Population Status of Transcaspian Urial (*Ovis orientalis* [*vignei*] *arkal*) at Aktau Buzachinsky Nature Reserve, Kazakhstan.

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Abstract: A ground survey of Transcaspian urial (*Ovis orientalis* [*vignei*] *arkal*) was conducted over a 7-day period in March 2000 on a 113-km^2 portion of the Aktau Buzachinsky Nature Reserve in southwest Kazakhstan. The purpose of the survey was to determine the population status of urial, especially males. A total of 491 urial (183 ewes, 97 rams, 15 lambs, 196 unclassified) were observed. About 70 urial were observed per day afield. The observed urial density was ~4 per km^2. Approximately 35% of urial habitat on the reserve was surveyed. During the survey 71 adult rams were observed of which 45% were older than 6 years. One ram was observed for every 2 females and 1 mature ram for every 2.6 females. Rams 5 years or older were considered mature. The data indicate urial are abundant on the reserve and adequate mature rams are present in the population for breeding. Indications are that historic grazing has impacted the land's ability to produce forage which, in combination with the relatively high density of urial, may be negatively affecting ram horn growth rate.

Key words: habitat, hunting, Kazakhstan, population, *Ovis orientalis*, urial

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Urial (*Ovis orientalis [vignei]*) are small to medium size wild sheep inhabiting temperate mountainous, steppe, and desert regions of Central Asia and the Middle East, including Kazakhstan (Clark 1964, Valdez 1982). The taxonomic status of urial is unclear, especially designation of the various subspecies, varying with author (Clark 1964, Ellerman and Morrison-Scott 1966, Valdez 1982, Shackleton and Lovari 1997). One subspecies, the Transcaspian urial (*Ovis orientalis [vignei] arka*l), occurs in Kazakhstan (Valdez 1982). The total number of Transcaspian urial in CIS (former USSR) countries at the beginning of the 1990s was estimated at ~ 6,000 animals (Weinberg et al. 1997).

In 2000, all urial except for the subspecies Ladakh urial (*Ovis orientalis [vignei] vignei*), which was already listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I, were listed in Appendix II (FWS 2001). During 1999 and 2000 several international organizations became concerned that "over hunting" of urial across their range was putting populations in peril. This issue was a major topic at the April 2000 CITES meeting in Africa. The Aktau Buzachinksy Reserve urial was one of the populations in question (Fedosenko 1998, Fedosenko and Weinberg 1999). I was asked by GSC/OVIS, an affiliate of the Foundation for North American Wild Sheep, to visit the reserve during March 2000 to conduct an independent survey of urial population status. This paper reports the findings of that survey.

STUDY AREA

The 170,000-ha Aktau Buzachinsky Nature Reserve is located in the Central Asian country of Kazakhstan on the shores of the Caspian Sea (Figure 1).

Figure 1. The Aktau Buzachinsky Nature Reserve is located in southwest Kazakhstan.

The landform of mountains separated by broad valleys was created over thousands of years as a receding Caspian Sea exposed steep chalky cliffs composed of marine deposits (Figure 2). The climate is temperate and plant communities are typical of shrub/steppe vegetation in the inner part of the Eurasian Continent (Coupeland 1993, Lavrenko and Karamysheva 1993). The landscape has been highly impacted by human activity, especially by domestic livestock grazing (Fedosenko 1998).

Situated about 65 km north of Aktau City, the reserve is government owned and is a popular urial trophy hunting area. It is home to a population of 1,600 to 2,000 Transcaspian urial (Berdaliev, personal communication, 2000). Managed trophy hunting is allowed (average about 10 licenses per year) and revenues from hunting play an important role in managing the reserve (Berdaliev, personal communication, 2000). On an annual basis the number of hunting licenses issued has varied from 5 to 20 (Fedosenko 1998, Fedosenko and Weinberg 1999). After a few successive years of trophy hunting on the same portion of the reserve, that portion may be closed for a few years to provide rest from hunting (Berdaliev, personal communication, 2000).

Other large ungulates on the reserve include Asiatic wild ass (*Equus hemionus*), and goitred gazelle (*Gazella subgutturosa*). The only large predators are wolves (*Canis lupus*) and golden eagle (*Aquila chrysaetos*).

Figure 2. The Aktau Buzachinsky Nature Reserve is a landform of mountains separated by broad valleys that was created over thousands of years as a receding Caspian Sea exposed steep chalky bluffs composed of marine deposits.

METHODS

Wild sheep were systematically surveyed within a 113-km^2 portion of the study area over a 7-day period from 25 March through 31 March 2000. Surveys were conducted on foot and from a jeep on travel routes and from observation points. Drop off points, base camp locations, and observation points were documented using GPS technology. Animals were observed with aid of 8X and 10X binoculars and 10X-60X spotting scopes. One or 2 observation groups consisting of 3 or 4 experienced observers went into the field together each day to observe sheep. Censuses were conducted over a 7-day period because it allowed sufficient time to adequately cover the area and to minimize counting the same animals twice. When the possibility existed that the same animals were observed more than once, only the first observation was recorded to minimize error. Location and altitude of sheep observation sites were recorded using GPS technology.

Observed urial densities were determined by dividing the number of animals observed by the size of the survey area. Each sheep observed was classified into one of the following categories: adult ewe, lamb, or ram. Rams were grouped by size class based on horn length (Geist 1971, Valdez 1982) as follows: Class I (1-2 years old), Class II (3-4 years old), Class III (5-6 years old) and Class IV (> 6 years old). Ages of 3 hunter harvested rams and 1 picked up head were determined by counting annual growth rings (Geist 1966). Horn measurements are in English units, the standard used by the most well known trophy record books (SCI 2000, RW 1998)

RESULTS AND DISCUSSION

A total of 491 urial were observed, of which 183, 15, and 97 were classified as adult females, lambs, and rams respectively. There were 179 that, due to field observation difficulties, were determined to be ewes and lambs but the age of individuals could not be determined. There were 17 unclassified urial observed. The 17 unclassified individuals were included in population density calculations, but were excluded when calculating population structure. All of the 97 rams classified were grouped into age classes. The observed ram age structure was 6 Class I, 20 Class II, 39 Class III, and 32 Class IV.

Population Density & Size

About 70 urial per day were observed during the 7-day survey. The observed urial density within the 113-km^2 portion of the reserve surveyed was ~4 urial per km^2. Approximately 35% of the reserve's urial habitat was surveyed. Fedosenko and Weinberg (1999) estimated a population density of 2.5 urial per km^2 for the north Aktau Mountains in 1997. In 1997, the area included the plain between separate mountains. In the 2000 survey, only the mountains and small lower elevation valleys frequently used by urial were included. Large, low elevation plains that are infrequently used by urial, sometimes when they cross from one mountain to the next, were excluded. This may be the reason for the lower observed density in 1997 compared to this survey.

A total urial population for the north Aktau Mountains was estimated at 1,000 by Fedosenko and Weinberg (1999) following their April 1997 survey. Berdaliev (personal communication, 2000) estimated the urial population to be 1,600-2,000 in 2000. March and April may not be the best months of the year to conduct a population census as it coincides with lambing when ewes may be more reclusive than other times of the year. March and April are also a time when winter is giving way to spring and animals are beginning to disperse to higher elevations on the reserve. A more suitable time to conduct a population census may be in November during the breeding season when males are more visible and ewes may be in larger groups as winter approaches. However, for comparative purposes, if one extrapolates the 491 urial I observed on the 35% of the reserve's urial habitat surveyed to the remaining 70% not surveyed, a population of ~1,400 urial is estimated for late March 2000. This estimate is higher than the 1,000 estimated for April 1997 by Fedosenko and Weinberg (1999), but smaller than the 1,600-2,000 estimated by Berdaliev (personal communication, 2000). Fedosenko and Weinberg (1999) believed the urial population to be slightly increasing since 1990.

Population Structure

About 80% of urial classified were ewes and lambs, and about 20% rams. An April 1997 urial survey on the reserve resulted in 27% males observed (Fedosenko 1998). Of 198 urial for which sex and age were determined, 15 were lambs. This proportion of lambs is low and is not suitable to use as an index of lamb production since lambs were being born during the survey. All 15 lambs observed were just recently born (within a few days) and the survey may have coincided with the peak of lambing.

The proportion of rams observed by size class was 6% Class I, 21% Class II, 40% Class III, and 33% Class IV. The relatively low proportion of Class I rams observed may reflect poor survival of lambs born the previous year.

One ram was observed for every 2 females and 1 mature ram for every 2.6 females. Rams 5 years or older were considered mature. These figures are conservative, as my classification of females combines nonproductive yearling females (lambs born the previous March) with adults. Savinov (1983) and Benikov (1983) determined females are sexually mature at 2.5 years of age (in Fedosenko 1998). During my survey, 71 mature rams were observed, of which 45% were older than 6 years.

CONCLUSIONS

Urial are abundant on the Aktau Buzachinsky Nature Reserve.

The observed ratio of 1 ram $\geq$ 5 years of age for every 2.6 females is adequate for successful breeding. Had we conducted the survey during the fall rut, when males are more observable, the ratio of males to females would likely have been higher than reported here.

To maintain high-quality trophies for the hunting program, and for long-term evolutionary processes, it is important to maintain a diversity of ram age classes representing the entire spectrum from young to old animals. However, it is interesting that Woodgerd (1964) determined Rocky Mountain bighorn (*Ovis canadensis canadensis*) rams to be sexually mature and capable of breeding at 18 months. For a population of Rocky Mountain bighorn sheep, Coltman et al. (2001) found that, although a few large-horned rams (age 8+ years) had very high reproductive success, younger rams sired about 50% of the lambs. Mating success was not restricted to a few top ranking rams each year (Coltman et al. 2001).

Horn development may be negatively affected by inadequate diet (Browning and Monson 1980). Environment and habitats may play a greater role in horn growth then genetics (Hook 1998). Even though livestock grazing on the reserve was significantly reduced during the early 1990s (Fedosenko 1998), habitat conditions are still less than ideal due to historic intensive, poorly managed livestock grazing. Although reduction in livestock grazing was needed to allow the land to heal, recovery is a long, slow process. The reserve is still in the initial stages of recovery (Figure 3). This

Figure 3. Intensive, historic livestock grazing on the Aktau Buzachinsky Nature Reserve has impacted the reserve's ability to produce forage.

historically intensive livestock grazing has impacted the land's ability to produce forage, and may be negatively affecting available nutrition and thus the rate of horn growth of rams. As a result, it appears that rams at the Aktau Buzachinsky Reserve take longer to achieve trophy size then they would under better nutritional circumstances. For example, during the survey 2 rams harvested by hunters were determined to be 7 years old. One of these rams is shown in Figure 4. Due to its relatively small horns, this mature Class IV (>6 years) male could easily be mistaken by a field observer for a younger Class III (5-6 years) or even a Class II (3-4 years) male. When conducting surveys rams are typically placed in size or age classes by estimating horn length. It is possible that during some

of the previous surveys, the number of rams in age Classes III and IV were

Figure 4. Many rams like this one, unusually small for a 7-year-old male, were observed during the survey and may be the result of slow growth due to habitat conditions. This Transcaspian urial (*Ovis orientalis* [*vignei*] *arkal*) has horn lengths of 24 5/8 and 25 3/8 in. and basal circumferences of 10 1/4 and 10 3/8 in.

underestimated due to the unusually slow horn growth at the reserve. During the March 2000 survey I observed many rams of the size shown in Figure 4. Trophies taken by hunters during recent years and picked up heads indicate suitable trophies are being produced, but it takes them longer than is typical to achieve trophy size (Figure 5).

The average trophy harvest of about 10 rams per year appears to be having little detrimental effect on the urial population. Fedosenko and Weinberg (1999) indicated a harvest quota of 10 trophy rams per year should be the maximum. Since ram horn growth may be relatively slow at the Aktau Buzachinsky Nature Reserve, a more conservative hunting quota may be necessary than for a similar population with more typical horn growth. Harvest quotas are important as hunting fees provide essential funds for managing the reserve and the salaries of game guards (Berdaliev, personal communication, 2000). Kazakhstan is the only Central Asian country in the CIS where part of the income from trophy hunts is spent on research, population counts, and protection (Fedosenko and Weinberg 1999).

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Figure 5. Klaus Ånerud (left) with his 10-year-old Transcaspian urial (*Ovis orientalis [vignei] arkal*) taken in 1999 (horn lengths = 34 3/4 and 35 3/8; basal circumferences = 11 and 11 1/4 in.). Author (right) with the head of an 11-year-old Transcaspian urial picked up on the Aktau Buzachinsky Nature Reserve (horn lengths = 34 1/2 and 35 3/4 in.; basal circumferences = 10 in.).

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