BIRDS AND HUMANS IN HARMONY: A SUSTAINABLE MANAGEMENT SCHEME IN LONG VALLEY

BIRD MONITORING PROGRAMME

Programme 2006/07	Autumn	September - November 2007

Summary Report – Autumn 2007 (September to November)

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1. Background

1.1. The Environmental and Conservation Fund (ECF) supports a Hong Kong Bird Watching Society's project: Birds and Human in Harmony – A sustainable Management Scheme in Long Valley, which aim to enhance conservation value especially for birds through a management agreement (MA) scheme between the Hong Kong Bird Watching Society (HKBWS) and a local farming community since December 2005.

1.2. The aim of this project is to demonstrate that conventional farming operation could benefit wildlife in particular to wild birds with specific management practices and adoptions. Effectiveness of the management practices is reflected by utilization of birds in the area and the regular Bird Monitoring Programme records this data.

1.3. This report presents results of the bird monitoring programme conducted in autumn 2007 (i.e. September to November).

2. Methodology

2.1. The Bird Monitoring Programme consists of regular bird surveys in the Long Valley area. The study area covers the whole Long Valley area confined by a drainage channel lying on west, north and east and Yin Kong Village on the south.

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2.2. The survey was conducted by following a standard transect to obtain comparables and complete coverage of all farmlands in the shortest time. Total surveying time maintains at about 3.5 hours in the morning.

2.3. Two surveys per week were scheduled in autumn 2007 in order to capture a more detailed pattern of bird utilization in Long Valley area during this migration season. A total of 26 surveys were conducted and the schedule is as follows:

2007 September: 3, 6, 10, 13, 17, 20, 26, 28;
2007 October: 1, 4, 8, 11, 16, 19, 22, 25, 29;
2007 November: 1, 5, 9, 13, 15, 19, 22, 26, 28.

2.4. Two surveyors who accredited by HKBWS recorded all wild birds in numbers and species with the specific number to each field in the whole study area.

3. Results

3.1. Bird numbers in the Long Valley area increased over the course of autumn 2007 from more than 300 birds in the early September to near 600 birds in November. An exceptional high count of 1,089 (excluding the number of feral Rock Doves) was made on 9 November and this is not only the highest count of bird present in the area since the commencement of this project, but also the first time to exceed 1,000 individuals. By this count, a total of 60 species of bird was also recorded and this is a new high figure of bird species present in the Long Valley area. The total number of species recorded at Long Valley in this autumn was 105. Details are shown in Figure 1.

Table 1. Numbers in each count, monthly average figures with SD of birds counted at Long Valley, autumn 2007 and average figures (with SD) in autumn 2006.

	September	October	November
Numbers of bird counted	312, 323, 286, 313, 338, 266, 454, 416	362, 413, 525, 599, 497, 437, 518, 636, 493	526, 526, 1089, 494, 665, 672, 601, 680, 405
Autumn 2007: Mean (SD)	339 (64)	498 (86)	629 (196)
Autumn 2006: Mean (SD)	352 (76)	465 (137)	559 (94)

	Autumn 2006	Autumn 2007	
All counts lumped	463 (133, n = 26)	494 (174, n = 26)	t = -0.733, df = 50, P = 0.467

3.2. Although average figures of each month and the whole autumn are higher than the same ones of previous year, there has no significant difference among two autumns (P > 0.05). We cannot show in statistics that more birds utilize the Long Valley area in this autumn than in the previous autumn, but the trend is seemingly increasing with the highly fluctuated numbers of birds present in the area (see Figure 1).

3.3. Details of species diversity expressed in Shannon index *H'* are shown in appendix 1. The mean figure of the index in autumn 2006 and 2007 is 2.81 (SD: 0.17) and 3.05 (SD: 0.26) and there is a significant different among these two years (Mann-Whitney Rank Sum Test, T = 910.000, P < 0.001), indicating that the diversity is higher in autumn 2007.

Managed area

3.4. In the period of autumn 2007 the HKBWS managed a total of 370,200 sq.ft. and the Conservancy Association (CA) managed a total of 608,960 sq.ft. and so the total managed area in the Long Valley was 979,160 sq.ft. The total area in Long Valley is 2,500,000 sq.ft. and hence the unmanaged area in this autumn was in 1,520,840 sq.ft. Comparing to the previous season, a total of 17,000 sq.ft. of farmland had been returned to unmanaged area because one of the management agreement contract on farmland margin was terminated.

3.5. Mean figures with SD of the bird's number in the managed and unmanaged fields are shown in Table 2. The result is clear that in this autumn the bird's numbers per unit area has no significant difference on the managed and unmanaged fields (Mann-Whitney Rank Sum Test, T = 646.000, P = 0.437).

Table 2. Mean (SD) of the numbers of birds in all managed and unmanaged fields per unit area in autumn 2006, winter 2006-07, spring, summer and autumn 2007.

	Autumn 2006	Winter 2006-07	Spring 2007	Summer 2007	Autumn 2007
Managed	26.9 (12.1)	17.2 (8.1)	9.3 (6.4)	6.7 (3.5)	19.0 (9.5)

fields					
Unmanaged fields	14.7 (4.3)	18.0 (4.1)	14.4 (5.9)	4.1 (2.2)	20.3 (6.4)

Dry Agricultural Lands

3.6. The dry Agricultural Lands are still maintained with planting Flowering Chinese Cabbage from mid-September. The crop started flowering in October and seeds were formed in early November, but it wilted in late November. Field 74 and 102 were used as control for comparison of this farming practice and these two fields were also maintained as dry agricultural lands with planting lettuces.

3.7. During this autumn the mean number per unit area in DAL fields is significantly higher than in the control fields (Mann-Whitney Rank Sum Test, T = 809.000, P = 0.03,), but the difference among two autumns (2006 and 2007) was not significant (Mann-Whitney Rank Sum Test, T = 683.500, P = 0.93). Details are referred to table 3. This result still shows that the managed DAL is still more effective to attract birds than the control fields.

Table 3. Mean (SD) of the counts of the birds in the dry agricultural land and its control per unit area.

	Autumn 2007	Autumn 2006
Managed fields	3.8 (5.2)	4.2 (5.1)
Control fields	1.1 (1.6)	1.1 (2.5)

Wet Agricultural Lands

3.8. Most of the Water Chestnuts and Chinese Arrow-heads planted in the summer 2007 started to wilt during this autumn. Water level and bunds of the fields (i.e. field 242 and 257) were still maintained suitable for birds, e.g. about 2.5 cm depth of water and removal of weed on bunds and in the fields. These crops were planted in lower density in this year.

3.9. Field 241 was used as control to compare the effectiveness of this farming practice to field 242, but it is managed as wet agricultural resumption area by CA. This makes the comparison is less contrast due to in similar farming practices. Hence, field 243 and 246 are now selected for the comparison of bird abundance to show the effectiveness of the WAL farming practices. Field 243 and 246 are now planted with Water Cress and so these fields are also wet.

The total area of these control fields was in 17,550 sq.ft. This comparison is aimed to show the difference between the attractiveness of Water Cress (active farming practice) to planting of Water Chestnut and Chinese Arrow-head (less active farming practice).

3.10. Mean number per unit area in WAL is significantly higher than the control fields (Mann-Whitney Rank Sum Test, T = 1007.00, P < 0.001) and also higher than the mean figure of the previous autumn (Mann-Whitney Rank Sum Test, T = 485.000, P < 0.001). Details are referred to table 4. Result indicates that the less active farming practice could attract more birds to utilize the area that might be related to the level of human disturbance and openness of the habitats. The fields planted with Water Cress are usually covered totally by this crop. Moreover, the low density of crops also can increase the bird's utilization of the field because the density of crops was higher in the previous autumn.

Table 4. Mean (SD) of the counts of the birds in the wet agricultural land and its control per unit area.

	Autumn 2007	Autumn 2006
Managed fields	11.2 (5.8)	5.0 (4.9)
Control fields	1.3 (2.0)	2.5 (2.5)

3.11. In addition, the wetland resumption area (field 241) also has significantly high bird utilization than in the control (Mann-Whitney Rank Sum Test, T = 978.000, P <0.001, mean (SD) = 9.64 (10.28)). This result also indicates that this farming practice managed by CA could also attract birds into this field.

Wet Agricultural Land (during migratory period)

3.12. During this migration season more fields were managed to provide more area for migratory birds. This management exercise was also done in the previous autumn and the same fields (i.e. 238q, 280, 281, 284, 285a and 288) were managed for this additional WAL practice. These fields were planted with Water Spinach since the beginning of this season and Water Cress in November. The total area of this additional WAL is 50,000 sq.ft and field 282, 283, 285b, 289 farmed with planting Water Spinach too were selected as control for comparison the bird's utilization and the total size of all these control fields is 51,500 sq.ft. These fields were also selected as control for comparison of the last year's dataset.

3.13. Mean number of the birds in this additional WAL fields was significantly higher in this autumn than in the previous autumn and also to the control fields (2006 autumn VS 2007 autumn: Mann-Whitney Rank Sum Test, T = 490.500, P < 0.001; Managed VS Control: Mann-Whitney Rank Sum Test, T = 960.000, P < 0.001). Details are referred to table 5. These results indicate that the management practice is more successful to attract birds in this autumn. In this autumn these farmlands were ploughed to increase the openness of the fields and the birds were attracted into these fields. It is also speculated that plough of the farmlands might provide extra food to the birds and it is worthwhile to find out in the future.

Table 5. Mean (SD) of the counts of the birds in the additional wet agricultural land and its control per unit area.

	Autumn 2007	Autumn 2006
Managed fields	4.9 (4.2)	1.2 (1.5)
Control fields	0.8 (2.5)	0.3 (0.4)

Shallow Water Habitat

3.14. In autumn 2007 the total area of the Shallow Water Habitat (SWH) remained the same to the spring 2007, i.e. in 127, 200 sq.ft. including the field 176, 177, 224, 225, 226, 227, 229, 238e, 238l and 238p. The control fields were field 173, 174 and 232 and all were in 77,100 sq.ft. Water depth of the SWH fields was maintained in 1-5 cm that is suitable for small-sized waterbirds, e.g. Wood Sandpiper and *Gallinago* snipes. Bunds of these fields were also maintained and vegetation inside the fields was partly removed to provide open area. The fields were also ploughed over the autumn.

3.15. Mean number of birds in SWH was significantly higher than the control in this autumn (Mann-Whitney Rank Sum Test, T = 1003.000, P < 0.001), but the mean figure in autumn 2007 was significantly lower than the same figure in 2006 (Mann-Whitney Rank Sum Test, T = 534.000, P = 0.005). This is because birds were attracted to the newly opened shallow water habitat (especially those turned from abandoned field) last year and the result this year showed the attractiveness of this habitat is decreasing. Details are shown in table 6.

Table 6. Mean (SD) of the counts of the birds in the shallow water habitat and its control per unit area.

	Autumn 2007	Autumn 2006
Managed fields	4.6 (4.9)	7.8 (5.5)
Control fields	0.4 (0.3)	2.1 (1.8)

Farmland Margin

3.16. Tomatoes were still planted in the field to demonstrate the effectiveness of this exercise. In this autumn tomato was planted in mid October but it could only grow slowly and finally fruit in late November. The total area for this practice in this season was reduced to 248,200 sq.ft. because of termination of a management contract of 17,000 sq.ft. Some of this area was also used for other management practices and the area of this farming practice used for the following data analysis is only 131,000 sq.ft. and the area of control fields is in 117,664 sq.ft.

3.17. Mean number of birds in the FM fields of autumn 2007 is significantly lower number than the mean of autumn 2006 (Mann-Whitney Rank Sum Test, T = 797.000, P = 0.049), contrasting to no significant difference to the control (Mann-Whitney Rank Sum Test, T = 663.000, P = 0.641). Details are shown in table 7. Although it seems to have fewer birds than the previous year, the effectiveness of this farming practice to attract the birds is less straightforward to demonstrate because the effective area of this practice is small and birds could also be attracted into the field by other factors, such as openness and wetness of the fields.

Table 7. Mean (SD) of the counts of the birds in the farmland margin and its control per unit area.

	Autumn 2007	Autumn 2006
Managed fields	7.6 (5.6)	9.8 (5.1)
Control fields	7.9 (8.5)	18.3 (17.8)

Plough of farmlands

3.18. This management programme has been implemented at Long Valley for more than one year. Many results are encouraging from effectively increasing the bird's number in the fields under the specific management practices, such as wet agricultural lands and shallow water habitats. Since then, results also indicated that the attractiveness of the managed fields to the birds would become fewer. The same management would not have the same effectiveness

over time.

3.19. Plough of farmlands has been conducted in some SWH and WAL fields. Besides the field 176 and 177 (data are combined to show in figure 5), all fields could show that this practice can easily increase the bird's utilization to the fields and bird numbers were usually increased considerably and quickly after the plough of the fields and details are shown in figure 5.

3.20. However, the effectiveness of this practice could not be so prominent in the second plough which is shown in the trial in field 238q, 280 and 281. The second plough could only attract fewer birds than the first plough on the same fields. Nevertheless, this practice is easy and in low cost and so it is worthwhile to continue in the management practices later on.

4. Discussion

4.1. Three new species were found in the Long Valley area: Grey Plover, Dunlin and Grey Bushchat. These make the species number recorded at Long Valley to reach to 145. General speaking, the new highest counts of both bird number and species were recorded in this autumn and the bird diversity of Long Valley seems to improve after the commencement of this management programme.

4.2. However, the difference between managed and unmanaged fields is not significant in this autumn but obviously that the managed fields have fewer birds compared to the previous autumn. This may reflect that the same management practice undertaken after a certain period might be less attractive. Plough of farmlands in this autumn shows that it could increase the attractiveness of the fields and so on the bird's utilization to that fields. Such small but useful practices to increase attractiveness of the fields to the birds should be taken into consideration for future management practices.

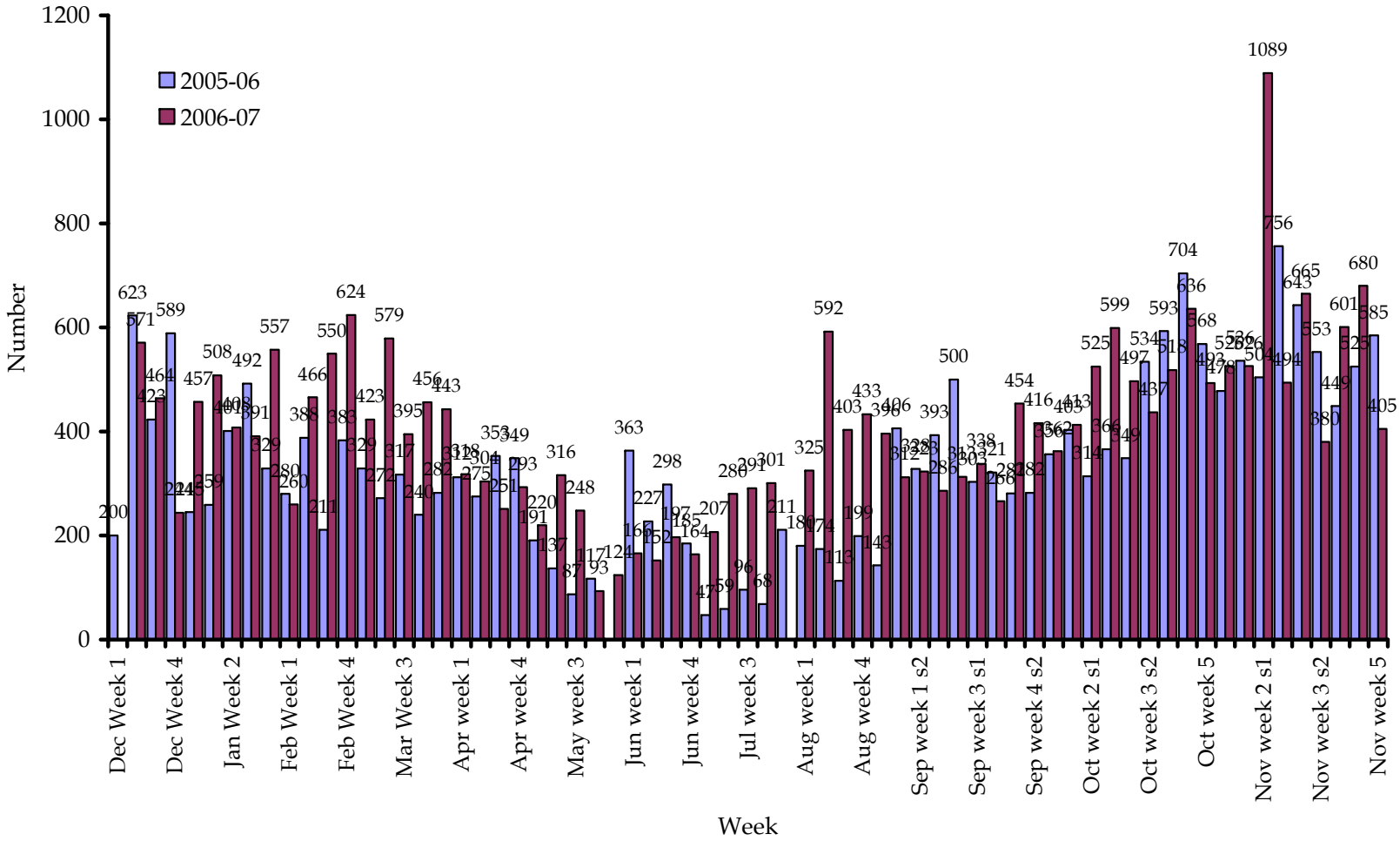

Figure 1. Total numbers of birds recorded in Long Valley, December 2005 to November 2007. Note: Survey was conducted once per week from December 2005 to August 2007 and twice per week in September to November 2006 and 2007.

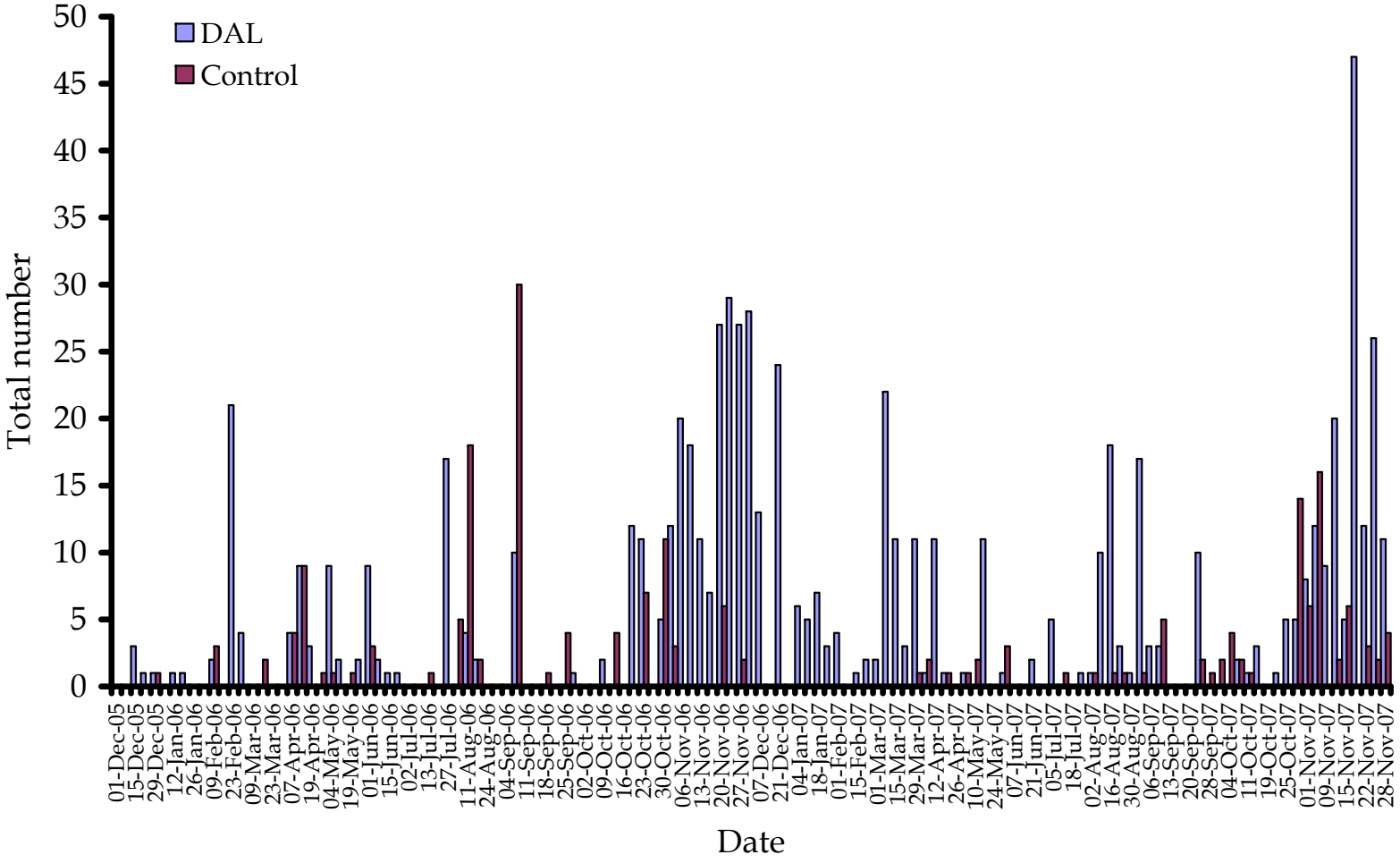

Figure 2. Total numbers of birds recorded in Dry Agricultural Lands (DAL) in Long Valley, Dec 2005 to Nov 2007. Note: Survey was conducted once per week from Dec 2005 to Aug 2007 and twice per week in Sep to Nov 2006 and 2007.

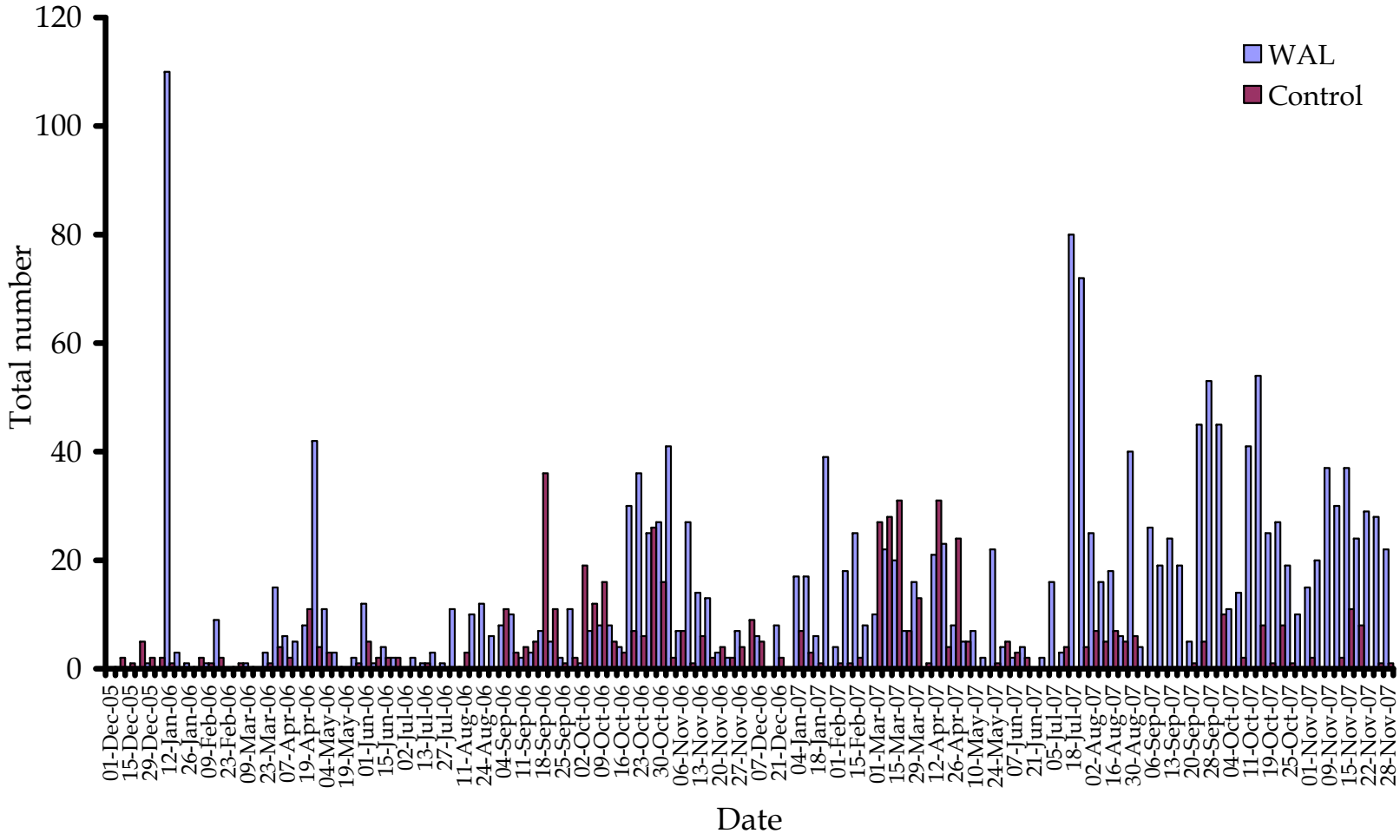

Figure 3. Total numbers of birds recorded in Wet Agricultural Lands (WAL) Long Valley, Dec 2005 to Nov 2007. Note: Survey was conducted once per week from Dec 2005 to Aug 2007 and twice per week in Sep to Nov 2006 and 2007.

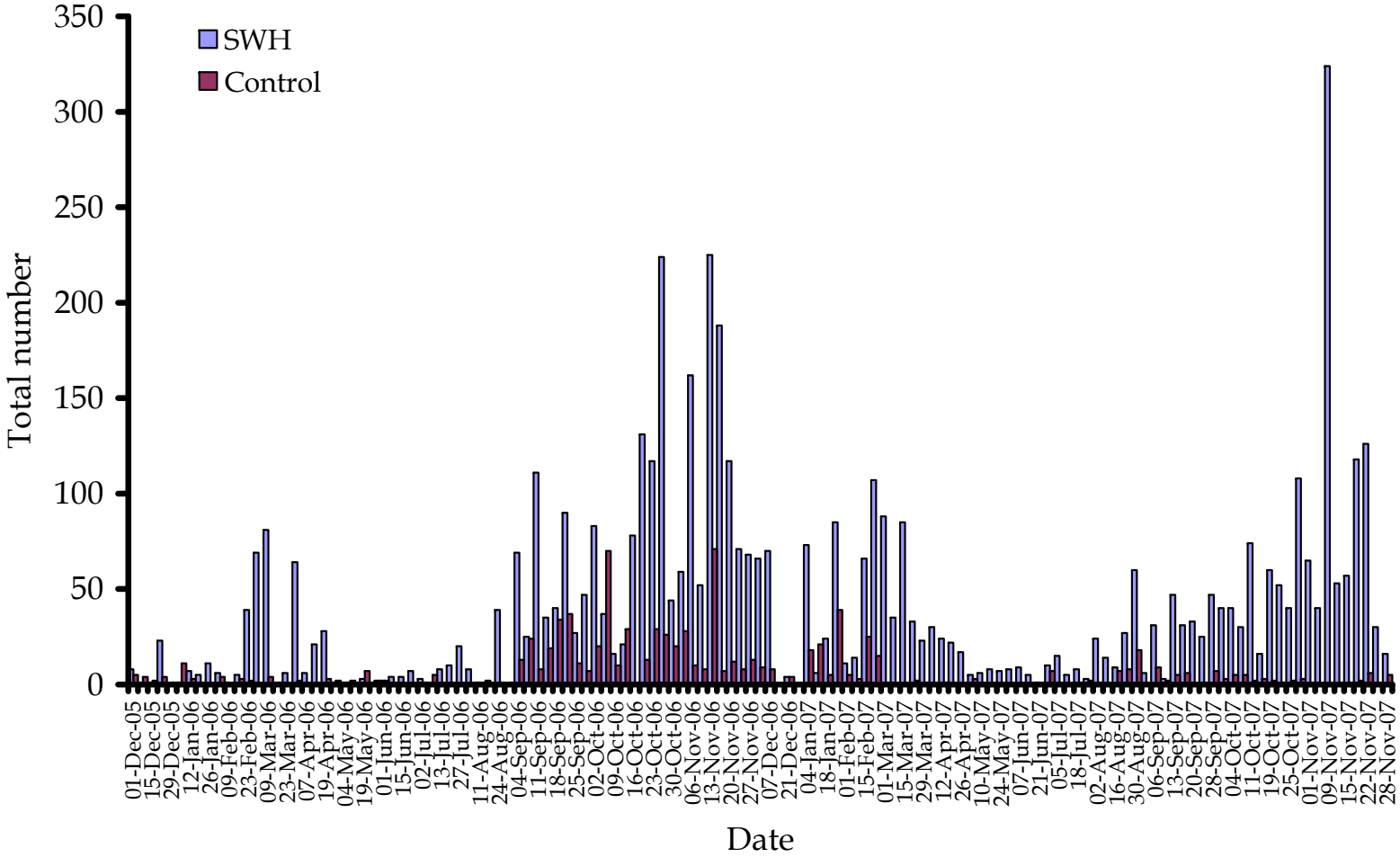

Figure 4. Total numbers of birds recorded in Shallow Water Habitat (SWH) Long Valley, Dec 2005 to Nov 2007. Note: Survey was conducted once per week from Dec 2005 to Aug 2007 and twice per week in Sep to Nov 2006 and 2007.

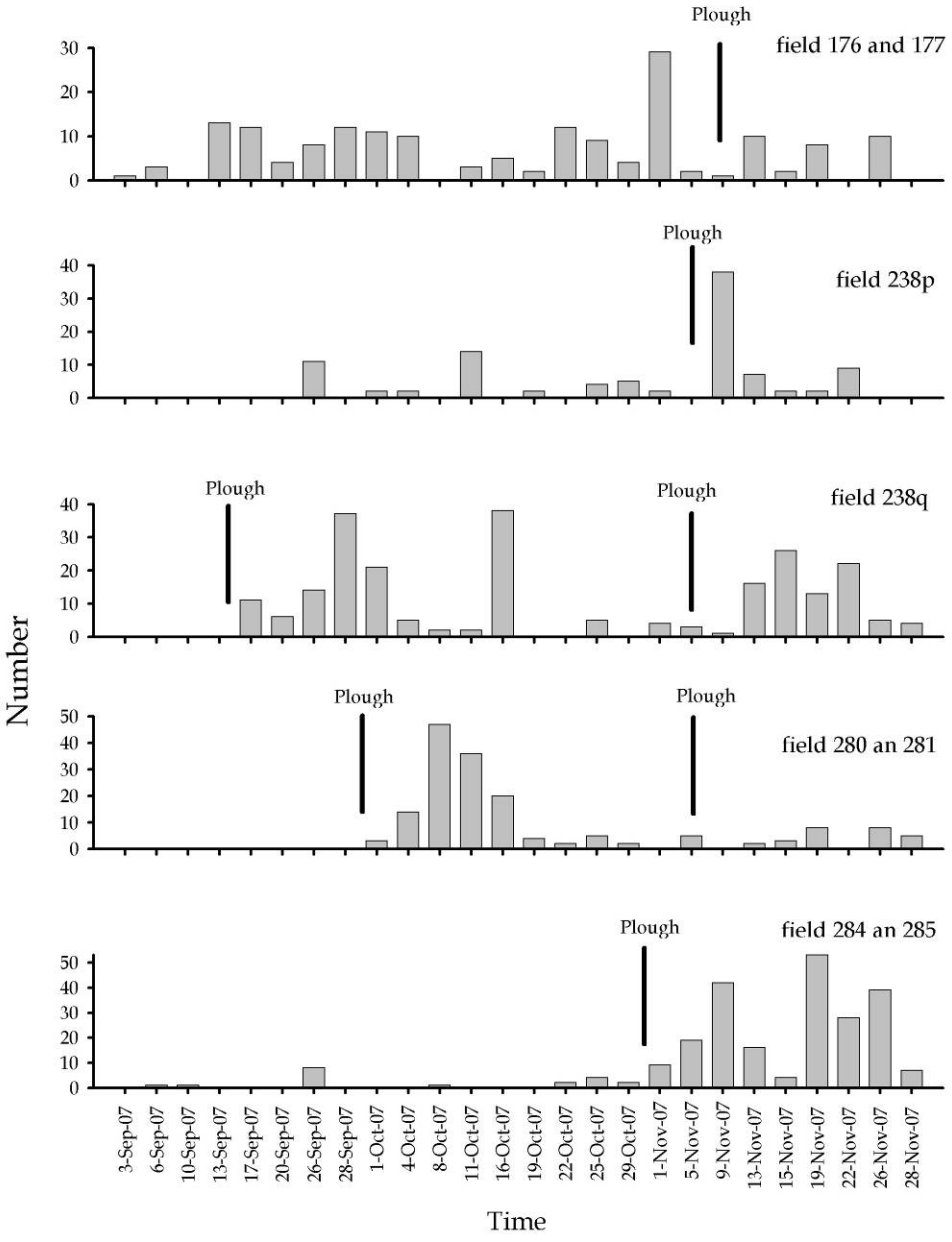

Figure 5. Numbers of birds recorded in the farmlands with plough in order to increase the bird's utilization, autumn 2007.

Appendix 1. Total numbers, numbers of species and diversity indices (Shannon index) of birds counted in Long Valley, autumn 2006 and 2007.

Autumn 2006				Autumn 2007			
Date	Total number	Number of species	Index	Date	Total number	Number of species	Index
4 Sep	406	32	2.87	3 Sep	312	33	3.11
7 Sep	328	26	2.67	6 Sep	323	38	2.99
11 Sep	393	23	2.37	10 Sep	286	34	3.00
14 Sep	500	31	2.56	13 Sep	313	37	3.20
18 Sep	303	36	3.04	17 Sep	338	40	3.00
21 Sep	321	35	2.81	20 Sep	266	37	3.07
25 Sep	281	31	2.89	26 Sep	454	40	2.91
28 Sep	282	32	2.86	28 Sep	416	41	2.81
2 Oct	356	43	2.95	1 Oct	362	37	3.02
5 Oct	403	37	2.92	4 Oct	413	46	3.04
9 Oct	314	35	3.09	8 Oct	525	45	3.19
12 Oct	366	34	2.71	11 Oct	599	45	2.97
16 Oct	349	33	2.74	16 Oct	497	39	2.74
19 Oct	534	35	2.88	19 Oct	437	38	2.67
23 Oct	593	42	2.86	22 Oct	518	42	3.03
26 Oct	704	43	2.71	25 Oct	636	43	2.94
30 Oct	568	41	2.93	29 Oct	493	41	2.91
2 Nov	478	33	2.55	1 Nov	526	46	3.00
6 Nov	536	45	2.83	5 Nov	526	50	3.14
9 Nov	504	48	2.98	9 Nov	1089	60	2.94
13 Nov	756	46	2.71	13 Nov	494	47	3.21
16 Nov	641	47	2.89	15 Nov	665	46	2.94
20 Nov	554	47	3.10	19 Nov	380	42	4.16
23 Nov	449	38	2.82	22 Nov	601	50	3.12
27 Nov	525	42	2.82	26 Nov	680	50	3.08
30 Nov	585	38	2.58	28 Nov	405	37	2.97
Mean (SD)			2.81 (0.17)	Mean (SD)			3.05 (0.26)

Appendix 2. Total numbers of birds in fields adopted with pilot conservation management agreement projects by HKBWS and CA ('Managed' fields – 996,160 sq.ft.) and in the remaining fields ('Unmanaged' fields – 1,503,840 sq.ft.), autumn 2007.

Date	Total bird numbers in Managed field	Total bird numbers in Managed field per unit area (x 10^{-5} sq.ft.)	Total bird numbers in Unmanaged field	Total bird numbers in Unmanaged field per unit area (x 10^{-5} sq.ft.)
3 Sep	45	4.6	267	17.6
6 Sep	99	10.1	224	14.7
10 Sep	55	5.6	231	15.2
13 Sep	118	12.1	195	12.8
17 Sep	84	8.6	254	16.7
20 Sep	100	10.2	166	10.9
26 Sep	228	23.3	226	14.9
28 Sep	169	17.3	247	16.2
1 Oct	155	15.8	207	13.6
4 Oct	138	14.1	275	18.1
8 Oct	179	18.3	346	22.8
11 Oct	252	25.7	347	22.8
16 Oct	174	17.8	323	21.2
19 Oct	184	18.8	253	16.6
22 Oct	156	15.9	362	23.8
25 Oct	194	19.8	442	29.1
29 Oct	203	20.7	290	19.1
1 Nov	222	22.7	304	20.0
5 Nov	188	19.2	338	22.2
9 Nov	469	47.9	620	40.8
13 Nov	216	22.1	278	18.3
15 Nov	259	26.5	406	26.7
19 Nov	366	37.4	306	20.1
22 Nov	271	27.7	330	21.7
26 Nov	216	22.1	464	30.5
28 Nov	95	9.7	310	20.4
	Mean (SD)	19.0 (9.5)	Mean (SD)	20.3 (6.4)