

Raptor migration monitoring in the spring of 2009 at Baiwangshan, Beijing

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Abstract Following a series of surveys since 2003, a full-seasonal raptor count was undertaken at Baiwangshan, a mountain in the vicinity of Beijing, from 6 March to 22 May 2009, when 3802 individual birds of 23 species were recorded. Four species, i.e., Oriental Honey Buzzard (*Pernis ptilorhynchus*), Common Buzzard (*Buteo buteo*), Eurasian Sparrow Hawk (*Accipiter nisus*) and Gray-faced Buzzard (*Butastur indicus*) together accounted for up 90% of the total and *P. ptilorhynchus* alone for 70%. Raptor passage of such magnitude and diversity at an inland site in China was unheard of up to then. As well, 113 other migrants were recorded at the site during this period, including 24 water birds, 74 passerines and 15 others (cuckoos, owls and other migrants).

Keywords raptors, spring migration, Baiwangshan, Beijing

Introduction

During the last two decades, raptor migration in South-east Asia and the Indonesian Archipelago has attracted considerable attention from ornithologists and bird-watchers (Ash, 1993; Nuraeni and Suparman, 2000; Nijman, 2001a and 2001b; Tordoff, 2002; Nijman, 2004; DeCandido et al., 2004–2006; Sukmantoro et al., 2005; Nijman et al., 2006; Geremi, 2005–2006). The number, composition, phenology, flying direction and behavior of these migrants have been investigated and systematically monitored at several locations, e.g. at Chumphon in Thailand and Tanjung Tuan in Malaysia. All observed migrants in Southeast Asia follow the corridor referred to as the “East Asian Flyway”, which stretches from eastern Siberia to Sunda Islands. However, the condition in the northern half of this corridor is little known, except for the route originating from Japan, which follows the Japan-Taiwan-South China or South China Sea flyway (Ellis et al., 1990; Lin, 1998; Higuchi et al., 2005; Shiu et al., 2006; Agostini, 2007). Cooperative studies from organizations, such as ARRCN (the Asian Raptor Re-

search and Conservation Network), also are engaged in long term monitoring at several locations. In China, the coastal flyway for raptor migration has been monitored since 1984 at the Changdao Archipelago, Bohai Sea. A total of 37672 diurnal raptors, of which 19304 were Japanese Sparrow Hawks (*Accipiter gularis*), had been banded and released by the end of 2005 (Fan et al., 1992, 2006). In nearby Liaodong Peninsula, raptor migrations were observed from 1996 to 1998 at two coastal areas, Laotieshan and Suizhong (Wan et al., 2002). Nearby Beidaihe is a hot spot for western birdwatchers, who also undertook recording raptor migration when encountered. Information of raptor migration was collected in Guizhou, Shanxi, Henan and Hubei provinces. All the same, no records of any significant size have been published (Ran, 1998; Niu et al., 2002; Lang et al., 2003; Yue et al., 2008). Our study presents the results, up till now, of the first full-seasonal raptor monitoring efforts from an inland migration bottleneck for raptors in mainland China.

Baiwangshan has become well known among Chinese birdwatchers for mass raptor passages since 2 October 2005, when over 150 Grey-Faced Buzzards (*Butastur indicus*) and 62 individual birds of eight other species were counted within a two hour period (China Ornithological Society, 2006). Then, during the 46 days from March to May 2006, 1127 raptors of 18 species were counted

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over a period of 138 h. During the 25 days from March to May 2007, 623 raptors of 19 species were counted in just over a period of 75 h. During 21 days from March to May 2008, 1894 raptors of 17 species were counted over a period of 63 h. There are significant records among these preliminary counts, e.g., over 800 Oriental Honey Buzzards (*Pernis ptilorhynchus*) on 11 May 2008 (unpublished data from a website data base, <http://www.birdtalker.net>). In order to investigate the diversity and composition of migrating diurnal raptors passing Beijing, we carried out a full-seasonal survey at Baiwangshan, from 6 March to 22 May 2009. During 78 days, 3802 raptors of 23 species were counted in over a period of 234 h, with the largest number recorded, i.e., 2054 Oriental Honey Buzzards, counted within 3 h on 19 May.

Study site

Baiwangshan (39°59'36.55"N, 116°10'0.31"E) is an extension of the SW-NE Taihang Range into the northern China Plain, 13 km long from SW to NE and, on average, 3 km wide, with elevations ranging from 100 to 400 m (Fig. 1). It is located 5 km north west of Peking University and 2 km north of the Summer Palace. The slopes and foothills are covered by dense secondary forests of Chinese Arborvitae (*Platycladus orientalis*), Black Locust (*Robinia pseudoacacia*), Maples (*Acer* spp.), Mongolian Oak (*Quercus mongolicus*), Papermulberry

(*Broussonetia papyrifera*) and Goldenrain trees (*Koeleruteria paniculata*). The mountain is surrounded by fields and densely populated communities. Winds from the northeast during spring and autumn create favorable updrafts when meeting the Taihang ridge. Raptors exploit these updrafts to gain height and then fly over Baiwangshan in long glides. A considerable proportion of migrants pass Baiwangshan within a visible range, thus offering a good chance to monitor their migration.

At Baiwangshan, a single watch site, on the western side of the ridge, was selected in the spring of 2009. The site provided optimal views of passing birds, arriving from the main Taihang ridge in the southwest during their northbound migration.

Method

Continuous fieldwork was conducted for 72 days from 6 March to 22 May 2009. Reconnaissance visits started on February 26th. Once the northbound passage of raptors was observed, counts were undertaken mainly from 08:00–11:00 hours by teams of 2 to 6 observers at the site, totaling 234 h during the season.

The direction from which raptors were likely to appear was constantly scanned with binoculars (10 × 42 EXWPI, Olympus). Between scans, the area around observers, both above and below the monitoring site was checked, because some raptors, especially sparrow hawks and honey buzzards, occasionally pass the valley

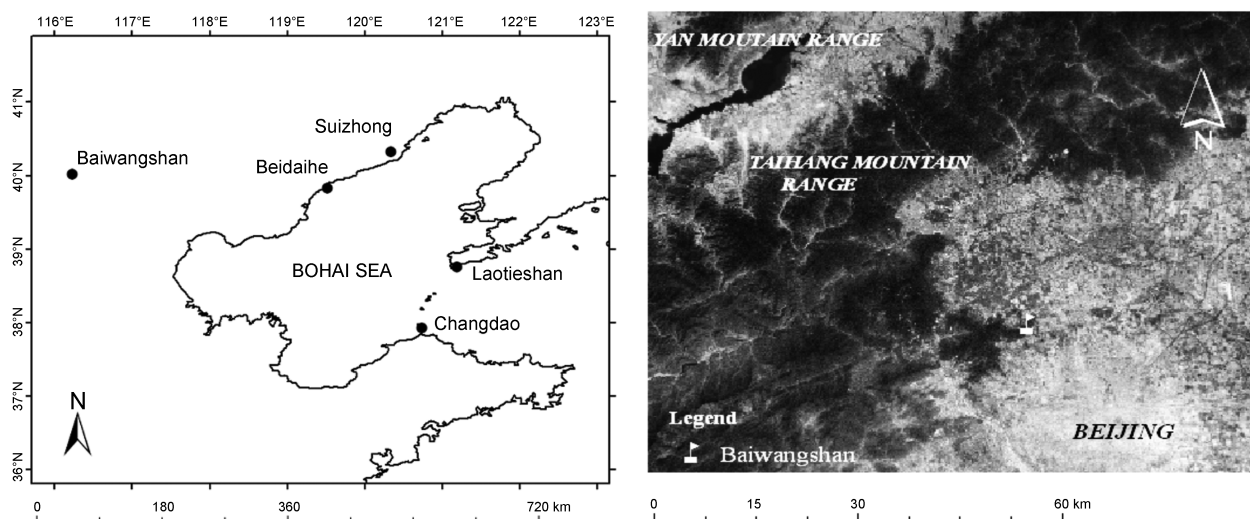


Fig. 1 Location of Baiwangshan. Left: Baiwangshan is located in northern China. Compared to the other four nearby sites for monitoring or observing raptor migration (Changdao, Laotieshan, Suizhong and Beidaihe), it is an inland site. Right: Baiwangshan is close to Beijing city, an extension of the Taihangshan mountains.

below the site with flapping-flight. When raptors appeared, photos were taken by 1 or 2 camera men with a Single Lens Reflex Digital Camera (Canon 30D/50D, Canon EF400/5.6L USM lens). Over 80% of the images of individual birds were collected except for those in big flocks (flocks with over 20 individuals, mostly Oriental Honey Buzzards). More than five thousand photos were taken for records and identification during the season. Raptors were counted only from one side (west) to avoid double-counting and to reduce the effect from resident raptors. They were counted individually, except for those in large flocks (> 50 individual birds); in instances of this type, they were counted according to full view photographs obtained with a Digital Camera (Ricoh, GX100), or counted individually when they undertook glide-outs in long lines. Whenever possible, counts of large flocks were repeated at least twice (Fuller, 1981). Over 99% of individual birds were identified to the species level. We missed the 100% mark, owing to the fact that two Accipiters were difficult to distinguish (Ferguson-Lees, 2001). Both, Japanese Sparrow Hawk (*Accipiter gularis*) and the Chinese Sparrow Hawk (*A. soloensis*), accounted for only a small portion of the seasonal counts.

Resident raptors are rare in this area (Li, 2005). It was clear that two pairs of falcons (Hobby *Falco subbuteo* and Common Kestrel *F. tinnunculus*) were nesting near the site. They typically tended to soar around the mountain and could be seen regularly. We excluded them from our daily number of sightings.

Results

Among the 3802 individual birds recorded in the 2009 spring migration, 23 species were involved. These included 2666 Oriental Honey Buzzards, 349 Common Buzzards (*Buteo buteo*), 270 Eurasian Sparrow Hawks (*Accipiter nisus*) and 167 Grey-faced Buzzards (*B. indicus*) (Fig. 2). These four species made up 90% of the total. The remainder consisted of 79 Eastern Red-footed Falcons (*Falco amurensis*), 72 *A. gularis*, 43 Northern Goshawks (*Accipiter gentilis*), 35 Eurasian Hobbies (*Falco subbuteo*), 32 Black-eared Kites (*Milvus lineatus*), 26 Upland Buzzards (*Buteo hemilasius*), 11 Ospreys (*Pandion haliaetus*), 8 Eastern Marsh Harriers (*Circus spilonotus*), 8 Common Kestrels (*Falco tinnunculus*), 8 Merlins (*Falco columbarius*), 7 Greater Spotted Eagles (*Aquila clanga*), 6 Peregrine Falcons (*Falco peregrines*), 4 Booted Eagles (*Hieraaetus pennata*), 3

Short-toed Eagles (*Circaetus gallicus*), 2 Imperial Eagles (*Aquila heliaca*), 1 Northern Harrier (*Circus cyaneus*), 1 Western Marsh Harrier (*Circus aeruginosus*), 1 Pied Harrier (*Circus melanoleucos*) and 1 Chinese Sparrow Hawk. Booted Eagles and Short-toed Eagles, fairly rare migrants in northern China (Mackinnon et al., 2000), were recorded on 12 April (a single Booted Eagle). On 4 May three Booted Eagles, including a juvenile, were spotted and on 10, 17 and 21 April one Short-toed Eagle each day. Chinese Sparrow Hawk is also rare in the north of China, but has recently been confirmed to breed in Beijing (China Ornithological Society, 2004–2007); a single bird was recorded on 19 May.

The daily totals (3 h counting each day) of each species reveal that Oriental Honey Buzzards arrived in late April (first recorded on 27 April) and passage continued into late May (last recorded on 22 May). There were two “waves” of the Oriental Honey Buzzard, with a significant peak in the second wave (with the highest count on 19 May, accounting for 77.0% of the total number of individual birds of the total counts in the season). It seems that continuity and size of the wave are fairly stable, compared with our reconnaissance counts from 2005 to 2008 (China Ornithological Society, 2004–2008). But the second peak in 2009 was rather different from the one in 2008, both in time and scale. The Common Buzzard, Eurasian Sparrow Hawk and Gray-faced Buzzard mainly pass during April, with 97.1% for the Common Buzzard, 88.9% for the Eurasian Sparrow Hawk and 88.0% for the Gray-faced Buzzard being counted before 1 May. All Eastern Red-footed Falcons, Eurasian Hobbies and Japanese Sparrow Hawks passed between late April and late May, with the last two species passing almost simultaneously.

The earliest observed migrants in the day arrived before 06:00 hour, about 1 h after sunrise in April and early May. They tended to fly low in an active flapping-flight. As time elapsed, more migrants arrived soaring or in long-glides. On clear days, after 11:00 hour, few raptors passed and flew so high that they could be merely seen as dark spots with binoculars. Eagles, hawks, harriers, ospreys and falcons tended to pass individually or in pairs. Buzzards, Grey-faced Buzzards, kites and honey buzzards tended to pass in flocks as well as in association with other species. Large flocks (>50 individual birds) were only observed during the Oriental Honey Buzzard's passage. Hunting during migration was recorded for Ospreys, Hobbies and Merlins. Of the 11 recorded Ospreys three birds passed with fish (possi-

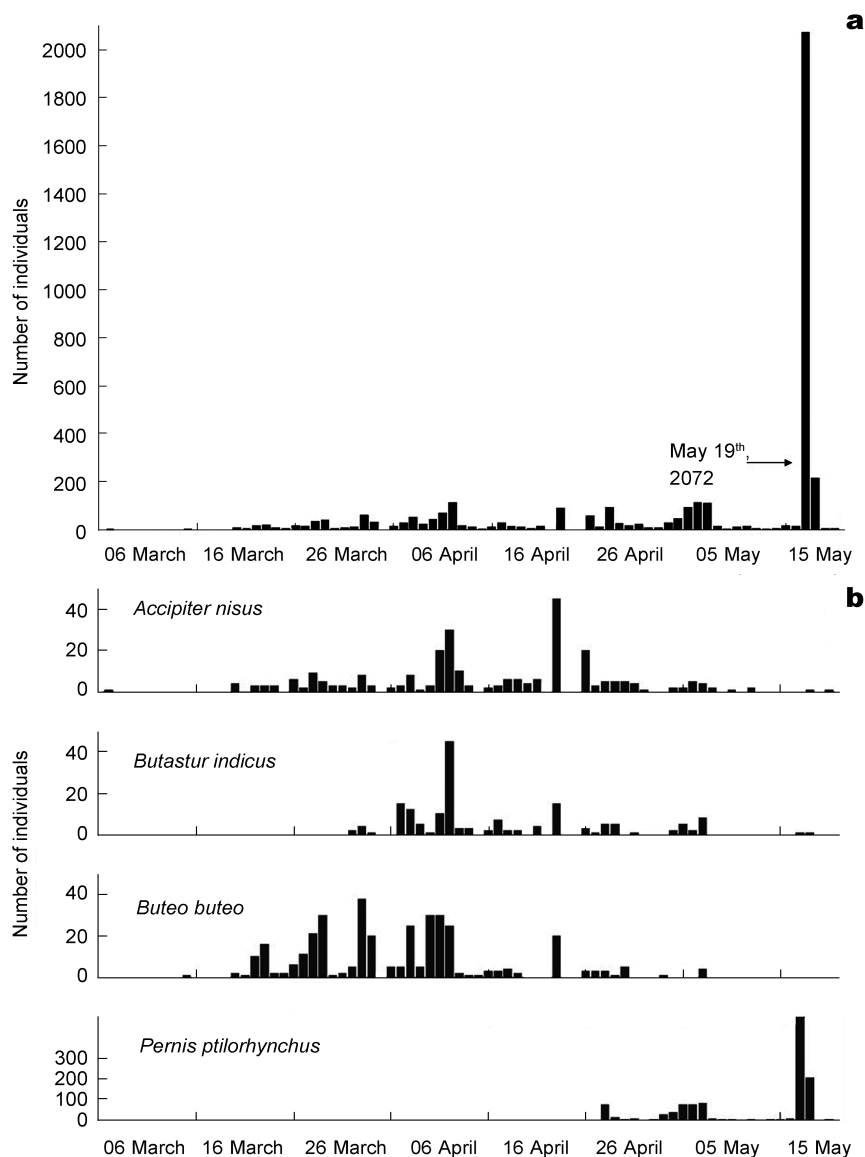


Fig. 2 Daily counts of all observed raptors and daily counts of four of the most common species, during the period from 6 March to 22 May. (a) daily counts of all observed raptors; (b) daily counts of Oriental Honey Buzzard, Common Buzzard, Eurasian Sparrow Hawk and Gray-faced Buzzard.

bly captured at the Summer Palace) dangling from their toes. Once, a Hobby was seen striving to attack passing passerine migrants and one Merlin was seen swooping at a flock of feral pigeons.

Non-raptor species observed on migration during the study period consisted of large numbers of passerines, waterfowls and other birds, up to 113 species in all (see Appendix 1). Water birds observed included Greylag Geese (*Anser anser*), White-naped Cranes (*Grus vipio*), Common Cormorants (*Phalacrocorax carbo*), Vega Gulls (*Larus vegae*) and others. A Long-eared Owl (*Asio otus*) was also observed following the route dur-

ing daytime on 26 March. A pair of Tawny Owls (*Strix aluco*) was found in a perch on 6 May, presumably on their migration.

Discussion

The most prominent feature of the raptor migration observed at Baiwangshan is the diversity of species. At sites in Taiwan and southeast Asia, where raptor migrations have been monitored, species recorded in any one season hardly exceeded 15. This can be attributed to the fact that several species passing northern China migrate

to other places, e.g. southern China or Africa, for the winter.

Compared with Liaoning, the Changdao Archipelago and Taiwan, the most numerous migrants at the Beijing site were different species. At Changdao, around 50% of ringed raptors were Japanese Sparrow Hawks (Fan, 2006). At Liaoning, Common Buzzards, Rough-legged Hawks (*B. lagopus*), Upland Buzzards (*B. hemilasius*) and Eurasian Sparrow Hawks are the dominant migrating species (Wan et al., 2002). At Taiwan, three species, i.e., Chinese Sparrow Hawk, Oriental Honey Buzzard and Gray-faced Buzzard, make up the majority of observed migratory raptors (ARRCN, 2008). Recently, mass raptor passages have also been recorded in Yunnan (over 10000 Eastern Red-footed Falcons and other species, J. Wang, pers. comm.) and Guangxi (over 10000 Eastern Red-footed Falcons and other species, A. Jiang, pers. comm.). Most migrants at these sites differed from those at Beijing. A plausible explanation is that Beijing is on a route different from those taken by the mass migrations of Chinese Sparrow Hawk, Japanese Sparrow Hawk and Eastern Red-footed Falcon. The direction of the route agrees with the satellite-traced results of the Oriental Honey Buzzard (Higuchi et al., 2005). However, these traced individual birds passed the northern China Plain following a route far to the south of Beijing. This suggests that even in species which prefer migration in large numbers, different birds or flocks would adopt various routes.

As the dominant species during spring migration at the study site, the number and phenology of the Oriental Honey Buzzard showed great oscillation. This trend is mainly due to the oscillation of the last wave of the Oriental Honey Buzzard during middle or late May. Judged from the coincidence of the phenology of the Oriental Honey Buzzard reported by Higuchi (2005), these honey buzzards are probably from the breeding population in Japan. However, further evidence is required to confirm the origin of the first wave of honey buzzards occurring in early May.

Large raptors, such as *Aquila* spp., have not been recorded passing in flocks at our site or other sites in North China. It is possible that there is no migration bottleneck, as is the situation in the Himalayas or further west of the continent (Besten, 2004), for these species in the vast areas of North China. The Booted Eagle and Short-toed Eagle, classified as wandering birds and winter visitors respectively (Mackinnon et al., 2000) in North China, have been regularly recorded at Baiwang-

shan during the migration season.

All raptors are ranked as Class I or II among National Protected Animals in China. However, habitat degradation still threatens them in the country. As our study reveals, mass raptors of great diversity pass Beijing on their northbound migration. Favorable habitats as roosting site and stopover for accumulating energy stores is extremely limited for migrants in this area. Potential stopovers near Beijing need to be found, assessed and included into China's protected area system. Baiwangshan is just one node on the routes of raptor migration traversing central China. Considering the great fidelity of some species to their routes and sites (Shiu et al., 2006), a great deal of effort needs to be made to find other nodes in China in order to maintain the safety of migrants over the entire flyway.

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2009年北京百望山猛禽春季迁徙监测

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摘要: 百望山位于北京西北近郊。在 2003 年以来一系列调查的基础上, 2009 年 3 月 6 日至 5 月 22 日, 首次全季节的猛禽迁徙监测在北京百望山得以开展。在此期间, 我们共记录到分别属于 23 个物种的 3802 只猛禽。其中 4 种猛禽的数量之和占有计数的 90%, 它们分别是凤头蜂鹰 (*Pernis ptilorhynchus*)、普通鵟 (*Buteo buteo*)、雀鹰 (*Accipiter nisus*) 和灰脸鵟鹰 (*Butastur indicus*)。凤头蜂鹰数量占有计数的 70%。如此多种类、大规模的猛禽在中国内陆地区过境此前尚未见报道。在此期间我们还记录到 113 种旅鸟, 包括 24 种水鸟、74 种雀形目鸟类和 15 种其他鸟类 (杜鹃、猫头鹰等)。

关键词: 猛禽, 春季迁徙, 百望山, 北京

Appendix 1 Checklist for the migrants recorded at Baiwangshan during the monitoring in the spring of 2009

Species	Fauna realm†	Protection grade‡
Tundra Swan (<i>Cygnus columbianus</i>)	1, 2, 10	II
Swan Goose (<i>Anser cygnoides</i>)	2	
Greylag Goose (<i>Anser anser</i>)	2, 8, 9	
Ruddy Shelduck (<i>Tadorna ferruginea</i>)	2, 3, 8, 9	
Common Shelduck (<i>Tadorna tadorna</i>)	2, 8	
Mallard (<i>Anas platyrhynchos</i>)	1, 2, 5, 8, 9, 10, 12	
Northern Shoveller (<i>Anas clypeata</i>)	1, 2, 3, 5, 6, 8, 9, 10	
Common Pochard (<i>Aythya ferina</i>)	2, 3, 8, 9	
Common Merganser (<i>Mergus merganser</i>)	1, 2, 5, 8, 9	
Eurasian Wryneck (<i>Jynx torquilla</i>)	2, 3, 8, 9	
Eurasian Hoopoe (<i>Upupa epops</i>)	2, 3, 4, 8, 9, 10	
Dollarbird (<i>Eurystomus orientalis</i>)	2, 8, 9, 10, 11, 12	
Large Hawk-Cuckoo (<i>Hierococcyx sparveroides</i>)	2, 8, 9, 10, 11	
Indian Cuckoo (<i>Cuculus micropterus</i>)	2, 8, 9, 10	
Common Cuckoo (<i>Cuculus canorus</i>)	2, 3, 8, 9, 10	
White-throated Needletail (<i>Hirundapus caudacutus</i>)	2, 8, 9, 10, 11, 12	
Common Swift (<i>Apus apus</i>)	2, 3, 8	
Fork-tailed Swift (<i>Apus pacificus</i>)	2, 8, 9, 10, 11, 12	
Oriental Scops Owl (<i>Otus sunia</i>)	2, 8, 9, 10	II
Tawny Wood Owl (<i>Strix aluco</i>)	2, 3, 9	II
Long-eared Owl (<i>Asio otus</i>)	1, 2	II
Short-eared Owl (<i>Asio flammeus</i>)	1, 2, 3, 5, 8, 9	II
Grey Nightjar (<i>Caprimulgus indicus</i>)	2, 8, 9, 10	
Oriental Turtle Dove (<i>Streptopelia orientalis</i>)	2, 8, 9, 10	
White-naped Crane (<i>Grus vipio</i>)	2	II
Common Crane (<i>Grus grus</i>)	2, 8	II
Yellow-legged Gull (<i>Larus cachinnans</i>)	2, 3, 8, 9	
Black-headed Gull (<i>Larus ridibundus</i>)	1, 2, 3, 8, 9, 10	
Osprey (<i>Pandion haliaetus</i>)*	1, 2, 3, 5, 6, 8, 9, 10, 11, 12	II
Oriental Honey Buzzard (<i>Pernis ptilorhynchus</i>)*	2, 8, 9, 10	II
Black Kite (<i>Milvus migrans</i>)*	2, 3, 4, 8, 9, 10, 11, 12	II
Short-toed Eagle (<i>Circus gallicus</i>)*	2, 3, 8, 10	II
Western Marsh-Harrier (<i>Circus aeruginosus</i>)*	2, 3, 8, 9	II
Eastern Marsh-Harrier (<i>Circus spilonotus</i>)*	2, 9, 10	II
Hen Harrier (<i>Circus cyaneus</i>)*	1, 2, 5, 6	II
Pied Harrier (<i>Circus melanoleucos</i>)*	2, 8, 9, 10	II
Chinese Sparrow Hawk (<i>Accipiter soloensis</i>)*	2, 9, 10, 11	II
Japanese Sparrow Hawk (<i>Accipiter gularis</i>)*	2, 9, 10, 11	II
Eurasian Sparrow Hawk (<i>Accipiter nisus</i>)*	2, 3, 8, 9	II
Northern Goshawk (<i>Accipiter gentilis</i>)*	1, 2, 5, 9, 10	II
Grey-faced Buzzard (<i>Butastur indicus</i>)*	2, 9, 10, 11	II
Common Buzzard (<i>Buteo buteo</i>)*	2, 3, 8, 9	II
Upland Buzzard (<i>Buteo hemilasius</i>)*	2, 8	II
Greater Spotted Eagle (<i>Aquila clanga</i>)*	2, 3, 8, 9, 10	II
Imperial Eagle (<i>Aquila heliaca</i>)*	2	I
Booted Eagle (<i>Hieraaetus pennata</i>)*	2, 3, 8, 9	II
Common Kestrel (<i>Falco tinnunculus</i>)*	2, 3	II

Appendix 1 (continued)

Species	Fauna realm†	Protection grade‡
Eastern Red-footed Falcon (<i>Falco amurebsis</i>)*	2, 3	II
Merlin (<i>Falco columbarius</i>)*	1, 2, 5, 6, 8, 9, 10	II
Eurasian Hobby (<i>Falco subbuteo</i>)*	2, 3, 8, 9	II
Peregrine Falcon (<i>Falco peregrinus</i>)*	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12	II
Great Cormorant (<i>Phalacrocorax carbo</i>)	1, 2, 3, 8, 9, 10, 12	
Little Egret (<i>Egretta garzetta</i>)	2, 3, 4, 8, 9, 10, 11, 12	
Grey Heron (<i>Ardea cinerea</i>)	2, 3, 4, 8, 9, 10	
Large Egret (<i>Casmerodius albus</i>)	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12	
Intermediate Egret (<i>Mesophoyx intermedia</i>)	2, 3, 8, 9, 10, 11, 12	
Cattle Egret (<i>Bubulcus ibis</i>)	1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12	
Chinese Pond-Heron (<i>Ardeola bacchus</i>)	2, 9, 10	
Black-crowned Night-Heron (<i>Nycticorax nycticorax</i>)	1, 2, 3, 4, 5, 6, 8, 9, 10, 11	
White Spoonbill (<i>Platalea leucorodia</i>)	2, 3, 8	II
Dalmatian Pelican (<i>Pelecanus crispus</i>)	2, 8, 9	II
Black Stork (<i>Ciconia nigra</i>)	2, 3, 8, 9	I
Brown Shrike (<i>Lanius cristatus</i>)	2, 8, 9, 10, 11	
Daurian Jackdaw (<i>Corvus dauurica</i>)	2, 9	
Rook (<i>Corvus frugilegus</i>)	2, 8, 9, 10	
Black-naped Oriole (<i>Oriolus chinensis</i>)	2, 8, 9, 10, 11	
Ashy Minivet (<i>Pericrocotus divaricatus</i>)	2, 8, 9, 10, 11	
Long-tailed Minivet (<i>Pericrocotus ethologus</i>)	8, 9	
Black Drongo (<i>Dicrurus macrocercus</i>)	2, 8, 9, 10	
Hair-crested Drongo (<i>Dicrurus hottentottus</i>)	2, 8, 9, 10, 11	
White-throated Rock Thrush (<i>Monticola gularis</i>)	2, 9, 10	
Blue Rock-Thrush (<i>Monticola solitarius</i>)	2, 3, 8, 9, 10	
Blue Whistling-Thrush (<i>Myophonus caeruleus</i>)	2, 8, 9, 10	
Scaly Thrush (<i>Zoothera dauma</i>)	2, 8, 9, 10	
Grey-sided Thrush (<i>Turdus feae</i>)	2, 8	
Eyebrowed Thrush (<i>Turdus obscurus</i>)	2, 8, 9, 10, 11	
Pale Thrush (<i>Turdus pallidus</i>)	2, 9, 10	
Dark-throated Thrush (<i>Turdus ruficollis</i>)	2, 8, 9	
Dusky Thrush (<i>Turdus naumanni</i>)	2, 9	
Grey-streaked Flycatcher (<i>Muscicapa griseisticta</i>)	2, 9, 10, 11	
Sooty Flycatcher (<i>Muscicapa sibirica</i>)	2, 8, 9, 10	
Asian Brown Flycatcher (<i>Muscicapa dauurica</i>)	2, 8, 9, 10, 11	
Yellow-rumped Flycatcher (<i>Ficedula zanthopygia</i>)	2, 9, 10	
Narcissus Flycatcher (<i>Ficedula narcissina</i>)	2, 9, 10	
Robin Flycatcher (<i>Ficedula mugimaki</i>)	2, 9, 10, 11	
Red-breasted Flycatcher (<i>Ficedula parva</i>)	2, 8, 9, 10	
Blue-and-white Flycatcher (<i>Cyanoptila cyanomelana</i>)	2, 9, 10	
Bluethroat (<i>Luscinia svecica</i>)	2, 3, 8	
Siberian Blue Robin (<i>Luscinia cyane</i>)	2, 10	
Orange-flanked Bush-Robin (<i>Tarsiger cyanurus</i>)	2, 8, 9, 10	
Daurian Redstart (<i>Phoenicurus auroreus</i>)	2, 3	
White-cheeked Starling (<i>Sturnus cineraceus</i>)	2, 10	
Coal Tit (<i>Parus ater</i>)	2, 9	
Yellow-bellied Tit (<i>Parus venustulus</i>)	9	

Appendix 1 (continued)

Species	Fauna realm†	Protection grade‡
Long-tailed Tit (<i>Aegithalos caudatus</i>)	2	
Bank Martin (<i>Riparia riparia</i>)	1, 2, 3, 5, 6, 8, 9, 10	
Eurasian Crag-Martin (<i>Hirundo rupestris</i>)	2, 8, 9	
Barn Swallow (<i>Hirundo rustica</i>)	1, 2, 3, 5, 6, 8, 9, 10, 11	
Red-rumped Swallow (<i>Hirundo daurica</i>)	2, 3, 8, 9	
House Martin (<i>Delichon urbica</i>)	2, 3, 8, 9	
Asian House Martin (<i>Delichon dasypus</i>)	8, 9, 10	
Goldcrest (<i>Regulus regulus</i>)	2, 8, 9, 10	
Chestnut-flanked White-eye (<i>Zosterops erythropleurus</i>)	2, 9	
Japanese White-eye (<i>Zosterops japonicus</i>)	2, 9, 10	
Asian Stubtail (<i>Urosphena squameiceps</i>)	2, 9, 10	
Japanese Bush-Warbler (<i>Cettia diphone</i>)	2, 9, 10	
Rusty-rumped Warbler (<i>Locustella certhiola</i>)	2, 8, 9, 10, 11	
Thick-billed Warbler (<i>Acrocephalus aedon</i>)	2, 8, 9, 10	
Dusky Warbler (<i>Phylloscopus fuscatus</i>)	2, 8, 9, 10	
Radde's Warbler (<i>Phylloscopus schwarzi</i>)	2, 8, 9	
Pallas's Leaf Warbler (<i>Phylloscopus proregulus</i>)	2, 8, 9	
Yellow-browed Warbler (<i>Phylloscopus inornatus</i>)	2, 8, 9, 10	
Arctic Warbler (<i>Phylloscopus borealis</i>)	1, 2, 8, 9, 10, 11	
Two-barred Warbler (<i>Phylloscopus plumbeitarsus</i>)	2, 9, 10	
Pale-legged Warbler (<i>Phylloscopus tenellipes</i>)	2, 8, 9, 10	
Eastern Crowned Warbler (<i>Phylloscopus coronatus</i>)	2, 8, 9, 10	
Blyth's Leaf-Warbler (<i>Phylloscopus reguloides</i>)	2, 8, 9	
Eurasian Skylark (<i>Alauda arvensis</i>)	2, 3, 8	
Russet Sparrow (<i>Passer rutilans</i>)	2, 8, 9, 10	
Forest Wagtail (<i>Dendronanthus indicus</i>)	2, 8, 9, 10	
White Wagtail (<i>Motacilla alba</i>)	2, 8, 9, 10	
Yellow Wagtail (<i>Motacilla flava</i>)	2, 3, 8, 9, 10, 11	
Grey Wagtail (<i>Motacilla cinerea</i>)	2, 8, 9, 10, 11	
Richard's Pipit (<i>Anthus richardi</i>)	2, 8, 9, 10	
Olive-backed Pipit (<i>Anthus hodgsoni</i>)	2, 8, 9, 10	
Red-throated Pipit (<i>Anthus cervinus</i>)	1, 2, 3, 10	
Water Pipit (<i>Anthus spinoletta</i>)	2, 8	
Mountain Accentor (<i>Prunella montanella</i>)	2	
Eurasian Siskin (<i>Carduelis spinus</i>)	2	
Common Rosefinch (<i>Carpodacus erythrurus</i>)	2, 8, 9	
Yellow-billed Grosbeak (<i>Eophona migratoria</i>)	2, 9, 10	
Tristram's Bunting (<i>Emberiza tristrami</i>)	2, 9	
Little Bunting (<i>Emberiza pusilla</i>)	2, 8, 9, 10	
Rustic Bunting (<i>Emberiza rustica</i>)	2, 8, 9	
Yellow-throated Bunting (<i>Emberiza elegans</i>)	2, 9	
Chestnut Bunting (<i>Emberiza rutila</i>)	2, 8, 9, 10	

†: The category of fauna realms according to *A Checklist on the Classification and Distribution of the Birds of the World* (Zheng et al., 2001). 1: North America, 2: Eurasia and North Africa, 3: Central and South Africa, 4: Indian Ocean, 5: Central America, 6: South America, 7: Galapagos, 8: Indian Subcontinent and Southwest China, 9: Indo-China Peninsula and Southeast China, 10: Pacific Islands, 11: Wallace District, 12: Australia and New Zealand, 13: Antarctic.

‡: The protected grade according to the *Chinese National Key Protected Wild Animal List*.

*: Recorded diurnal raptors.