above), has fluctuated from year to year, but has not experienced catastrophic drops (Table 4) and therefore cannot be the cause of the disappearance of the steppe polecat.

In the mountain forest belt, ground squirrels were always absent; the numbers of hamsters were initially low, and therefore, these species could hardly determine the level of abundance and distribution of the polecat. Surveys of local residents, rangers, and hunters conducted by us and the game manager of the reserve P. Chashchin (personal report) showed that

the steppe polecat is currently not found in the mountain forest belt.

A downward trend in the numbers of steppe polecats can be seen in Bashkiria. According to the WA data, the number of polecats in Bashkiria was 584 individuals in 2019, 411 individuals in 2020, and 315 individuals in 2021. It should be noted that the largest number of polecats in Bashkiria is recorded in regions with stepped territories (Blagovarskii, Baimakskii, and Ermekeevskii districts), and it is most often recorded in the “field” biotope. The steppe polecat has not been found in recent years in the mountain forest of Beloretsk district of Bashkiria according to the WA data, as well as in the mountain taiga of Chelyabinsk oblast (Results of Winter..., 2019; Statement..., 2020, 2021).

In European countries, the reasons leading to the disappearance of the steppe polecat are considered to be possible introgressive hybridization with the European polecat or free-living domestic polecats *Mustela cf. furo* (Davison et al., 1999; Vallo et al., 2007). In the Southern Urals such a possibility is excluded, because pet ferrets are not found in the wild and the forest polecat is absent in this region.

A possible reason for the depression in the numbers of steppe polecats in the region may be the appearance and widespread distribution of an invasive species—the American mink (*Neovison vison* Schreber, 1777). In Chelyabinsk oblast, releases of American mink

Table 4. Changes in the numbers of the Russet ground squirrel (*Spermophilus major*) and gray ground squirrel (*Spermophilus pygmaeus*) in the Krasnoarmeiskii (forest–steppe) and Troitskii (steppe) districts of Chelyabinsk oblast for the period from 2017 to 2020

	Krasnoarmeiskii district				Troitskii district			
	2017	2018	2019	2020	2017	2018	2019	2020
Russet ground squirrel	56	164	901	166	131	181	143	496
Gray ground squirrel	987	1143	575	1664	0	5	0	77

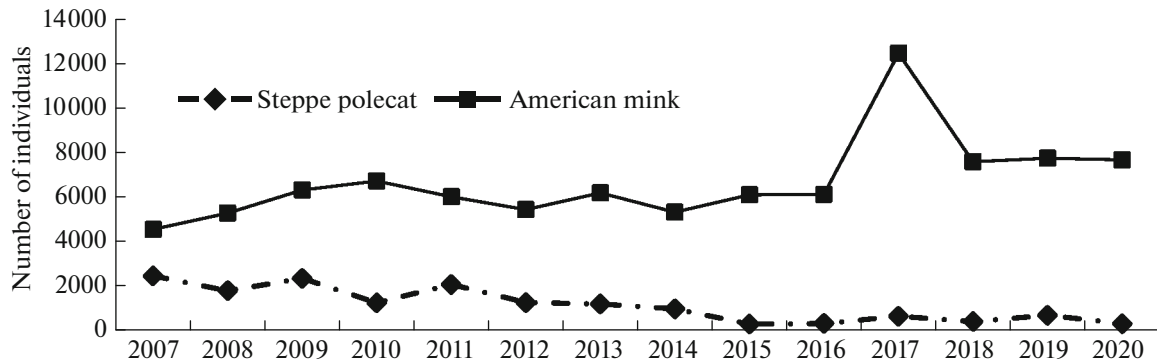


Fig. 3. Long-term abundance dynamics of the steppe polecat (*M. eversmanii*) and American mink (*N. vison*) in Chelyabinsk oblast.

were carried out in 1960. In the mountain forest part of the region, 478 animals were released for six years, from 1960 to 1966. Twenty-two years after the releases, the American mink accounted for 83.3% of minks hunted (Matveev and Bakunin, 1994). Currently, it has colonized a wide variety of water bodies and penetrated into forest–steppe and steppe areas (Kiseleva and Sorokin, 2013).

Over all these years, the numbers of American minks have been increasing (Fig. 3). So, while in 1970 its abundance throughout the region was only 1500 individuals, in 1990 it was already 3640 individuals (Table 1). By 2019–2020, the numbers of American mink in the region have doubled compared to the 1990s, reaching more than 7629 individuals; in some years its numbers exceeded 12400 individuals (Table 2). In forest–steppe areas, the numbers of American mink increased from 810 individuals in 2008 to 2147 individuals in 2020, i.e., almost 2.7 times. There were no releases of the American mink in the forest–steppe and steppe; it self-dispersed from the mountain taiga.

The mountains of the Southern Urals are characterized by a mosaic type of distribution of rodents (Sadykov et al., 1984) and a significant range of fluctuations in their numbers (Kiseleva, 2020a). The most favorable biotopes for mouse-like rodents are the valleys of forest streams and rivers and lowlands with abundant undergrowth and dead wood.

American minks in natural conditions have individual areas that are located linearly along the shoreline of a reservoir. The territory of one animal stretches in a narrow strip along the shore of a reservoir, and resources are limited to this strip. The steppe polecat in forest areas more often chooses riverbanks and lakeshores, where there is a higher abundance of its main food—rodents (Bolshakov, 1977). Taking into account the peculiarities of the spatial distribution of rodents in mountain forests, their confinement to shore habitats, and the biotopic preferences of the steppe polecat, it seems very reasonable to assume that the steppe polecat can encounter the American mink

in shore habitats. Both species are obligate predators, but the mink is a generalist in food, while the steppe polecat is more specialized (Jędrzejewska et al., 2001; Zalewski et al., 2021). Using similar food resources, mustelids gravitate towards areas with similar resources, which may lead to partial overlap of their ecological niches (Sidorovich et al., 2000; Zalewski et al., 2021). It is well known that wherever the American mink has dispersed, it affects both its prey and its competitors (Macdonald and Harrington, 2003). In Western Siberia, the appearance of the American mink caused a reduction in the numbers of ermine and Japanese mink (*Kolonok...*, 1977; Sinitsin, 1992). In the northeastern part of European Russia, an increase in the density of the American mink caused a decrease in the number of stoats (Sokolsky, 1998). In Belarus, the spread of the American mink led to an almost halving of the density of the European polecat (Danilov et al., 1976; *Kun'i v Belarusi*, 1997). Currently, there is active penetration of the American mink into the shore habitats of Kazakhstan, and researchers believe that *M. eversmanii* may face problems because of this (Maran et al., 2016).

Many studies have shown that introduced alien species can negatively impact native competitors by reducing their populations or eliminating them from ecosystems (Sax et al., 2007). The spread of the American mink led to the complete disappearance of the European mink (*Mustela lutreola* Linnaeus, 1761) throughout almost its entire range (Sidorovich and Macdonald, 2001; Maran, 2007; Kiseleva, 2016). On the territory of Chelyabinsk oblast, the European mink was found, in addition to the mountain taiga, in the northeastern part of the region in the forest–steppe and steppe zones on the Sinara River. A few individuals were found up until the end of the 20th century, while the numbers of steppe polecats remained quite high (Matveev and Bakunin, 1994). After the American mink entered this area and after its population increased, the European mink disappeared. The numbers of polecats in this area in 2008 were 737 individuals, but nine years later, in 2017, the

numbers were 80 individuals, and in 2020 there were only 51 individuals (State monitoring..., 2021).

In our opinion, an important and even key factor influencing the numbers of species living together with the American mink is its aggressiveness. Aggressive interactions between adult mink and other mustelid species have been observed in the wild (Maran et al., 1998; Sidorovich et al., 1999, 2000). Attacks by aggressive male American mink against European mink males and females have been observed more than once. American mink males followed the tracks of European minks and chased them away (Maran et al., 1998; Sidorovich et al., 2000).

In natural conditions, as a rule, when species use the same habitat, there is a division of activity over time. We observed a division in time of activity between different species when installing camera traps on different rivers in the mountain taiga (Kiseleva, 2020b). Harrington and Macdonald (2008) also described niche partitioning over time between the American mink and the European polecat.

However, in the case of the American mink, its negative impact is due not so much to competition and aggressive relationships with adult animals, but to killing different-age pups of different mustelid species. In the mink nursery in Il'meny Nature Reserve, several cases were recorded when male American minks managed to escape from their enclosures. In one case, a male American mink and a female it had mated with destroyed a litter of nine furo ferret pups that were 75 days old. American minks purposefully broke into the enclosure with ferrets, digging into the ground under the mesh and tearing it. In another case, a male American mink killed a young three-month-old male of its species (Kiseleva, 2016). Young polecats in the wild usually stay together in the first months of their lives and are easy prey for the aggressive male American mink. Infanticide is difficult to observe in the natural environment, and therefore, there are very few facts of its recording and description. However, there are cases of its observation in natural conditions (García-Díaz and Lizana, 2013).

Direct killing of polecat pups or pups of other mustelid species, for example, European mink is believed by us to convincingly explain the rapid disappearance of native species during the intervention of the invasive American mink. Additional indirect evidence of the negative impact of the aggressiveness of the American mink on the numbers of polecats can be provided by data on a shift in the sex ratio towards males in the European polecat in the presence of the American mink in natural shore habitats (Zalewski et al., 2021). Female polecats are much smaller than male American minks and are unlikely to withstand their aggression, unlike large male polecats.

CONCLUSIONS

The data we used on the modern distribution of the steppe polecat in Chelyabinsk oblast covered territories with different landscape conditions and different protection status (hunting farms, nature reserves, wildlife sanctuaries, national parks), and agricultural areas and rural settlements. An analysis of the long-term abundance dynamics of steppe polecats, species identification of mustelid excrement using PCR analysis of mitochondrial DNA, observations using camera traps, and surveys showed that there has been a sharp significant decrease in the numbers of steppe polecats in all natural zones of the Southern Urals. In the mountain taiga regions this species has disappeared; in the steppe and forest-steppe zones, it is found fragmented and its numbers are low. The numbers of the main prey of the steppe polecat (ground squirrels and groundhogs in the forest-steppe and steppe zones) did not experience a catastrophic decline; on the contrary, in some years it increased significantly and therefore could not cause a depression in the numbers of polecats. Natural disasters (fires and drought) could have contributed to the process of reducing the numbers of steppe polecats. However, the gradual and long-term nature of the decline in the numbers of steppe polecats does not speak in favor of these factors.

It is quite possible that the main reason for the depression of the steppe polecat was the invasion and spread of the invasive American mink, which has colonized all landscape areas of the region. The peculiarities of its behavior—extreme aggressiveness and infanticide—can lead to the physical destruction of pups, young animals, and females, which will quickly lead to a decline in the numbers of the native species. Studies in nature do not always provide direct evidence of the nature of interactions between species, and therefore, it is difficult to find clear reasons for changes occurring in species. Further research is needed on both the ecological characteristics of the steppe polecat and its relationship with the invasive species in order to identify the reasons for the observed depression in its numbers.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This work does not contain any studies involving human and animal subjects.

CONFLICT OF INTEREST

The author of this work declares that she has no conflicts of interest.

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