

SHOREBIRD MONITORING AT THE MAI PO INNER DEEP BAY RAMSAR SITE

1999-2000 REPORT

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Introduction

Systematic, long-term monitoring of waterfowl in the Mai Po and Inner Deep Bay Ramsar Site commenced in March 1998, coordinated by the Hong Kong Bird Watching Society under the auspices of the Conservancy Association and funded by the Agriculture, Fisheries and Conservation Department. Counts of shorebirds (also called waders) form one part of this programme, the other components being monthly counts of waterfowl in the area and surveys of ardeid nesting colonies. This report concerns the shorebird monitoring component.

Methodology

During spring and autumn migration shorebird migrants feed on the intertidal mudflats of Deep Bay and, at high tide, roost in the hinterland. The size and geographic layout of Deep Bay is such that it is not viable to count shorebirds when they are feeding in Deep Bay, except for a short period immediately after the tide has withdrawn past the two 'boardwalk' hides situated at the edge of the bay (facilities provided by the WWF-HK Mai Po Marshes Nature Reserve - see map 1 [*Ed.-available from HKBWS office*]). Consequently, counts need to be made during this relatively short window, but mainly during high tide when birds are roosting inland. Since the mid 1980s management activities at the Mai Po Marshes NR have generally ensured that there are suitable roosting areas on the reserve that allow counts to be made with a relatively high degree of accuracy for many species. Depending on the height of the tide, this high tide period when full counts can realistically be made lasts up to four hours, in addition to the time spent in the boardwalk hides.

However, on some days the tide does not reach a height sufficient to force birds to roost inland or even to move close to the boardwalk hides, which means that accurate counts cannot be made. Consequently, the census period is divided into 'blocks' of days long enough that a high tide sufficient to allow at least one count to be made was highly likely to occur, yet short enough to ensure that the majority of birds utilising the Bay during that season could be recorded.

Taking into account these factors the following schedule is used:

- 22 March to 17 May: one count in every block of three days
- 18-31 May: one count per week
- 1 June to 15 July: two counts per month
- 16 July to 4 November: one count per week

When possible, during late March and the whole of April, two counts are carried out in each block of three days. This is because turnover for some species may well be sufficiently great for such frequent counting to be required, and because on some days some species simply do not 'perform' and prove impossible to count accurately.

The equipment used consisted of 7x, 8x or 10x binoculars and a telescope with wide angle 32x or 50x eyepieces. The procedure for each count was as follows:

- count birds on the rising tide, beginning at a tidal height of around 1.5m.
- count birds roosting in Mai Po NR using a bicycle (essential to complete the count during the time available)
- count birds on the falling tide until such a time as counting is no longer possible due to distance from the observer

In some cases where counts were made on days with a relatively low early morning or late afternoon high tide, counts were made on the reserve prior to high tide where overnight roosts of waders were situated. Counts were carried out by the authors of this report.

When counting from the boardwalk hides at the edge of Deep Bay, the emphasis is on counting species that did not generally roost on the reserve or are difficult to count there, primarily smaller species such as the sandpipers, Broad-billed Sandpiper and Red-necked Stint, but also Bar-tailed Godwit. The sandpipers, stints and Broad-billed Sandpipers have roosted away from Mai Po NR for some years now, and appear to be fly up the Shenzhen River in the direction of Ma Tso Lung to an unknown roost site. In addition, however, and where possible, counts of species already counted on the reserve were also made as a method of checking or refining numbers, in particular Curlew Sandpiper which is usually the most numerous species and may constitute up to 50% of shorebirds present on any given date. Species that have a tendency to arrive *en masse* at the mudflat when the tide is falling are suitable for such counts; *Tringa* sandpipers, although numerous, generally behave differently arriving in small groups over a longer period of time, and can rarely be checked this way.

In addition to identification and counting, records were also made of birds carrying coloured leg-flags most of which were attached in Australia, and in autumn, where possible, birds were aged as adults, juveniles or first-summer birds.

Finally with regard to methodology, it should be noted that the provision through habitat management by WWF-HK of suitable roosting areas for shorebirds is essential to the success of this monitoring programme. At present, the great bulk of larger shorebirds roost within the reserve area, which means that using a bicycle on most days a single experienced observer can make an accurate count of the number of birds present. The distribution of birds during autumn 1999 and spring 2000 in ponds 1b, 8, 11 and 16/17 (see map 1) approaches the limit in terms of area that a single observer can comfortably cover at the lower tide levels.

As regards waders such as Red-necked Stint and Greater Sand Plover which at present do not generally roost on the reserve, these can generally be counted accurately on the falling tide; the falling tide cannot be relied on for the larger shorebirds, however. It is important to note that should significant roosts form elsewhere in the Deep Bay area in the future, then provision will need to be made to ensure that these birds are counted simultaneously with birds roosting at Mai Po in order to maintain the accuracy of counts and of the monitoring programme. Proposals to create further wader scrapes in the Deep Bay area must be viewed with this in mind. At present, it would appear that Mai Po Nature Reserve is providing adequate areas for those waders that wish to roost there. In addition, as far as is known, there are not significant numbers of shorebirds using Tsim Bei Tsui as a roosting area.

Results

Results of all wader counts are presented in full in Appendix 1. The previous report detailed the results of shorebird counts during autumn 1998 to spring 1999; this reports details those for autumn 1999 to spring 2000.

Autumn 1999

The peak count of all waders combined was 3168 on 21 October; however, it is likely that this count included a significant number of wintering waders, including 580 Kentish Plovers. The highest count of birds considered to relate primarily to passage migrants was 2508 on 27 September, which is lower than the figure for 1998 of 3331 on 19 September. With few data with which to compare these figures, it is not known whether such counts might be considered high, or whether they are regular.

Relatively high numbers of the following species were noted: Black-winged Stilt (maximum count 504, a new high), Greater Sandplover (350, a new autumn high), Ruff (10 - a new high), Asian Dowitcher (19, one short of the highest autumn count), Whimbrel (158), Marsh Sandpiper (833), Common Greenshank (716, high but not as high as noted last autumn), Terek Sandpiper (144 - 25 short of the highest autumn count).

Species for which the highest count was considered relatively low were Bar-tailed Godwit (nine) and Common Redshank (635 - the lowest autumn peak since 1990). Common Redshank is known to use Deep Bay as a moulting stagepost (D.S. Melville *pers. comm.*, WWF-HK bird-ringing data) and peak counts during 1991-97 ranged from 809 to 2471.

Winter 1999-2000

A minimum aggregate total of 12,114 waders was recorded wintering in Hong Kong, a figure approximately 2000 higher than the equivalent for the previous two winters. This figure is achieved by summing the peak counts of each species during the waterfowl counts of December, January and February. The bulk of birds, approximately 94%, comprised Pied Avocet (1758), Kentish Plover (3000), Grey Plover (309), Dunlin (2980), Black-tailed Godwit (454), Eurasian Curlew (755), Spotted Redshank (970) and Marsh Sandpiper (1165). The counts for Black-tailed Godwit and Marsh Sandpiper are the highest on record for this time of year.

Spring 2000

Spring shorebird passage during 2000 appeared to be relatively weak in terms of numbers (see Table 1.), though as this is only the third spring in which systematic counts have been carried out, it is perhaps a little early to be certain. The figure for the minimum number of birds passing through (the sum of peak counts for each species) was 13,174, approximately 10,000 lower than the equivalent for 1998, but very similar to the figure for 1999 (13,163). When some estimate is made of turnover, that figure becomes 16,479. Peak species counts were on the low side, and patterns of 'influx-decline-influx' that allow some estimate of turnover were less-marked. The reasons for this are unknown. The peak day count was 9931 on 16 April which is higher than the 7915 of 1999, but lower than the 11,127 of spring 1998, and other counts in previous years.

Relatively high peak spring counts were noted for Grey Plover (36), Red Knot (138 - the third highest count), Whimbrel (84), Common Redshank (1820), Marsh Sandpiper (1615 - the third highest) and Terek Sandpiper (400). Relatively low peak spring counts were noted for Greater Sand Plover (450), Spoon-billed Sandpiper (only four individuals were noted) and Asian Dowitcher (57).

Whereas in previous years pond 1b proved problematic with regard to counting waders because the bunds of the pond leaked and the sluice gate remained permanently open to allow flushing of water from Deep Bay, this was not the case in spring 2000. This meant that there was no gradual flight of waders to other areas of the reserve as the tide rose, and thus no effect on the accuracy of counts.

Summer

As is to be expected, the number of waders recorded during the summer was low, and the sum of peak counts for each species during June was 54, even lower than the 79 of summer 1999. The reason for such a low total may be that water levels at Mai Po NR were relatively high. It is likely that many of these were first-summer birds in moult.

Total numbers recorded

In an attempt to estimate the actual number of migrant waders that utilised the Mai Po and Inner Deep Bay Ramsar Site during the 12-month period from July 1999 to June 2000, the peak winter (defined as December to February) count obtained during winter waterfowl counts can generally be added to the estimated minimum number of birds passing through during the spring and autumn migration seasons (see Table 1). For some species, however, there is considered to be some overlap in individuals occurring in different seasons; consequently, such records (marked by a dash in table 1.) are excluded from the calculation.

With regard to the number of birds passing through during each migration season, this figure is arrived at by simply taking the peak daily count or by summing the number of 'new' birds between successive peaks and troughs where such a pattern was observed and where it was felt that such peaks included an element of newly-arrived birds. Birds present during the summer are not certainly different from some of those counted in spring or autumn, and so are not included in this calculation.

It can be seen that a minimum of 31,387 shorebirds utilised the Ramsar Site during the 12-month period from July 1999 to June 2000, very similar to the equivalent figure of 31,115 for July 1998 to June 1999. Of this total, 19,273 were migrant shorebirds recorded during autumn and spring migrations, with 16,479 occurring on spring passage. It should be noted that these are minimum figures; the spring total in particular probably underestimates the number of birds passing through as only minimum turnover rates have been assumed for some species and for others no turnover rate has been postulated.

Shorebird turnover rates in Hong Kong have yet to be determined; however, Howes and Bakewell (1989) quote studies using marked birds in Morocco and Malaysia as indicating that the total number of shorebirds using a given area during migration lies in the range 3-4.5 times the peak daily count. Using this as a basis for calculation, with peak day counts of 9,931 in spring and 2,508 in autumn, Deep Bay may have supported in the range 37,317 to 55,976 migrant shorebirds during 1999-2000.

Table 1. Estimate of the minimum number of shorebirds utilising Deep Bay during the 12-month period July 1999 to June 2000.

species	autumn peak	winter peak	spring peak	spring total	total
Black-winged Stilt <i>Himantopus himantopus</i>	504	-	185	185	689
Pied Avocet <i>Recurvirostra avosetta</i>	-	1758	-	-	1758
Oriental Pratincole <i>Glareola maldivarum</i>	2		4	9	11
Little Ringed Plover <i>Charadrius dubius</i>	11	118	-	-	129
Kentish Plover <i>C. alexandrinus</i>	-	3000	4	4	3004
Lesser Sand Plover <i>C. mongolus</i>	8	1	74	74	83
Greater Sand Plover <i>C. leschenaultii</i>	350	1	450	528	879
Pacific Golden Plover <i>Pluvialis fulva</i>	56	67	320	320	443
Grey Plover <i>P. squatarola</i>	-	309	36	36	345
Grey-headed Lapwing <i>Vanellus cinereus</i>		1			1
Great Knot <i>Calidris tenuirostris</i>	19	4	234	243	266
Red Knot <i>C. canutus</i>	11	-	138	138	149
Sanderling <i>C. alba</i>			4	6	6
Red-necked Stint <i>C. ruficollis</i>	-	-	1062	1841	1841
Temminck's Stint <i>C. temminckii</i>		8			8
Long-toed Stint <i>C. subminuta</i>	2	3			5
Sharp-tailed Sandpiper <i>C. acuminata</i>	1		40	60	61
Curlew Sandpiper <i>C. ferruginea</i>	37		3800	4810	4847
Dunlin <i>C. alpina</i>	1	2980	2	2	2983
Spoon-billed Sandpiper <i>E. pygmeus</i>			3	4	4
Broad-billed Sandpiper <i>Limicola falcinellus</i>	21	5	85	157	14
Ruff <i>Philomachus pugnax</i>	10	1	3	3	3
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>		-	3	3	3
Asian Dowitcher <i>L. semipalmatus</i>	19		57	57	76
Black-tailed Godwit <i>Limosa limosa</i>	37	454	760	760	1251
Bar-tailed Godwit <i>L. lapponica</i>	9		16	16	25
Little Curlew <i>Numenius minutus</i>			1	1	1
Whimbrel <i>N. phaeopus</i>	158	1	84	84	243
Eurasian Curlew <i>N. arquata</i>	20	755	-	-	775
Far Eastern Curlew <i>N. madagascariensis</i>			4	6	6
Spotted Redshank <i>Tringa erythropus</i>	91	970	938	1637	2698
Common Redshank <i>T. totanus</i>	635	152	1820	1820	2607
Marsh Sandpiper <i>T. stagnatilis</i>	7	1165	1615	1615	2787
Common Greenshank <i>T. nebularia</i>	716	247	726	1043	2006
Nordmann's Greenshank <i>T. guttifer</i>			28	35	35
Green Sandpiper <i>T. ochropus</i>	4	26	-	-	30
Wood Sandpiper <i>T. glareola</i>	63	20	6	10	93
Terek Sandpiper <i>Xenus cinereus</i>	144		400	640	784
Common Sandpiper <i>Actitis hypoleucos</i>	4	67			71
Grey-tailed Tattler <i>Heteroscelus brevipes</i>	15		207	267	282
Ruddy Turnstone <i>Arenaria interpres</i>	3		64	64	67
Red-necked Phalarope <i>Phalaropus lobatus</i>	16		1	1	17
NUMBER OF SPECIES	34	29	38	38	42
TOTAL NUMBER OF BIRDS	2974	12,114	13,174	16,479	31,386

Note: a dash indicates that birds were recorded, but are not thought to comprise different individuals to those in other seasons.

Regionally important numbers

Carey and Young (1999) listed a number of wader species for which Mai Po and Deep Bay held, or possibly held, regionally important numbers during five-year periods in the 1990s. Regionally important is defined as 1% of the flyway or regional population (criteria 3c for determining a wetland of international importance), and the latter is based on population estimates contained in Rose and Scott (1997). (As the figure for Spotted Redshank appears to be on the low side, the next higher population level is used). These species are listed in Table 2, as are the percentages of the regional population of each estimated to have occurred in the Ramsar Site during the course of July 1998 to June 1999.

Table 2. Species recorded in regionally important numbers in Deep Bay during July 1999 to June 2000.

species	flyway/regional population#	number recorded	percentage
Black-winged Stilt <i>H. himantopus</i>	10,000-100,000	690	0.69-6.9%
Pied Avocet <i>Recurvirostra avosetta</i>	10,000-25,000	1758	7.0-17.6%
Kentish Plover <i>C. alexandrinus</i>	25,000-1,000,000	3004	0.3-12.0%
Greater Sand Plover <i>C. leschenaultii</i>	99,000	879	0.89%
Grey Plover <i>P. squatarola</i>	25,000-100,000	345	0.35-1.38%
Curlew Sandpiper <i>C. ferruginea</i>	471,000	4847	1.03%
Dunlin <i>C. alpina</i>	25,000-1,000,000	2983	0.30-11.9%
Eurasian Curlew <i>N. arquata</i>	10,000-100,000	775	0.78-7.8%
Spotted Redshank <i>Tringa erythropus</i>	25,000-100,000*	2698	2.69-10.8%
Marsh Sandpiper <i>T. stagnatilis</i>	90,000	2787	3.1%
Common Greenshank <i>T. nebularia</i>	40,000	2006	5.0%
Nordmann's Greenshank <i>T. guttifer</i>	1000	35	3.5%
Terek Sandpiper <i>Xenus cinereus</i>	25,000-1,000,000	784	0.08-3.14%

figures from Rose and Scott (1997) apart from that marked * whose population estimate is one class higher

Threatened species

With regard to species listed in Collar *et al.* (1994), the following were recorded (population figures from Rose and Scott 1997):

- Grey-headed Lapwing: listed as Near-threatened, one bird out of an estimated east Asian (excluding the discrete Japanese population) wintering population in the range 10,000 to 25,000 was recorded.
- Spoon-billed Sandpiper: listed as Vulnerable, the population is estimated at 2000-2800 pairs. A relatively low total of four individuals are estimated to have occurred during the 12-month period, all in spring.
- Asian Dowitcher: listed as Near-threatened, the world population is estimated to be 15,000-20,000 birds. At least 57 birds passed through during the period under consideration, a relatively low figure.
- Nordmann's Greenshank: listed as Endangered (i.e. facing a very high risk of extinction in the wild in the near future), the world population is estimated to be 1000 birds. A total of 35 birds during spring passage continues the improvement on the total for 1998, which was the poorest showing since representative records of this species' occurrence began in 1987.

Other observations

The regular observations brought a series of records of leg-flagged birds during spring passage (Appendix 2) [Ed.-available from HKBWS office]. These records have been sent to the Australia Wader Studies Group which organises the leg-flagging programme involved.

Appendix 3 lists records of birds that were assigned to a age [Ed.-available from HKBWS office]. As this is only the second time that such systematic ageing has been carried out, little can be said about these figures at the present time.

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