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

BIRD MONITORING PROGRAMME

Programme 2006/07	Spring	March – May 2007

Summary Report – spring 2007 (March to May)

Y.T. Yu[1]

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 the conservation value of this freshwater wetland 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 winter 2006-07 (i.e. December to February).

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.

[1] Yu Yat Tung
The Hong Kong Bird Watching Society Limited
Postal address: G.P.O. Box 12460, Hong Kong
Tel: (852) 2377 4387 Fax: (852) 2314 3687 E-mail: hkbws@hkbws.org.hk

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. One survey per week was scheduled in spring 2007. A total of 14 surveys were conducted and the schedule is as follows:

2007 March: 1, 8, 15, 22, 29;
2007 April: 4, 12, 18, 26;
2007 May: 3, 10, 17, 24, 31.

2.4. One surveyor who accredited by HKBWS recorded all wild birds in numbers and species with the specific number to each field in the whole study area. On 4 Apr, the survey was done by Mr. Sung Yik Hei who is another accredited surveyor of HKBWS since Mr. Cheung Mok, Jose Alberto was not available for the survey.

3. Results

Overview

3.1. As shown in other study period, the total numbers of birds recorded in Long Valley area are fluctuated. The peak count in the 2007 spring was 579 on 8 March, while the lowest number is only 93 birds on 24 May. In general, the numbers decreased from the early part of the spring toward the summer, although numbers also showed going up and down. Details are shown in figure 1 and table 1.

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

	March	April	May
Numbers of bird counted	423, 579, 395, 456, 443	318, 304, 251, 293	220, 316, 248, 93, 124
Spring 2007: Mean (SD)	459 (71)	292 (29)	200 (91)
Spring 2006: Mean (SD)	289 (36)	322 (37)	133 (44)

3.2. Comparison of the figures of this spring and the previous year is made in table

1. Mean figures of March and May of 2007 are higher than the ones in 2006, while the April figure of 2007 is lower. Table 2 summaries all these figures to show that the average figure of spring 2007 is higher than the 2006, but the difference of the mean figures between two years is not significant (t-test, t = -1.546, df = 25, P = 0.135, n.s.).

Table 2. Mean (SD) of the total numbers of the birds in the Long Valley area, springs 2006 and 2007.

Spring 2006	Spring 2007
250 (90), n = 13	318 (132), n = 14

3.3. Number of bird species present in the study area is a direct indication of the diversity of the site. Analysis below is mainly done with the Shannon index H' ($H' = -\sum p_i \ln p_i$) which is commonly used to compare species richness and abundance. An index is transformed by the counts from each counting day and the analysis is made with the average figure of the index of the counts over the winter. Details are shown in appendix 1. The average figure of the Shannon index in spring 2006 and 2007 is 2.47 (SD = 0.4) and 2.72 (SD = 0.33) respectively and the difference between two means is not significant (t-test, t = - 1.758, df = 25, P = 0.09, n.s.).

3.4. The difference is not significant between two mean figures of the diversity index of two springs. The data in second half of May in both years are low because many migratory bird species has left Long Valley and these data causes high variation of mean figures and so on difficult to give a statistical test with significant result. The mean figure of spring 2007 still shows higher than the 2006 figure.

Managed area

3.5. The total area of Long Valley is 2,500,000 sq.ft.. The HKBWS managed a total of 337,200 sq. ft. in the spring period (March to May) of 2007 and the Conservancy Association also managed the other 488,000 sq. ft.. Therefore, these made up a total of 825,200 sq.ft. managed fields and leave the unmanaged field area at 1,674,800 sq.ft.

3.6. Details of the total bird numbers, numbers per unit area, mean and SD are shown in appendix 2. The numbers of birds in all managed and unmanaged

fields are in significantly difference in this spring (t-test, t = -2.191, df = 26, P = 0.038). Table 3 shows that the mean figure of birds in managed fields in this spring count is the smallest than the previous two seasons.

Table 3. Mean (SD) of the numbers of birds in all managed and unmanaged fields per unit area in autumn 2006, winter 2006-07, spring 2007.

	Autumn 2006	Winter 2006-07	Spring 2007
Managed fields	26.9 (12.1)	17.2 (8.1)	9.3 (6.4)
Unmanaged fields	14.7 (4.3)	18.0 (4.1)	14.4 (5.9)

3.7. Although this result is not following our expectation, we could still gain experience from this. During the spring 2007, we continue our habitat enhancement exercise, e.g. plant a new crop of Choi Sum in dry agricultural land, harvesting the over-density water chestnut and setting up a fence in shallow water habitat to reduce disturbance from people to the bird. However, the bird's utilization in the managed fields still decreased. Our observations also indicate that birds prefer more to the 'newly' created or managed area than the ones which have been routinely managed for a while. On the other hand, the total numbers of birds in Long Valley area are higher in autumn and winter than the spring that also influence the numbers of bird utilizing the managed fields.

Dry agricultural land (DAL)

3.8. During the 2007 spring, Choi Sum planted in the last season produced seeds noted in early March and drying up of the whole plant noted in late March. A new crop of Choi Sum were then planted in the field 101 and 110 from early April, flowering noted in late April and producing seed and drying up of the whole plant noted since middle of May.

3.9. The mean number per unit area in DAL fields in spring 2007 is significantly higher than the mean number per unit area in the control, i.e. field 74 and 102 (Mann-Whitney Rank Sum Test, T = 258.000, P = 0.01). Superficially, the mean figure in the managed fields has increased by more than 100% over the same period last year. However, the difference is not significant (Mann-Whitney Rank Sum Test, T = 159.500, P = 0.285, n.s.).

3.10. This habitat enhancement exercise has been started since February 2006 and so

these fields have been managed with this exercise in the previous spring. By that time, the mean figures of managed and control fields were not in significantly difference. But the difference has started to become significant in last winter and this spring, it indicates that the management exercise would still increase bird's utilization in this habitat than in the control fields. Details can be referred to table 4.

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

	Spring 2007	Spring 2006
Managed fields	2.7 (3.3)	1.3 (1.6)
Control fields	0.3 (0.4)	0.6 (1.0)

Wet agricultural land (WAL)

3.11. Chinese Arrow-head corms had been planted in both field 242 and 257 during the last winter period. These grow well in this spring and the plant could grow up to 100 cm in height. A new crop of paddy rice is also planted in early May. These plants were also planted in low density and the fields were wet over this spring.

3.12. Harvesting of Water Chestnut was conducted in both field 242 and 257 on 18 and 31 March 2007. The Water Chestnut was planted in very high density and the harvest decreased the density and water was pumped in these fields on 1 April. The Water Chestnut germinated and grew again since middle April and the density is much lowered.

3.13. The mean number of birds in the managed wet agricultural fields has increased over 60% over the same period last year. However, there were no significantly difference of mean figures of birds per unit area in the WAL fields than the control fields (Mann-Whitney Rank Sum Test, T = 233.000, P = 0.175, n.s.) and in the WAL the mean figure of birds in this spring is also not in significant difference with the previous spring (Mann-Whitney Rank Sum Test, T = 143.000, P = 0.062, n.s.). Please refer to table 5 for details.

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

	Spring 2007	Spring 2006

Managed fields	5.1 (3.6)	3.1 (4.8)
Control fields	3.8 (3.8)	0.6 (0.9)

Shallow water habitat (SWH)

3.14. Field 227 and 229 were converted into shallow water habitat from 15 January 2007 onward. Therefore, we cannot still use the count from these fields as control site to compare the effectiveness for field 224, 225 and 226. We noted birds to start using these fields during this spring.

3.15. No other suitable field in nearby area could be found to replace Field 227 and 229 as the control for comparison. So, we just use Field 173, 174 and 232 as control fields to compare the data from Field 176, 177, 238e, 238l, 238p, 224, 225, 226, 227 and 229 where habitat enhancement exercises have been conducted to maintain these fields to be the shallow water habitat. The counts from all these fields are standardized with the unit area for the analysis. The total area of managed SWH is increased to 127,200 sq. ft. (i.e. 43,200+25,000+41,000+ 10,300+7,700 sq.ft.) and control is set at 77,100 sq.ft.

3.16. There is a significant difference between mean figures of birds in managed SWH and the control fields in 2007 spring (Mann-Whitney Rank Sum Test, T =105.000, P < 0.001), but the difference between spring of 2006 and 2007 is not significant (Mann-Whitney Rank Sum Test, T = 166.000, P = 0.45, n.s.) and the mean figure of spring 2007 has decreased over 40% from the figure of 2006 (table 6).

Table 6. Mean (SD) of the counts of the birds in the shallow water habitat and its control per unit area, spring 2006 and 2007.

Spring	2007	2006
Managed fields	2.2 (2.1)	3.8 (6.0)
Control fields	0.1 (0.1)	0.3 (0.4)

3.17. This habitat enhancement still has some effects to attract bird because more birds were still recorded in this field than the control. However, fewer birds were recorded to utilize this habitat in spring 2007, and more birds were actually presented in the Long Valley area in this spring rather than last spring (table 2), this habitat enhancement seem less attractive or effective compared to the previous year. In previous spring, we just started the enhancement exercise

in the Long Valley area and the SWH is the first habitat to be created and managed in early February. Since then more birds were attracted to this habitat and the whole Long Valley area was also no other managed habitat for the birds on that time. At present, several different kinds of habitat are created and managed in Long Valley and birds might be less concentrated in certain type of habitat.

3.18. The result of this part would come out with the idea mentioned in 3.17. Our previous observations showed that this habitat was the most favourite one to the birds and birds also make quick responses to this habitat. Later, this habitat enhancement exercise was provided in the same or similar manner and the decrease of bird's utilization of this habitat is noted and presented in this result. In the coming autumn, we would suggest to make some fine adjustments to this habitat enhancement such as small fluctuation of water level.

Farmland margin (FM)

3.19. This habitat enhancement exercise has still been conducted in the spring 2007 and the main task also refers mainly to the planting of tomatoes. Some tomatoes grow less well in the spring due to wet weather but some could still produce fruits as a potential food source to some birds. The total area of this habitat enhancement exercise has not been changed during this spring and so the area of control also remained unchanged.

3.20. The mean figure of the birds recorded in the field with planted farmland margins is significantly higher than in the control fields (t-test, $t = -2.29$, $df = 26$, $P = 0.03$). The mean figure in the managed fields is in 35% higher than in the control fields. This result shows the tomatoes would have possible effect on attracting birds to increase the utilization of the bird to those particular fields.

Table 7. Mean (SD) of the number of the birds in Farmland Margin and its control per unit area, spring 2007

Managed	Control
9.8 (4.0)	6.4 (4.0)

Additional observations

3.21. The total number of bird species recorded in the Long Valley area during the

bird survey increased to 130. However, no new species was found in the Long Valley area in this spring.

3.22. The Greater Painted-snipe *Rostratula benghalensis* was only recorded in six surveys in this spring. This species would become secretive in the spring because the breeding period is started. A pair was noted on 24 May, indicating that this species might be breeding in the Long Valley area.

Discussion

4.1. In previous report it is noted that the numbers of birds in the Long Valley area fluctuated widely partly from human disturbance and partly possibly a natural consequence. Such fluctuation was still noted in the numbers of birds in this spring.

4.2. After 18 months of the habitat management experience and data of the bird count, a few remarks are made to the habitat enhancement exercises and their effectiveness as follows.

4.3. The Dry Agricultural Land (DAL) was designed to attract target species such as pipits, buntings and Japanese Quail *Coturnix japonica*. Since comparison of the fields of this habitat and the control could be made from autumn 2006, more birds could be found in the managed fields than in the control fields and the differences between the figures are often significant. Target species such as Red-throated Pipit *Anthus cervinus* and Common Stonechat *Saxicola torquata* were regularly recorded in this habitat, but the increase of the birds was mainly from other common species such as Spotted Dove *Streptopelia chinensis*, Yellow-bellied Prinia *Prinia flaviventris* and Eurasian Tree Sparrow *Passer montanus*. The effectiveness of this enhancement is less prominent.

4.4. The Wet Agricultural Land (WAL) includes planting of water cress, water spinach, water chestnut, Chinese Arrow-head for attracting species such as Greater Painted-snipe, Wood Sandpiper *Tringa glareola* and Green Sandpiper *T. ochropus* and Yellow Wagtails *Montacilla flava*. This practice also needs time and many efforts to create suitable habitats for birds. The mean figures of the birds in the WAL are also usually higher than the birds in the control fields with significant difference. Snipes *Gallinago spp.*, Wood Sandpipers and White-breasted Waterhen *Amaurornis phoenicurus* are regularly recorded in this

habitat. The effectiveness is satisfactory but the technique of planting the crops is not fully known. Besides, these target species could also be attracted by the presence of the water rather than the presence of these plants and so the Shallow Water Habitat which is relatively easier to be created could serve the same function (See below).

4.5. The Shallow Water Habitat (SWH) was aimed to create some wetland habitats such as marshes and shallow water ponds for wetland-dependent species such as Greater Painted-snipe, *Gallinago* snipes, rails, crakes, bitterns and egrets. This habitat is the first one to be provided in the Long Valley area and its effectiveness is seemingly high and well known by the immediate response of presences of high numbers of snipes in these fields in both winters. Also, this habitat enhancement exercise is less intensive and the simple exercises such as pumping water in the fields, remove some of the vegetation and control of some disturbances could yield an obvious result.

4.6. For further evaluation of the effectiveness between WAL and SWH, three wetland bird species are selected for the following analysis, namely Chinese Pond Heron *Ardeola bacchus*, Wood Sandpiper and *Gallinago* snipes. These species are key components of bird community in the local wetland system, especially in the Long Valley area. The Chinese Pond Heron is a resident with a breeding colony at Ho Sheung Heung. The Wood Sandpiper and *Gallinago* snipes could be both winter visitors and passage migrants in spring and autumn in Hong Kong.

4.7. The analysis focuses to habitat utilisation of these species in WAL and SWH. Because of that total numbers of all the bird species and numbers of these species from all counts are highly varied, percentages derived from individuals of these species in these habitats to the total numbers are used. All the counts from December 2005 to May 2007 are included for the analysis of the Chinese Pond Heron, while data from the period of May to July 2006 and May 2007 are excluded from this analysis because the Wood Sandpiper and the *Gallinago* snipes are migratory and therefore absent in the summer period (i.e. May to July).

4.8. The *Gallinago* snipes actually consist of three species: Common *Gallinago gallinago*, Pintail *Gallinago sternxxx* and Swinhoe's *Gallinago megla* Snipes. The Common Snipes in Hong Kong could have both winter visitors and passage

migrants, while the Pintail and Swinhoe's Snipes are predominantly passage migrants with very small numbers present in the winter. All these three species of snipe are difficult to separate in the field and so the numbers of these species are lumped for this analysis.

4.9. All three species have a higher mean percentages in SWH than in WAL. The mean figures in these different habitats of Chinese Pond Heron do not differ significantly (Mann-Whitney Rank Sum Test, T = 7900.000, P = 0.09, n.s.), but the mean figures of the Wood Sandpiper (Mann-Whitney Rank Sum Test, T = 6331.500, P = 0.002) and the *Gallinago* snipes (Mann-Whitney Rank Sum Test, T = 4086.000, P < 0.001) are in significantly difference in these different habitats. Details refer to table 8. From the results of this analysis, the SWH could attract more birds, at least to Wood Sandpipers and the snipes than the WAL.

Table 8. Mean percentages (with SD) of the three wetland bird species in different managed habitats.

	WAL	SWH
Chinese Pond Heron (n = 92)	0.14 (0.39)	0.23 (0.43)
Wood Sandpiper (n = 74)	0.51 (1.42)	1.58 (3.00)
Gallinago snipes (n = 74)	0.42 (0.94)	3.42 (5.13)

4.10. The Farmland Margin (FM) is thought to attract some open country species such as pipits, buntings, Common Stonechats and starlings. Although the mean figures of the birds in these fields could be larger than the control fields, the effectiveness of this exercise is difficult to assess. The effective area relating to the exercise is restricted and many other factors such as disturbance, presence of other good habitats nearby could easily affect the result.

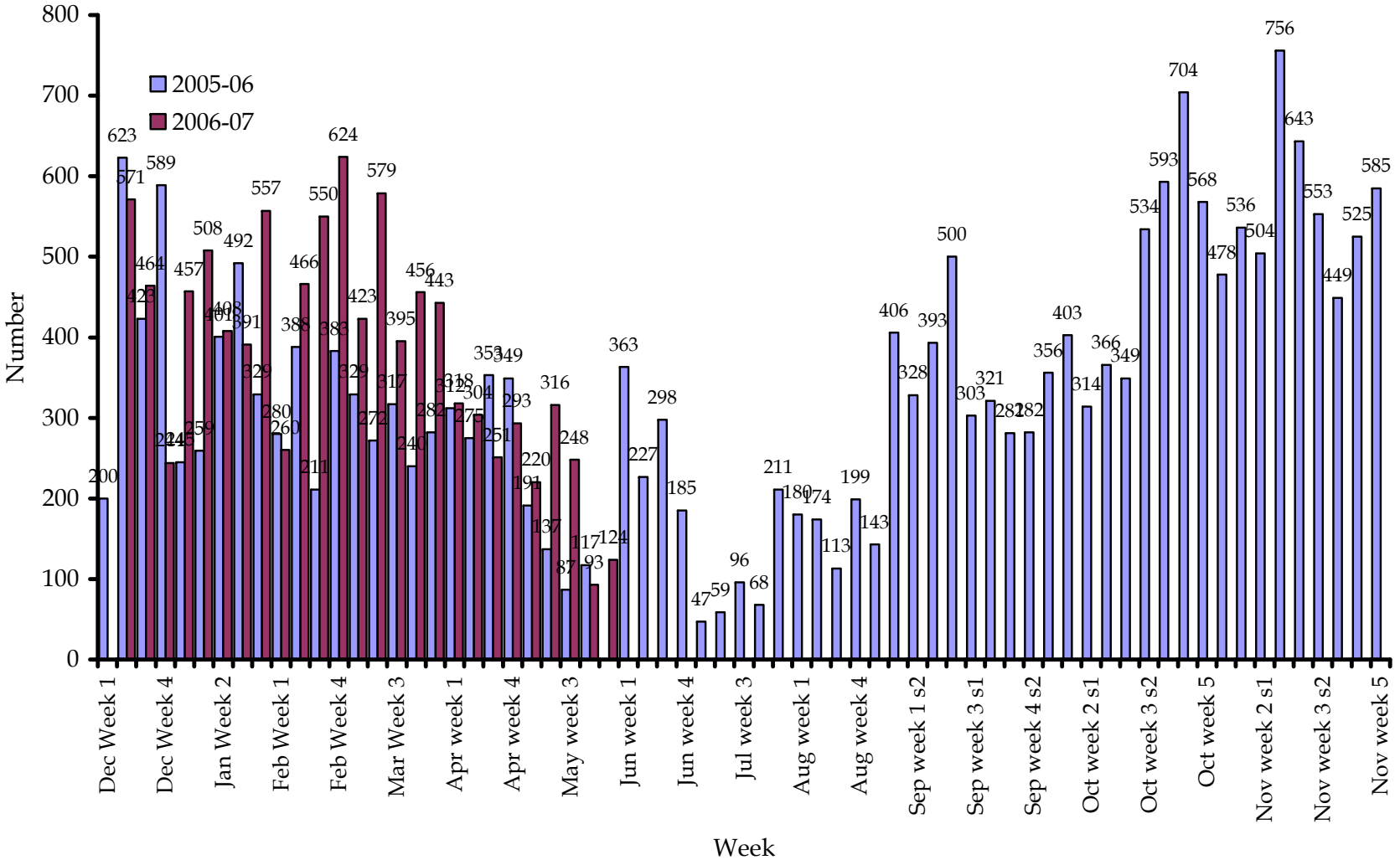

Figure 1. Total numbers of birds recorded in Long Valley, December 2005 to May 2007. Note: Survey was conducted once per week from December 2005 to August 2006, and December 2006 to May 2007 and twice per week in September to November 2006.

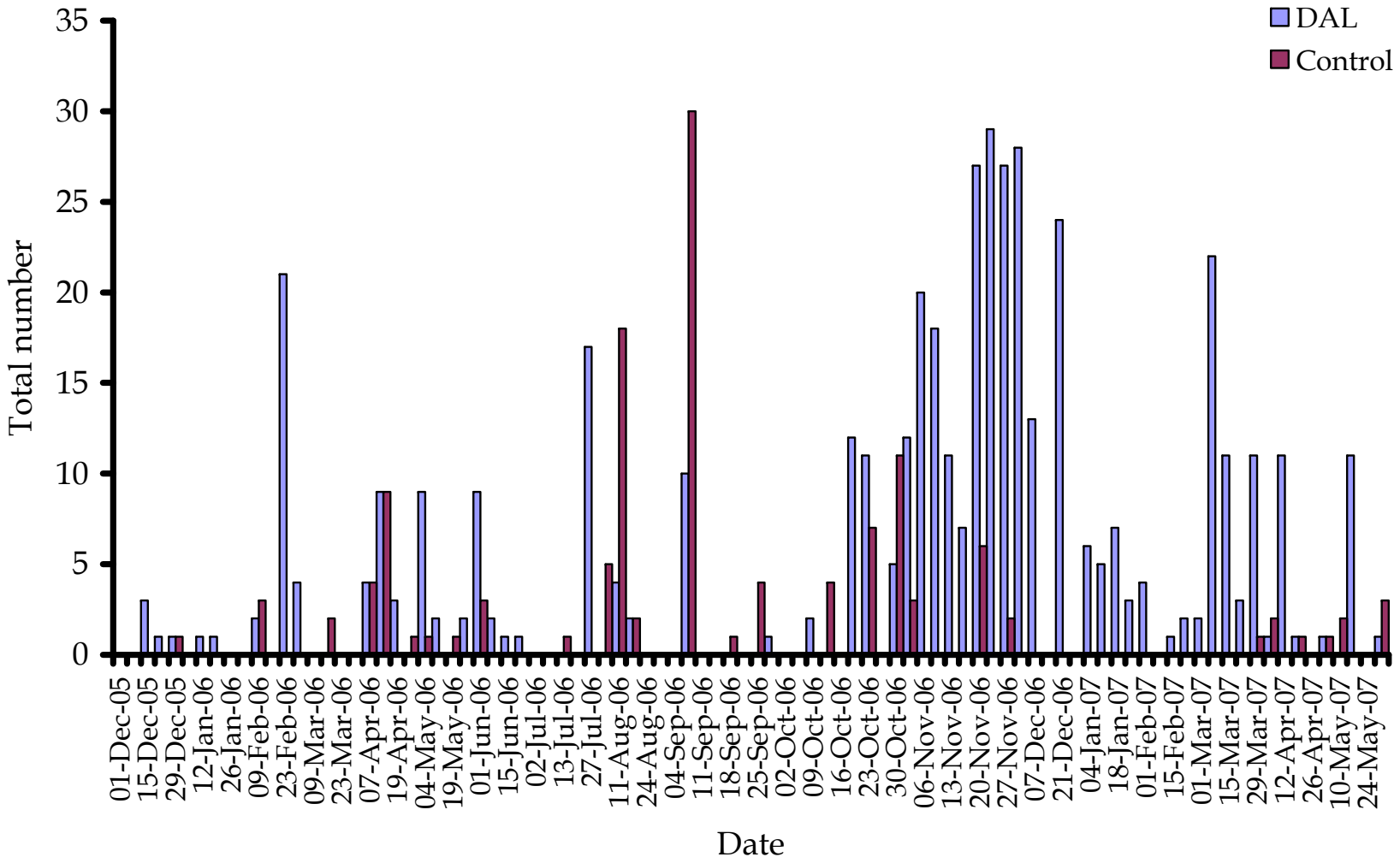

Figure 2. Total numbers of birds recorded in Dry Agricultural Lands (DAL) in Long Valley, December 2005 to May 2007. Note: Survey was conducted once per week from December 2005 to August 2006, and December 2006 to May 2007 and twice per week in September to November 2006.

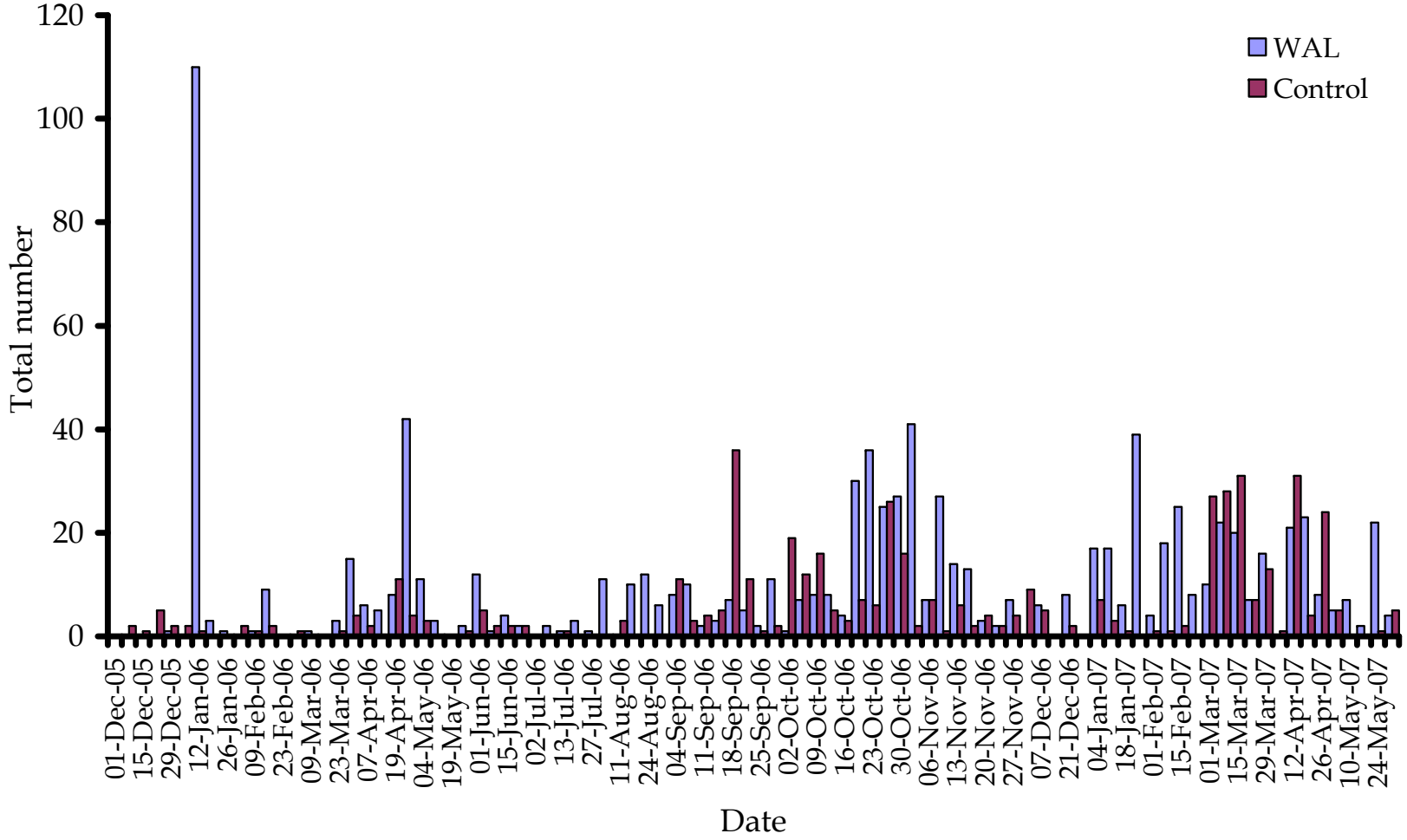

Figure 3. Total numbers of birds recorded in Wet Agricultural Lands (WAL) Long Valley, December 2005 to May 2007. Note: Survey was conducted once per week from December 2005 to August 2006, and December 2006 to May 2007 and twice per week in September to November 2006.

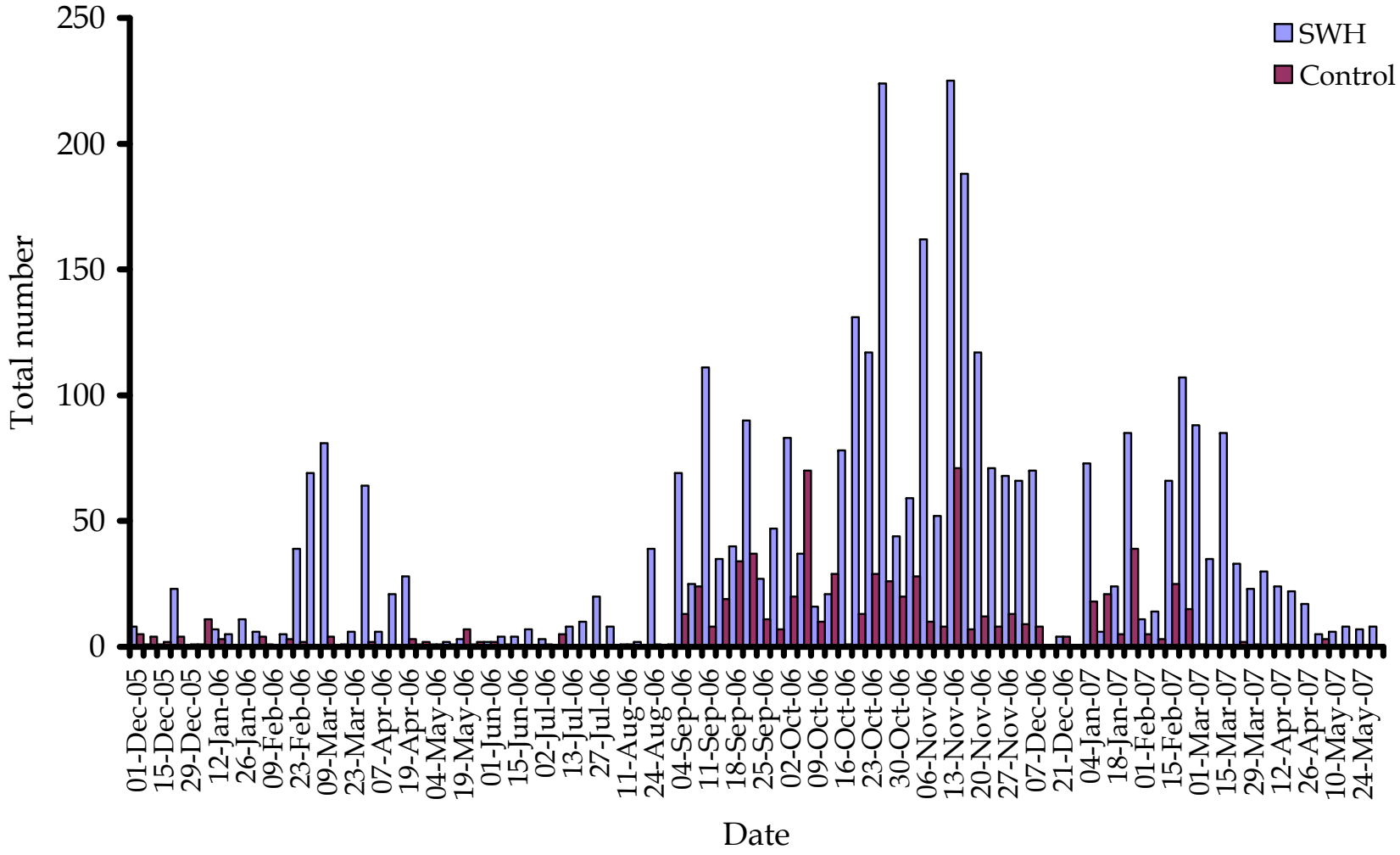

Figure 4. Total numbers of birds recorded in Shallow Water Habitat (SWH) Long Valley, December 2005 to May 2007. Note: Survey was conducted once per week from December 2005 to August 2006, and December 2006 to May 2007 and twice per week in September to November 2006.

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

Spring 2006				Spring 2007			
Date	Total number	Number of species	Index	Date	Total number	Number of species	Index
2 Mar	329	31	2.65	1 Mar	423	43	3.11
9 Mar	272	36	2.67	8 Mar	579	37	2.75
16 Mar	317	33	2.87	15 Mar	395	47	3.02
23 Mar	420	35	1.94	22 Mar	456	37	2.65
29 Mar	282	33	2.94	29 Mar	443	32	2.79
7 Apr	312	32	2.67	4 Apr	318	37	2.93
13 Apr	275	32	2.77	12 Apr	304	34	2.98
19 Apr	353	30	2.35	18 Apr	251	34	3.04
27 Apr	349	26	1.59	26 Apr	293	35	2.76
4 May	191	27	1.91	3 May	220	25	2.56
10 May	137	26	2.85	10 May	316	25	2.30
19 May	87	15	2.42	17 May	248	19	1.98
25 May	117	16	2.44	24 May	93	15	2.42
-				31 May	124	21	2.94
Mean (SD)			2.47 (0.42)	Mean (SD)			2.72 (0.34)

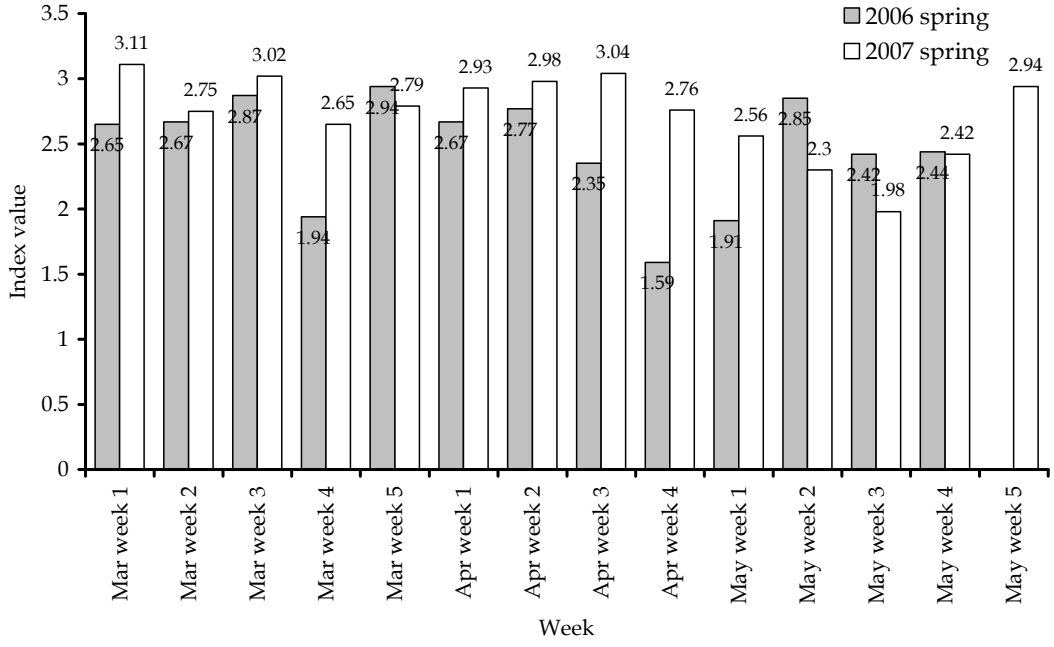

Figure 5. A weekly trend of Shannon Index of birds recorded in the Long Valley area in springs 2006 and 2007. This figure is derived from the data shown in Appendix 1.

Appendix 2. Total numbers of birds in fields adopted with pilot conservation management agreement projects by HKBWS and CA ('Managed' fields – 825,200 sq.ft.) and in the remaining fields ('Unmanaged' fields – 1,674,800 sq.ft.), spring 2007.

Date	Total bird numbers in Managed field	Total bird numbers in Managed field per 10^5 sq.ft.	Total bird numbers in Unmanaged field	Total bird numbers in Unmanaged field per 10^5 sq.ft.
1 Mar	159	19.3	264	15.8
8 Mar	176	21.3	403	24.1
15 Mar	156	18.9	239	14.3
22 Mar	78	9.5	378	22.6
29 Mar	91	11.0	352	21.0
4 Apr	68	8.2	250	14.9
12 Apr	100	12.1	204	12.2
18 Apr	61	7.4	190	11.3
26 Apr	33	4.0	260	15.5
3 May	30	3.6	190	11.3
10 May	22	2.7	294	17.6
17 May	35	4.2	213	12.7
24 May	34	4.1	59	3.4
31 May	37	4.5	87	5.2
	Mean (SD)	9.3 (6.4)	Mean (SD)	14.4 (5.9)