

Conservation assessment of Far Eastern Oystercatcher *Haematopus [ostralegus] osculans*

David S. Melville¹, Yuri N. Gerasimov², Nial Moores³, Yu Yat-Tung⁴ & Qingquan Bai⁵

¹1261 Dovedale Road, R.D. 2 Wakefield, Nelson 7096, New Zealand. david.melville@xtra.co.nz

²Kamchatka Branch, Pacific Institute of Geography, Russian Academy of Science, Rybakov 19a, Petropavlovsk-Kamchatsky, 683024, Russia

³Birds Korea, 1108 Ho, 3 Dong, Samik Tower Apt., Namcheon 2 Dong, Su Young-Gu, Busan 613762, Republic of Korea

⁴c/o Hong Kong Bird Watching Society, 7C, V Ga Building, 532 Castle Peak Road, Lai Choi Kok, Kowloon, Hong Kong

⁵Forestry Bureau of Dandong, Dandong, Liaoning, China 118000

Melville, D.S., Gerasimov, Y.N., Moores, N., Yat-Tung, Y & Bai, Q. 2014. Conservation assessment of Far Eastern Oystercatcher *Haematopus [ostralegus] osculans*. *International Wader Studies* 20: 129–154.

The Far Eastern Oystercatcher *Haematopus [ostralegus] osculans* is a little-known taxon, with an estimated total population of about 11,000 birds. The disjunctive breeding range extends along the west coast of the Kamchatkan Peninsula to Shelikov Bay at the head of the Sea of Okhotsk, and from the west and south coasts of the Korean Peninsula south to Fujian Province, China. During the summer a few birds occur from the Amur River delta south along the coasts of Khabarovsk and Primorsky regions, and inland in the central Amur region and northeast China, but few are thought to breed there. It is nowhere common. It winters mainly along the west coast of the Korean Peninsula and the coast of East China from southern Shandong Province to as far south as northern Guangdong Province. At present, the greatest number, possibly accounting for c. 50% of the total population, winter in South Korea at the Geum estuary, an area which was until 2007 threatened by large-scale reclamation. Northern Jiangsu and southern Shandong, China, support about 20% of the total winter population, but this area is threatened by extensive reclamation. The wintering populations of Taiwan and Japan declined in the late 1880s and early 1900s; the reasons for this are unknown. Current population trends are unknown, however the number wintering in Japan is increasing, although still small (c. 350), while habitat loss in the Yellow Sea, in both China and South Korea, has the potential to cause declines in the core of its range. There is an urgent need for an assessment of the taxonomic status of this form; an assessment of the population and trends in numbers and distribution. It is a candidate species for IUCN listing as ‘Near Threatened’ based on population size (<10,000 mature individuals), and the rapid loss of habitat in the main wintering areas.

TAXONOMIC STATUS

The Far Eastern Oystercatcher¹ was first described as *Haematopus osculans* by Swinhoe (1871), from an adult male collected in Talien (Dalian) Bay, Liaoning, China in July, and an immature taken in November at Swatow (Shantou, Guangdong). The taxon *osculans* is a bulky-looking, long-billed ‘pied’ oystercatcher; it is currently regarded by most authors (e.g. Cramp & Simmons 1982, Peters 1934, Vaurie 1965) as a race of Eurasian Oystercatcher *Haematopus ostralegus*, from which it can be distinguished by a longer bill, the absence of white on the shafts of the outer 2–3 primaries, and no white on the outer webs of the outer five primaries (Hayman *et al.* 1986, Vaurie 1965) [Photos A & B].

The colouration of the primaries is, however, somewhat variable. Of 27 specimens of *osculans* in the Natural History Museum (BMNH), Tring collection, seven had the rachis of the outer two primaries all dark and two had the outer three

all dark, while the remaining birds showed some pale or white areas on the rachis (Table 1). One bird showed some white on the outer vane of the fourth (ascendant) primary while 11 birds had white on the fifth primary. The primary patterning was, nonetheless, different from 16 specimens of *longipes*, all of which showed white on the rachis and vanes of all outer primaries.

Further differences are shown in reduced seasonal variation, most especially in the prominence of the fore-neck collar and in bill colouration, as well as in length of the nasal groove and the eye-ring colour of adults. *Osculans* shows little difference in plumage and soft-part characteristics between birds of different ages.

Sharpe (1896) quoted Stejneger (1885) as stating the juveniles collected in Kamchatka “had no white across the throat”, and Dement’ev & Gladkov (1969) note that juvenile *osculans* often lack white throat markings [Photo D], whereas in *longipes* and nominate *ostralegus* the white fore-collar is typically prominent in first-winter birds, immatures, and the majority of non-breeding adults (Ali & Ripley 1983,

¹Chandler (2009) suggests the name ‘Korean’ Oystercatcher for *osculans*, and Livezey (2010) uses the name Korean Oystercatcher without explanation. In view of the fact that this taxon has major populations also in China and Russia the name Far Eastern Oystercatcher is used here.



Photo A. Far Eastern Oystercatcher in flight, Hong Kong, April 2009. The characteristic wing pattern is clearly visible with pale areas on the rachis of the outer two primaries, white on the rachis of the next five, and white on the outer web of the sixth primary. The contrast between the brown primary coverts and the rest of the upperparts suggest that this is a first year bird (photo: Kelvin Yam).



Photo B. Far Eastern Oystercatcher in Oksu, Saemangeum, South Korea on 1 May 2006 (photo: Jan van de Kam).

Cramp & Simmons 1983, Dare & Mercer 1974a). While some immature *osculans* show a faint fore-collar, and especially in the most strongly-marked birds a small white chin spot, adult non-breeding *osculans* lack the fore-collar. In addition, immature *ostralegus* also has a rather duller bill, and non-breeding adults have a duller bill-tip (Hayman *et al.* 1986), while the bill of *osculans* remains bright orange throughout the year, with only the distal third washed browner in immatures, and in adults a slightly duller tip in the non-breeding season and a yellowish tip in the breeding season. Also, *osculans* has an orange eye-ring, which is described as scarlet in adult *ostralegus* by Hayman *et al.* (1986). Combined, these features appear to be good field characters allowing separation of *osculans* from *ostralegus* and *longipes*, even at distance in the field, especially in mid-winter.

Del Hoyo *et al.* (1996) noted that *osculans* may deserve specific status, but provide no supporting information. Chandler (2009) also questioned the taxonomic status of *osculans* based on wing pattern, its long bill, the lack of a white throat in juvenile and non-breeding plumages and geographical isolation. Livezey (2010) considered *osculans* to be a full species.

LIFE-HISTORY

Biometrics

Eurasian Oystercatchers show a cline of increasing bill length from west to east (Prater *et al.* 1977), with *osculans* having the longest. Measurements of museum specimens of *osculans* are given in Tables 2 and 3. There is limited information on bill length in the Chinese, Korean and Russian literature (Table 3).

Measurements of live specimens are only available for three individuals.

Magsalay & Kennedy (2000), Philippines: wing 250 mm; wing span 850 mm; tail 89 mm; tarsus 51 mm; nalospi 69 mm; bill 89 mm; head and bill 133.9 mm; total length 460 mm.

Kuwabara & Nakagawa (1995), Japan: total length 433 mm; wing maximum chord 267 mm; wing span 850 mm; tail 100.4 mm; tarsus 57.5 mm, exposed culmen 81.7 mm; total head 122.1 mm; nasal groove 32 mm.

A bird banded in Japan: wing 266 mm; tail 103 mm; exposed culmen 90.1 mm; tarsus 63.4 mm (measurements by M. Takeshita, per K. Ozaki, Bird Migration Research Center, Yamashina Institute for Ornithology).

The limited information available on weights of Far Eastern Oystercatcher (Table 4) does not permit an assessment of seasonal patterns or differences between the sexes.

Table 1. Colouration and patterning of the outer five primaries of Far Eastern Oystercatcher. These are specimens in the collection of the Natural History Museum (BMNH), Tring.

	Outer				Inner
	P1	P2	P3	P4	P5
Sample size	27	27	27	26	27
Number of birds with all dark rachis	8	8	2	0	0
Number with pale rachis	16	15	4	2	1
Number with white rachis	3	4	21	24	26
Range in length of pale/white area of rachis (mm)	20–50	10–35	10–45	15–55	10–65
Mean length (mm) of pale/white area on rachis	25.7	14.8	25	32.5	37.4
Number with white on outer vane	0	0	0	1	11



Photo C. Far Eastern Oystercatcher in primary moult, Jinzhou, Liaoning, China 15 May 2014 (primary score $5^3 4^1 x^2 0^4$). Brown iris and pale legs indicate that this is a first year bird (photo: Qingquan Bai).



Photo D. Juvenile Far Eastern Oystercatcher, Matsu (Mazu) Island, July 2005. Note the very indistinct white throat marking (photo: Martin Hale).

Moult

Little is known about moult in *osculans*, however Dement'ev & Gladkov (1969) stated that it “evidently conforms to moult pattern of other subspecies”, and record one having “just completed moult” on 30 September. There are two specimens from Japan in the Natural History Museum BMNH, Tring, in active wing moult; one is undated, and the other, dated 15 May, has a primary moult score (PMS) of 21. One caught in the Philippines on 21 November had a PMS of 26 [$5^4 4^1 2^1 0^4$] (Magsalay & Kennedy 2000).

Photographs of flying birds allow an assessment of the number of old, unmoulted (outer) primaries (Table 5). Birds in active primary moult in late April (in Liaoning) are likely to be first year/immatures [Photo C]. Based on photographs from Liaoning it appears that most/all birds have completed moult by mid-November. This limited information suggests that moult in *osculans* may be initiated and completed earlier than in nominate *ostralegus* in western Europe (Dare & Mercer 1974b, Boere 1976, Wilson & Morrison 1981). It appears that *longipes* may moult somewhat later as one with one remaining old primary was photographed in Gujarat, India, on 30 December (Trivedi 2011).

Table 2. Measurements of Far Eastern Oystercatcher (from Prater *et al.* 1977).

	Adult			Juvenile		
	Sample size	Range mm	Mean mm	Sample size	Range mm	Mean mm
Wing	11	260–284	270.9	15	244–275	260.7
Bill	12	79–99	90	15	71–102	86.1
Tarsus	12	49–60	53.9	15	51–57	53.7

Table 3. Bill measurements (mm) of specimens of Far Eastern Oystercatcher.

Bill length	Sex	Source
88–97	M	Zhao 1995
100–110	F	Zhao 1995
91	F	Wildlife Institute of Heilongjiang Province 1992
80–110		Zhao 1988
92		Gao 1989
98, 76, 89	M	Yang 1990
89	F	Yang 1990
98, 108	M	Shaw 1936
105	F	Shaw 1936
75–108, mean 94.3, n =11		Wang <i>et al.</i> 2006
88.5–96		Hachisuka & Udagawa 1951
83.5–100, mean 90.6, n =6		Kozlova 1961
89–98, mean 92.6, n=6	M	Tomek 1999
90–100, mean 95.6, n =3	F	Tomek 1999
88.6, 90	F	N.N. Gerasimov



Photo E. Nest site of Far Eastern Oystercatcher, Saemangeum, South Korea, May 2008 (photo: Jesse Conklin).

Breeding

Far Eastern Oystercatchers usually nest on sand and gravel beaches, often near river mouths with low herb vegetation (Kuroda 1918, Caldwell & Caldwell 1931, Lobkov 1986, 2001, Gerasimov *et al.* 1999, Gerasimov 2006). At Yalu Jiang and Shuangtaizihekou Nature Reserves, Liaoning, they usually nest on open silt areas in recently reclaimed sites and on bunds between ponds inside the seawall with little or no vegetation (Adrian Riegen *in litt.* 25 March 2009, C.Y. Choi & D.S. Melville unpubl.). They also are found on rocky shores on islands off the Chinese coast during the breeding season (Ding *et al.* 2000, Talbot *et al.* 2004, Liu Weiting *in litt.* 23 March 2009), and in South Korea, Moores (2006) recorded them typically nesting in rocky crevices on small rocky islets [Photo E], although nests have also been found on open sand, and in among salt-marsh vegetation (N. Moores *in litt.* 24 April 2009), as also recorded by Shi (1992). Following the closure of the Saemangeum reclamation, South Korea numbers of breeding Far Eastern Oystercatchers increased as birds occupied the dry, bare flats (Moores 2012).

On the west coast of the Kamchatkan Peninsula the distribution of breeding pairs appears to be determined by the availability of suitable feeding areas (mudflats); where the coast is a narrow strip of sand/pebble with an almost total absence of mudflats, oystercatchers are absent (Gerasimov *et al.* 1992).

The only detailed breeding study is that of Zhang *et al.* (1991) in Liaoning, China. There, birds arrived on the breeding grounds from mid-March to April and started nest building in mid-April, laying in late April, the first observation of copulation being 21 April (Zhang *et al.* 1991). Wong & Liang (1992, 1993) recorded a chick on 29 May and nests with eggs and chicks in Liaoning in late June, while Shi (1992) reported egg laying in June on the Yellow Sea coast. St John (1880) reported oystercatchers “busily breeding ... their eggs surrounded with frozen snow” near Akishi Bay, Yesso (Hokkaido), in early May. In the Kamchatkan Peninsula/Sea of Okhotsk region egg laying starts in early June (Lobkov 1986, Gerasimov *et al.* 1992); Gerasimov (2006) reported a nest with three eggs on 29 June, when a brood of three chicks was also seen.

Table 4. Weights of Far Eastern Oystercatcher.

Weight (g)	Age	Sex	Date	Location	Source
403		M	10 September	Han River, South Korea	Fennell 1961
520		–	21 November	Olango Island, Philippines	Magsalay & Kennedy 2000
518		F	–	–	Dement'ev & Gladkov 1969
515–577		M	–	–	Zhao 1995
590		F	–	–	Zhao 1995
487–642			–	–	Zhao 1988
490	Juv	–	12 October	Takamatsu, Ishikawa Prefecture, Japan	Kuwabara & Nakagawa 1995
530	Ad	F	28 October	Tanggu, Hopeh	Shaw 1936
650		M	11 May	Moroschechnaya, Kamchatkan Peninsula	Gerasimov <i>et al.</i> 1992
665, 700		F	11, 22 May	Moroschechnaya, Kamchatkan Peninsula	Gerasimov <i>et al.</i> 1992

In China, Zhang *et al.* (1991) found nests to average 244 mm×156 mm, with an average depth of 30 mm (n = 8), while Zhao (1988) reported the outside diameter of nests to be 120–200 mm, and the depth 10 mm. Nests at the Moroshechnaya estuary, Kamchatkan Peninsula, had an external diameter of 165–190 mm, internal diameter 110–115 mm, and a depth of 35 mm – they were lined with lichen, reindeer *Rangifer tarandus* droppings and a few pieces of *Elymus mollis* (Gerasimov *et al.* 1992).

Clutch size varies between 1 and 4, but is usually 3 eggs (Caldwell & Caldwell 1931, Wildlife Institute of Jilin Province 1987, Yang 1990, Zhang *et al.* 1991, Zhao 1995, Gerasimov 2006).

Descriptions of eggs of *osculans* need to be treated with caution. For example, Swinhoe (1875) described the collecting of oystercatcher eggs near Chefoo (Yantai, Shandong), this information being copied by various authors (La Touche 1931–1934, LeFevre 1962, Cheng 1987); the eggs were described by Oates (1902) who noted them as being “of very abnormal shape and colouration”. Two of Swinhoe’s eggs, which are in the Natural History Museum (BMNH), Tring (BMNH: 1901.1.1.3906-7), were subsequently identified as belonging to Ancient Auklet *Synthliboramphus antiquus* (Jourdain 1935). Baker (1935) described the eggs collected by Stanford (1937) from the Sundarbans, Bangladesh, as “just like the eggs of the Common Oystercatcher; in shape rather unusually broad ovals but of normal texture and surface. The ground is rather deep brownish-buff, the surface freely spotted with primary markings of black and secondary ones of lavender and dark grey, just a trifle more numerous at the larger end than elsewhere”, further noting that the two eggs collected by Jourdain in Siberia were “much longer ovals in shape” than those from the Sundarbans. The Sundarbans breeding record remains an anomaly, being far removed from the known breeding range of any oystercatcher taxon, and the identification of the eggs may be in doubt. Étchécopar & Hüe (1978) in describing eggs in China copied the text from Hüe & Étchécopar (1970) for birds in the Middle East.



Photo F. Clutch of Far Eastern Oystercatcher, Saemangeum, South Korea, May 2008 (photo: Jesse Conklin).

Kuroda (1918) describes two eggs from Mokpo, South Korea, as being “stone buff with grayish underlying shell-markings and spotted and blotched on surface with blackish or pale brown”, and Caldwell (1932) described them as “a drab ground colour, boldly marked and blotched with black and brown, over underlying markings of pale lavender”. Measurements of eggs are given in Table 6. [A clutch at Saemangeum, South Korea is shown in Photo F.]

Zhang *et al.* (1991) reported an average egg mass of 49.6 g (range 37.0–53.8 g, n = 8), while Kondratyev (1995) noted the mass of three eggs as 42.5 g, 43.0 g and 40.0 g – these compare with a calculated egg mass of 44.9 g (Hockey 1996).

Incubation is reported to last 21–24 days (Zhao 1988), 22–24 days (Zhang *et al.* 1991) and 25–28 days (Anon. 1983).

In Liaoning, Zhang *et al.* (1991) found that nine of 38 eggs hatched. Losses were attributed to heavy rainfall and flooding (22 eggs), and collection by fishermen.

Caldwell (1932) noted how the oystercatcher “often conceals its eggs by partially covering them with bits of shell, gravel, and other material when leaving the nest for a

Table 5. Primry moult of Far Eastern Oystercatchers based on photographs of birds in flight. Numbers in the body of the table are the numbers of birds with the given number of old primaries.

Date	Location	Number of old primaries											No moult	Photographer		
		10	9	8	7	6	5	4	3	2	1	0				
27 April	Shuangtaizihou NNR, Liaoning	8	5	3	1	1	1									David Melville
8 August	Xiamen, Fujian							1								Jian Sheng Lin
17 August	Yalujiang NNR ¹ Liaoning						6	4	3							Qingquan Bai
26 August	Panjin, Liaoning					1		8	25	4	1					Qingquan Bai
28 September	Geum, South Korea					1				2	1	4				Tim Edelsten
6 October	Yancheng NNR, Jiangsu									1	6	6	1			unknown
17 November	Yalujiang NNR, Liaoning													all		Qingquan Bai

¹ The Yalujiang National Nature Reserve is officially titled the Dandong Yalu Jiang Estuarine Wetland National Nature Reserve.

time". This behaviour apparently has not been described for any other oystercatcher taxon, and may indicate that the nests he found had been subject to tidal inundation.

Parasites

Fennell (1961) noted that a male he collected in South Korea "was heavily infested with ectoparasites". *H.o. osculans* has been identified as the natural definitive host for the trematode *Gymnophalloides seoi* (Ryang *et al.* 2000) – the only intermediate host known for this species is the Pacific oyster *Crassostrea gigas* (Sohn *et al.* 1998).

Ringling

A total of six Far Eastern Oystercatchers had been ringed up to 2010: three in Japan, two in China, one in the Philippines. There have been no recoveries – the record in Zhang & Yang (1997) is in error (Liu Weiting *in litt.* 24 March 2009).

Nothing is known of longevity or survival. One ringed at Yalujiang National Nature Reserve, Liaoning, in 2010 was resighted there in 2012 (C.Y. Choi pers. comm.). Gerasimov (2006) quoted Dugincev & Pakin 1993) as saying that Far Eastern Oystercatchers start breeding when four to five years old, and both Gerasimov (2006) and Lobkov (2001) noted that non-breeding birds are present on the breeding grounds in the Russian Far East.

HABITAT AND FOOD

The Far Eastern Oystercatcher occurs in a variety of coastal habitats, ranging from extensive tidal mud and sand flats, to

rocky shores during both breeding and non-breeding seasons. Migrants in Japan occur on sandy beaches and mudflats, whereas wintering birds may be found on rockier coasts (Brazil 1991). On migration they also have been recorded from salt pans in Hebei Province (Yang & Zhang 2006). In inland areas of northeast China they apparently frequent freshwater lakes (M.R. Leven *in litt.* 2 November 2007, Paul Holt *in litt.* 26 January 2011), marshlands and open dune grasslands.

There have been no detailed studies of feeding behaviour or diet. Most descriptions are generalised, e.g. Caldwell (1932) noted that "it is found usually on sandy beaches close to the outgoing tide, feeding upon mussels, small crabs and shellfish", and it is uncertain how much of this information is derived from studies of *osculans* rather than copying of information from *ostralegus* (e.g. the text for China (Étchécopar & Hüe 1978) is copied directly from that for the Near and Middle East (Hüe and Étchécopar 1970)). The Chinese literature is summarised in Table 7.

Dement'ev and Gladkov (1969) reported mussel fragments in one stomach. Hori & Noda (2001) recorded a single bird in April from their rocky coast study site in southeast Hokkaido, and Hori (2008) recorded trophic linkages between oystercatchers and limpets (*Lottia* spp., *Nipponoacmea schrenckii*). At Yalujiang National Nature Reserve, Liaoning, migrant birds feed extensively on the clam *Potamocorbula laevis*, but breeding birds also take polychaetes (C.Y. Choi and D.S. Melville unpubl. data).

DISTRIBUTION

Supporting details are provided in Appendix 1.

Table 6. Measurements (mm) of eggs of Far Eastern Oystercatcher.

Dimensions	Sample size	Source
57.4 × 36.4		Hartert 1912–1921, Dement'ev & Gladkov 1969
59.3 × 27.3		Hartert 1912–1921, Dement'ev & Gladkov 1969
51–62 × 35–45 (range)	Not given	Zhao 1995
56–59.3 × 36.4–46.6 (range)	Not given	Anon. 1983
57.9 × 43.4 (average)	Not given	Wang <i>et al.</i> 2006
58.5 × 40		Kuroda 1918
56.0 × 39.5		Kuroda 1918
57.2 × 38.1 (average)	10	Étchécopar & Hüe 1978
59.90 × 40.35		Gerasimov <i>et al.</i> 1992
58.10 × 40.70		Gerasimov <i>et al.</i> 1992
58.05 × 40.50		Gerasimov <i>et al.</i> 1992
54.5 × 39.7		Kondratyev 1995
54.2 × 40.0		Kondratyev 1995
54.8 × 39.5		Kondratyev 1995
54.5 × 40.0		C.Y. Choi & D.S. Melville unpubl. data
54.3 × 40.8		
57.3 × 41.8		
55.3 × 42.9		C.Y. Choi & D.S. Melville unpubl. data
56.9 × 40.5		
53.6 × 39.7*		Baker 1935
52.5 × 40.0*		Baker 1935

*Eggs from Sundarbans, Bangladesh.

Breeding

The range of this taxon remains poorly known. There are historical records (19th and early 20th centuries) of birds observed during the breeding season at Chukotka (Dement'ev & Gladkov 1969, Tomkovich 2003, Evgeny Syroechkovskiy *in litt.* 25 March 2009), and Avacha Bay, southeast Kamchatka (Gerasimov 2006), but there are no recent records. In the early 20th century it bred at Olga and Ossora Bays, Kamchatka, but there have been no breeding records from the east coast of Kamchatka since the mid-20th century (Gerasimov 2006). The oystercatcher has been reported as a vagrant from the Commander Islands (Gerasimov 2006 [quoting Stejneger 1885]). Dement'ev and Gladkov (1969) noted that it may nest on the Kurile Islands, but apparently there are no records.

Currently the Far Eastern Oystercatcher breeds in the Russian Far East on the west coast of the Kamchatkan Peninsula, north from the Moroshechnaya River to Penzhina and Shelikov Bays at the northern end of the Sea of Okhotsk. It appears to be absent from much of the west coast of the Sea of Okhotsk, but occurs in Khabarovsk and Primorsky from the mouth of the Amur River southwards towards North Korea, but its breeding status there is uncertain (Lobkov 2001). It occurs on the west coast of the Korean Peninsula, and in small numbers on the south coast, and around the shores of the Bohai and Yellow Sea as far south as Fujian Province, China. It is also suspected to breed from Amurland and Ussuriland through Manchuria to Hebei (del Hoyo *et al.* 1996, Vaurie 1965). For China, Cheng (1986) gave the summer range as coastal Liaoning and northern Shandong, as well as inland records from Hebei and Heilongjiang, while Wang *et al.* (2006) also included Nei Mongol. The status of oystercatchers inland remains uncertain, some authors reported them as passage migrants (Anon. 1988), whereas others reported them as breeding (Ma 1984, Zhang 1995). Xu Qingyu reported that small groups of Far Eastern Oystercatchers appear in late March at Da Jintou, Heilongjiang, with numbers peaking in April (maximum 20); he photographed one on a nest with three eggs in May (Paul Holt *in litt.* 26 January 2011).

Although Brazil (2009) showed the summer range to include the western shores of the Sea of Okhotsk there appear to be no breeding records from this area (Dement'ev



Photo G. Chick of Far Eastern Oystercatcher. Moroshechnaya River, Kamchatkan Peninsula, August 2004 (photo: Yuri Gerasimov).

& Gladkov 1969, Flint *et al.* 1984), apart from a few records in Magadan (Kistchinsky 1968, Kondratyev 1995). Sea ice remains along the western shore of the Sea of Okhotsk for much longer than it does on the western shore of the Kamchatkan Peninsula, and in some years persists until June (Parkinson 2000). The uncertainty as to sea ice conditions may make this coastline unattractive to oystercatchers for breeding; however it should be noted that few observations have been made in this area.

Migration

There are no ringing recoveries. The only records of visible migration are those from the Moroshechnaya estuary, Kamchatkan Peninsula (Gerasimov *et al.* 1992, Gerasimov & Gerasimov 1998), and one record of 38 departing from Yalujiang, Liaoning, at 1058h towards the northeast on 2 May 2011 (C.Y. Choi & D.S. Melville unpubl. data).

The first birds arrive on the breeding grounds in Liaoning in mid-March (Zhang *et al.* 1991); however Yang (1990) noted that birds leave Zhejiang from April, with the last birds leaving in mid-May. At Yalujiang National Nature Reserve, Liaoning, there is a marked passage of birds in mid-March

Table 7. Food of Far Eastern Oystercatcher.

Worms	Crustaceans	Molluscs	Insects	Fish	Source
	x	x			Caldwell 1932
x	x	x			Caldwell & Caldwell 1931
x	x	x		x	Fu <i>et al.</i> 1984
x	x	x	x	x	Zhao 1995
	x	x			Wildlife Institute of Heilongjiang Province 1992
x	x	x			Wildlife Institute of Jilin Province 1987
x	x	x	x		Zhao 1988
x	x	x			Gao 1989
	x	x		x	Yang 1990
	x				Jin <i>et al.</i> 1989
	x	x	x	x	Wang <i>et al.</i> 2006
x	x	x		x	Shi 1992

to mid-April, with up to 1,500+ present (C.Y. Choi, Q.Q. Bai, D.S. Melville unpubl. data); the largest count was 2,458 birds on 16/17 March 2013 (Q.Q. Bai & Dong Jiangtian unpubl. data). Peak passage through the Saemangeum estuary area, South Korea, is in early-mid April (Moores 2012). It is a rare passage migrant in Sakhalin passing through in the second half of May–early June (Naechev 1998), and in the Khabarovsk Region (Dement'ev & Gladkov 1969, Gerasimov & Huettmann 2006). Gerasimov & Huettmann (2006) recorded northward migration through the Sea of Okhotsk between early May and early June, and estimated 500 oystercatchers arriving on, or passing through, the Kamchatkan Peninsula on northward migration.

The status of oystercatchers inland in Jilin, Heilongjiang and Nei Mongol remains uncertain (see above), and it is possible that at least some are migrants on passage, as suggested by Meise (1934).

Using Davidson's (1984) flight range formula, the limited weight data (Table 4), and a flight speed of 50 km/h (Schnell & Hellack 1978), it appears that Far Eastern Oystercatcher might be able to fly some 3,000 km, which would be sufficient to fly from the Bo Hai/Yellow Sea direct to Moroshechnaya, Kamchatka. The Great Circle route from Hebei, Bo Hai, to the Moroshechnaya estuary, Kamchatkan Peninsula, passes over Manchuria, thus at least some of the oystercatchers recorded inland could be grounded migrants en route to areas further north.

Southward migration was recorded through Kamchatka from late August to late September (Gerasimov & Huettmann 2006), with an estimated 1,000 passing through the Moroshechnaya estuary (Schuckard *et al.* 2006). The last oystercatchers leave Moroshechnaya in October when the area starts to freeze over. Southward migration is recorded on Sakhalin between late July and early October (Nechaev 1998). At Yalujiang, Liaoning, numbers in 2008 increased from about 20 in June to a peak of 361 in September, before dropping rapidly in early October (Anon 2011). The peak autumn count in 2012 was of 642 on 16 August; this included at least one bird with "droopy wings" suggesting that it had just arrived after a long flight; in September the birds roosted at an inaccessible site, but hundreds were present, and 513 were counted on 17–18 November (Q.Q. Bai unpubl. data). At Shuangtaizihou, Liaoning, there were peaks of 1,250 and 1,450 in August 2011 and 2012 respectively (Q.Q. Bai unpubl. data). It seems likely that sites such as Shuangtaizihou and Yalujiang are used as moulting sites prior to birds moving south to wintering grounds.

Non-breeding

The coasts of the Sea of Okhotsk start freezing in October (Parkinson 2000), by which time most oystercatchers have left (Gerasimov *et al.* 1992). The European Oystercatcher typically winters in areas with mean winter temperature above 0°C and with few ice days (Hulscher *et al.* 1996). The January 0°C isotherm is a reasonable indicator of the northern limit of Far Eastern Oystercatcher in winter. The position of this isotherm has moved northwards slightly between the periods 1948/1957 and 2000/2009 (NOAA 2009), but there are so few winter records of oystercatchers that it is not possible to determine whether this has resulted in any change in distribution.

The east coast of Liaoning and the northern Bohai (Liaodong Bay) freeze during the winter months, with an average of 130 days of sea ice around the mouth of the Liaohe, northern Bohai (Yang 2000), the ice extending for c. 80 km offshore (Anon. 1988, Liu *et al.* 2000), making the area unsuitable for oystercatchers in winter. In northern Hebei, where sea ice is present for about 115 days (Yang 2000), considerable numbers of Dunlin *Calidris alpina* and Grey Plover *Pluvialis squatarola* over-winter, feeding on tidal flats exposed beyond the coastal sea ice, but no oystercatchers have been recorded (Yang & Zhang 2006, Yang *et al.* 2007).

The majority of Far Eastern Oystercatchers winter along the west coast of South Korea; between 1,000 and 5,500 were reported in the winters of 2011–2012 during an annual mid-winter census. In 2013 more than 8,300 were reported in a total of seven areas by the same census, with the main concentration at Yubu Island in the Geum estuary (see below) and adjacent coast (c. 6,300), and at Gomsu Bay (1,940) (Ministry of Environment 2013). Small numbers winter in Japan and Taiwan. In China, Cheng (1987) recorded it wintering along the coast from Jiangsu to northern Guangdong, apparently with some records from Guangxi (Wang *et al.* 2006). The area around Qingdao, Shandong, has been discovered to hold significant numbers in mid-winter (Paul Holt *in litt.* 25 October 2007), and the northern Jiangsu coast around Lianyungang has a major winter population (China Coastal Waterbird Census unpubl. data). This latter population has only been found recently and it is not possible to determine whether this is a traditional site, or whether it has been recently occupied.

There are confirmed extralimital records of *osculans* from Myanmar, Vietnam, the Philippines Sarawak, and Guam, Micronesia (Appendix 1).

Table 8. Asian Waterfowl Census counts of Far Eastern Oystercatcher (after Lopez & Mundkur 1997, Li & Mundkur 2004, 2007, S. Delaney *in litt.* 4 April 2009).

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
South Korea				1,169	2,700	3,984	532	2,516	3,556	5,504	2,272	3,694	2,809	1,043
Japan	15	9	7	8	20	8	78	92	153	163	106	150	180	199
Mainland China		17	14								26		41	501
Taiwan		1	4	2		38	1	40	3	4	1	90	87	24
Total	15	27	25	1,179	2,720	4,030	611	2,648	3,721	5,671	2,405	3,934	3,117	1,767

POPULATIONS: SIZES AND TRENDS

No attempt has been made to estimate total breeding populations, but data are available for some areas. The summer population in Kamchatka and Sea of Okhotsk is estimated at 700 birds (Gerasimov 2006). However the breeding population is thought to be only about 100–150 pairs, because many non-breeders are present (Gerasimov 2006, Lobkov 1986, 2001). There has been a contraction in the breeding range in east Kamchatka (Lobkov 2001). Lobkov (1986) noted that the number of oystercatchers breeding on the Kamchatkan Peninsula had decreased “especially during the last 10–15 years”; local people reporting reductions of a half or more at the mouth of the Tigil River and at Khayruzova.

The South Korean breeding population is suspected to be between 300 (Moores 2006) and 500–700 pairs (Barter 2002), with about 30 pairs estimated to be on Yubu Island in the Geum estuary (Lee 2004, Lee *et al.* 2002). In China there are estimates of 100 pairs at Shuangtaizihou, Liaoning, and 50 pairs at Yancheng, Jiangsu (Barter 2002). At Yalujiang National Nature Reserve, Liaoning there are estimated to be at least 10–15 pairs (C.Y. Choi, Q.Q. Bai, D.S. Melville unpubl. data), and some 50–60 pairs in the Yellow River Delta National Nature Reserve, Shandong (K. Shan *pers. comm.* to D.S. Melville 15 April 2013). Off the coast of Fujian, Lui Weiting (*in litt.* 23 March 2009) noted the breeding population on Jinmen Island as less than 15 pairs, and there maybe less than five pairs on Mazu (Matsu) Island.

Rose & Scott (1994) estimated the total population of *osculans* as less than 10,000; however the discovery of large numbers of oystercatchers wintering at Yubu Island, South Korea (Lee *et al.* 2002, Lee 2004) resulted in a revision of the flyway population to 10,000 by Delaney & Scott (2002); a figure which was retained by Delaney & Scott (2006). Wetlands International (2013) currently estimates the population as between 5,000 and 10,000 birds, and uses 70 birds for the 1% population criterion for sites of international importance under the Ramsar Convention.

The Asian Waterfowl Census (AWC) results (Table 8) show comparatively small numbers of oystercatchers in countries other than South Korea. The AWC data, gathered in mid-January, need to be treated with some caution because the mid-January count is not necessarily the peak winter count and sometimes not all records have been submitted to Wetlands International; for example Cho & Park (1995) reported some 2,500 oystercatchers at Yubu, South Korea but these are not recorded by Lopez & Mundkur (1997).

While there appears to be a general tend of increasing numbers wintering in Japan, where it is thought that survey effort is reasonably consistent, elsewhere no such trends are evident. It is particularly important to note that the variation

in counts at Yubu Island, South Korea, likely results at least in part from differences in viewing conditions and survey effort (see below), of sufficient importance potentially to mask real changes in numbers present.

In Korea, *osculans* was previously described as a “not uncommon summer resident along the west coast” (Austin 1948), but in South Korea Won & Gore (1971) noted it as “an uncommon passage migrant; a few occasionally winter in the south”, and surveys of many coastal areas usually found less than 10 birds (see Appendix 1). However, access to the coastal zone was largely restricted until the late 1990s, and there was limited shorebird survey effort (Moores 2006). The discovery of large numbers wintering in the Geum estuary (Cho & Park 1995, Lee *et al.* 2002, Lee 2004) could reflect a change in winter distribution but is more probably due to increased survey effort and access to the coastal zone. Recent surveys by the China Coastal Waterbird Census group have resulted in many more Far Eastern Oystercatchers being recorded than previously reported to the AWC (Anon. 2009b, 2011); see Appendix 1.

Considerable numbers of birds are now known to occur within the Geum Estuary and at Yubu Island throughout the year (Tables 9 and 10), with birds often moving between roosts and feeding areas dependent on tide, and apparently disturbance and food availability. Maximum numbers tend to be recorded in mid-winter (December–February), with smaller numbers over-summering and large numbers recorded again from August (e.g. 2,240 on 16–17 August 2007 (Moores *et al.* 2007b)). Unless coverage is simultaneous and comprehensive, numbers are difficult to determine across many tide-cycles, and as a result to compare between years. While Yubu Island usually produces the highest roost-counts, birds utilize much of the coast of the Geum estuary. This includes the main river channel tidal-flats downstream of the barrage, where e.g. 2,896 were counted (many noted at the time as feeding on worms) on 6 February 1999 (Moores 1999), and small mainland bays, where e.g. 1,496 were counted on 1 January 2009, with only 910 counted on Yubu Island the previous day at high tide (Birds Korea unpubl. data).

Information on wintering in China is sparse and it is impossible to determine any trend because it is only in recent years that reasonably systematic shorebird counts have been undertaken. Bamford *et al.* (2008) reported a maximum winter count of 325 oystercatchers in China, but gave an estimated total of 3,010; on the basis of current information (Appendix 1) this estimate appears reasonable.

Cao *et al.* (2008) compared historical information (late 1800s/early 1900s) with 2006 count data for the Fujian coast and considered that oystercatchers had declined greatly. They recorded 41 Oystercatchers, which they adjusted to 63 to take account of those parts of the coast not covered by their survey, and compared this with an arbitrary baseline

Table 9. Far Eastern Oystercatchers at Yubu Island, Geum River estuary 1999–2000 (after Lee *et al.* 2002).

1999					2000						
30 Aug	28 Sep	25 Oct	24 Nov	23 Dec	22 Jan	20 Feb	22 Mar	19 Apr	20 May	18 Jun	17 Jul
1,060	2,600	1,400	2,200	3,200	2,800	1,700	690	179	118	87	160

Table 10. Numbers of Far Eastern Oystercatchers at the Geum estuary in 2008 (after Kim *et al.* 2009).

25 January	21 March	9 May	20 August	18 September	13 November
2,197	88	281	803	448	1,589

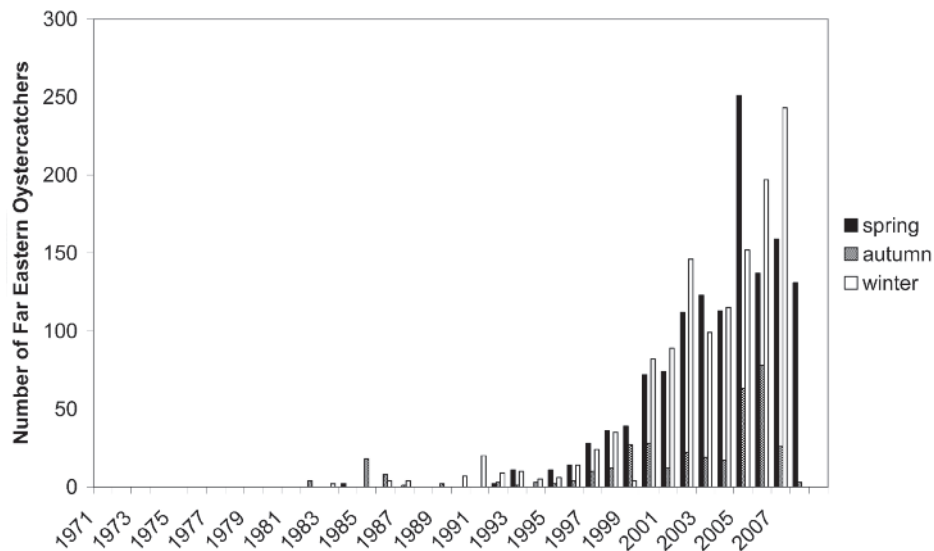


Fig 1. Numbers of Far Eastern Oystercatchers recorded in Japan. Spring = April–May; Autumn = August–September; Winter = December–February. Data courtesy of The Director, Biodiversity Centre of Japan, Nature Conservation Bureau, Ministry of the Environment, Japan.

of 1,000 birds for a species described, historically, as “common”. It should be noted that 150 oystercatchers were recorded at Min Jiang estuary, Changle, Fujian on 7–8 August 2004 (China Ornithological Society 2005), highlighting the difficulty of such comparisons.

Autumn migration counts in Japan (undertaken in August–September, Fig. 1) show relatively low numbers compared with those wintering. This would fit in with birds arriving from South Korea later in the autumn. Austin & Kuroda (1953) state that the “small Korean population visits the western Honshu and Kyushu coasts irregularly”, however many of Austin’s assertions on Korean bird status have recently been challenged (Duckworth & Moores 2008). There are no ringing recoveries to support this statement, and Brazil (1991) suggested that the main migration route follows the continental coast rather than the Japanese archipelago. There are insufficient data from east/southeast China to determine whether birds recorded in winter are possible migrants from further north, or simply local breeding birds aggregating, or a combination of the two.

The wintering populations of Japan and Taiwan decreased in the late 19th and early 20th centuries (Hachisuka & Udagawa 1951), but the reasons for this are unknown. Numbers of oystercatchers in Japan increased markedly between the 1970s and 1980s, when an average of two to three birds was recorded annually on spring and autumn migration, (Anon. 1985a, b), and the first decade of the 21st century with *c.* 200 birds recorded (Fig. 1).

The highest estimates from the breeding range suggest some 1,020 pairs. Extremely cold weather in January 2013 in both northeast China and the Korean Peninsula (Anon. 2013b, Meier 2013) is likely to have resulted in a southward movement of Far Eastern Oystercatchers; extensive sea ice would have ensured that none were present in the Bohai or northern Yellow Sea. January 2013 counts in South Korea and China suggested a total population of about 11,000 birds, with about half of these being at Yubu Island, or within the Geum estuary, South Korea, and a further quarter at Lianyungang, Jiangsu, China. This is somewhat higher than the current population estimate (5,000–10,000) by Wetlands International (2013), but similar to that of Delany & Scott (2006).

DEMOGRAPHIC AND MECHANISTIC CAUSES OF POPULATION CHANGE

There is no information to determine what may have caused the reported reduction in populations of *osculans* in Japan and Taiwan in the late 1800s and early 1900s.

The sudden increase in numbers of birds found in South Korea in the 1990s coincided with an increase in shorebird survey effort, facilitated by reduced restrictions on coastal access, improved infrastructure and an improvement in survey effort (e.g. Moores 2006). Such changes helped facilitate a six-fold increase in the identification of new species recorded in Korea in the 1990s when compared to the period 1948–1971 (Park 2002), and the identification of several key sites for Far Eastern Oystercatchers, most notably the Geum Estuary, Namyang Bay and the Song Do/Incheon coast. Even if there was some increase in the number of birds within the Geum Estuary during the 1990s/early 2000s this could have been a result of a redistribution of birds from elsewhere rather than a reflection of an overall population increase. In this regard it should be noted that several sites used by the birds have been ‘lost’ to reclamation in recent years, most notably Saemangeum, much of Namyang Bay (where still 215 were counted on 10 January 2009: Birds Korea unpublished data) and Song Do/Shiwa in Incheon/Gyeonggi Province.

The distribution and perhaps the number of oystercatchers wintering in South Korea appear to be much affected by the direct and indirect impacts of reclamation projects. Studies associated with the Saemangeum reclamation in South Korea, employing a consistent and rigorous methodology in all three years, documented a decline in numbers of oystercatchers using Saemangeum and the adjacent Geum Estuary and Gomso Bay during northward migration, with the peak number in 2006 being 1,483, falling to 1,132 in 2007 when the seawall was closed, and 921 in 2008 after the Saemangeum area had largely dried out (Moores *et al.* 2008). Interestingly, numbers of oystercatchers counted at Saemangeum during this period showed little variation despite the drying out of much of the former tidal flats and the loss of large shellfish populations and several pairs attempted breeding in areas which would

otherwise have been inundated during high-tides before seawall close. During the same period, numbers in the Geum estuary apparently dropped markedly (from 1,225 in 2006 to 670 in 2008) and the total numbers reported nationwide during the annual mid-winter census also fell to only 1,047 in 2007. After several years with reduced numbers of oystercatchers in the Geum estuary, numbers apparently started to recover from 2011 to reach >6,000 in January 2013, similar to the count of 5,700 there in January 2001. Many of the tidal-flats within the estuary appear to be changing from sand/mud- to mudflats as a result of changing hydrodynamics following construction of the Saemangeum seawall (Kim *et al.* 2008). Further, a recent increase in construction, most especially within the main Geum River channel, might have led locally to reduced feeding opportunities, while an unknown number of birds are suspected of formerly using the outer parts of Saemangeum prior to seawall close, an area now permanently inundated and unavailable to the species. Some of these are now considered likely to have relocated to the adjacent Gomso Bay. Other formerly important sites for the species (including Namyang Bay and Song Do) now support greatly-reduced numbers, even though some areas of intertidal flat remain there outside of recently-reclaimed areas.

CONSERVATION STATUS

H. o. osculans is currently regarded as being of 'Least Concern' by IUCN (2013), and the Russian Red Data Book (Lobkov 2001) lists it as 'Uncertain Status', however it was listed as 'Endangered' by Gill *et al.* (1995). A summary of legal protection afforded to the Far Eastern Oystercatcher is given in Appendix 2.

It is unclear whether the population is stable, increasing or declining, though it is clear that many of their preferred migration stop-over and wintering sites around the Yellow Sea have been degraded by, or are threatened by, reclamation projects. Moores (2012b) considered that the population was declining in South Korea.

It appears that about 50% of the estimated global population winters at one site (Yubu Island, South Korea), which makes it extremely vulnerable to natural and/or anthropogenic effects. The tidal area near Yubu and Maseo-myun, covering an area of 16.5 km², was declared a 'Coastal Wetland Protection Area' on 30 January 2008, and 1,530 ha of the same area was designated as Seocheon Tidal-flat Ramsar Site on 2 December 2009. However, numerous threats to the integrity of the Geum Estuary remain, including bridge building and port expansion in the inner part of the estuary, renewed calls for reclamation of much of the Seocheon coast, and proposals for a wind-farm within 2–3 km of Yubu Island in 2013. It is notable too that the Yubu tidal flats have been much affected by the 41,000 ha Saemangeum reclamation, just to the south, as the flats changed from sand/mud to mud with a decrease in the numbers of bivalve molluscs and an increase in polychaete worms (Kim *et al.* 2009). In 2013, local fishing communities reported some recovery of shellfish stocks starting in 2010, a recovery that has been matched by the increase in numbers of wintering oystercatchers. An oil spill in December 2007, although c. 120 km to the north of Yubu Island, resulted in three oystercatchers becoming mildly oiled (Moores *et al.* 2007a), highlighting the potential threat posed to the population concentrated there.

A further quarter of the total population winters at

Lianyungang, Jiangsu, dubbed 'China's East-West Freight Corridor' (Anon. 2013a), where in April 2013 there was large scale coastal reclamation (Y. Chen & D.S. Melville pers. obs).

The future of the major part of the global population of *Haematopus [ostralegus] osculans* is far from secure.

Since the total population is <10,000 mature individuals, population reductions have been reported from the breeding grounds, and there is rapid and extensive reclamation of the staging and wintering areas in both South Korea and China, consideration should be given to classifying the Far Eastern Oystercatcher as 'Near Threatened'.

In 2013, 17 sites were identified as being of international importance, meeting the 1% Ramsar population criterion (Appendix 3).

THREATS

Threats along the East Asian-Australasian Flyway were reviewed by Melville (1997), and Barter (2002) summarized threats to shorebirds and their habitats in the Yellow Sea. A summary of conservation issues in the Russian Far East was provided by Newell (2004). MacKinnon *et al.* (2012) summarized threats to shorebirds in the East Asian-Australasian Flyway, with particular attention to the Yellow Sea.

Habitat loss and alteration

The Chinese and South Korean coasts of the Yellow Sea have been, and continue to be, subject to extensive reclamation. Barter (2002) noted that 37% of the intertidal area existing in China in 1950, and 43% of that in South Korea since 1917 had been reclaimed, and large scale reclamation had also taken place in North Korea. By 2010, approximately 75% of historical tidal-flat area in South Korea had been reclaimed, with two-thirds of this loss in the previous 25 years, with only c. 110,000 ha of tidal-flat remaining (Birds Korea 2010, Moores 2012). Despite assurances by South Korea that "no large scale reclamation projects are now being approved" (Ramsar Convention Secretariat 2008), on 18 March 2009, a new reclamation of 715 ha at Song Do, Incheon was approved; this site currently supporting oystercatchers throughout the year, including breeding birds (Birds Korea 2009) and an additional reclamation of part of the site was also started in 2013. Reclamation at Yalu Jiang National Nature Reserve, Liaoning resulted in a reduction in the reserve area and the process was continuing (Vaughan 2009).

In the second half of the 20th century, more than 2,300 km² of tidal area, including 1,444 km² of salt marsh were reclaimed in Jiangsu Province (Zhang *et al.* 2004). Reclamation in the 1950s and 1960s was mostly above mean spring high water, leaving areas of saltmarsh outside the seawall; the seawalls are now constructed further off shore, which has resulted in the complete loss of saltmarsh. The lack of salt marsh, together with reduced sediment loads carried by rivers due to dams and abstraction upstream, means that rates of shoreline accretion are often greatly reduced, and in some cases are predicted to erode (Yang *et al.* 2006). Between 1990 and 2008 an average of 285 km² was reclaimed along the Chinese Yellow Sea coast annually – it was predicted that this will exceed 500 km² annually between 2009 and 2020 (CCICED 2010), with 1,800 km² being reclaimed in Jiangsu Province alone.

There has been extensive planting of *Spartina alterniflora* on the East China coast, especially in Jiangsu province, where 410 km of the total 954 km of coastline are currently 'protected' by this plant, which in places extends for 4 km seaward, and covers a total area of 137 km² (Zhang *et al.* 2004). *Spartina* rapidly invades the intertidal and results in large areas becoming unavailable to shorebirds for foraging (Gan *et al.* 2009), while upper beach areas are also lost as nesting sites.

Tidal power generation is being considered and/or implemented in North Korea, South Korea and China (Chang *et al.* 2003, Moores 2012, von Hippel & Hayes 2012). Of the 127 MW of new offshore wind power capacity installed in China in 2012, 89% was in intertidal wind farms (Wu 2013). There is a pilot intertidal windfarm at Rudong, and at least two others are planned elsewhere along the Jiangsu coast. In 2013, a wind-farm was proposed close to Yubu Island, the Geum estuary, South Korea, where probably more than half of the population of *osculans* winter (Birds Korea 2013).

Climate change

The January 0°C isotherm has moved north in the period 1948–1957 and 2000–2009 (NOAA 2009) and there has been an overall reduction in the extent of winter sea ice in the Sea of Okhotsk (Parkinson & Cavalieri 2002). Warming may result in a northward expansion of the oystercatcher's breeding range, as predicted for *H.o. ostralegus* (Huntley *et al.* 2007, Maclean *et al.* 2008).

Sea-level rise resulting from global climate change may be expected to negatively impact shorebirds such as oystercatchers (Durrell *et al.* 2006). Shi *et al.* (2000) predicted an increased in sea-level of 25–50 cm by 2050 in the Yangtze Delta – double the world average – and a rise of 48 cm is predicted for the Yellow River Delta area by 2050 (Li *et al.* 1999). Sea-level rise, together with continued encroachment of reclamation and reduced coastal accretion, is expected to result in loss of feeding, roosting and breeding habitat. Because the Yellow Sea coast is being rapidly developed such that future coastal retreat is impossible, habitat loss will be exacerbated by sea level rise (Iwamura *et al.* 2013).

Pollution

The Bohai is heavily polluted with more than 3 billion tonnes of sewage discharged into it annually, together with 21,500 tonnes of contaminants from river run off (Zhang *et al.* 2006). Metal pollution became extremely serious in the 1990s, with particularly high levels of lead present. Liaodong Bay, at the head of the Bo Hai, is thought to be the most contaminated site in the world with respect to heavy metals. Organochlorine pesticides are present in marine molluscs (Yang *et al.* 2004) and there is evidence of continued release to the environment in some areas, e.g. lindane into Hangzhou Bay, Zhejiang (Zhou *et al.* 2008). Little is known about levels of pollutants in shorebirds in East Asia, and there is no information for oystercatchers (Lee *et al.* 1988, Yasunaga *et al.* 2000, Kunisue *et al.* 2003, Kim *et al.* 2007, Kim & Koo 2008).

Hunting and egg collection

The oystercatcher was not listed as a bird of "economic importance" by Cheng (1966), but it is regarded as tasty and good for hunting by both Zhou (1988) and the Wildlife

Institute of Jilin Province (1987), although Wilder & Hubbard (1938) considered it "edible but coarse". However it was not recorded in commercial catches of waders in the Shanghai area (Tang & Wang 1995, Ma *et al.* 1998), where birds were usually caught in clap-nets, although this may be a reflection of its scarcity in this area. Gerasimov (2006) noted disturbance during breeding and poaching as the main threats in Kamchatka.

Commercial egg collecting for human consumption has long been practiced along the coast of China (Caldwell 1935) and continues to this day (Chen *et al.* 2009). Oystercatchers are known to have been subject to subsistence egg collecting at Shuangtaizihou Nature Reserve, Liaoning (Wong & Liang 1992, D.S. Melville pers. obs), and Zhang *et al.* (1991) recorded that eggs were lost to fishermen. While oystercatchers generally lay a replacement clutch after initial egg loss, these tend to contain fewer eggs (Harris 1967), and in the case of birds breeding on the east coast of China (e.g. Yancheng, Jiangsu) this extends the breeding season further into the typhoon season, thus increasing the likelihood of nest washouts and egg or chick loss. Furthermore, the frequency of typhoons and storm surge events is predicted to increase with climate change (Li *et al.* 1999).

Competition for food

The coasts of the Yellow Sea are heavily exploited by human populations for human food and animal feed. For example, in July 1992 over 1,000 people were present, together with some 400 hundred donkey carts, along a 5 km section of coast in Jiangsu Province collecting molluscs (Melville 1997). Similarly high levels of human activity are regularly recorded elsewhere on the Chinese coast, as well as in South Korea and Vietnam (Pedersen *et al.* 1998). Harvesting benthic invertebrates adversely impacts oystercatchers through direct competition for food and/or associated disturbance.

Drought

Inland areas of Northeast China are suffering from drying, reduced precipitation and increased water abstraction; Xi-anghai National Nature Reserve, Jilin, has lost 89% of its original wetland area (Buckley 2005). Elsewhere in Heilongjiang and the middle Amur region it is thought that water is also becoming scarcer. The preferred habitat of *osculans* in this area remains unknown but the effects of water reduction are uncertain but are unlikely to be beneficial.

Mineral extraction

The coasts of the sea of Okhotsk are subject to increasing development. Much of this is related to oil and gas extraction around Sakhalin (Newell 2004, Huettmann & Gerasimov 2006, Poussenkova 2007). There is active oil extraction from the Bohai. Disturbance during exploration and extraction, infrastructure development and oil spills are all potential problems.

RECOMMENDATIONS FOR CONSERVATION RESEARCH

1. The breeding distribution of *osculans* needs to be clarified, particularly in the inland areas of Nei Mongol, Jilin, Heilongjiang and the middle Amur region. The status of *osculans* in North Korea needs to be clarified.

2. Participants in the Asian Waterbird Census and the China Coastal Waterbird Census should be informed about the uncertain conservation status of Far Eastern Oystercatcher and encouraged to survey sites as thoroughly as possible and ensure regular coverage of sites with known concentrations of oystercatchers. Information on how to distinguish between *osculans* and *longipes* should be provided to counters around the Bay of Bengal.
3. The lack of distinctive plumage/soft part colouration to allow identification of juvenile birds in their first winter in the field makes determination of breeding success difficult. An international marking and resighting programme, e.g. using readable rings, would provide valuable information on recruitment, annual survival, site faithfulness etc.
4. Research is required to understand why Yubu Island, Korea and southern Shandong/northern Jiangsu are such important sites for the taxon.
5. The main wintering populations are in South Korea and China, where reclamation continues to threaten several breeding areas and the main coastal wintering areas. Research is required to assess the likely effects of continued coastal reclamation in both South Korea and China.
6. Research is needed to elucidate migratory movements of *osculans* so that important stop-over sites can be identified and, if necessary, protected and managed.
7. Genetic studies could usefully assist in determining the status of this taxon. If, as del Hoyo *et al.* (1996) and Chandler (2009) suggest, it deserves species status this might increase conservation opportunities.
8. Studies on feeding, breeding and wintering ecology are required.

RECOMMENDATIONS FOR MANAGEMENT

1. The fact that up to 50% of the total population winters at one site, and a further 25% at another is cause for serious concern. Yubu Island remains threatened by the effects of reclamation and other human activities in the vicinity, including a proposed wind farm development. The South Korean Government should be encouraged to manage the island and surrounding areas to ensure the continuation of suitable habitat for Far Eastern Oystercatchers.
2. Countries bordering the Yellow Sea should be encouraged to implement both Ramsar Resolution X.22 *Promoting international cooperation for the conservation of waterbird flyways*, and the IUCN Resolution WCC-2012-Res-028 *Conservation of the East Asian-Australasian Flyway and its threatened waterbirds, with particular reference to the Yellow Sea*.
3. There is a need for improved public awareness of the taxon and its conservation throughout its range.
4. Protection laws need to be enforced, especially with regard to egg collecting.

ACKNOWLEDGEMENTS

Many people have contributed to this report, in particular large numbers of people who have counted waders, often in difficult conditions, throughout Northeast and East Asia, in particular participants in the Asian Waterfowl Census and the China Coastal Waterbird Census.

We would like to thank Robert Prŷs-Jones and Douglas Russell for access to the skin and egg collections respectively at the Natural History Museum (BMNH), Tring. The Director, Biodiversity Center of Japan, Nature Conservation Bureau, Ministry of the Environment, Japan kindly provided count data for Japan.

The following provided information and/or commented on drafts of this account: Hitoha Amano, Tatsuya Amano, Geoff Carey, Simba Chan, Ying Chen, Zhihong Chen, Leong Loh Chi, Peter Collins, Jesse Conklin, Simon Delany, Jiantiang Dong, Wenxiao Dong, Tim Edelsten, Woei-horng Fang, Stephan Flink, Kenneth Foote, Martin Hale, Yongxiang Han, Paul Holt, Yung Ki Ju, Andreas Kim, Satoshi Kobayashi, Angela Langford, Mike Leven, Jing Li, Yu Liang, Jiang Sheng Lin, Weiting Liu, Zhijun Ma, Clive Mann, Derong Meng, Toshifumi Moriya, Alte Ivar Olsen, Kioaki Ozaki, Fawen Qian, Subaraj Rajathurai, Michael Rank, Adrian Riegen, Phil Round, Chris Rose, Sajahan Sorder, Kai Shan, Evgeny Syroechkovskiy, Qingyuan Tang, Jan van de Kam, Gillian Vaughan, Fengqin Wang, Qingyu Wang, David Wells, Xiangji Wen, Gary Wiles, Songping Xu, Kelvin Yam, Chin Aik Yeap, Shoko Yoshida, Victor Yu, Lin Zhang, Ming Zhang, and Chao Zhao.

Ingrid Hutzler kindly assisted with translations from German.

REFERENCES

- Ali, S. & Ripley, S.D. 1983. *Handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka*. Compact edition. Oxford University Press, Delhi. pp. 737.
- Anderson, B. & Davner, L. undated. Japan "from palm-trees to pack-ice" a report on a trip to Japan in February/March 2002. <http://www.surfbirds.com/mb/trips/japan/japan-0402-ba.html> (Accessed 6 October 2013).
- Anon. 1977. *Zhonghua Renmin Gongheguo Fen Sheng Dituji (Hanyu pinyinban)*. Ditu Chubanshe, Beijing. 174 pp.
- Anon. 1983. *The birds of Northeast China*. Liaoning Science and Technology Press, Shenyang. pp. 605. [In Chinese.]
- Anon. 1985a. Results of the nationwide counts of waders in Japan 1. Annual changes in the species and numbers of waders (1973-1985). *Strix* 4: 76-87. [In Japanese.]
- Anon. 1985b. Results of the nationwide counts of waders and waterfowl conducted by the Wild Bird Society of Japan. *Strix* 4: 88-105. [In Japanese.]
- Anon. 1988. *Map of snow, ice and frozen ground in China*. China Cartographic Publishing House, Beijing.
- Anon. 2000. *Check-list of Japanese birds. Sixth revised edition*. Ornithological Society of Japan, Tokyo. 345 pp.
- Anon. 2007. *The interim report of the shorebirds census in Japan (winter 2006-07)*. The National Survey on the Natural Environment, Ministry of the Environment, Japan. [In Japanese.]
- Anon. 2009. *The interim report of the shorebirds census in Japan (winter 2008-09)*. The National Survey on the Natural Environment, Ministry of the Environment, Japan. 58 pp. [In Japanese.]
- Anon. 2013a. *Lianyungang*. <http://lianyungang.jiangsu.net> (Accessed 11 October 2013).
- Anon. 2013b. *Record cold snap grips Korean Peninsula*. <http://english.yonhapnews.co.kr/national/2013/01/03/67/0302000000AEN20130103005900315F.HTML> (Accessed 12 October 2013).
- Anon. undated. Bird checklist of the Lazovsky Nature Reserve. http://dersu.newhost.ru/english/reserves/nat-east-las_bird.htm (Accessed 9 October 2007).

- Antonov, A.** 2003. A shorebird census of Schastya Bay and the Amur estuary, Sea of Okhotsk, Russia from 6 August–21 September 2002. *Stilt* 44: 52–53.
- Austin, O.L.** 1948. The birds of Korea. *Bulletin of the Museum of Comparative Zoology*, Harvard 101: 1–301.
- Austin, O.L. & Kuroda, N.** 1953. The birds of Japan, their distribution and status. *Bulletin of the Museum of Comparative Zoology*, Harvard 109: 279–637.
- Babenko, V.G.** 2000. [*Birds of the lower Amur River*]. Prometej, Moscow. [In Russian.]
- Baker, E.C.S.** 1935. *The nidification of the birds of the Indian Empire*. Vol. IV. Taylor and Francis, London. 546 pp.
- Bamford, M., Watkins, D., Bancroft, W., Tischler, G. & Wahl, J.** 2008. *Migratory shorebirds of the East Asian–Australasian Flyway: population estimates and internationally important sites*. Wetlands International. <http://www.environment.gov.au/biodiversity/migratory/publications/shorebirds-east-asia.html> (Accessed 6 October 2013).
- Barter, M.** 2002. *Shorebirds of the Yellow Sea: importance threats and conservation status*. Wetlands International Global Series 9; International Wader Studies 12, Canberra, Australia. 104 pp.
- Barter, M., Tonkinson, D., Tang, S.X., Yang, X. & Qian, F.W.** 1997. Wader numbers on Chongming Dao, Yangtze estuary, China, during early 1996 northward migration and the conservation implications. *Stilt* 30: 7–13.
- Barter, M.A., Tonkinson, D., Lu, J.Z., Zhu, S.Y., Kong, Y., Wang, T.H., Li, Z.W. & Meng, X.M.** 1998. Shorebird numbers in the Huang He (Yellow River Delta) during the 1997 northward migration. *Stilt* 33: 15–26.
- Barter, M.A., Wilson, J.R., Li, Z.W., Li, Y.X., Yang, C.Y., Li, X.J., Liu, Y.F. & Tian, H.S.** 2000a. Northward migration of shorebirds in the Shuangtaizhekou National Nature Reserve, Liaoning Province, China in 1998 and 1999. *Stilt* 37: 2–9.
- Barter, M.A., Wilson, J.R., Li, Z.W., Dong, Z.G., Cao, Y.G. & Jiang, L.S.** 2000b. Yalu Jiang National Nature Reserve, North-eastern China – a newly discovered internationally important Yellow Sea site for northward migrating shorebirds. *Stilt* 37: 13–20.
- Barter, M.A., Li, Z.W. & Xu, J.L.** 2001. Shorebird numbers on the Tainjin Municipality coast May 2000. *Stilt* 39: 2–9.
- Barter, M.A., Du, J.J., Wang, H., Chen, Y.Q., Gao, Z.D., Cheng, H. & Li, C.R.** 2002. Shorebird numbers in the Yancheng National Nature Reserve during the 2001 northward migration. *Stilt* 41: 27–34.
- Barter, M. & Riegen, A.** 2004. Northward migration through Yalu Jiang National Nature Reserve. *Stilt* 46: 9–14.
- Barter, M.A., Riegen, A. & Xu, Q.** 2003. Shorebird numbers in Bohai Wan during northward migration. *Stilt* 44: 3–8.
- Barter, M. Gosbell, K., Cao, L. & Xu, Q.** 2005. Northward shorebird migration surveys in 2005 at four new Yellow Sea sites in Jiangsu and Liaoning Provinces. *Stilt* 48: 13–17.
- Beaman, M.** 2003. China in winter 18 November–6 December 2003. Tour report. Birdquest. [http://www.birdquest.co.uk/pdfs/report/CHINA%20\(WINTER\)%20REP%2003.pdf](http://www.birdquest.co.uk/pdfs/report/CHINA%20(WINTER)%20REP%2003.pdf) (Accessed 6 October 2013).
- Beaman, M.** 2005. Northern China, 10–27 May 2005. Tour report. Birdquest. [http://www.birdquest.co.uk/pdfs/report/CHINA%20\(NORTHERN\)%20REP%2005.pdf](http://www.birdquest.co.uk/pdfs/report/CHINA%20(NORTHERN)%20REP%2005.pdf) (Accessed 6 October 2013).
- Beaman, M.** 2006. China in winter 5 November–22/27 November 2006. Tour report. Birdquest. [http://www.birdquest.co.uk/pdfs/report/CHINA%20\(WINTER\)%20REP%2006.pdf](http://www.birdquest.co.uk/pdfs/report/CHINA%20(WINTER)%20REP%2006.pdf) (Accessed 6 October 2013).
- Birds Korea.** 2009. *Large-scale wetland reclamation of Song-Do tidal-flat approved*. <http://www.birdskorea.org/Habitats/Wetlands/Songdo/BK-HA-Songdo-Tidal-flat-reclamation-2009-03.shtml> (Accessed 6 October 2013).
- Birds Korea.** 2010. *The Birds Korea Blueprint 2010 for the conservation of the avian biodiversity of the South Korean part of the Yellow Sea*. Birds Korea. <http://www.birdskorea.org/Habitats/Yellow-Sea/YSBR/Downloads/Birds-Korea-Blueprint-2010.pdf> (Accessed 12 October 2013).
- Birds Korea.** 2013. *Proposed wind farm development in the Geum estuary*. http://www.birdskorea.org/Our_Work/Publications/Homepage-articles/BK-HP-Homepage-article-08.2013.shtml (Accessed 11 October 2013).
- Blokhin, A.Y.** 1998. Breeding wader populations on the marine coasts of north-eastern Sakhalin. *International Wader Studies* 10: 221–224.
- Boere, G.C.** 1976. The significance of the Dutch Waddenze in the annual life cycle of arctic, subarctic and boreal waders. Part 1. The functions as a moulting area. *Ardea* 64: 210–212.
- Brazil, M.A.** 1991. *The Birds of Japan*. Christopher Helm, London. 466 pp.
- Brazil, M.A.** 1992. The birds of Shuangtaizhekou National Nature Reserve, Liaoning Province, P.R. China. *Forktail* 7: 91–124.
- Brazil, M.** 2009. *Field guide to the birds of East Asia, Eastern China, Taiwan, Korea, Japan and Eastern Russia*. Christopher Helm, London. 528 pp.
- Buckley, L.** 2005. Important wetland may soon disappear, take endangered species with it. <http://www.worldwatch.org/node/40> (Accessed 6 October 2013).
- Caldwell, H.R.** 1932. Eastern Oystercatcher. *Hong Kong Naturalist* 3: 67–68.
- Caldwell, H.R.** 1935. A day with birds among the islands. *Hong Kong Naturalist* 6: 148–150.
- Caldwell, H.R. & Caldwell, J.C.** 1931. *South China birds*. Hester May Vanderburgh, Shanghai. 447 pp.
- Campbell, C.W.** 1892. A list of birds collected in Corea. *Ibis* 1892: 230–248.
- Cao, L., Barter, M. & Lewthwaite, R.** 2008. The declining importance of the Fujian coast, China, for wintering waterbirds. *Waterbirds* 31: 645–650.
- Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M. & Young, L.** 2001. *The avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong. 563 pp.
- CCICED** 2010. *Ecosystem issues and policy options addressing sustainable development of China's ocean and coast*. CCICED Task Force Report. China Council for International Cooperation on Environment and Development, Beijing. 61 pp. <http://lib-contentdm2.lib.sfu.ca/cdm/singleitem/collection/cciced/id/1292/rec/1> (Accessed 6 October 2013).
- Chandler, R.** 2009. *Shorebirds of the Northern Hemisphere*. Christopher Helm, London. 448 pp.
- Chang, J., Leung, D.Y.C., Wu, C.Z. & Yuan, Z.H.** 2003. A review on the energy production, consumption, and prospect of renewable energy in China. *Renewable & Sustainable Energy Reviews* 7: 453–468.
- Chang, J.C., Chieko, K., Liu, B.W. & Zhang, P.** 1995. *A field guide to the birds of Northeast China*. Heilongjiang Science and Technology Press. pp. 238. [In Chinese.]
- Chen, K.L., Li, Z.W., Barter, M., Watkins, D. & Yuan, J.** 1997. *Shorebirds survey in China (1997)*. Wetlands International-China Programme, Wetlands International-Oceania. 126 pp.
- Chen, S.H., Chang, S.H., Liu, Y., Chan, S., Fan, Z.Y., Chen, C.S., Yen, C.W. & Guo, D.S.** 2009. A small population and severe threats: status of the Critically Endangered Chinese crested tern *Sterna bernsteini*. *Oryx* 43: 209–212.
- Cheng, T.H.** 1966. [*China's economic fauna: birds*]. Science Press, Beijing. pp. 696. [In Chinese.]
- Cheng, T.H.** 1967. [*Distributional list of Chinese birds*]. Science Press, Beijing. pp. 1218. [In Chinese.]
- Cheng, T.H.** 1987. *A synopsis of the avifauna of China*. Science Press, Beijing. 1223 pp.
- China Coastal Waterbird Census Team.** 2009. *China coastal waterbird census report 9.2005 – 12.2007*. Hong Kong Bird Watching Society, Hong Kong. 152 pp.
- China Coastal Waterbird Census Team.** 2011. *China coastal waterbird survey report 1.2008 – 12.2009*. Hong Kong Bird Watching Society, Hong Kong. pp. 167.
- China Ornithological Society.** 2004. *China Bird Report 2003*. China Ornithological Society, Beijing.
- China Ornithological Society.** 2005. *China Bird Report 2004*. China Ornithological Society, Beijing.
- China Ornithological Society.** 2006. *China Bird Report 2005*. China Ornithological Society, Beijing.
- China Ornithological Society.** 2007. *China Bird Report 2006*. China Ornithological Society, Beijing.
- China Ornithological Society.** 2008. *China Bird Report 2007*. China Ornithological Society, Beijing.
- Cho, S.R., Kim, J.H., Kim, H.T. & Kang, H.Y.** 2001. The summer avifauna and status of breeding birds in Seosan A-B Reclamation area. *Korean Journal of Ornithology* 8: 11–22.
- Cho & Park** 1995. The study on winter monitoring of oystercatcher *Haematopus ostralegus osculans* in West Sea, Korea. <http://www2.kongju.ac.kr/srcho/paper/paper22.htm> (Accessed 6 October 2013).
- Choi, Y.B. & Jung, S.H.** 1995. Survey of the waders on the West coast of Korea with special reference to waders on Kwanghwal mudflat in Kimje, Collabuk Do. *Korean Journal of Ornithology* 2: 57–73. [In Korean.]

- Clark, A.H. 1910. Report on a collection of birds made by Pierre Louis Jouy in Korea. *Proceedings of the United States National Museum* 38: 147–176.
- Cramp, S. & Simmons, K.E.L. (Eds.). 1982. *The birds of the western Palearctic*. Vol. III. Oxford University Press, Oxford. 913 pp.
- Dare, P.J. & Mercer, A.J. 1974a. The white collar of the Oystercatcher. *Bird Study* 21: 180–184.
- Dare, P.J. & Mercer, A.J. 1974b. The timing of wing-moult in the Oystercatcher *Haematopus ostralegus* in Wales. *Ibis* 116: 211–214.
- David, A. 1872. Journal d'un voyage dans le centre de la Chine et dans Tibet Oriental. *Bulletin des Nouvelles Archives d' Museum* 8: 3–128.
- Davidson, N.C. 1984. How valid are flight range estimates? *Ringing & Migration* 5: 49–64.
- Delaney, S. & Scott, D. 2002. *Waterbird population estimates*. 3rd edition. Wetlands International Global Series 12. Wageningen, The Netherlands. 226 pp.
- Delaney, S. & Scott, D. 2006. *Waterbird population estimates*. 4th edition. Wetlands International, Wageningen, The Netherlands. 239 pp.
- del Hoyo, J., Elliott, A. & Sargatal, J. (eds). 1996. *Handbook of birds of the world*. Vol. 3. Lynx Editions, Barcelona. 827 pp.
- Dementiev, G.P. 1940. [*Materials on the avifauna of Koryak Land*]. Moscow. [In Russian.]
- Dement'ev, G.P. & Gladkov, N.A. 1969. *Birds of the Soviet Union*. Vol. III. Israel Program for Scientific Translations, Jerusalem. 756 pp.
- Ding, C.Q., Ding, W.N., Yin, Z.H., Zhang, Y.S. & Xu, Y.G. 2000. The breeding site and conservation of the Black-faced Spoonbill. *OBC Bulletin* 32: 14–16.
- Dorofeev, D.S. & Kazansky, F.V. (in press). Post-breeding stopover sites of waders in the estuaries of the Khalrusovo, Belogolovaya and Moroshechnya rivers, western Kamchatka Peninsula, Russia, 2010–2012. *Wader Study Group Bulletin*.
- Duckworth J. W & N. Moores. 2008. A re-evaluation of the pre-1948 Korean breeding avifauna: correcting a 'founder effect' in perceptions. *Forktail* 24: 25–47.
- Dugincev, V.A. & Pankin, N.S. 1993. List of birds of Upper and middle parts of Amur River area in the administrative border of Amur oblast. pp. 120–140 in *Ecology of upper part of Amur River region*. Blagoveschensk. [In Russian.] [quoted by Gerasimov 2006.]
- Durrell, S.E.A.LeV., Stillman, R.A., Caldow, R.W.G., McGroarty, S., West, A.D. & Humphreys, J. 2006. Modelling the effect of environmental change on shorebirds: a case study on Poole Harbour. *Biological Conservation* 131: 459–473.
- Edelsten, T. 2007. Photographs of *H.o. osculans*, Geum Estuary South Korea. http://orientalbirdimages.org/search.php?action=searchresult&Bird_ID=1203&Bird_Image_ID=27261&Bird_Family_ID=&p=3 (Accessed 6 October 2013).
- Edwards, P.J., Pertwee, N. & Garland, P. 2003. Birds recorded from the Rajin-Sonbong Free Economic and Trade Zone; Democratic People's Republic of Korea. *Korean Journal of Ornithology* 10: 25–50.
- Étchécopar, R.D. & Hüe, F. 1978. *Les oiseaux de Chine, de Mongolie et de Corée: non passereaux*. Les Éditions de Pacifique, Papeete, Tahiti. 586 pp.
- Fennell, C.M. 1961. Occurrence of the Oystercatcher and Curlew Sandpiper in Korea. *Condor* 63: 182–183.
- Firsova, L.V. & Levada, A.V. 1982. [Ornithological findings in the southern part of the Koryak Highland] *Ornithologia* (Moscow) 17: 112–118. [In Russian.]
- Flint, V.E., Boehme, R.L., Kostin, Y.V. & Kuznetsov, A.A. 1984. *A field guide to the birds of the USSR*. Princeton University Press, Princeton. 353 pp.
- Fu, T.S., Gao, W. & Song, Y.J. 1984. *Birds of the Changbai mountains*. Northeast Normal University Press. 513 pp. [In Chinese.]
- Gan, X.J., Cai, Y.T., Choi, C.Y., Ma, Z.J., Chen, J.K. & Li B. 2009. Potential impacts of invasive *Spartina alterniflora* on spring bird communities at Chongming Dongtan, a Chinese wetland of international importance. *Estuarine, Coastal and Shelf Science* 83: 211–218.
- Gao, Z.X. (ed.). 1989. *Zha Long Niao Lei*. China Forestry Publishing House. 278 pp. [In Chinese.]
- Gee, N.G. & Moffett, L.I. 1917. *A key to the birds of the Lower Yangtze Valley*. Shanghai Mercury, Shanghai. 221 pp.
- Gee, N.G., Moffett, L.I. & Wilder, G.D. 1948. *A tentative list of Chinese birds*. Peking Natural History Society, Peiping. 361 pp.
- Gerasimov, N.N., Sokolov, A.M. & Tomkovich, P.S. 1992. [Birds of the ornithological reservation 'Moroshechnya River', West Kamchatka.] *Russian Journal of Ornithology* 1: 157–208. [In Russian.]
- Gerasimov, N.N. & Gerasimov, Y.N. 1998. The international significance of wetland habitats in the lower Moroshechnaya River (West Kamchatka, Russia) for waders. *International Wader Studies* 10: 237–242.
- Gerasimov, Y. 2003. Shorebird studies in North Kamchatka from July 5–August 12 2002. *Stilt* 44: 19–28.
- Gerasimov, Y. 2004. Southward migration in 2003 of shorebirds at Penzhina River mouth, Kamchatka, Russia. *Stilt* 45: 33–38.
- Gerasimov, Y. 2005. The Penzhina River Estuary, Kamchatka, Russia – a very important shorebird site during southward migration. pp. 161–167 in Straw, P. (Ed.). *Status and conservation of shorebirds in the East Asian-Australasian Flyway*; Proceedings of the Australasian Shorebird Conference 13–15 December 2003, Canberra, Australia. Wetlands International Global Series 18, International Wader Studies 17. Sydney, Australia.
- Gerasimov, Y.N. 2006. [*Red Data Book of Kamchatka. Vol. 1. Animals*]. Petropavlovsk, Kamchatsky. [In Russian.] http://www.kamchatsky-krai.ru/red_book_kamchatka/birds/36_dv_kulik-soroka_1.htm (Accessed 6 October 2013).
- Gerasimov, Y., Artukin, Y., Gerasimov, N. & Lobkov, E. 1999. Status of shorebirds in Kamchatka, Russia. *Stilt* 34: 31–34.
- Gerasimov, Y.N. & Huettmann, F. 2006. Shorebirds of the Sea of Okhotsk: status and overview. *Stilt* 50: 15–22.
- Gill, R.E., Butler, R.W., Tomkovich, P.S., Mundkur, T. & Handel, C.M. 1995. Conservation of North Pacific shorebirds. *Wader Study Group Bulletin* 77: 82–91.
- Gizenko, A.I. 1955. [*Birds of Sakhalin Region (Oblast)*] Moscow. [In Russian.]
- Głowaciński, Z., Jakubiec, Z. & Profus, P. 1989. Materials for the avifauna of the Democratic People's Republic of Korea. Results of the Spring Expedition '87. *Acta Zool. Cracov.* 32: 439–494.
- Hachisuka, M. & Udagawa, T. 1951. Contribution to the ornithology of Formosa, Part II. *Quarterly Journal of the Taiwan Museum* 4: 1–180.
- Ham K.H. & Lee D.P. 1985. A preliminary study on the population of birds in the Kum River estuary. *Bulletin of the Korean Association for the Conservation of Nature* 7: 111–119. [In Korean.]
- Harris, M.P. 1967. The biology of Oystercatchers *Haematopus ostralegus* on Skokholm Island, S. Wales. *Ibis* 109: 180–193.
- Hartert, E. 1912–1921. *Die Vögel der paläarktischen Fauna*. Vol. II. Friedlander, Berlin. 931 pp.
- Harvey, W.G. 1990. *Birds in Bangladesh*. University Press, Dhaka. 188 pp.
- Hayman, P., Marchant, J. & Prater, T. 1986. *Shorebirds: an identification guide to the waders of the world*. Croom Helm, London. 412 pp.
- He, K.J. & Chang, H. 2005. Bird community and bird diversity in the Shantou coastal wetland, Guangdong. *Ecology and Environment* 14: 746–751. [In Chinese.]
- Hemmingsen, A.M. & Guildal, J.A. 1968. Observations on birds in North Eastern China, especially the migration at Pei-tai-ho beach. *Spolia Zoologica Musei Hauniensis* 28: 1–326.
- Hockey, P.A.R. 1996. *Haematopus ostralegus* in perspective: comparisons with other Oystercatchers. In: J.D. Goss-Custard (ed.), *The Oystercatcher*, pp. 251–285. Oxford University Press, Oxford.
- Hong, S.B. 2003. The avifauna of the Nakdong estuary. *Korean Journal of Ornithology* 10: 51–63.
- Hong Kong Bird Watching Society. 2013. Systematic list. *Hong Kong Bird Report* 2011: 62.
- Hori, M. 2008. Between-habitat interactions in coastal ecosystems: current knowledge and future challenges for understanding community dynamics. *Plankton and Benthos Research* 3: 53–63.
- Hori, M. & Noda, T. 2001. Spatio-temporal variation of avian foraging in the rocky intertidal food web. *Journal of Animal Ecology* 70: 122–137.
- Huang, Z.G., Huang, G.Y., Liu, J.B., Lin, Y.Y., Cai, K.F., Li Y.H. & Yang, W.H. 2004. The birds of Quanzhou Bay. In: Z.G. Huang (ed.), *Biodiversity on marine estuarine wetland*, pp. 252–298. Ocean Press, Beijing. [In Chinese.]
- Hüe, F. & Étchécopar, R.D. 1970. *Les oiseaux du Proche et du Moyen Orient de la Méditerranée aux contreforts de l'Himalaya*. Éditions Boubée, Paris. 948 pp.
- Huettmann, F. 2003. Shorebird migration on northern Sakhalin Island, Russia in early northern autumn 2002. *Stilt* 43: 34–39.
- Huettmann, F. 2004. Findings from the 'southward shorebird migration' expedition to Aniva Bay (Sakhalin Island) and Iturup (Kurile Islands), August 2003. *Stilt* 45: 6–12.
- Huettmann, F. & Gerasimov, Y.N. 2006. Conservation of migratory shorebirds and their habitats in the Sea of Okhotsk, Russian Far East, in the year 2006: state-of-the-art and outlook. *Stilt* 50: 23–33.

- Hulscher, J.B., Exo, K.M. & Clark, N.A. 1996. Why do Oystercatchers migrate? In: J.D. Goss-Custard (ed.), *The Oystercatcher*, pp. 154–185. Oxford University Press, Oxford.
- Huntley, B., Green, R.E., Collingham, Y.C. & Willis, S.G. 2007. *A climatic atlas of European breeding birds*. Durham University, RSPB and Lynx Edicions, Barcelona. 521 pp.
- Ijima, I. 1892. Notes on a collection of birds from Tsushima. *Journal of the College of Science Imperial University, Japan*. 5: 105–128.
- Ingram, C. 1909. The birds of Manchuria. *Ibis* 1909: 422–469.
- IUCN. 2013. 2013 IUCN Red List of Threatened Species. Version 2013.1. www.iucnredlist.org (Accessed 6 October 2013).
- Iwamura, T., Possingham, H.P., Chadès, I., Minton, C., Murray, N.J., Rogers, D.I., Treml, E.A. & Fuller, R.A. 2013. Migratory connectivity magnifies the consequences of habitat loss from sea-level rise for shorebird populations. *Proceedings of the Royal Society B* 280: 20130325. <http://dx.doi.org/10.1098/rspb.2013.0325> (Accessed 11 October 2013).
- Japan Wetlands Action Network (JAWAN). 2004. Background & update on wetlands in Japan, spring 2004. http://www.ramsar.org/forum/forum_japan_jawan_2004.htm
- Jin, L.K., Liang, Y., Zhang Y.W., Hu Y.G. & Wang, J. 1989. A survey of birds in Panjin wetland, Liaoning Province. *Transactions of the Liaoning Zoological Society* 7: 21–38. [In Chinese.]
- Johansen, H. 1961. Revised list of birds of the Commander Islands. *Auk* 74: 44–56.
- Jones, K.H. 1911. On some birds observed in the vicinity of Wei Hai Wei, North-East China. *Ibis* 1911: 657–695.
- Jourdain, F.C.R. 1935. Remarks. *Bulletin of the British Ornithologists' Club* 56: 86–88.
- Kawanabe, M., Ichida, N., Kanai, Y., Kawasaki, S., Fujimaki, Y. & Sato, F. 2002. Birds of Japan's disputed northern territories, the southern Kuril Islands. *Strix* 20: 79–100.
- Kim, H.C. & Won, P.O. 1994. Ecology of waterbirds on the Naktong River estuary, Korea. *Korean Journal of Ornithology* 1: 57–71. [In Korean.]
- Kim, H.C. & Yoo, J.C. 1997. Wintering waterbirds at Dongjin River estuary. *Bulletin of Korea Institute of Ornithology* 6: 47–53.
- Kim J.H., Park J.Y. & Yi J.Y. 1997. Spring and autumn avifauna of western coastal mudflat in Korea. *Journal of Korean Biota* 2: 183–205. [In Korean with English abstract.]
- Kim, J.S., Park, S.K. & Koo, T.H. 2007. Lead and cadmium concentrations in shorebirds from the Yeongjong Island, Korea. *Environmental Monitoring and Assessment* 134: 355–361.
- Kim, J.S. & Koo, T.H. 2008. Heavy metal concentrations in feathers of Korean shorebirds. *Archives of Environmental Contamination and Toxicology* 55: 122–128.
- Kistchinsky, A.A. 1968. [*Birds of the Kolyma highlands*]. Nauka, Moscow. 189 pp. [In Russian.]
- Kistchinsky, A.A. 1980. [*Birds of the Koryak highlands*]. Nauka, Moscow. 336 pp. [In Russian.]
- Kondratyev, A. Ya. 1995. [New record of Oystercatcher in the northern part of the Sea of Okhotsk]. *Information Material of the Working Group on Waders*. 8.
- Kozlova, E.V. 1961. [Far Eastern Oystercatcher *Haematopus ostralegus osculans*]. *Fauna of the USSR. Birds*. Vol. 2, issue 1, part 2: 294–296. Academy of Sciences of the USSR, Moscow & Leningrad. [In Russian.]
- Kunisue, T., Watanabe, M., Subramanian, A., Sethuraman, A., Titenko, A.M., Qui, V., Prudente, M. & Tanabe, S. 2003. Accumulation features of persistent organochlorines in resident and migratory birds from Asia. *Environmental Pollution* 125: 157–172.
- Kuroda, N. 1918. Notes on Corean and Manchurian birds. *Annotationes Zoologicae Japonenses* 9: 495–573.
- Kuwabara, K. & Nakagawa, T. 1995. Banding record of Oystercatcher *Haematopus ostralegus* in 1st winter plumage at TaKamatsu, Ishikawa prefecture, central Honshu, Japan. *Bulletin of the Japanese Bird Banding Association* 10: 88–98. [In Japanese.]
- LaTouche, J.D.D. 1892. On birds collected or observed in the vicinity of Foochow and Swatow in South-eastern China. Part II. *Ibis* 1892: 477–503.
- LaTouche, J.D.D. 1914. The spring migration at Chingwangtao in North-east Chihli. *Ibis* 1914: 560–586.
- LaTouche, J.D.D. 1921. Notes on the birds of North-East Chihli, in North China. Part III. *Ibis* 1921: 3–48.
- LaTouche, J.D.D. 1931–1934. *A handbook of the birds of eastern China*. Vol. II. Taylor and Francis, London. 566 pp.
- Lappo, E., Tomkovich, P., Syroechkovskiy, E. 2012. *Atlas of breeding waders in the Russian Arctic*. UF Ofsetnaya Pechat, Moscow. 448 pp.
- Lee, D.S., Honda, K., Tatsukawa, R. & Won, P.O. 1988. Heavy metal accumulation in the livers of waders in the Naktong estuary. *Bulletin of the Institute of Ornithology, Kyung Hee University* 2: 17–21. [In Korean.]
- Lee, H.S. 2004. The breeding and wintering population of Eurasian Oystercatcher, *Haematopus ostralegus osculans* at Yabu Island. pp. 153–159 in Rhim, S.J., Kim, J.S., Chung, O.S. & Park, S.J. (Eds.). *Proceedings of 2004 International Symposium on Migratory Birds, Gunsan, Korea, 2–3 December 2004*. The Ornithological Society of Korea.
- Lee, H.S., Yi, J.Y., Kim, H.C., Lee, S.W. & Park, W.K. 2002. Yabu Island, the important waterbird habitat on the west coast of Korea and its conservation. *Ocean and Polar Research* 24: 115–121.
- Lee, K.G., Ko, G.N., Jegal, G.M. & Joo S.G. 2008. The Birds, Field Works and Conservation Activities of 1004 Islands, Shinan-gun county. pp. 83–105 in Chae H-Y, Choi C-Y & Nam H-Y (Eds.). 2008. *Proceedings of the 2nd International Symposium on Migratory Birds* (October 2008, Changwon, Korea).
- Lee, K.S., Baek, U.K. & Yoo, J.C. 2002. Important wintering and migrating route for waterbirds on the intertidal mudflat of Mankyung River estuary. *Bulletin of the Korea Institute of Ornithology* 8: 1–7.
- Lee, W.S., Hur, W.H. & Rhim, S.J. 2001. Distribution characteristics of Black-faced Spoonbill *Platalea minor* in western coast of South Korea. *Korean Journal of Ecology* 24: 219–222.
- LeFevre, R.H. 1962. *The birds of northern Shantung Province, China*. 151 pp. Cyclostyled.
- Leven, M.R. 2005. Northeast China – May 2005. http://www.surfbirds.com/trip_report.php?id=722 (Accessed 6 October 2013).
- Li, D.Z.W. & Mundkur, T. 2004. *Numbers and distribution of waterbirds and wetlands in the Asia-Pacific region. Results of the Asian Waterbird Census: 1997–2001*. Wetlands International, Kuala Lumpur. 166 pp.
- Li, D.Z.W. & Mundkur, T. 2007. *Numbers and distribution of waterbirds and wetlands in the Asia-Pacific region. Results of the Asian Waterbird Census: 2002–2004*. Wetlands International, Kuala Lumpur. 225 pp.
- Li, P.Y., Yuan, J., Liu, L.J. & Fu, M.Z. 1999. Vulnerability assessment of the Yellow River Delta to predicted climate change and sea level rise. In: R.A. van Dam, C.M. Finlayson & D. Watkins (eds), *Vulnerability assessment of two major wetlands in the Asia-Pacific region to climate change and sea level rise*, pp. 7–73. Supervising Scientist Report 149, Supervising Scientist, Darwin.
- Liu, B.F. 2003. Waders and its conservation strategy in the coastal wetlands of Fujian Province. *Chinese Journal of Zoology* 38: 72–75. [In Chinese.]
- Liu, J.Q., Huang, R.H., Jin, Z.G., Wu, K.Q. & Sun, C.R. 2000. Bohai sea ice monitoring using satellite images. *Journal of Cold Regions Engineering* 14: 93–100.
- Livezey, B.C. 2010. Phylogenetics of modern shorebirds (Charadriiformes) based on phenotypic evidence: analysis and discussion. *Zoological Journal of the Linnean Society* 160: 567–618.
- Lobkov, E.G. 1986. [*Nesting birds of Kamchatka*]. Far Eastern Branch, USSR Academy of Sciences, Vladivostok. 306 pp. [In Russian.]
- Lobkov, E.G. 2001. Oystercatcher, Far Eastern subspecies. In: *Red Data Book of Russian Federation*. AST, Astrel, Moscow. [In Russian.] <http://www.biodat.ru/db/rb/rb.php?src=1&vid=321> (Accessed 6 October 2013).
- Long, A.J., Poole, C.M., Eldridge, M.I., Won, P.O. & Lee, K.S. 1988. *A survey of coastal wetlands and shorebirds in South Korea, spring 1988*. Asian Wetland Bureau, Kuala Lumpur. 163 pp.
- Lopez, A. & Mundkur, T. (eds). 1997. *The Asian Waterfowl Census 1994–1996. Results of the Coordinated Waterbird Census and an overview of the status of wetlands in Asia*. Wetlands International, Kuala Lumpur. 118 pp.
- Ma, M., Lu, J.J., Tang, C.J., Sun, P.Y. & Hu W. 1998. The contribution of shorebirds to the catches of hunters in the Shanghai area, China during 1997–1998. *Stilt*. 33: 32–36.
- Ma, Y.C. 1984. On the waders (Charadrii) of Harbin area, Northeast China. Paper presented at ICBP Asian Regional Conference, Sri Lanka. MS. 2 pp.
- Ma, Z.J., King, J., Tang, S.M. & Chen, J.K. 2002a. Shorebirds in the eastern intertidal areas of Chongming Island during the 2001 northward migration. *Stilt* 41: 6–10.
- Ma, Z.J., Tang, S.M., Lu, F. & Chen, J.K. 2002b. Chongming Island: a less important shorebird stopover site during southward migration? *Stilt* 41: 35–37.
- Maben, A.F. & Wiles, G.J. 1981. Nine new bird records for Guam and Rota. *Micronesica* 17: 192–195.
- Macfarlane, A.M. & Macdonald, A.D. 1960. *An annotated check-list of the birds of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong. 92 pp.

- MacKinnon, J., Verkuil, Y.I. & Murray, N.** 2012. *IUCN situation analysis on East and Southeast Asian intertidal habitats, with particular reference to the Yellow Sea (including the Bohai Sea)*. Occasional Paper of the IUCN Species Survival Commission No. 47. IUCN, Gland Switzerland and Cambridge, UK. 70 pp.
- Maclean, I.M.D., Austin, G.E., Rehlfisch, M.M., Blew, J., Crowe, O., Delany, S., Devos, K., Deceuninck, B., Günther, K., Laursen, K., van Roomen, M. & Wahl, J.** 2008. Climate change causes rapid changes in the distribution and site abundance of birds in winter. *Global Change Biology* 14: 2489–2500.
- Magsalay, P.M., Kennedy, R.S.** 2000. First record of the Eurasian Oystercatcher *Haematopus ostralegus* from the Philippines. *Forktail* 16: 175–176.
- Mann, C.F.** 2008. *The birds of Borneo. BOU Checklist* 23. British Ornithologists' Union, British Ornithologists' Club, Peterborough. 440 pp.
- Meier, A.W.** 2013. *Unusual cold in China and northeast Asia*. <http://chinadailymail.com/2013/02/01/unusual-cold-in-china-and-northeast-asia> (Accessed 12 October 2013).
- Meisse, W.** 1934. Die Vogelwelt der Mandchurei. *Abhandlungen und Berichte der Museen für Tierkunde und Völkerkunde zu Dresden* 18 (2): 1–86.
- Melville, D.S.** 1997. Threats to waders along the East Asian-Australasian Flyway. In: P. Straw (ed.), *Shorebird conservation in the Asia-Pacific region*, pp. 15–34. Australasian Waders Studies Group, Hawthorn East.
- Messersmith, D.H.** 1983. Birds observed on World Nature Association Field Trip to Northeastern China, 1983. 5 pp. Unpublished MS.
- Ministry of Environment, South Korea.** 2004. *1999–2004 Winter Waterbird Census*. Ministry of Environment and the National Institute of Environmental Research. 620 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2005. *2005 Winter Waterbird Census*. Ministry of Environment and the National Institute of Environmental Research. 418 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2006. *2006 Winter Waterbird Census*. Ministry of Environment and the National Institute of Biological Resources. 440 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2007. *2007 Winter Waterbird Census*. Ministry of Environment and the National Institute of Biological Resources. 448 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2008. *2008 Winter Waterbird Census*. Ministry of Environment and the National Environment Scientific Institute. 546 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2009. *2009 Winter Waterbird Census*. Ministry of Environment and the National Environment Scientific Institute. 546 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2010. *2010 Winter Waterbird Census*. Ministry of Environment and the National Environment Scientific Institute. 546 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2011. *2011 Winter Waterbird Census*. Ministry of Environment and the National Environment Scientific Institute. 546 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2012. *2012 Winter Waterbird Census*. Ministry of Environment and the National Environment Scientific Institute. 546 pp. [In Korean.]
- Ministry of Environment, South Korea.** 2013. *2013 Winter Waterbird Census*. Ministry of Environment and the National Environment Scientific Institute. 546 pp. [In Korean.]
- Moore, N.** 1999a. A survey of the distribution and abundance of shorebirds in South Korea during 1998–1999: interim summary. *Stilt* 34: 18–29.
- Moore, N.** 1999b. *National NGO Wetlands Report: Ramsar 1999*. Korean Wetlands Alliance. 142 pp.
- Moore, N.** 2002. Wetlands: Korea's most-threatened habitat. *Oriental Bird Club Bulletin* 36: 54–60.
- Moore, N.** 2006. South Korea's shorebirds: a review of abundance, distribution, threats and conservation status. *Stilt* 50: 62–72.
- Moore, N.** 2012a. *Support for proposed Incheon and Ganghwa tidal power-plants ebbs away*. <http://www.talking-naturally.co.uk/birds-korea-support-for-the-proposed-incheon-and-ganghwa-tidal-power-plants-ebbs-away> (Accessed 11 October 2011).
- Moore, N.** 2012b. *The distribution, abundance and conservation of avian biodiversity in Yellow Sea habitats in the Republic of Korea*. PhD thesis, the University of Newcastle, Australia. 322 pp.
- Moore, N. & Ju, Y.K.** 2007. Internationally important shorebird species at the Geum Estuary: southward migration, 2007. *Tattler* 7: 7.
- Moore, N., Ju, Y.K. & Kim, A.** 2007a. Birds Korea rapid assessment survey of oiled waterbirds, December 19th–20th 2007. http://www.bird-skorea.org/News/In_the_News/BK-IN-Oilspill-2007.shtml (Accessed 6 October 2013).
- Moore, N., Rogers, D., Koh, C.H., Ju, Y.K., Kim, R.H. & Park, M.N.** 2007b. *The 2007 Saemangeum shorebird monitoring program report*. BirdsKorea, Busan. 25 pp.
- Moore, N., Rogers, D., Kim, R.H., Hassell, C., Gosbell, K., Kim, S.A., Park, S.M.** 2008. *The 2006–2008 Saemangeum Shorebird Monitoring Program Report*. Birds Korea, Busan. 37 pp.
- Nechaev, V.A.** 1991. *Birds of Sakhalin Island*. USSR Academy of Sciences, Far-Eastern Branch, Vladivostok. pp. 746. [In Russian.]
- Nechaev, V.A.** 1998. Distribution of waders during migration at Sakhalin Island. *International Wader Studies* 10: 225–232.
- Nechaev, V.A.** 2000. Far Eastern Oystercatcher. In: Red Data Book of Sakhalin region. Yuzhno-Sakhalinsk. http://www.fauna.ru/redbook/red_info/02_072.htm (Accessed 6 October 2013).
- Nechaev, V.A.** undated. Nesting birds of the Kuril Islands. <http://artedi.fish.washington.edu/okhotskia/ikip/Info/birds.html> (Accessed 12 May 2009).
- Newell, J.** 2004. *The Russian Far East: a reference guide for conservation and development*. Daniel and Daniel, McKinleyville, California. 466 pp.
- NOAA.** 2009. 20th Century Reanalysis data provided by the NOAA/OAR/ESRL PSD, Boulder, Colorado, USA, from their Web site at <http://www.cdc.noaa.gov> (Accessed 14 May 2009).
- Oates, E.W.** 1883. *A handbook of the birds of British Burmah, including those found in the adjoining state of Karennee*. Vol. II. Porter, London. 493 pp.
- Oates, E.W.** 1902. *Catalogue of the collection of birds' eggs in the British Museum, London*. Vol. II. British Museum, London. 400 pp.
- Ogilvie-Grant, W.R. & LaTouche, J.D.D.** 1907. On the birds of the Island of Formosa. *Ibis* 1907: 254–279.
- Oh, H.S., Im, I.C., Kim, B.S., Kim, W.N.B. & Park H.S.** 2002. A study of the status of migrating shorebirds on major wetlands in Cheju Island Korea. *Bulletin of Korea Institute of Ornithology* 8: 9–25.
- Park, J-Y.** 2002. Current status and distribution of birds in Korea. Department of Biology, Kyung-Hee University, Korea. Unpublished doctoral thesis. 530 pp. [In Korean with English abstract.]
- Parkinson, C.L.** 2000. Variability of Arctic sea ice: the view from space, an 18 year-old record. *Arctic* 53: 341–358.
- Parkinson, C.L. & Cavalieri, D.J.** 2002. A 21 year record of Arctic sea-ice extents and their regional, seasonal and monthly variability and trends. *Annals of Glaciology* 34: 441–446.
- Pedersen, A., Nielsen, S.S., Thuy, L.D. & Trai, L.T.** 1998. The status and conservation of threatened and near threatened species of birds in the Red River Delta, Vietnam. *Bird Conservation International* 8: 31–51.
- Peters, J.L.** 1934. *Check-list of birds of the world*. Vol. II. Harvard University Press, Cambridge, Massachusetts. 401 pp.
- Piechocki, R.** 1958. Beiträge zur avifauna Nord- und Nordost-Chinas (Mandschurei). *Abhandlungen und Berichte aus dem Museum für Tierkunde in Dresden* 24: 105–203.
- Poussenkova, N.** 2007. The wild, wild East. East Siberia and the Far East: a new petroleum frontier? *Carnegie Moscow Center Working Papers* 4: 1–59.
- Prater, T., Marchant, J. & Vauorinen, J.** 1977. *Guide to the identification and ageing of Holarctic waders*. BTO Guide 17. British Trust for Ornithology, Tring. 168 pp.
- Pronkevich, V.V.** 1998. Migration of waders in the Khabarovsk region of the Far East. *International Wader Studies* 10: 425–430.
- Ramsar Convention Secretariat.** 2007. *Designating Ramsar sites: The strategic Framework and guidelines for the future development of the List of Wetlands of International Importance*. Ramsar handbooks for the wise use of wetlands. 3rd. Ed. Vol. 14. Ramsar Convention Secretariat, Gland, Switzerland. 114 pp.
- Ramsar Convention Secretariat.** 2008. Resolution X.22 Promoting international cooperation for the conservation of waterbird flyways. http://www.ramsar.org/pdf/res/key_res_x_22_e.pdf (Accessed 6 October 2013).
- Riegen, A., Vaughan, G., Woodley, K., Postill, B., Zhang, G.M., Wang, T. & Sun, D.Y.** 2006. The fourth full shorebird survey of Yalu Jiang National Nature Reserve, 13–23 April 2006. *Stilt* 50: 47–53.
- Ripley, S.D.** 1982. *A synopsis of the birds of India and Pakistan together with those of Nepal, Bhutan, Bangladesh and Sri Lanka*. Bombay Natural History Society, Bombay. 653 pp.
- Robson, C.** 2000. From the field. *OBC Bulletin* 31: 49–57.
- Robson, C.** 2001a. From the field. *OBC Bulletin* 33: 68–78.

- Robson, C.** 2001b. From the field. *OBC Bulletin* 34: 83–93.
- Robson, C.** 2002. From the field. *OBC Bulletin* 35: 83–93.
- Robson, C.** 2005a. From the field. *BirdingASIA* 4: 84–92.
- Robson, C.** 2005b. From the field. *Birding ASIA* 3: 77–85.
- Robson, C.** 2006. From the field. *BirdingASIA* 6: 92–96.
- Rogers, D.I., Moores, N. & Battley, P.** 2006. Northwards migration of shorebirds through Saemangeum, the Geum Estuary and Gomso Bay, South Korea in 2006. *Stilt* 50: 62–72.
- Rose, P.M. & Scott, D.A.** 1994. *Waterfowl population estimates*. IWRB publication 29. 102 pp.
- Round, P.D.** 2000. New bird records for Thailand 1989–1999. http://www.lamnaoprai.com/L_birdsrecord.htm (Accessed 23 May 2009).
- Ryang, Y.S., Yoo, J.C., Lee, S.H. & Chai, J.Y.** 2000. The Palearctic Oystercatcher *Haematopus ostralegus*, a natural definitive host for *Gymnophalloides seoi*. *Journal of Parasitology* 86: 418–419.
- Sai, D.J.** in press. *Shandong birds distribution and name list*.
- Sakhalin Energy Investment Co.** 2005. Red Data Book and migratory birds. Sakhalin II Phase 2 Project Environmental Impact Assessment Addendum. 65 pp. http://www.sakhalinenergy.com/en/documents/doc_lender_eia_15.pdf (Accessed 6 October 2013).
- Schnell, G.D. & Hellack, J.J.** 1978. Flight speeds of Brown Pelicans, Chimney Swifts, and other birds. *Bird-Banding* 49: 108–112.
- Schuckard, R., Huettmann, F., Gosbell, K., Geale, J., Kendall, S., Gerasimov, Y., Matsina, E. & Geeves, W.** 2006. Shorebird and gull census at Moroschechnaya Estuary, Kamchatka, Far East Russia, during August 2004. *Stilt* 50: 34–46.
- Seebohm, H.** 1890. *The birds of the Japanese Empire*. Porter, London. 386 pp.
- Sharpe, R.B.** 1896. *Catalogue of the Limicolae in the collection of the British Museum*. Trustee of the British Museum, London. 795 pp.
- Shaw, T.H.** 1936. The birds of Hopei Province. *Zoologia Sinica, Series B*. 15(1): 1–528.
- Shaw, T.H.** 1938. The avifauna of Tsingtao and neighbouring districts. *Bull. Fan Memorial Institute Biology, Zoo. Ser.* 8 (2): 133–222.
- Shi, Y.F., Zhu, J.W., Xie, Z.R., Ji, Z.X., Jiang, Z.X. & Yang, G.S.** 2000. Prediction and prevention of the impacts of sea level rise on the Yangtze River delta and its adjacent areas. *Science in China D* 43: 412–422.
- Shi, Z.R.** 1992. [Yellow Sea birds]. Jiangxi Publishers. 362 pp. [In Chinese.]
- Smythies, B. E.** 1953. *The birds of Burma*. 2nd Ed. Oliver and Boyd, Edinburgh. 668 pp.
- Snow, H.J.** 1897. *Notes on the Kuril Islands*. John Murray, London. 88 pp.
- Sohn, W.M., Ryang, Y.S., Chai, J.Y. & Lee, S.H.** 1998. Discovery of *Gymnophalloides seoi* metacercariae in oysters from islands in the West Sea known as habitats of palearctic oystercatchers. *Korean Journal of Parasitology* 36: 163–169.
- Sonobe, K.** 1987. *Endangered bird species in the Korean Peninsula*. The Museum of Korean Nature, Korea University, Tokyo and Wild Bird Society of Japan, Tokyo. 75 pp.
- Sowerby, A. de C.** 1943. Birds recorded from or known to occur in the Shanghai area. *Musée Heude Notes d'ornithologie*. 1: 1–212.
- St John, H.C.** 1880. *Notes and sketches from the wild coasts of Nippon with chapters on cruising after pirates in Chinese waters*. David Douglas, Edinburgh.
- Stanford, J.K.** 1937. The breeding of the Oystercatcher (*Haematopus ostralegus* subsp.) and other birds in the Bengal Sunderbunds. *Journal of the Bombay Natural History Society* 39: 867–868.
- Stegmann, B.** 1930. Die Vögel des dauro-mandschurischen Uebergangsbereiches. *Journal für Ornithologie* 78: 389–471.
- Stejneger, L.** 1885. Results of ornithological explorations in the Commander Islands and in Kamchatka. *Bulletin of the US National Museum* 29: 1–329.
- Styan, F.W.** 1891. On the birds of the Lower Yangtse basin. Part II. *Ibis* 1891: 481–510.
- Sun, S.D.** 1989. A survey of the birds of Dalian. *Transactions of the Liaoning Zoological Society* 7: 43–68. [In Chinese.]
- Sweet, P.R., Duckworth, J.W., Trombone, T.J. & Robin, L.** 2006. The Hall collection of birds from Wonsan, central Korea, spring 1903. *Forktail* 23: 129–134.
- Swinhoe, R.** 1871. A revised catalogue of the birds of China and its islands. *Proceedings of the Zoological Society of London* 2 May 1871: 337–423.
- Swinhoe, R.** 1875. Ornithological notes made at Chefoo (Province of Shantung, North China). *Ibis* 1875: 114–140.
- Talbot, G., Campion, C., Moran, N., Hammer, J. & Anderson, B.** 2004. Matsu–Taiwan (A Chinese Crested Tern Twitch), 2nd July–4th July 2004. <http://www.surfbirds.com/mb/trips/crested-tern-gt-0804.html> (Accessed 6 October 2013).
- Tang, S.X. & Wang, T.H.** 1995. *Waterbird hunting in East China*. Asian Wetland Bureau Publication No. 114. Kuala Lumpur. 33 pp.
- Thompson, P.M., Harvey, W.G., Johnson, D.L., Millin, D.J., Rashid, S.M.A., Scott, D.A., Stanford, C. and Woolner, J.D.** 1994. Recent notable bird records from Bangladesh. *Forktail* 9: 13–44.
- Thompson, P.M. & Johnson, D.L.** 2003. Further notable bird records from Bangladesh. *Forktail* 19: 85–102.
- Tomkovich, P.S.** 2003. List of wader species of Chukotka, northern Far East of Russia: their banding and migratory links. *Stilt* 44: 29–43.
- Tomek, T.** 1999. The birds of North Korea. Non-passeriformes. *Acta Zoologica Cracoviensia* 42: 1–217.
- Tordoff, A.W. & Eames, J.C.** 2001. New additions to the list of birds of Vietnam. *OBC Bulletin* 33: 37–38.
- Tristram, H.B.** 1885. On a small collection of birds from Korea. *Ibis* 1885: 194–195.
- Trivedi, V.** 2011. Photograph of *Haematopus ostralegus longipes*, Jamnagar, Gujarat, India taken on 30 December 2011. http://oriental-birdimages.org/search.php?p=11&Bird_ID=1203&Bird_Family_ID=&pagesize=1 (Accessed 6 October 2013).
- Von Hippel, D. & Hayes, P.** 2012. *Foundations of energy security for the DPRK: 1990–2009 energy balances, engagement options, and future paths for energy and economic redevelopment*. The Nautilus Institute, Berkeley, California. 297 pp. http://nautilus.wpengine.netdna-cdn.com/wp-content/uploads/2012/12/1990-2009-DPRK-ENERGY-BALANCES-ENGAGEMENT-OPTIONS-UPDATED-2012_changes_accepted_dvh_typos_fixed.pdf (Accessed 11 October 2013).
- Vaughan, G.** 2009. 10 years at Yalu Jiang National Nature Reserve. *Miranda Naturalists' Trust News* 73: 3–5.
- Vaurie, C.** 1965. *The birds of the Palearctic fauna: non-passeriformes*. Witherby, London. 763 pp.
- Wang, H.** 1993. Report of waterbird survey to Dongsha Island in August 1993. Unpublished report to WWF Hong Kong. 3 pp.
- Wang, T.H. & Tang, S.X.** 1990. *Survey of shorebirds and coastal wetlands in Shanghai. December 1989 to September 1990*. East China Waterbird Ecology Group, Shanghai. 63 pp.
- Wang, T.H., Tang, S.X., Sai, D.J. & Fu, R.S.** 1992. *A survey of coastal wetlands and shorebirds in Yellow River Delta, Shandong Province. Spring 1992*. East China Waterbird Ecology Study Group, Shanghai. 57 pp.
- Wang, Q.S., Ma, M. & Gao, Y.R.** 2006. *Fauna Sinica, Aves*. Vol. 5. Gruiformes, Charadriiformes and Lariformes. Science Press, Beijing. 632 pp. [In Chinese.]
- Wells, D.R.** 1999. *The birds of the Thai-Malay Peninsula*. Vol. 1. Non-passerines. Academic Press, London. 648 pp.
- Wetlands International** 2013. *Waterbird population estimates*. [http://wpe.wetlands.org/search?form\[species\]=oystercatcher&form\[population\]=&form\[publication\]=5](http://wpe.wetlands.org/search?form[species]=oystercatcher&form[population]=&form[publication]=5) (Accessed 6 October 2013).
- Wilder, G.D.** 1925. Migration notes. *The China Journal of Science and Arts* 3: 562–566, 603–606.
- Wilder, G.D. & Hubbard, H.W.** 1924. List of the birds of Chihli Province. *Journal of the North China Branch of the Royal Asiatic Society* 55: 156–239.
- Wilder, G.D. & Hubbard, H.W.** 1938. *Birds of Northeastern China*. Peking Natural History Bulletin 700 pp.
- Wildlife Institute of Heilongjiang Province.** 1992. *The avifauna of Heilongjiang*. China Forestry Publishing House. 398 pp. [In Chinese.]
- Wildlife Institute of Jilin Province.** 1987. *Jilinsheng yesheng dongwu tujian (Niao lei)*. 228 pp. [In Chinese.]
- Williams, M.** undated. *Checklist of the birds of Beidaihe birds* <http://www.drmartinwilliams.com/beidaihe-birding/beidaihe-list.html> (Accessed 6 October 2013).
- Williams, M.** 1986. *Report on the Cambridge Ornithological Expedition too China 1985*. 133 pp.
- Wilson, A.** 1999. Aleutian island expedition. Part 3. <http://www.oceanwanderers.com/Aleut.3.html> (Accessed 6 October 2013).
- Wilson, J.R. & Morrison, R.I.G.** 1981. Primary moult of Oystercatchers in Iceland. *Ornis Scandinavica* 12: 211–215.
- Won, P.O.** 1983. Bird population in the Nakdong estuary – assessment of ecological impact of Nakdong estuary barrage and land reclamation project. *Theses Collection, Kyung Hee University* 12: 67–84. [In Korean.]
- Won, P.O.** 1984. A preliminary assessment of bird population and species diversity on the Nakdong estuary and the Ju-nam reservoir in the south eastern part of the Korean peninsula. *Theses Collection, Kyung Hee University* 13: 99–117. [In Korean.]

- Won, P.O. 1986. Birds on the Nakdong estuary. *Bulletin of Institute of Ornithology, Kyung Hee University* 1: 1–37.
- Won, P.O. 1988. The population of waterfowl and waders wintering or staging on the Nakdong estuary (3). *Bulletin of Institute of Ornithology, Kyung Hee University* 2: 1–16.
- Won, P.O. 1990. A waterbird survey on the west coast of Korea. *Bulletin of Institute of Ornithology, Kyung Hee University* 3: 28–50. [In Korean.]
- Won, P.O. 1996. Checklist of the birds of Korea. *Bulletin of Korea Institute of Ornithology* 5: 39–58.
- Won, P.O. 2000. Checklist of the birds of Korea. *Bulletin of the Korean Association for the Conservation of Wildlife* 2: 145–161.
- Won, P.O. & Gore, M.E.J. 1971. *The birds of Korea*. Royal Asiatic Society, Korea Branch. Seoul. 450 pp.
- Wong, F.K.O. & Liang, Y. 1992. WWF Project:CN0032 (4527). Management Plan for *Larus saundersi*. Field survey of selected areas along the coast of Bohai Sea, People's Republic of China. Final Report. Unpublished MS. 46 pp.
- Wong, F.K.O. & Liang, Y. 1993. WWF Project CN0032. Management Plan for *Larus saundersi*. Field work in Shuangtaizhekou National Nature Reserve, Liaoning Province, PRC, 27 May 1993 to 2 June 1993. Final Report. Unpublished MS. 42 pp.
- Woo, Y.T., Lee, J.N. & Hur, W.H. 1997. Birds recorded in the Nakdong River estuary. *Bulletin of Korea Institute of Ornithology* 6: 21–24.
- Wu, Q. 2013. China relies on inter-tidal for 127MW boost. <http://www.windpowermonthly.com/article/1175202/china-relies-inter-tidal-127mw-offshore-boost> (Accessed 11 October 2012).
- Yang, G.J. 2000. Bohai sea ice conditions. *Journal of Cold Regions Engineering* 14: 54–67.
- Yang, H.Y. & Zhang, Z.W. 2006. Shorebirds wintering in northern Bohai Bay. *Stilt* 49: 3–6.
- Yang, H.Y., Chen, B. & Zhang, Z.W. 2008. Seasonal changes in numbers and species composition of migratory shorebirds in northern Bo Hai Bay, China. *Wader Study Group Bulletin* 115: 133–139.
- Yang, L., Holt, P. & Zhang, Z.W. 2007. Wintering records of Saunders's Gull in Bohai Bay, China. *Journal of the Yamashina Institute of Ornithology* 38: 100–103.
- Yang, R.Q., Yao, Z.W., Jiang, G.B., Zhou, Q.F. and Liu, J.Y. 2004. HCH and DDT residues in molluscs from Chinese Bohai coastal sites. *Marine Pollution Bulletin* 48: 795–805.
- Yang, Z., Wang, H., Saito, Y., Milliman, J.D., Xu, K., Qiao, S. & Shi, G. 2006. Dam impacts on the Changjiang (Yangtze) River sediment discharge to the sea: the past 55 years and after the Three Gorges Dam. *Water Resources Research* 42: W04407, doi:10.1029/2005WR003970.
- Yang, Z.G. (ed.). 1990. *Fauna of Zhejiang, Aves*. Zhejiang Science and Technology Publishing House. 461 pp. [In Chinese.]
- Yasunaga, G., Watahanabe, I., Prudente, M.S., Subramanian, A., Qui, V. & Tanabe, S. 2000. Trace element accumulation on waders in Asia. *Toxicological and Environmental Chemistry* 77: 75–92.
- Yen, C.W. & Shu, Y.M. 2002. Species diversity of birds in the Wujiang Estuary of Jinmen, Fujian Province. *Zoological Research* 23: 483–491. [In Chinese.]
- Yu, Y.T. & Cheng, W.K. 2004. Eurasian Oystercatcher in Deep Bay: the first record for Hong Kong. *Hong Kong Bird Report* 1999 & 2000: 181–184.
- Zhang, F.Y. & Yang, R.L. 1997. *Bird migration research of China*. China Forestry Publishing House, Beijing. 364 pp. [In Chinese.]
- Zhang, R.S., Shen, Y.M., Lu, L.Y., Yan, S.G., Wang, Y.H., Li, J.L. & Zhang, Z.L. 2004. Formation of *Spartina alterniflora* salt marshes on the coast of Jiangsu Province, China. *Ecological Engineering* 23: 95–105.
- Zhang, Y.W., Jin, L.K. & Liang, Y. 1991. A survey of the breeding habits of *Haematopus ostralegus*. *Chinese Wildlife (suppl.)*: 101–104. [In Chinese.]
- Zhang, Z.H., Zhu, M.Y., Wang, Z.L. & Wang J. 2006. Monitoring and managing pollution load in Bohai Sea, PR China. *Ocean & Coastal Management* 49: 706–716.
- Zhao, Z.J. (ed.). 1988. *The birds of Northeast China*. Liaoning Science and Technology Press, Shenyang. 605 pp. [In Chinese.]
- Zhao, Z.J. 1995. *A handbook of the birds of China*. Vol. 1. Non-passerines. Jilin Science and Technology Press, Changchun. 814 pp. [In Chinese.]
- Zhou, R.B., Zhu, L.Z., Chen, Y.Y. & Kong, Q.X. 2008. Concentrations and characteristics of organochlorine pesticides in aquatic biota from Qiantang River in China. *Environmental Pollution* 151: 190–199.
- Zhu, S.Y., Li, Z.W., Lu, J.Z., Shan, K. & Barter, M.A. 2001. Northward migration of shorebirds through the Huang He delta, Shandong Province, in the 1997–1999 period. *Stilt* 38: 33–38.

APPENDIX 1. NOTES ON THE DISTRIBUTION OF *HAEMATOPUS [OSTRALEGUS] OSCULANS*

RUSSIA

Chukotka

A sight record in July 1898 in the Anadyr estuary (Dement'ev & Gladkov 1969) is the only record (Tomkovich 2003).

Koryakia

On the northeast coast, L.A. Portenko recorded a pair of Oystercatchers at the mouth of the Apuka River on 12 July 1959 (Kistchinsky 1980), and 3 were recorded feeding on the mudflats of Geka Bay on 26 June to 4 August 1977 (Firsova & Levada 1982). There are no recent records from the east coast.

On the west coast of the Kamchatkan Peninsula Oystercatchers are most commonly found from the mouth of the Sopochynaya River to Podkagernaya Bay (Lobkov 1986), with a few in Penzhina Bay at the head of the Sea of Okhotsk (Gerasimov *et al.* 1999).

First arrivals in spring recorded between 3 and 9 May, with most birds passing the Moroshechnaya River in the first 10 days of May (Gerasimov *et al.* 1992) – the highest number on a single day being 195 – but occasional late flocks, e.g. 17 on 1 June (Gerasimov & Gerasimov 1998). In the first half of May 1990 about 400 individuals were observed migrating past Moroshechnaya (Gerasimov *et al.* 1992). On 6 June 1987 a total of about 200 oystercatchers (in groups of 5–15) were present along the coast to the north of the Moroshechnaya estuary (Gerasimov *et al.* 1992).

It is thought that there are no more than 250 pairs in the area up to 500 km north of the Moroshechnaya River (Gerasimov & Gerasimov 1998). Three pairs regularly breed on the shores of the Moroshechnaya estuary (Gerasimov & Gerasimov 1998). Nests with eggs have been found in early June, a pair with one chick on 16 July and a fledgling collected on 21 July (Dementiev 1940, Lobkov 1986).

The fact that only one bird was recorded at the Penzhina River mouth between 12 July and 10 August 2002 (Gerasimov 2003), and none recorded there between 11 August and 10 September 2003 (Gerasimov 2004, 2005), suggests an early departure after breeding. Southward migration at the Moroshechnaya River begins in August when up to five flocks each of 40–50 birds have been recorded on a single day along 6 km of coast, and birds are present through September (15–16 there on 29 September 1986) (Gerasimov & Gerasimov 1998). Schuckard *et al.* (2006) recorded Oystercatchers daily throughout the period 7–22 August 2004, with a maximum of 51 on 10 August. Dorofeev & Kazansky (2013) recorded 10–30 at the Khairusovo-Belogolovaya estuary between mid-July and late September. At the Moroshechnaya estuary they recorded 100 in mid-August 2011, 400 in late August/early September 2011 and 600 in early 2012.

Kamchatka

In East Kamchatka Oystercatchers were repeatedly recorded in Avacha Bay (Petropavlovsk-Kamchatski) in the 19th and early 20th centuries, with a breeding female collected on 17 June

1847 (Lobkov 1986). In the 1930s and 40s oystercatchers bred at Ossora Bay, a fledgling being collected there on 31 August 1931. Chicks were also recorded in 1936 and 1939 at Olga Bay, but thereafter there have been no breeding records from the east coast of Kamchatka., but one pair was recorded at Kronotskiy Nature Reserve, in June 1997 (Wilson 1999).

Lobkov (1986) records oystercatchers breeding on the west coast from Kambalnaya Bay northwards, but most are found in Koryakia (see above).

Magadan

Breeding recorded at the mouths of the Topolovka and Bulun Rivers (Kistchinsky 1968). Kondratyev (1995) reported five Oystercatchers from Ostrovnoy Bay on 11 July 1994, which from their behaviour were thought to be breeding, and on 12 July 1995 a pair at Pestraya Dresva Bay had a nest with three eggs.

Khabarovsk

Pronkevich (1998) recorded only single Oystercatchers at Turursky Bay in late June, early July and early September. Not recorded August/September 2002 at Schastya Bay and the Amur estuary (Antonov 2003).

Amur

Reported from the middle reaches of the Amur River but breeding not confirmed (Lobkov 2001), although thought probable (Babenko 2000).

Primorsky

Oystercatchers are repeatedly reported from the lower Amur, the Ussuri River basin and the coast of Primorsky but breeding has yet to be confirmed (Lobkov 2001). Recorded as a rare migrant at Lazovsk Nature Reserve (Anon. undated).

Sakhalin

A rare migrant, passing through in the second half of May-early June, and late July to early October, usually singly but occasionally in flocks of 3–5 (Gizenko 1955, Gerasimov & Huettmann 2006, Nechaev 1991). A maximum of 3 seen on 5–8 June 1990 and 30 May 1991 at Lososei Bay, southern Sakhalin (Nechaev 1998). A flock of 60 at Lunsky Bay, September 1990, and 4 at Dagi Bay, October 1998 (Sakhalin Energy Investment Co. 2005). Not recorded breeding by Blokhin (1998). Not recorded in northern Sakhalin, or at Aniva Bay, southern Sakhalin in August (Huettmann 2003, 2004), although one record of 60 in Lunsky Bay, northern Sakhalin (Lappo *et al.* 2012).

Komander Islands

Status uncertain. Dement'ev & Gladkov (1968) recorded it as a straggler, but noted that "according to Shul'pin [it] may have possibly nested there for many years". Johansen (1961) noted it as accidental, there being one record (22 May 1883), yet Anon. (2000) records it breeding there.

Kuriles

Collected (BMNH: 96.7.1.134) from the Kuriles in the late 1800s (Seebohm 1890, Snow 1897); recorded from Kunashir Island (Nechaev 2000). Dement'ev & Gladkov (1969) noted that it may breed, but not recorded breeding by Nechaev (undated). Very rare during migration (Gizenko 1995); it was not recorded in August 2003 on Iturup (Huettmann 2004), or in the southern Kuriles in July 1998 and 2000 (Kawanabe *et al.* 2002).

JAPAN

Seebohm (1890) regarded it as resident on the Japanese coast, and noted that it was present in Yezzo (Hokkaido), "but not in great abundance". Ijima (1892), however, recorded it as "abundant on Mitsushima", northern Tsushima, where he collected three specimens.

The Oystercatcher is a rare spring and autumn migrant and occasional winter visitor to Japan (Brazil 1991, Anon. 2000) being recorded from the south Kuriles, Hokkaido, Honshu, Shikoku, Tsushima, Tanegashima, and from Kikai Island, Okinoerabu Island, the Ryuku Islands (Okinawa, Miyako, Ishigaki, Iriomote) and Daito Islands (Minami-Daito). Most records are from southwestern Honshu and Kyushu (Brazil 1991).

Only small numbers (average 2–3) were recorded in spring and autumn in Japan between 1973 and 1985 (Anon. 1985a), Brazil (1991) describing a flock of 18 birds at Monbetsu, Hokkaido on 26 September 1985 as "exceptional". Five were counted on 29 April 1984, and 2 on 15 September 1984 (Anon. 1985b). A group of 54 at Funbashi, Honshu in February/March 2002 (Anderson & Davner undated).

Numbers have increased over the past two decades (Figure 1), with the majority of these in Tokyo Bay, e.g. on tidal-flats at Sanbanze, where up to 80 are present in winter (JAWAN 2004). The national January 2013 wader survey found 351 Far Eastern Oystercatchers (T. Moriya, Bird Research Japan email to D.S. Melville 11 October 2013).

NORTH KOREA

Specimen records 1897 and 8 May 1903 (Sweet *et al.* 2006). Tomek (1999) considers *osculans* to be primarily a spring migrant and breeding species along the west coast of North Korea, with only about four records from the east coast.

Glowaciński *et al.* (1989) reported three in Nampo, Taedog Bay on 18 April and five at Haeju (28–30 April). Edwards *et al.* (2003) recorded two Oystercatchers at Man-p'o, in the Rajin-Sonbong Free Economic and Trade Zone on 9 April 1996. Sonobe (1987) reports that it breeds on Tegam-do and Unmo-do, both of which are Sea Bird Breeding Protection Areas on the west coast.

SOUTH KOREA

Historical records include a pair from Chemulpo (Incheon) 6 September 1883, and a female from the Nakdong River near Fusan (Busan) 8 November 1885 (Clark 1910), and a male probably from near Inchon (Incheon) (Tristram 1885). Campbell (1892) collected a specimen from Seoul, and recorded it as "plentiful in spring and early summer along the Han River", and Kuroda (1918) collected one in April near Mokpo.

The status of the species in much of the twentieth century prior to the late 1990s is largely obscured by access restrictions to much of the coastal zone imposed throughout much of the period (and still enforced locally in 2009, e.g. at Song Do), and to a lack of survey coverage, compounded by the tidal-range that reaches 5 m in the southwest increasing to >9 m in the northwest. Few coastal sites were surveyed until the 1990s, and even fewer sites have been surveyed comprehensively, even at present. Although approximately 60 coastal wetlands are included by the Ministry of Environment (MOE) mid-winter survey in January (e.g. MOE 2004, MOE 2005, MOE 2006, MOE 2007, MOE 2008), many of these sites are counted irregularly if at all at other times of the year, and the sites do not include many of the small islands in the southwest known to be used by oystercatchers.

Based on improving access and growing survey effort towards the end of the twentieth century, following Long *et al.* (1988) and Kim *et al.* (1997), the Oystercatcher was described as an uncommon resident and common winter visitor to the west of the country (Won 1996, 2000). With the exception of the Geum estuary, where the majority are concentrated (see below), oystercatchers are now considered to be uncommon and locally distributed. Small wintering flocks and locally-breeding birds are presently most regular in Gyeonggi Bay (especially on mainland tidal-flats in or near to Incheon, and in the Deibu/Namyang Bay area, where up to 195 were first recorded by Kim *et al.* (1997), and also in the southwest, e.g. in the county of Shinan where there are many hundreds of small islands and tidal-flats, many of which even now remain unsurveyed (e.g. Lee *et al.*, 2008). In Shinan County, a total of 22 were counted at three locations from a commercial ferry between Bigeum Island and Mokpo City on 28 May 28 2009 (Birds Korea, unpublished data) – and none of these three locations are included in MOE mid-winter surveys. Probably low tens of pairs are also scattered along the south coast, e.g. in Haenam County in the southwest (where birds are present throughout the year), decreasing eastward. In the Nakdong Estuary in Busan, in the far southeast, between one and 10 birds occur annually throughout the non-breeding season, with e.g. 9 in January 2008 (MOE, 2008). The species is much scarcer along the east coast, where there is minimal tidal-range, few islands and almost no tidal-flats, with e.g. up to five wintering in the late 1990s at the Guryong Peninsula, and singles occurring irregularly northward on small beaches and headlands.

The Nakdong estuary is one of the better-surveyed coastal wetlands in South Korea, with a number of studies conducted there, both before and after construction of the estuarine barrage in the late 1980s (e.g. pp 101–107 in Moores 1999b). It was considered as a passage migrant in the Nakdong estuary by Woo *et al.* (1997). During surveys between 1982 and 1987, Won (1986, 1988) recorded 10 on 12 February 1984, three on 20 May 1984, and two on 9 May 1987, none was recorded in August or September 1987 (Won 1987), a situation broadly comparable to the present (see above), although it is now typically considered to be a scarce winter visitor to the site. In contrast, Kim & Won (1994) recorded only one during a 12 month study in 1992–1993. Between May 2002 and April 2003 Hong (2003) recorded two in November and one in March.

At the national level, Long *et al.* (1988) conducted pioneering survey work at several sites along the west and south coasts between 10 April and 6 June 1988, recording a total of 31–32 oystercatchers as “scattered individuals or pairs” along the west coast, with a flock of 25 birds at Kunsan (Gunsan) on 17 April. However, this survey effort covered a limited number of sites, many briefly and at neap tide, and it is believed that they missed significant numbers of waders (Moores 2006), which may have included some oystercatchers.

Won (1990) also surveyed some areas on the west coast in 1988/1989 and recorded a single oystercatcher in the Yongchong-do area, but none at Kanghwa-do (Ganghwa Island) or Asan Bay, and he recorded no oystercatchers during surveys of the west coast between May 1989 and April 1990. Kim & Yoo (1997) surveyed the Dongjin River estuary (Saemangeum)

between 20 October 1996 and 26 April 1997 and recorded a single oystercatcher on 12 April. Oh *et al.* (2002) recorded two Oystercatchers on Cheju (Jeju) Island in November and December 1998. Lee *et al.* (2002) surveyed the Mankyung (Mangyeung) estuary (Saemangeum) between October 1996 and April 1997 and recorded a single Oystercatcher on 21 October. Choi *et al.* (1995) recorded five oystercatchers in January and two in April during a two and a half years study at the Kwanghwal mudflat, Kimje, Collabuk (Ganghwal, Gimje, Jeollabuk), also at Saemangeum.

Wintering birds seem to have been concentrated around Gunsan for at least the past 25 years; Ham & Lee (1985) recorded 850 in the Geum estuary in December 1984. Moores (1999) surveyed coastal wetlands between April 1998 and February 1999, recording a maximum of 2,987 oystercatchers nationwide in the period 4 January–26 February 1999 (Table A), with 11 of these in the outer Mangyeung estuary and 2,896 in the main river channel of the Geum River (on 6 February). This survey did not include coverage of Yubu Island.

Oystercatchers roosting on Yubu Island in the Geum estuary were first counted monthly in 1999–2000 by Lee (2004) and Lee *et al.* (2002) (Table 9, main text), who also reported that more than 30 pairs nest on the Island. Counts were conducted of birds roosting on a single sand spit at high tide (Lee, 2004), and based on subsequent survey effort would likely have missed birds roosting at other sites, on adjacent islands and on the mainland of the Geum estuary (e.g. Rogers *et al.* 2006). Winter counts at the Geum estuary include a peak of 5,700 in January 2001 (Moores 2002), with *c.* 5,300 of these counted simultaneously at two well-separated roosts on Yubu, and the remainder counted the next day on the mainland. A count submitted to the MOE the same month was published as 2,500, with numbers recorded at Yubu in January between 2000 and 2004 ranging from only 300 in 2000, to 3,200 in 2002, and numbers on the mainland of the Geum estuary ranging from 3,964 in 1999 to zero in 2001 and 2002 (MOE 2004).

Subsequent counts conducted at the adjacent Saemangeum Estuary and Gomso Bay, an area with a large tidal-range (*c.* 7 m on spring tides), very wide tidal-flats and a complex morphology, conducted during northward migration between 2006–2008 required large teams of counters using both land-based count points and boats (Rogers *et al.* 2006; Moores *et al.* 2008). This level of survey effort recorded more shorebirds of most species including oystercatchers at these sites (see main account above), than other surveys, and suggests that much of the extreme variation in oystercatcher counts between years might be attributable to differences in survey effort and coverage.

In recent years, 1,070 were counted on Yubu Island in January 2007 (MOE, 2007), 2,240 in August 2007 (Moores & Ju 2007), 3,153 on 20 December 2007 (Moores *et al.* 2007 b), and 3,145 in January 2008, when the count area was expanded to include adjacent islets and roost sites (MOE 2008). Numbers of wintering oystercatchers reported nationwide by the annual mid-winter census between 2010 and 2013 range from a low of 2,062 in 2011 to a new high count of >8,300 in 2013, with Gomso Bay supporting 2,980 in 2012 and 1,940 in 2013 (MOE 2010–2013).

Table A. Counts of Far Eastern Oystercatchers in South Korea 1998–1999 (after Moores 1999).

13–25 April	29 April–11 May	14–27 May	12 August – 3 September	5–29 September	4 January– 26 February
162	6	104	18	369	2,987

CHINA

[Place names are given in the original spelling and pinyin (after Anon. 1977).]

'Manchuria'

Recorded as common and breeding in Manchuria by Gee *et al.* (1948), but it is unclear where in Manchuria the birds occurred, i.e. coastal Liaoning, inland, or both.

Stegmann (1930) saw two at the Bareja mouth on 30 May, and noted that Schrench had collected specimens from the Ussuri delta near Khabarovsk (20 July), and above Chingan (12 August). He concluded that the oystercatcher probably breeds in the middle reaches of the Amur. Meise (1934) also considered that it probably bred in the Middle Amur. It was not recorded by Piechocki (1958).

Heilongjiang

Meise (1934) noted that Jakowlew mentioned the frequent appearance of oystercatchers in spring and late summer, at Sungari and Harbin and claims that they were breeding in the area. Specimen collected from Harbin (Wildlife Institute of Heilongjiang Province 1992). Recorded from central Heilongjiang, including Harbin and the Songhua River area, where it is reported as scarce passage migrant by Zhao (1988), but Wang *et al.* (2006) record it as a summer visitor and Zhao (1995) reports it breeding there. Recorded as an uncommon breeding species in the Harbin area by Ma (1984). Recorded at Shi Shui Island, Qiqihar on 23 May (Messersmith 1983). An incubating bird photographed by Xu Songping at Da Jintou, Taikang, about 70–80 km south of Dorbod (Paul Holt *in litt.* 26 January 2011).

Jilin

One at Hunchun, Yanbian in May 1959 (Fu *et al.* 1984).

Recorded from Baichang, Changchun and the Songhua River area, being reported as a scarce passage migrant by Zhao (1988), and as a summer visitor by Wang *et al.* (2006), while Zhang (1995) records it breeding there.

One at Xianghai Nature Reserve on 13 June 2004 (Paul Holt *in litt.* 28 March 2009), three there 11 May 2005 (Leven 2005, M.R. Leven *in litt.* 2 November 2007), and five there in May 2005 (Beaman 2005).

Nei Mongol

Recorded in summer from Hulun Buir and Tongliao (Wang *et al.* 2006).

Liaoning

The type locality is Talien (Dalian) Bay, where it was recorded breeding (Swinhoe 1871).

One at Yingtzu (Yingkou) 8 May 1908 (Ingram 1909).

Reported from Dandong, Dalian, Yingkou, Jin Xian and Xingcheng, Fuxin, Jinzhou and inland at Dawa (Zhao 1988, 1995).

Regularly recorded on northward migration at Yalu Jiang National Nature Reserve (Table B). Most birds occur in the

central and western areas of the reserve (Q.Q. Bai, C.Y. Choi & D.S. Melville unpublished). Birds displaying in April 2002, and recorded breeding in April 2006 (P. Collins & D.S. Melville unpublished, Riegen *et al.* 2006). Six present 10 June 2004 (China Ornithological Society 2005), eight there 14–16 June 2005 (China Ornithological Society 2006), and 102 there 14 June 2010 (Q.Q. Bai unpublished). At least ten pairs breeding 2011 and 2012 (Q.Q. Bai, C.Y. Choi & D.S. Melville unpublished). 24 on 19 November 2006 (China Ornithological Society 2007). An exceptional winter record of two on 9 December 2007 foraging on unfrozen mudflats (Q.Q. Bai unpublished).

Seventy-five to the west of Yalujiang NNR in April/May 2005, and 70 along 30km of coast in northeastern Liaodong Wan 4/5 May 2005 (Barter *et al.* 2005).

Brazil (1992) recorded the first birds at Shuangtaizhekou on 20 April, and small numbers, ranging from 2–10+, were seen in both the east and west sections of the reserve throughout the summer with several nests found. Numbers built up in July with 50+ seen on 10 and 11 in the east reserve, and over 100 there on 24 July. At Shuangtaizhekou National Nature Reserve Barter *et al.* (2000a) recorded 36 and 38 birds in May 1998 and April 1999 respectively. 43 there 7 November 2007 (China Ornithological Society 2008), and four there 26–28 March 2005 (China Ornithological Society 2006). 1,250 on 13 August 2011 and 1,450 on 26 August 2012 (Q.Q. Bai & M. Zhang unpublished). 151 on 2 May 2013 included a considerable number in active primary moult (Y. Chen & D.S. Melville unpublished).

Four birds recorded from Xing-Ren Tuo, northern part of the Changhai archipelago in July 1999 (Ding *et al.* 2000).

Five adults at Xiazhuangzi 26 June and 27 in four flocks at Daling River 27 June 1992, when 2 chicks were seen (Wong & Liang 1992).

Hebei

LaTouche (1914, 1921) recorded it as “not commonly seen” in the vicinity of Qinhuangdao. Wilder & Hubbard (1924) recorded occasional sightings in August and September, but subsequently recorded it as a “rather rare summer resident” between March and September (Wilder & Hubbard 1938). One was at Beidaihe in July 1925, and “pairs of oystercatchers” were found at the Yang Ho estuary (Wilder 1925). Hemmingsen & Guildal (1968) suggested that it might breed near Beidaihe.

Its status apparently remains unchanged, Williams (undated) noting it as a rare migrant in early spring (April/May), and scarce/uncommon in early autumn. The high level of bird-watching activity at Beidaihe and Happy Island since the mid 1980s (Williams 1986) has resulted in a large number of records of Oystercatcher from this area, but records are usually of less than five birds, but occasionally up to about 10. At Happy Island, usually no more than five, but occasionally up to 25 (14 May 2001) (Paul Holt *in litt.* 25 October 2007); 20 there 28 September 2007 (China Ornithological Society 2008).

Three adults at Langwokou 19 June 1992, and a nest found at the Luan River mouth 20 June 1992, where a fisherman handed an egg to Wong & Yu (1992). Two adults at Xihe and 4 adults at Dongkan Island, 13 July 1992, and four adults Ge Island 14 July 1992 (Wong & Yu 1992). At Cangzhou two in May 2009, one in June 2008, and 111 in November 2011 (China Coastal Waterbird Census unpublished).

Table B. Counts of Far Eastern Oystercatchers at Yalu Jiang National Nature Reserve, Liaoning (after Barter & Riegen 2004 and Riegen *et al.* 2006).

13–23 April 2006	20–25 April 2004	2–9 May 1999	8–12 May 2005	16–23 May 2000
296	224	70	109	189

Up to two Oystercatchers were recorded (on migration) during two counts out of 30 during the period January–December 2004 at Nan Pu (Yang *et al.* 2008), but there were no winter records, although Eurasian Curlew *Numenius arquata*, Dunlin *Calidris alpina* and Grey Plover *Pluvialis squatarola* over-wintered despite a lot of broken ice around the coast, on the estuaries and salt pans (Yang & Zhang 2006).

Surveys of the Hebei coast in April and May revealed no Oystercatchers (Barter *et al.* 2003), but 12 in Leting County on 5 May 2007, and 13 at Xiangyun Forestry Farm, Leting County 1 October 2008 (<http://www.cnbird.com/index.asp>).

Seventy-five at Jingtangguan, Laoting 3–5 October – probably a provincial record (China Ornithological Society 2006).

Cheng (1967, 1987) and Wang *et al.* (2006) indicate Oystercatchers occurring inland in northwest Hebei, but provide no supporting information.

Tianjin

Recorded at Tanggu estuary on 7 June 1868 (David 1872).

Not recorded in May 2000 (M. Barter *in litt.* 24 March 2009, correcting Barter *et al.* 2001). Recorded as a “scarce bi-annual passage migrant”, with one to two birds in March, July, August and September (Paul Holt *in litt.* 25 October 2007).

One at Tanggu 19 September 2004 (China Ornithological Society 2005). One Tanggu 29 July 2005 (China Ornithological Society 2006). Two at Tanggu on 17 March and single birds there on 1 and 5 September 2006 (China Ornithological Society 2007). One at Beidagang Reservoir 1 May 2006 (<http://www.cnbird.com/index.asp>). One at Jingqu, Dagang 6 August 2007, and two at Beidagang Reservoir, Dagang on 21 October 2007 (China Ornithological Society 2008).

Shandong

Not recorded from Weih Hai Wei (Weihai) by Jones (1911). Shaw (1938) recorded it as a summer visitor, noting “it seems to be very rare”. Swinhoe (1875) reported Oystercatchers breeding near Chefoo (Yantai), a claim which frequently has been copied (e.g. LaTouche 1931–1934, LeFevre 1962, Cheng 1987), however the eggs collected were those of Ancient Auklet *Synthliboramphus antiquus* (Jourdain 1935).

It was not recorded during wader surveys of Laizhou Bay and Jiaozhou Bay in April/May 2004 (Barter & Xu 2004). 12 in Laizhou Wan on 29 December 2005, and eight there 18–19 February 2006 (China Ornithological Society 2006, 2007).

Wang *et al.* (1992) recorded a total of 130 Oystercatchers in the Yellow River Delta area between 10 April and 2 May 1992, and small numbers recorded there in June (Wong & Yu 1992). A total of 76 recorded at the Huang He delta in April/May 1997 (Barter *et al.* 1998). Counts in early-April (1999), late-April (1997) and early-May (1998) at the same sites in the Huang He delta (Zhu *et al.* 2001) suggest a reduction in numbers over the season (44, 15, 2 respectively), but whether this reflects movement of birds through the area or dispersal to local breeding sites is unknown. 41 at the Huang He delta in late April–early May 2002 (Barter *et al.* 2003, M.A. Barter *in litt.* 23 March 2009). Three at Kenli on 16 November 2008 (<http://www.cnbird.com/index.asp>).

294 in Jiaozhou Bay, Qingdao on 29 December – 131 at Hong Si Yan and 163 at Zhang Ge Zhuang. 167 near Hongshiya, Jiaozhou Bay on 30 December 2003 (Paul Holt *in litt.* 25 October 2007).

Sai (in press) records it from all coastal areas in the province.

Jiangsu

The northern area of the Jiangsu coast appears to be an

important site during both winter and summer. 200 at Linhongkou, Ganyu on 8 December 2007 (China Ornithological Society 2008). 2,000 there on 24 January 2010; 1,002 on 14 February 2011; 2,000 on 23 December 2012; 2,600 on 11 January 2013 and 2,600 on 14 February 2013 (Y.X. Han/China Waterbird Census unpublished). It is not known to breed in this area.

Breeds at the Yancheng National Nature Reserve, where it is also present throughout the winter. 51 at Xinyang Gang, Sheyang 3 October 2004 (China Ornithological Society 2005). 179 at Sheyang on 14 January and four there on 13–14 December 2005 (China Ornithological Society 2006, Paul Holt *in litt.* 25 October 2007). A total of 29 in the Reserve April/May 2001 (Barter *et al.* 2002), 73 there November/December 2003, and 45 there November 2006 (Beaman 2003, 2006). 15 at Shenyang saltworks 25 December 2006 (China Ornithological Society 2007).

Regularly recorded from Xiaoyangkou, Yangkou Town throughout the year, with 20 present on 19 October and 29 November 2008. 20 at Dayangkou, Changsha Town on 19 October 2008 (<http://www.cnbird.com/index.asp>). 145 at Rudong on 7 March 2010 and 235 on 15 August 2013 (China Coastal Waterbird Census unpublished). 145 at South Rudong on 1 April and 84 at North Rudong on 2 April 2013 (Chen Ying & D.S. Melville unpublished).

There were 52 Oystercatchers (including 8 juveniles) on the Dong Sha islands, off Yancheng in August 1993 (Wang 1993). South of Yancheng to the mouth of the Yangtze Barter *et al.* (2005) recorded only eight birds in late April 2005.

Shanghai

Sowerby (1943) recorded it from Wu-sung (Wusong). Wang & Tang (1990) undertook extensive surveys around Shanghai and Chongming Dao. No Oystercatchers were recorded at Chongming Dao during the winter (January/February) counts, but four were found on 13–14 April. Between 8 and 11 April a total of 16 was recorded from Shi-Dong-Kou and two sites in Nan Hui County.

At Chongming Dao four in mid-April 1990, but none 2 May 1990, one 25–31 March 1996 (Barter *et al.* 1997); two there in April 1997 (Chen *et al.* 1997), three there 9–13 April and two in 8–12 May 2001 (Ma *et al.* 2002a), but none in August 2001 (Ma *et al.* 2002b); three on 23 April 2007 (China Ornithological Society 2008).

Two at Binhai, Nanhui on 2 May 2006 (China Ornithological Society 2007). Two at Nanhui Dongtan 2 May 2006, and one there 9 September 2007 (<http://www.cnbird.com/index.asp>).

Zhejiang

Styan (1891) reported it as “not very abundant” in winter in the Lower Yangtze basin (which extended downstream to Hangzhou Bay), and Gee & Moffett (1917) regarded it as so rare that it is “not often met with”. Specimens collected from Dinghai, Daishan, Ningbo, Xiangshan and Lishui (Yang 1990). Reported by Yang (1990) to arrive in Zhejiang in October, with some birds overwintering, and northward migration starting from April, with the last birds leaving in mid May.

Two at Tanshan Islands, Xiangshan on 20 April 2004, and three at Jiushan Dao, Xiangshan on 29 July 2004 (China Ornithological Society 2005). One at Yangshan Harbour, Shengsi 6 May 2007 (China Ornithological Society 2008). Three Feishan Archipelago 7 August 2008, and two Yangshan Island 17 September 2008 (<http://www.cnbird.com/index.asp>).

Fujian

Not uncommon in winter around Foochow (Fuzhou) (La

Touche 1892). Recorded nesting at Haitan Dao by Caldwell (1932, 1935, Caldwell & Caldwell 1931).

A single bird at Xiamen airport 17 April 2002 (<http://www.cnbird.com/index.asp>) and 12 May 2003 (China Ornithological Society 2004). Two at Putian on 18–19 February 2006 (China Ornithological Society 2007), and three there 22 February 2006 (Robson 2006). 150 at Min Jiang estuary, Changle 7–8 August 2004 – possibly the highest ever count from SE China (China Ornithological Society 2005). Five at Fuqing Bay 22 March 2008, and two at Minjiang estuary 31 October 2008 (<http://www.cnbird.com/index.asp>). Two wintered at Xinghuawan, Putian December 2006–February 2007 (China Coastal Waterbird Census Team 2009).

Liu (2003) surveyed coastal wetlands in Fujian between January 1997 and April 2003 and recorded a maximum of 14 oystercatchers. At Quanzhou Bay, Huang *et al.* (2004) recorded only two oystercatchers on 26 November 2002 during surveys between December 2001 and January 2003. Small numbers occur Quanzhou Bay, with a maximum of 51 in December 2011; seven pairs recorded breeding there in 2011 (Z.H. Chen unpublished).

Yen & Shu (2002) recorded it in spring (4), summer (1) and winter (2) at the Wujiang Estuary on Jinmen Island in 2000/2001. Weiting Liu (*in litt.* 23 March 2009) notes that it is both resident and a winter visitor at Jinmen Island, with about 70 birds present in winter and less than 15 pairs breeding. At Matsu (Mazu) Oystercatchers are rare migrant and summer visitors, with probably less than five pairs breeding (Weiting Liu *in litt.* 23 March 2009).

Guangdong

Not uncommon in winter around Swatow (Shantou) (La Touche 1892), “fairly common” in winter (Gee *et al.* 1948).

One at Hengqing Dao, Zhuhai on 9 December 2005 (China Ornithological Society 2006), and one at Haifeng Nature Reserve 1 January 2009 (<http://www.cnbird.com/index.asp>). Not recorded from Shantou in the period October to December 2001 and 2003 (He & Chang 2005). One at Shenzhen in January 2009 (China Coastal Waterbird Census unpublished).

Hong Kong

A single bird on 9–10 December 2000 (Yu & Cheng 2004), and two (an adult and a juvenile) on 9 April 2009. Photographs of the latter two show that the birds were *osculans* (<http://www.hkbws.org.hk/BBS/viewthread.php?tid=7871>; <http://www.hkbws.org.hk/BBS/viewthread.php?tid=7863>). An immature on 6 December 2011 (Hong Kong Bird Watching Society 2013). The only previous record (one on 10 December 1958, Macfarlane & Macdonald 1960), was regarded as being doubtful by Carey *et al.* (2001) due to insufficient field notes.

Guangxi

Recorded as wintering by Wang *et al.* (2006), but no supporting information provided.

TAIWAN

Ogilvie-Grant & La Touche (1907) noted that “a few parties visit Apes’ Hill Creek”, Kaohsiung (Gaoxiong) in winter. During the Japanese occupation of Taiwan (1895–1945) the Oystercatcher became rare and Hachisuka & Udagawa (1951) had only one record from Tainan Prefecture.

Single birds have been recorded in winter (November–February) in recent years from Pei-kang Estuary, Yunlin, Tseng-

Wen estuary, Tainan, and from Tung-shih and Au-ku, Chiayi (Robson 2000, 2001 a, 2001b, 2002, 2005a, 2005b). 80 were present on Kinmen (Quemoy) Islands 27–29 January 2013 (W.H. Fang email to D.S. Melville 11 October 2013).

VIETNAM

One at Xuan Thuy Nature Reserve, Red River Delta on 27 November and 12 December 1999 (Tordoff & Eames 2001), also recorded there in December 1999 by Y.T. Yu and K. Swennen (Yu & Cheng 2004).

MALAYSIA

Sarawak

A single bird Bako–Buntal Bay 15 and 31 January and 4 November 2006, and 21 January and 1 February 2007, are the only records for Borneo (Mann 2008). Photographs taken of the bird confirm that it was *osculans* (Clive Mann *in litt.* 23 January 2008, Yeap Chin Aik *in litt.* 18 May 2009).

Peninsula Malaysia

[One apparently wintered on the Selangor coast 1992/1992, being seen periodically between 29 August and the first week of April (Wells 1999). Wells notes that “good views of the distribution of white on the primaries identified the bird as *H. o. longipes*”. The bird also had a prominent white throat band (D.R. Wells *in litt.* 5 April 2009, Chris Rose *in litt.* 7 May 2009). The occurrence of *longipes* so far to the southeast of its previously known range highlights the need for careful field observation before assigning a subspecific name to extralimital birds.]

MYANMAR

Oates (1883) recorded two specimens, one of which was taken in the Arrakan (Arakan) Region and noted that “*H. osculans* from China is similar to the Burmese bird in many respects”. This specimen is presumably that noted by Sharpe (1898) as collected on 15 January at “Naab River, Arakan” and from the Oates collection – this specimen (BMNH: 82.1.20.490) is in the Natural History Museum, Tring and is *osculans*. An annotation in the copy of Oates (1883) in the Alexander Library, Edward Grey Institute of Field Ornithology, University of Oxford by J.K. Stanford reads “looked for and not seen by me. S.F. Hopwood records it from near [China Bakin]. I found it breeding in the Sunderbunds [Bangladesh] with Fawcus (ICS) in April 1922, so it one day be found breeding in Arakan coast”. Smythies (1953) records two specimens, one from Arakan the other from Bassein.

PHILIPPINES

One mist-netted at Olango Island, 21 November 1992 (Magsalay & Kennedy 2000).

MICRONESIA

Photographs of an oystercatcher recorded on Guam 19 March 1980 – 21 March 1981 (Maben & Wiles 1981) confirm that it was *osculans*.

RECORDS FOR WHICH THE IDENTITY OF THE TAXON IS UNCERTAIN/UNKNOWN

Bangladesh

Although Harvey (1989) recorded Oystercatcher as a rare winter visitor, Thompson *et al.* (1994) regard it as a vagrant to Bangladesh, there being two recent records: one at Nilbaria north-east of Dubla island on the edge of the Sundarbans in March 1984, and two at the same site on 9 February 1987. Subsequently one was recorded at Patenga, Southeast Region on 8 February 2002 (Thompson & Johnson 2003). There have been no subsequent records (Sajahan Sorder *in litt.* 24 March 2009).

Stanford (1937) recorded a pair breeding in the Sunderbans in April 1922 but no specimen was collected and the subspecific identity of these birds is uncertain (Ripley 1982). A pair of Oystercatchers was seen at the same location in 1933–34 (Stanford 1937). It is uncertain which taxon occurs.

[Thailand

A possible record from Thailand was not adequately supported to be accepted (Round 2000. Phil Round *in litt.* 4 April 2009).]

APPENDIX 2. PROTECTION STATUS OF FAR EASTERN OYSTERCATCHER IN RANGE STATES AND TERRITORIES

State/Territory	Protection status
Russian Far East	Russian Red Data Book: 'Endangered'. Also listed in RDB for Khabarovsk region, Kamchatka and Sakhalin
China	Nationally protected as one of the 706 species of birds that are regarded as "beneficial or of important economic or scientific value" (announced on 1 August 2000)
North Korea	Not protected
South Korea	National Natural Monument
Japan	Hunting prohibited. Wildlife Protection and Hunting Law No. 32 1918
Taiwan	Not protected
Hong Kong SAR	Protected
Vietnam	Not protected
Peninsula Malaysia	Not protected
Myanmar	Protected
Sarawak	Protected
Philippines	Not protected
Micronesia (Guam)	Protected

APPENDIX 3. SITES OF INTERNATIONAL IMPORTANCE FOR FAR EASTERN OYSTERCATCHER (i.e. having more than 1% of the total population*)

Site	Country	Max. count	Season(s) of importance	Reference
Moroschechnaya River Estuary	Russia	1,000	N, S, B	Bamford <i>et al.</i> 2008
Geum Estuary (including Yubu Island)	South Korea	5,700	S, N, W	Bamford <i>et al.</i> 2008, Barter 2002
Gomso Bay	South Korea	2,980	W	MOE 2012
Namyang Bay	South Korea	220	W, S	Bamford <i>et al.</i> 2008 Barter 2002 This paper

APPENDIX 3 continued

Site	Country	Max. count	Season(s) of importance	Reference
Saemangeum	South Korea	249	N	Moores <i>et al.</i> 2008
Song Do, Incheon	South Korea	108	W	Birds Korea 2009
Sanbanze, Tokyo Bay	Japan	218	W	Anon. 2009
Kasai Kaihinkoen, Chiba	Japan	101**	N	Anon. 2007
Yalujiang National Nature Reserve, Liaoning	China	2,458	N, S, B	Bamford <i>et al.</i> 2008 Barter 2002 China Coastal Waterbird Census Team 2009, 2011 Q.Q. Bai C.Y. Choi D.S. Melville unpublished
Shuangtaizihkou National Nature Reserve, Liaoning	China	1,450	N, S, B	Bamford <i>et al.</i> 2008 Barter 2002 China Coastal Waterbird Census Team 2009, 2011 Q.Q. Bai unpublished
Cangzhou, Hebei	China	111	S	
Huang He National Nature Reserve, Shandong	China	130	N	Bamford <i>et al.</i> 2008 Barter 2002
Jiaozhou Bay, Qingdao, Shandong	China	945	W	P. Holt email 10 January 2008
Lianyungang, Jiangsu	China	2,600	W	China Coastal Waterbird Census unpublished
Yancheng National Nature Reserve, Jiangsu	China	200	S, W	Bamford <i>et al.</i> 2008 Barter 2002
Rudong area, Jiangsu	China	235	N	China Coastal Waterbird Census unpublished Y. Chen & D.S. Melville unpublished
Dong Sha, Jiangsu	China	120**	S	Bamford <i>et al.</i> 2008 Barter 2002
Min River Estuary, Fujian	China	150**	W	China Ornithological Society 2005

N = Northward migration

S = Southward migration

B = Breeding

W = Winter

*1% population threshold is 70 birds (Wetlands International 2013)

**There are limited data for several sites and it is uncertain whether they 'regularly' support (Ramsar Convention Secretariat 2007) such large numbers of oystercatchers.

