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Abstract: In this chapter the status of 27 mammals of Turkmenistan is discussed. Today the cheetah can be considered extinct in Turkmenistan; even though some unconfirmed records indicate that single cheetahs still are present in the northwest but the existence of a viable population there is doubtful. Cheetahs were frequently found in Badghyz and Karabil until the late 1950s.

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moment but which are found in very low numbers or in very limited areas, and may disappear due to environmental change or human influence.

- IV. *Undetermined*. These species are poorly studied and may possibly be rare or even threatened; the lack of data does not allow to classify these species into one of the three aforementioned categories.
- V. *Restored*. These are species whose existence is now not threatened due to applied protective measures, and whose abundance is no longer decreasing. These species are not yet eligible for industrial use, and their status should be constantly monitored.

Below, we give an annotated list of vertebrate species included in the Red Data Book of Turkmenistan which was published in two languages (Turkmen and Russian) in 1985. Classification of some species into one of the given categories is tentative; due to incomplete or subjective knowledge.

Mammals (27 species)

1. *Endangered Species (eight spp.)*

1. *Ursus arctos* Linnaeus, 1758 – Black Bear. The subspecies *U. a. syriacus* Hemprich et Ehrenberg, 1828, is not a resident of our republic but rather visits West Kopetdagh from northern Iran. Such records were common in the 1920s (Laptev 1934, 1937); in recent decades, they are much more sporadic. Footprints of two bears were recorded in the winter of 1961–1962 in the Aidere Valley. Bear footprints were registered also in the spring of 1963 and 1964 in the Chandyr Valley (localities Chaili and Narli) and in the Guen Valley. An adult bear was killed in 1967 in Karakala District; another, on Mt. Tagarev in 1967 (Shcherbina 1970). An adult bear looting the nest of wild bees on a juniper was seen in the summer of 1972 in the Chandyr Valley (locality Kelykhalyk). In West Kopetdagh, bears have been observed in remote valleys with thickets of trees and shrubs, up to the juniper belt. The only record outside this area is that of a female bear with cubs from East Kopetdagh (Meana-Chaacha area), next to the Iranian border, in 1980 (V. Fet pers. comm.; information obtained from border patrol). This subspecies is included in the IUCN Red Data Book.

2. *Felis lynx* Linnaeus, 1758 – Lynx. The subspecies *F. l. isabellina* Blyth, 1847, is rarely found in Kopetdagh (mostly in the more forested western part but also in Central Kopetdagh). Probably, lynx is not resident there but visits from northern Iran. During the 1960s, only ten lynx pelts were bought from hunters by state purchasing commissioners (from Karakala, Bakharden, and Geoktepe Districts).

3. *Acinonyx jubatus* Schreber, 1775 – Cheetah. In Turkmenistan, the Asian subspecies of cheetah, *A. j. raddei* Hilzh., has been (still is?) found. Before World

War II, there were about 40 cheetahs in Turkmenistan (Sludsky 1973); from 1930 to 1957 in Badkhyz, 25 animals were shot or captured, and about 70 encounters recorded. Cheetahs were often found in Badkhyz and Karabil until the late 1950s (Dementyev 1956); today they are absent (A. Rustamov 1980). Some still inhabited Northwest Turkmenistan during the 1960s and early 1970s (A. Rustamov 1980). Today the cheetah can be considered extinct in Turkmenistan; even though some non-confirmed records indicate that single cheetahs still are present in the Northwest, the existence of a viable population there is doubtful. We recommend the reintroduction of this unique large predator to the Badkhyz and Kaplankyr Reserves (A. Rustamov 1980). It should be done quickly while it is still possible to obtain the Asian subspecies from Iran or Afghanistan; if cheetah in these countries also disappear, we would have to introduce the African subspecies. This species is included in the IUCN Red Data Book.

4. *Panthera pardus* Linnaeus, 1758 – Leopard. The subspecies *P. p. tullianus* Valenciennes, 1856, was widespread in mountains and foothills of Turkmenistan in the late 19th and early 20th centuries; its range included the entire Kopetdagh, Kyurendagh, Bolshoi and Maly Balkhans, the western Badkhyz, the area between the Kushka and Murghab Rivers (Chengurek Mountains), and part of southern Karabil (Dementyev and Rustamov 1956; Kolesnikov 1956; Rustamov and Shcherbina 1957; Heptner and Sludsky 1967; Gorelov 1973; Babaev *et al.* 1978). Today, it is found only in Kopetdagh and the western Badkhyz, including ranges of Gyazgyadyk, Keletkaya, Danagermab, the western part of the Pulihatsum pistachio grove, Yeroyulanduz Depression, and Kizyldzhar Valley (Heptner and Sludsky 1967; Gorelov and Shcherbina 1971). It is also found in Bolshoi Balkhan (Zarkhidze 1979), and, from there, sometimes visits West Uzboi. Leopard is completely extinct in Maly Balkhan (the last adult animal was killed there in 1966), as well as in the Kyurendagh and Chengurek Mountains (Babaev *et al.* 1978).

The population of Kopetdagh leopards is steadily declining. Estimates from the 1920s gave an average of 0.25 animals/100 sq. km. In Kopetdagh, up to 15 leopards per year were killed from 1940 to 1941; in Badkhyz, in 1947 and 1948, fourteen leopards were killed within 500 sq. km. From 1963 to 1970, 46 leopards were killed in Kopetdagh and Gyazgyadyk (western Badkhyz). In total, records show that 360 leopards were killed throughout Turkmenistan from 1924 to 1966. Seventy animals were killed within only seven years in the 1960s (Gorelov 1973).

Today, leopard is a very rare and endangered species. Its records are constant but sporadic in Kopetdagh. In the last two decades, leopards were encountered in Central Kopetdagh in Gaudan (February 1974, one female with two cubs); Mt. Dushak (February 16, 1976, footprints of an adult); Pervomaisky village (December 1976, footprints of an adult); Yablonnaya village (December 26, 1976, footprints of two adults and two young animals); Shamli (January 1977, footprints of an adult); Kelat (in the eastern part of Central Kopetdagh);

January 1977, footprints of two adults); Kurkulab (May 1977, footprints of an adult); Firyuza Valley (January 1978, next to the Iranian border; one adult); Mergenulya (May 1978, one adult); Babazo Valley (summer 1979, one adult). In West Kopetdagh in the 1970s, leopards were spotted in the Syulyukli Valley (a tributary of the Chandyr Valley; June 1975, a female with two cubs), next to the village of Makhtumkala in the Sumbar Valley (June 1976, one adult), and on Mt. Khasardagh (June 1976, footprints of an adult). With the establishment of the Kopetdagh Reserve in 1976, and the Syunt-Khasardagh Reserve in 1979, regular observations of leopards were recorded in the 1980s in Central and West Kopetdagh.¹ Other protected areas in Turkmenistan which are inhabited by leopard include the Kopetdagh and Badghyz Reserves. The total number of leopards in Turkmenistan (including those that may visit from adjacent Iranian territory) probably does not exceed 30 to 40 animals. This species is included in the IUCN Red Data Book.

5. *Panthera tigris virgata*. Illiger, 1815 – Turanian Tiger. Unfortunately, this subspecies is now not only lost from the fauna of Turkmenistan but is probably extinct from the world fauna as well (Potapov 1978). Tiger lived in Kopetdagh (the Atrek, Sumbar, and Chandyr Valleys) as well as in valleys of the Amudarya, Murghab, and Tedzhen, but it was almost completely exterminated in the first decades of the 20th century. The last tiger in the Sumbar Valley was killed in January 1954 (Dementyev and Rustamov 1956).² Tigers entering from Iran were recorded in May 1963 (Arvaz Plateau) and in May 1964 (Mt. Khasardagh)³ (Babaev *et al.* 1978). The last records of tigers from the Amudarya were in summer 1968 and fall 1971, and from Iran, in the late 1960s to the early 1970s⁴ (Potapov 1978). The species is included in the IUCN Red Data Book.

6. *Cervus elaphus bactrianus* Lydekker, 1900 – Bokhara Deer, or Khangul. In the past, this subspecies of deer inhabited the Amudarya Valley and possibly also the Murghab and Tedzhen Valleys (Heptner *et al.* 1967).⁵ Within Turkmenistan, the Bokhara deer now inhabits only tugais (riparian forests) on the Amudarya in Darganata and Deinau Districts. In 1941, when the deer reserve was established in the tugais of the Amudarya, the population there was about 60, and by 1947, about 100 (Bannikov 1979; Heptner *et al.* 1967). Abolishment of this reserve led to the decline of species in this area, and, by the middle of the 1960s, there were only twelve or fifteen deer left (Bannikov 1979). Today, although a new Amudarya Reserve has recently been established, there are no more than a total of 20 to 30 deer within Turkmenistan. This population of Bokhara deer, together with those from Uzbekistan and Tajikistan, is invaluable for the preservation of their genetic pool. This subspecies of deer is included in the IUCN Red Data Book.

7. *Gazella subgutturosa* Gldenstaedt, 1780 – Goiter Gazelle. Dzhairan. From the mid-19th century up to the 1930s, many research

recorded herds of thousands of these gazelles. In the early 1940s the population of dzheiran in Turkmenistan was estimated as more than 100,000 animals (Heptner 1949). Today, its range has decreased more than 70%; this gazelle is now found only in isolated herds. Hunting of gazelles has been banned since 1950; however, this ban has not been effectively enforced, and extensive poaching continues. The only place where dzheiran is relatively secure is the Badghyz Reserve, where its population reaches 3,000 to 4,000 animals; the total population in Turkmenistan today is estimated as not more than 5,000 or 6,000. The dzheiran has been reintroduced at the Gyaur's nursery and introduced on Ogurchinsky Island in the Caspian Sea (Rustamov 1979). By mid-1990 there were more than 400 dzheirans on Ogurchinsky Island. This species is included in the Red Data Book of the IUCN.

8. *Capra falconeri* Wagner, 1839. – Markhor. In Turkmenistan, the subspecies *C. f. heptneri* Zalkin, 1945, is found only on the western slopes of the Kugitang between the villages Khodzhaqaskar and Karlyuk (Heptner *et al.* 1967). This population primarily inhabits the highest part of the range next to the village of Khodzheipil (Ishadov and Klyushkin 1978). The number of *C. falconeri* within Turkmenistan is estimated anywhere from 25 to 200 animals; within the entire range of this species in Middle Asia, there are not more than 1,000 goats. This species is included in the Red Data Book of the IUCN and is protected in the Kugitang Reserve.

II. Declining Species (six spp.)

9. *Rhinolophus blasii* Peters, 1866. This bat is found in Kopetdagh from the Bakharden Cave to the Chandyr Valley. The Bakharden Cave population has declined from 250 to 300 bats in the 1930s (Kuz'yakin 1950) to about 100 today.

10. *Miniopterus schreibersi* Kuhl, 1819. The subspecies *M. s. pallidus* Thomas, 1907, is found in the Bakharden Cave and several other caves in Kopetdagh. In 1937, the number of bats in the Bakharden Cave was estimated as 40,000 (Kuz'yakin 1950). In the spring of 1966 and in August, 1968, only 12,000 bats were recorded (Strelkov *et al.* 1979; the second survey counted young bats also). In the spring of 1970 about 19,000 bats were found, and in 1972, 4,000 to 5,000 (Babaev 1974, Strelkov *et al.* 1979). *M. schreibersi* may possibly move from cave to cave: e.g. in May, 1971, when Bakharden Cave population figures were low, several thousand bats were found in a cave to the south of the city of Geok-Tepe (Strelkov *et al.* 1979). This cave was also used as a winter shelter by about 10,000 bats (February 1979). Of 2,000 to 3,000 bats found in May 1967 in the Kelat Cave, approximately 50% were *M. schreibersi* (Strelkov *et al.* 1979). The total population of this species in Turkmenistan is estimated as 10,000 to 20,000, a two- to four-fold decline in the last 50 years.

11. *Calomyscus mystax* Kashkarov, 1925. This hamster species is an endemic of the Turkmeno-Khorasan Mountains. Within Turkmenistan, it inhabits Kopetdagh (Chakankala, Aidere, Yoldere, Koine-Kesyr, Germab, Firyuza, Dushak, Keltechinar) and adjacent mountains, from the Maly and Bolshoi Balkhans to Gyazgyadyk in Badghyz (Kashkarov 1925; Ogniyev and Heptner 1929; Laptev 1934; Heptner 1956; Kolesnikov 1956; Bondar and Zhernovov 1960; Shukurov 1962). Presently it is rare in West Kopetdagh (Rossolimo and Pavlinov 1982) although it was common there in the 1950s (Bondar and Zhernovov 1960). Maintenance of the Turkmenistan population is important for the preservation of this species. The species is protected in the Badghyz, Kopetdagh, and Syunt-Khasardagh Reserves.

12. *Hyaena hyaena* Linnaeus, 1758 - Striped Hyena. In the early 20th century, hyenas were common in southern Turkmenistan from the Caspian to the Amudarya (mostly in Maly and Bolshoi Balkhans, Kopetdagh, Badghyz, and Karabil). Today, isolated populations of hyenas still exist locally in western Badghyz and in Kopetdagh; single specimens are recorded also from eastern Badghyz and, possibly, from Karabil (Heptner and Sludsky 1967; Shcherbina 1970; Gorelov 1973; Babaev *et al.* 1978; Rossolimo and Pavlinov 1982). It is very rare in Maly Balkhan, the middle portion of Uzboi (Ishadov and Klyushkin 1979), in the Central Karakum (Ishadov 1973a), and Southeast Karakum (Nurgeldiyev 1960). The total number of these animals in Turkmenistan is not more than several dozen (Babaev *et al.* 1978). It should be mentioned that only about 200 hyenas survive in the southern parts of Eastern Transcaucasia (Azerbaijan), and this species is extremely rare in Tajikistan and Uzbekistan. Hyena is protected within the Badghyz and Kopetdagh Reserves.

13. *Capra aegagrus* Ersleben, 1777 - Bearded Goat. The Turkmenistan population belongs to the subspecies *C. a. turkmenicus* Zalkin, 1950. It is found in Maly and Bolshoi Balkhans and in Kopetdagh. Its numbers have decreased dramatically in the last decades. The populations on Gyazgyadyk (Gorelov 1959, 1973) and Kubadagh (Heptner *et al.* 1967) Mountains have disappeared; it is almost gone from West Kopetdagh, where it has been recorded in the past (Laptev 1934); and it is on the verge of extinction in Maly Balkhan (Zarkhidze 1980a). Most of the population is concentrated in Central Kopetdagh, where about 2,000 goats are found within the borders of the Kopetdagh Reserve. The Bolshoi Balkhan population is also declining. This mountain range was especially rich in goats in the past (they were found even in the foothills, at 100-200 m above sea level); a survey in 1971 showed 140 goats per 10 km² (Zarkhidze 1980a). The total number of bearded goats in Turkmenistan probably does not exceed 2,000. This species is protected in the Kopetdagh and Syunt-Khasardagh Reserves.

14. *Ovis ammon* Linnaeus, 1758. The Turkmen mountain sheep (*O. a. cycloceros* Hutton, 1842), or arkhar, inhabits mountains and foothills from Bolshoi Balkhan

through Kopetdagh to Badghyz and Karabil, as well as isolated mountains and cliffs in lowland Turkmenistan. Another subspecies (*O. a. bucharensis* Nasonov, 1914) is found in Kugitang. Uncontrolled hunting, use of natural pastures by domestic sheep and cattle, and disturbance by human activity has significantly decreased the population of the mountain sheep in Turkmenistan. There are now 8,000 to 10,000 *O. a. cycloceros*, and the Kugitang population of *O. a. bucharensis* does not exceed 15 to 20 animals. This species is included in the IUCN Red Data Book and is protected in several reserves in Turkmenistan.

III. Rare Species (11 spp.)

15. *Rhinolophus euryale* Blasius, 1853. Only several dozen of these bats inhabit the Bakharden Cave. Another record is known from a cave 10 km to the south of Geok-Tepe (Kuzyakin 1950; Strelkov *et al.* 1979).

16. *Rhinolophus hyposideros* Bechstein, 1800. Only seven specimens of this bat species are known from Turkmenistan, mostly from the Sumbar and Chandyr Valleys in West Kopetdagh. It is protected in the Syunt-Khasardagh Reserve.

17. *Nyctalus noctula* Schreber, 1775. This bat has been recorded only twice in Turkmenistan: from the Sumbar Valley (Kyzyltagh, 25 km to the south of Kara-Kala) in West Kopetdagh; and during migration, 200 km to the southeast of the city of Tashauz.

18. *Tadarida teniotis* Rafinesque, 1814. This bat species is rare all over its range; in Turkmenistan, its total number is about several hundred. The colonies have been found in rock crevices and cliffs in Kopetdagh, Badghyz, and in the Kashan River valley, 60 km to the south of the city of Takhta-Bazar (Kuzyakin 1950; Babaev and Dmitrieva 1966; Gorelov 1977a; Babaev *et al.* 1978; Strelkov *et al.* 1979). Each colony contained 15 to 19 bats. It is protected in the Badghyz, Kopetdagh and Syunt-Khasardagh Reserves.

19. *Jaculus turkmenicus* Vinogradov et Bondar, 1949 – Turkmen Jerboa. This rare and subendemic for Middle Asia rodent has been recorded mostly from the lowlands of West Turkmenistan (about 20 records are known). Surveyed density is 0.2–0.25 animals/km for automobile transects and 0.3–0.5 animals/km for foot transect (Babaev and Ataev 1966; Lobachev and Shenbrot 1973).

20. *Vormela peregusna* Gldenstaedt, 1770. – Marbled Polecat. This polytypic mustelid species is represented in Turkmenistan by its subspecies *V. p. koshevnikovi* Satunin, 1910. It is a common inhabitant of lowlands, foothills, and lower mountain belts, where it feeds on gerbils. The Turkmen Anti-Plague Station conducted surveys of density of this species within gerbil colonies for many years (Babaev *et al.* 1978). The density varied from 13 animals per 100 gerbil colonies (Darvaza at Karakum, Spring 1970) to seven per 100 colonies

(submountain plain between the cities of Bakharden and Kaakhka, Fall 1970); 3.2/100 colonies (Dardzha in West Turkmenistan, Spring 1976); 3.0 to 4.6/100 colonies (Sundukli Sands in Southeast Turkmenistan, Spring 1976); and 2.8/100 colonies (Repetek and Unguz, Spring 1976). In Central Karakum (Yerbent) only one animal per 100 gerbil colonies was counted after an especially cold winter (1968–1969) which affected the gerbil density. Low density, also due to another rodent depression, was observed in the Central Karakum (0.3/100 colonies) and Trans-Unguz Karakum (0.2/100 colonies). Average density of marbled polecat in West Turkmenistan, surveyed in 1954 to 1980, was low: 0.3–1.8 animals/100 colonies on the Krasnovodsk Peninsula; 0.3–0.5/100 colonies in Trans-Uzboi area; and 0.1–0.4 animals/100 colonies in South Ustyurt. Preservation of the Turkmenistan population is important because in many other parts of its range, *V. peregusna* is now rare or has disappeared. This species is found and protected in all Turkmenistan reserves.

21. *Mellivora capensis* Schreber, 1776 – Honey Badger. In Middle Asia, this species is found only in Turkmenistan (represented by the subspecies *M. c. indica* Kerr, 1792). It is recorded sporadically but probably is not as rare as was thought before (Novikov 1956). In 1952–1962, 31 records of honey badger were reported (Sukhinin and Shcherbina 1955; Sapozhenkov *et al.* 1963; Heptner *et al.* 1967), and in 1970 to 1977, 30 records, mostly in the Karakum Desert along the Unguz dry bed and in the Trans-Unguz area (Gorelov *et al.* 1978; Ishadov and Klyushkin 1979). Its numbers are probably neither sharply fluctuating nor increasing, and its range does not seem to expand northward (Heptner *et al.* 1967). Honey badger is protected in several reserves.

22. *Lutra lutra* Linnaeus, 1758 – Otter. The subspecies *L. l. seistanica* Birula, 1912, inhabits drainages of the Sumbar and Atrek Rivers (including Maloe Delili Lake), as well as the Amudarya, Murghab and Kushka Rivers (Heptner 1956; Heptner *et al.* 1967; Ishadov 1973b; Ishadov and Ishunin 1975, 1976; Babaev *et al.* 1978). Otter may live along the Kashan River (a tributary of the Murghab) but have not been observed in the Tedzhen River drainage in the last 40 years. After the construction of the Karakum Canal, otter dispersed along the canal, and the formerly disjunct populations in the Amudarya and Murghab drainages became connected. Migration of otters into Lake Sarykamys is also thought possible. There are no more than 200 otters throughout Turkmenistan; even in the past, when otter hunting was permitted, only about 100 pelts were recorded by state fur purchasers during 1924 to 1966.

23. *Felis caracal* Schreber, 1777 – Caracal, or Sand Lynx. In Turkmenistan, the subspecies *F. c. michaëlis* Heptner, 1945, is found in the Karakum Desert and other lowland and foothill regions (Heptner and Sludsky 1967). Its population now does not exceed 200 to 300 animals. These areas are main part of the species' range in Middle Asia; caracal is on the verge of extinction in the Cis-Aral area of Uzbekistan. A ban on caracal hunting was established in 1937, but

its range is decreasing due to the development of desert areas. Some cats die in cold winters with high snow accumulation, or they are attacked by stray dogs. The frequency of records of caracal also depends on density fluctuations of its prey species, the desert hare (*Lepus tolai*). Caracal is listed in the IUCN Red Data Book and is protected in several reserves of Turkmenistan.

24. *Felis manul* Pallas, 1776 – Manul Cat. The subspecies *F. m. ferrugineus* Ognev, 1928, is found in Kopetdagh from the Atrek River to the meridian of Artyk Station, and also in Kyurendagh, Bolshoy Balkhan, western Badghyz (and probably in Karabil), on the southern chink of Ustyurt, and in parts of northern Turkmenistan (Laptev 1934; Heptner 1956; Heptner and Sludsky 1967; Babaev *et al.* 1978). This cat is rare in Kopetdagh and Bolshoi Balkhan, and very rare in Badghyz (Heptner and Sludsky 1967; Zarkhidze 1979; Rossolimo and Pavlinov 1982).

25. *Equus hemionus* Pallas, 1775. – Onager (Wild Ass), or Kulan. The Turkmen subspecies (*E. h. onager* Boddaert, 1785) is currently found only in South Turkmenistan between the Tedzhen and Kushka Rivers, to the south of the line connecting the villages of Shortepe and Kalaimor (Heptner 1948; Shcherbina and Kravchenko 1960; Heptner *et al.* 1967; Babaev *et al.* 1978). Outside of Turkmenistan, the onager is found only in Iran and northern Afghanistan. It was recently introduced to the Meanachaacha and Kalinin Refuges (submountain plain of Central Kopetdagh) and to the Kaplankyr Reserve (northern Turkmenistan).

In the 19th century, thousands of onagers lived in Turkmenistan. By 1935, only about 500 animals were left, all of them in Badghyz. Their number continued to decrease until the Badghyz Reserve was established in 1941, when only 250 onagers were left. In 1969, the Badghyz herd comprised 800 animals and in 1976, 1,254 (Babaev *et al.* 1978). Currently, the Badghyz Reserve has not less than 2,000 onagers. The population growth in Badghyz is limited by the territory of the Reserve and water availability; most water sources and summer pastures are located outside of the Reserve, in valleys of the Kushka and Tedzhen Rivers. The onager is included in the IUCN Red Data Book.

IV. Undetermined

26. *Myotis nattereri* Kuhl, 1818. The endemic subspecies, *M. n. tschuliensis* Kuzyakin, 1935, is described from Turkmenistan. Only seven specimens are known from gorges and abandoned mines of Central and West Kopetdagh (Kuzyakin, 1950; Strelkov *et al.* 1979). This bat species is protected in the Kopetdagh and Syunt-Khasardagh Reserves.

27. *Myomimus personatus* Ognev, 1924. In Middle Asia, this dormouse is found only in Southwest and Central Kopetdagh (Rossolimo and Pavlinov 1982) and Bolshoi Balkhan. Since its discovery (Ognyev 1924), only 10 to 12