

## BIRDWATCHERS IN ACTION

# The east–west migration of Steppe Eagle *Aquila nipalensis* and other raptors in Nepal and India

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In the last few years, DA and RDC have visited Nepal to study the migration of Steppe Eagle *Aquila nipalensis* and other raptors, and have been fortunate to meet two Nepalis (SG and TS) with similar interests. All of us have been amazed by how close the eagles approach observers at our watch site in Nepal (Plate 1). In autumn 2012 we began monitoring trans-Asian migrants including Steppe Eagles, Amur Falcons *Falco amurensis* and Cinereous Vultures *Aegypius monachus*. We hope to maintain this effort for several years. We have found publications by Clark (1996) and Forsman (2005) essential works to guide us in determining the ages of the passing raptors. For most of the sites mentioned in the text, refer to Figure 1 for approximate location.

Commencing in the 1920s observers in Nepal and India have seen Steppe Eagles and other raptors in an east to west migration in autumn (Donald 1923, Inskipp *et al.* 1971, Fleming 1983, de Roder 1989, Inskipp & Inskipp 1991, den Besten 2004), and occasionally in spring as the birds return (den Besten 2004). Estimates of the number of eagles involved vary between 5,000 and 50,000 each autumn. The diversity (and number) of other raptor species, such as Black Kite *Milvus migrans* (Plate 2), Eurasian Sparrowhawk *Accipiter nisus* and Oriental Honey Buzzard *Pernis ptilorhynchus* (Plate 3), migrating along this corridor is also not well known.

The first notes of this migration were made on 9 November 1923 from the small town of Jhatingri (1,620 m), Himachal Pradesh, northern India (Figure 1 #5). Here Donald (1923) watched about 40 Steppe Eagles passing close to him between 15h00 and dusk. He wrote, ‘occasionally two came very close together but for the most part they followed each other at intervals varying from one to four or five minutes’, and that the direction of flight was ‘from the east-north-east to west-south-west.’

On 7 November 1970, Tim Inskipp and colleagues recorded south-westerly movements of a number of raptor species in two hours at Daman—a pass on the south rim of the Kathmandu valley (Figure 1 #2), including 174 Steppe Eagles, an adult male Northern Goshawk *Accipiter gentilis*, two Eurasian Sparrowhawks, two Common Buzzards *Buteo buteo*, one Booted Eagle *Hieraetus pennatus*, 18 Himalayan Griffon *Gyps himalayensis*, one Eurasian Hobby *Falco subbuteo* and one Common Kestrel *F. tinnunculus*. On the following morning, they counted 78 migrating Steppe Eagles in migration on a single hour (Inskipp *et al.* 1971).

In the 1970s, Robert Fleming Jr. and others made observations on diurnal raptor migration in various locations in central Nepal, primarily along the Jomsom trek near Dhampus (1,800 m) within sight of the Annapurna range (Fleming 1983) (Figure 1, location ▲). On 2 November 1976,

All images were taken at the raptor watch site at Khare, Paudur Hill, Nepal.

**Plate 1.** View from the raptor watch site at Khare, Paudur Hill, Nepal, 25 November 2011.



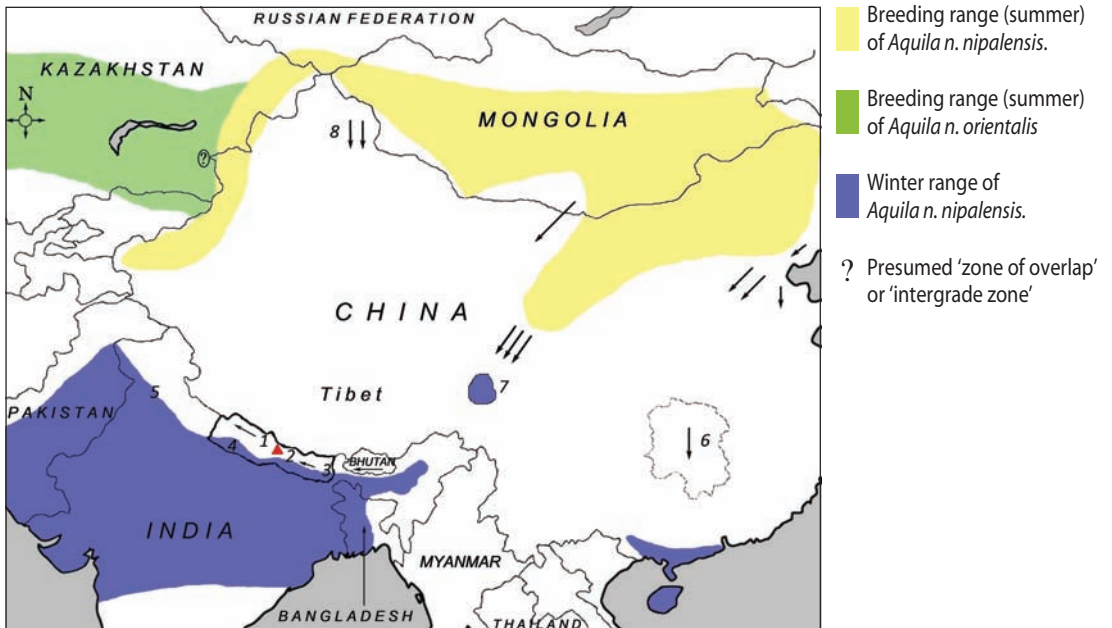


**Plate 2.** Adult Black Kite *Milvus migrans*, 19 November 2011.



**Plate 3.** Juvenile (first year) Oriental Honey Buzzard *Pernis ptilorhynchus*, 22 November 2011.

**Figure 1.** ▲ Khare (Nepal) – location of current migration study at 1,646 m; the town of Dhampus is directly north across a valley at approx. 1,800 m. (1) Ghasa in the Kaligandaki valley, (2) Kathmandu Valley, (3) Ilam District, (4) Bardia National Park, (5) Jhatingri and Dharamsala, Himachal Pradesh, India, (6) Chihkiang [Hongjiang], China, (7) Eastern Tibet, (8) Kalamaili, Xinjiang Province, China.



Fleming counted 305 Steppe Eagles in about an hour passing close to the Dhampus ridge, 70% of them in mixed age groups of up to 11 birds. He also saw a few Greater Spotted Eagles *Aquila clanga* and Imperial Eagles *A. heliaca*. Fleming was the first to note that migration begins at about 09h00, and that the eagles used different routes at different times of day. As cumulus clouds increase over the Annapurna range, the eagles changed their route to the south, away from the high peaks and closer to the Dhampus ridge. If later clouds begin to obscure Dhampus, they moved further to the south and by 14h00 begin to pass over the small town of Khare (sometimes called Khande) at Paudur Hill (1,646 m), varying their route by up to 8 km from morning to late afternoon on exceptionally cloudy days. Overall, Fleming estimated that 45,000 eagles migrated between the last week of October and the end of November. However, he only observed small numbers of two other raptor species migrating, Hen Harrier *Circus cyaneus* and Common Buzzard (Plate 4).

From 6 October to 4 November 1984, Bijlsma (1991) observed Steppe Eagles on the Jomsom trek near Khare, and further west near the small town of Ghasa (2,200 m) in the Kali Gandaki valley, where north-south migration of Demoiselle Cranes

*Grus virgo* was also seen (Figure 1 #1). Steppe Eagle migration peaked at Khare in late October—1,169 counted in all, with highest count of 817 on 27 October. By comparison, Demoiselle Crane totalled 8,163 between 13 and 19 October including 6,360 on 13 October. Thiollay (1979) placed the peak autumn migration of Demoiselle Cranes between late September and early October. Bijlsma also noted 305 Amur Falcons roosting in the outskirts of Pokhara on 29 October 1984.

From 20 October to 7 November 1985, de Roder (1989) counted 7,852 Steppe Eagles, passing at a rate of over 58 eagles per hour at the Paudur Hill site near Khare, with a maximum of 1,397 on 1 November. His observations suggested that first-year (juvenile) Steppe Eagles migrate in greater number later in the season compared to older birds. He also noted 16 other migrating raptor species including a few Imperial and Greater Spotted Eagles, as well as Lesser Kestrel *Falco naumanni* and Amur Falcon, the numbers of which both peaked between 20 and 30 October.

In October 1999, RDC and DA made their first visit to the Paudur Hill site in Nepal to study the migration between late October and early November (DeCandido *et al.* 2001) (Plate 1). In nine days a total of 821 Steppe Eagles were seen

**Plate 4.** Common Buzzard *Buteo buteo vulpinus*, 22 November 2011.



**Plate 5.** Light-morph juvenile Booted Eagle *Hieraetus pennatus*, October 2011.



(over 15 per hour) as well as eight other raptor species. Members of the Gurung family (Gurung *et al.* 2004) recorded 6,503 migrating Steppe Eagles between 24 October and 5 December 2003 (21 per hour), with a peak of 571 on 23 November. This was the first time Steppe Eagle migration was recorded in December. In both studies, up to six local vulture species were seen daily, particularly flocks of Himalayan Griffons and lone Lammergeier *Gypaetus barbatus*. In subsequent years, SG noted other migrant raptors including Lesser Kestrel and Booted Eagle (Plate 5).

During autumn 2001 and spring 2002 den Besten (2004) studied the migration of Steppe Eagles and other raptors from a site (1,900 m) at Dharamsala, Himachal Pradesh, India (Figure 1 #5). He counted 8,194 Steppe Eagles (over 46 per hour) between 23 October and 30 November. The highest daily total was 914 on 20 November, with a peak of 194 between 13h30 and 14h30. Counts of 100–150 eagles per hour were made on several days. In addition, he recorded 15 other raptor species including migrating Greater Spotted and Imperial Eagles.

In November 2011, a team led by TS and SG observed the migration from Paudur Hill, at the same location as de Roder (1989), DeCandido *et al.* (2001), and Gurung *et al.* (2004). Between 15 and 28 November, M. Siponen and M. Pajunen (*in litt.*) counted 1,105 Steppe Eagles (over 16 per hour), comprising first-year (juvenile), subadult (second to fourth year) and adults. At least 15 other raptor species, including three vulture species, were also seen.

Besides these large movements south of the Annapurna range, there are other reports of migrating raptors from Nepal—of these, the highest Steppe Eagle count is from the Kathmandu Valley where 135 Steppe Eagles and two Greater Spotted Eagles moved west in half an hour on 19 November 1989 (Nielsen & Jakobsen 1989). Small numbers of Steppe Eagles were noted flying west along the Himalayan foothills in Ilam District in east Nepal (Figure 1 #3) in October and November 1978, and at Bardia National Park in the west (Figure 1 #4) in November 1985 (Cox 1985).

Perhaps the biggest mystery of this migration is, where are the Steppe Eagles coming from, and what are their final destinations? The nominate race *nipalensis* breeds widely in Mongolia (Ferguson-Lees & Christie 2001), and locally in China—western Xinjiang, north-east Qinghai, central Inner Mongolia and northern Hebei provinces; it migrates through central China, some wintering in the south (Cheng 1987). Davis & Glass (1951) reported that ‘for about two weeks in October these large birds [Steppe Eagles] were seen every day in vicinity of

Chihkiang [Hongjiang, Hunan province]. None seen at other seasons.’ (Figure 1 #6) There are few other records of migrating Steppe Eagles for China, but recently birds have been seen flying south at Kamuste-Kalamali in northern Xinjiang (Figure 1 #8), including a peak count of 191 on 23 October 2006 (China Ornithological Society 2007). Williams (2000) saw 10 Steppe Eagles moving south at Beidaihe, China, in autumn between 1986 and 1990 (3 October–9 November), but these birds most likely continued south towards the Thai-Malay peninsula.

It is not clear where the birds moving from east to west in Nepal have entered the Himalayan chain, but since the species is a scarce to uncommon passage migrant in northern Myanmar (Robson 2008), an uncommon to rare passage migrant and winter visitor to northern Thailand (P. Round *in litt.* 2012), and the peak daily count in November in Bhutan is only 14 (Spierenburg 2005), it suggests that east to west migrating Steppe Eagles do not enter in the far east of the chain.

Ellis *et al.* (2001) showed that the winter range of at least one adult Steppe Eagle that bred in Mongolia was in eastern Tibet—2,000 km to the south-west (Figure 1 #7), suggesting that not all race *nipalensis* undertake a long migration every year. Some Steppe Eagles overwinter in the Arabian Peninsula and Africa (Welch & Welch 1991, Meyburg *et al.* 2003, Meyburg *et al.* 2012). These are primarily *A. n. orientalis* of south-east Europe and western Asia. Ferguson-Lees & Christie (2001) noted that ‘movements of eastern nominate *A. n. nipalensis* not well known, but in Nepal main passage apparently from third week October; some almost certainly migrate west to winter with western populations in north-east Africa.’ On the other hand, a very small number of *nipalensis* drift east towards Beidaihe (Williams 2000), and ultimately overwinter from (rarely) Hong Kong (Chan 2009), to the Thai-Malay Peninsula. In Petchaburi province, Thailand, in recent years up to six, mostly juvenile to fourth year Steppe Eagles have been found annually from November to early April in rice fields at Bang Jaak and Nong Pla Lai (Mallalieu 2007, P. Round & K. Sutasha, *in litt.* 2012). Here they hunt rats during the rice harvest between November and January. Further south in Malaysia, Wells (1999) found Steppe Eagles ‘sparse to uncommon, recorded in all months November–March.’ Three Steppe Eagles were seen flying over Perak island on 19 November 1976 (Wells 1999). Numbers of Steppe Eagles seen in Peninsular Malaysia appear to be decreasing; between 1998 and 2010, only one bird was reported in each of seven years (D. Bakewell, *in litt.* 2012) and in Singapore five subadults were seen between 1987



**Plate 6.** First plumage (juvenile) Steppe Eagle *Aquila nipalensis nipalensis*, 24 November 2011.

**Plate 7.** Second plumage Steppe Eagle, 19 November 2011.



**Plate 8.** Third plumage Steppe Eagle, 21 November 2011.

**Plate 9.** Fourth plumage Steppe Eagle, 21 November 2011.





**Plate 10.** Adult Steppe Eagle, 23 November 2011.

and 1999 (1 November–28 February), but none has been seen since (Lim 2009).

Reports suggest that a significant number of *A. n. nipalensis* that migrate east to west across central Asia can be found in India and Nepal each winter (Inskipp & Inskipp 1991, Naoroji 2006, Mallalieu 2008), and are common in the Kathmandu Valley with a few returning each evening to roost at the Swayambhunath temple, Kathmandu, between November and March (TS pers. obs.). Sharma & Sundar (2009) noted in winter that juvenile Steppe Eagles far exceeded adults at a carcass dump in Rajasthan, India—only six adults were seen in the three years of their study. Young birds (under five years old) arrived at the dump by late September each year and peaked in number between January and mid-March, with a maximum of 136 in a day and an average of 43. Pande *et al.* (2010) also found a high ratio of juvenile to adult Steppe Eagles (44 to 1) at a metropolitan garbage dump in north-west India.

From the above observations, we believe that a long-term monitoring programme is needed in Nepal, because the number of migrants seen varies greatly from year to year, partly as a result of local weather conditions, particularly cloud cover over the Annapurna range. From a broader perspective, observers have recently noted a significant decline in the number of European and west Asian race *orientalis* passing through the migratory bottleneck of Eilat, Israel (Zduniak *et al.* 2010). Bird & Symes (2009) sought solid baseline data from east Asia, a main breeding area for *A. n. nipalensis*, where intensification of agriculture, and overgrazing of steppic habitats by domestic animals may be driving a decline. In western China in Xinjiang province, farmers have taken to using poisons to eliminate rodents in their fields, and this has negatively impacted Golden Eagles *Aquila chrysaetos* and other raptors (Ma *et al.* 2010).

Our plan is to establish several watch sites as close to the Annapurna range as possible,

particularly one above the town of Dhampus (see Fleming 1983) at about 1,900 m. We hope to determine the numbers and ratios of adults:sub-adults:first-year (juvenile) Steppe Eagles, as well as the extent of diurnal bird migration in the area including other raptors, Demoiselle Cranes and species such as Barn Swallows *Hirundo rustica*.

If you have significant experience in field studies of migrating raptors, and would like to participate in this study, please do contact us. We need help to man the watch sites we have established, and would like to explore the area for new and/or better ones in the Himalayan foothills.

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**Plate 11.** First plumage (juvenile) Steppe Eagle, 20 November 2011.

**Plate 13.** Third or fourth plumage Steppe Eagle, 23 November 2011.



**Plate 12.** Second plumage Steppe Eagle, 22 November 2011.

**Plate 14.** Adult Steppe Eagle, 24 November 2011.



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**Authors' Note on identification** We consulted William (Bill) Clark for commentary on our Steppe Eagle plumage identifications, as well as the other raptor species we have plates linked to in the text. He encouraged us to use the term 'plumage' instead of 'year' because using calendar year (tied to a number: 2009, 2010 etc.) for birds that migrate can be confusing because they breed in different months at different latitudes. Instead he suggested juvenile, second plumage, third plumage, etc until adult. For our ID of each plumage we submitted almost every plate to him for verification.