

Long-term Population trends and nesting success of Imperial Eagle, Golden Eagle and White-tailed Sea Eagle in North-West Kazakhstan in 1990-2002

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ABSTRACT

We conducted a 20-year study of the eagle population within the Naurzum National Nature Reserve in north-west Kazakhstan. Data from these long-term studies include information on spatial distribution, numbers and productivity, breeding phenology, survival, and diet. The Imperial Eagle population was nearly stable through the period 1990-2002 and approximately 40 regular breeding sites were monitored. The number of breeding pairs fluctuates from 22 to 34 annually. The White-tailed Sea Eagle population increased slowly through the 1980s but at the end of the 1990s and into 2002, it increased sharply. This increase coincided with the cyclic depression (drying) of regional lakes. Overall the number of White-tailed Sea Eagle breeding pairs increased from eight in 1979 to 21 in 2002. In 1993 two breeding pairs of Golden Eagle were first observed in the reserve. The number of pairs of this species fluctuated for the remainder of the decade, but has stabilized at four pairs since 1999. Nesting success of Imperial and Golden Eagles was highest in 2000 with 2.0 young fledged per successful pair; for White-tailed Eagles nesting success was highest in 1993, when they also fledged 2.0 chicks per successful pair. The increase in the number of White-tailed Sea and Golden Eagles did not coincide with obvious changes in prey resources. It is possible that these data reflect a generally positive population trend for eagles in Kazakhstan

INTRODUCTION

The last two decades of the 20th century have seen significant changes in population trends of some species of birds of prey in northern Eurasia. Among these are several types of large eagles, including the Imperial Eagle *Aquila*

heliaca, White-tailed Sea Eagle *Haliaeetus albicilla* and Golden Eagle *Aquila chrysaetos*. Monitoring populations of these species is therefore an important goal, both for our understanding of these birds and for their conservation.

The Naurzum National Nature Reserve (NR) is one of the most important sites for nesting eagles in the steppe zone of north Kazakhstan. Intensive research on these eagles has been ongoing at the reserve since 1979. In addition, there were shorter-term studies conducted during the period from the early 1930s to the mid-1960s. In this paper we report on long-term trends in populations of these species during our intensive studies and we compare these data with those observed during the earlier shorter-term research.

STUDY AREA AND METHODS

The Naurzum Reserve covers 87700ha of dry steppe landscape in north-central Kazakhstan, near the town of Kustanay. The wooded part of the reserve is composed of three isolated and highly fragmented forest areas: Naurzum (18,000ha), Tersek (4,100ha) and Sipsin (14,000ha). The Naurzum and Tersek regions are predominantly pine forest (*Pinus sylvestris*) and Sipsin is composed mostly of birch trees (*Betula* spp.). The majority of the steppe surrounding the reserve has not been ploughed and consequently Siberian Marmot (*Marmota bobac*) and three species of Suslik (*Spermophilus fulvus*, *S. major*, *S. pygmeus*) occur widely. The other main landscape type is wetlands, composed of fresh and salt lakes that have intermittent cyclic flooding and drying stages.

From 1978 to 2002 we searched the entire NR for nesting eagles. By 1980 the vast majority of eagle nesting territories had been identified. Location of occupied territories was mapped and since 1998 locations were determined with a GPS. Any area where a single reproductively active eagle pair was observed in one or more years was considered a nesting territory. A nesting territory was considered occupied if we regularly observed a pair of adult or subadult birds, or if we observed signs of territory defence, nest building, or other reproductive activity.

Occupancy and reproductive activity of all known eagle nesting territories was monitored from 1979 to 2002. Monitoring involved surveys of every territory at least two times per year. The first survey, which determined if territories were occupied, usually occurred in the second half of April. Often we surveyed again in early June to assess success of incubation and productivity. Another survey was always conducted in late July or early August to determine nesting success. Between 1978-1985 (E. Bragin) and 1998-2000 (T. Katzner) we visited the majority of nests every one to four weeks for separate dietary assessment; reproductive activity was also monitored during these visits. Similar patterns in productivity were observed regardless of the intensity of the visitation schedule.

The reproductive parameters we report here are (a) the number of territorial pairs laying eggs; (b) the percentage of laying pairs that were successful; (c) the brood size at fledging (number of fledged young per successful pair).

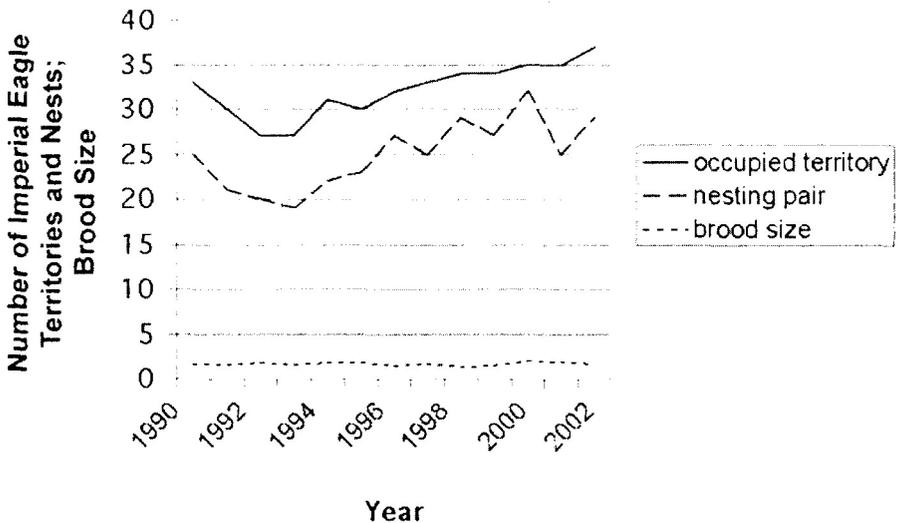
RESULTS AND DISCUSSION

The Imperial Eagle is the most common eagle species in the NR. Between 1979 and 2002 we described and located 42 nesting territories, of which 22-37 were occupied in each year from 1990 to 2002 (Figure 1). The location and

occupancy of nesting territories has remained relatively constant during this period. Only four territories occupied at some time since 1979 have not been occupied at all in the last 7-10 years. However, in these last 7-10 years, three formerly occupied territories have been reoccupied and two new territories have been established. It appears that the Imperial Eagle population in the NR has been relatively stable in recent years, with some small variations.

The total number of Imperial Eagle pairs breeding in the NR between 1990 and 2002 averaged 24.9, and ranged from 19 to 32 (Figure 1). The proportion of pairs that laid eggs during these years was 77.5%, although annually it varied between 71.4% and 91.4%. In general the number of occupied territories was correlated with the number of breeding pairs, but this was not always the case. On average 81.7% of breeding attempts were successful, but annual breeding success ranged from 74.1% to 88.0%. Each successful pair fledged an average of 1.7 young, although average annual productivity ranged from 1.3 to 2.0. Although highest productivity was in 2000, there was no trend in productivity between 1990 and 2002.

Figure 1. Number of Imperial Eagle territories, nesting pairs and brood size at the Naurzum Nature Reserve, Kazakhstan, between 1990 and 2002.

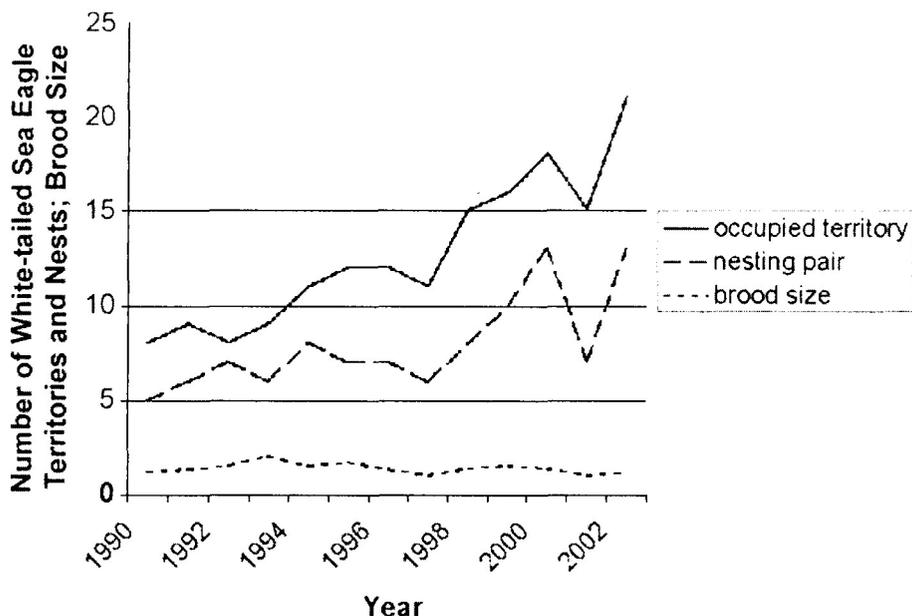


Historical (long-term) changes in the Imperial Eagle population in the NR and throughout the steppe zone of the Kustanay region probably were more significant than the recent (short-term) fluctuations. We have no complete data on the number of Imperial Eagles historically in either the NR or in any other local area. However, we do have relative assessments of many populations during the period from 1927 to 1955, though these are often contradictory. According to some authors, Imperial Eagles were "rare" in the region (Gibet 1959, 1960), but others described them as "common" (Voloshin 1949; Osmolovskaia 1953) or even "numerous" (Livron 1939). In some areas we do have more detailed information on Imperial Eagle numbers. In 1946-1947 along the north border of the Naurzum forest four nesting territories were known. At present, we know of seven active territories, possibly suggesting an

increase in numbers. In contrast, in 1963 and 1966-67 the number of nesting Imperial Eagles in Tersek (10) did not differ from those at present known (Zabelin *et al.* 1963; Solomatin 1969). These data may suggest that the distribution and population of Imperial Eagle increased between 1950-1960 (Bragin 1999, 2000), when Large-toothed Suslik *Spermophilus fulvus* appeared and became widely distributed in the area. During this same period, the number of Siberian Marmot *Marmota bobac* was also restored to previous levels (Formosov 1959). Sizeable increases in the population size of the main prey of Imperial Eagles, Suslik, Marmot and Rook (*Corvus frugilegus*), between earlier studies (1935-1955) and our research (1978-2002) also support this hypothesis (Bragin 2000; Katzner 2002).

White-tailed Sea Eagles occur only in some places of the steppe zone of Kazakhstan during the breeding season. In fact, until recent surveys in other areas, the NR was the only known nesting place in this zone (E. Bragin, unpubl. data). Previously, only one nest was known in the reserve (Voloshin 1949; Gibet 1959). From 1979 to the early 1980s, the total number of White-tailed Sea Eagles in the NR ranged from six to eight pairs (Figure 2). Since 1984, however, there has been a slow increase in the number of breeding birds found. Between 1985 and 1998 the population increased to 13 pairs, and since 1999 we have found new territorial pairs in each year. In our most recent surveys in 2002, we found a total of 21 occupied territories. Environmental conditions differed widely during this period of slow growth (1985-1998) and during the period of more rapid increase (1998-2002). The early growth stages coincided with a period of high water levels in the Naurzum lakes. However, the more recent increases occurred during a dry period when water levels were very low and waterbird numbers were correspondingly quite low.

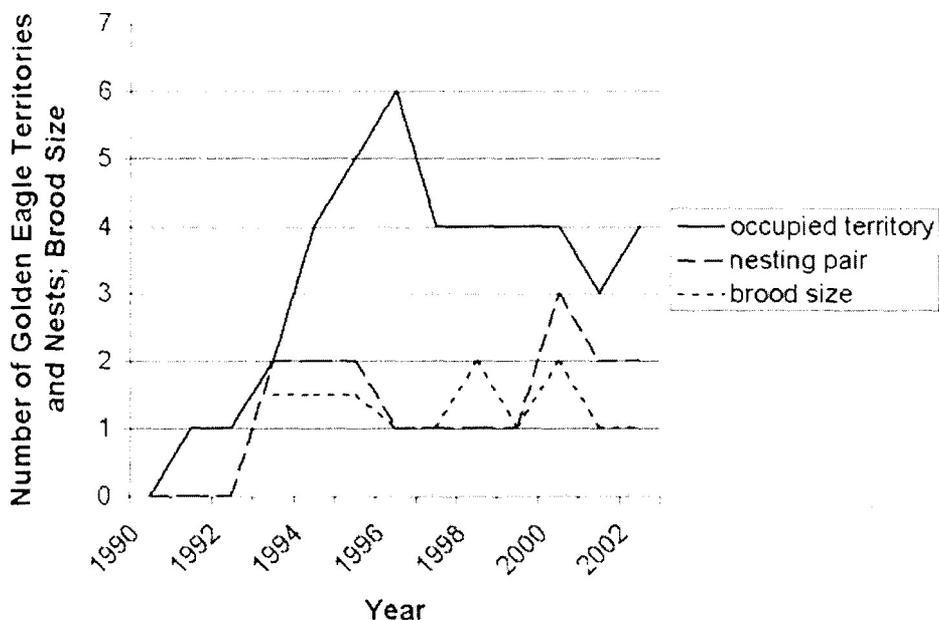
Figure 2. Number of White-tailed Sea Eagle territories, nesting pairs and brood size at the Naurzum Nature Reserve, Kazakhstan, between 1990 and 2002.



On average, 63.2% of White-tailed Sea Eagle pairs laid eggs per year, but annual averages varied considerably, from 46.7% to 87.5%. The percentage of successful pairs during these years ranged from 36.4% to 100%, with an average of 74.2%. Mean brood size at fledging was 1.4 young per successful pair. The annual variance in productivity from 1.0 to 2.0 showed some correlation with changing of the number of nesting pairs. In general, productivity was positively correlated with the number of nesting pairs, but we did not test this trend statistically.

The Golden Eagle is the rarest eagle species in the steppe zone of Kazakhstan. There is one note about one breeding pair in the NR in the 1930s (Rjabov 1949). In 1979 through the 1980s, Golden Eagles occurred occasionally during early spring or fall (August-October). The first territorial pair was recorded in May 1991 and in 1993 they began to breed. A second pair was also recorded in 1993, and the number of territorial pairs observed increased to six pairs in 1996. However, these birds were mainly subadults. In 1997 the population of Golden Eagles declined to four pairs, and it has apparently remained at that point since then.. The number of nesting pairs during these years ranged from one to three. Successful pairs fledged an average of 1.4 young, and annual averages ranged from 1.0 to 2.0. Highest productivity occurred in 1998 and 2000.

Figure 3. Number of Golden Eagle territories, nesting pairs and brood size at the Naurzum Nature Reserve, Kazakhstan, between 1990 and 2002.



The forests of the NR have a unique assemblage of three species of large eagles that usually live in substantially different habitat types. These populations have very high density and appear stable or are increasing. The expansion of White-tailed See Eagle and Golden Eagle was not linked with any

changes of prey resources, but possibly these situations reflect a positive population trend in general in Kazakhstan.

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