Nature Conservation Management for Long Valley 2012-2015

BIRD MONITORING PROGRAMME

Programme 2012/15	March 2012 to February 2013

Summary Report – March 2012 to February 2013

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1. Background

1.1. The Environment and Conservation Fund (ECF) supports a joint project: Nature Conservation Management for Long Valley 2012-2015, 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), The Conservancy Association (CA) and the local farming community since March 2012.

1.2. The aim of this project is to conserve and enhance the agricultural freshwater wetland and habitat diversity for avifauna and other freshwater wetland-dependent species in Long Valley. The effectiveness of the management practices is reflected by the utilization in the area by birds and the regular Bird Monitoring Programme gathers such data.

1.3. This report presents the results of the bird monitoring programme conducted in the period from March 2012 to February 2013 which covers spring, summer, autumn and winter.

2. Methodology

Transect Counts

2.1. The bird monitoring programme in both the core and northern parts of Long Valley was conducted by regular transect counts following routes shown in Fig. 1, Fig. 2 and Fig. 3 in order to obtain comparable results and complete coverage of all farmlands in the shortest time. All birds encountered in the transects, including seen and heard, were recorded with the species (common) name and field (i.e. farming plot) number, following Fig. 1, 2 and 3, where the birds were located. Birds flying in the sky were also marked down but not allocated to any specific field. Bird calls heard which could not be exactly located to a field number was marked as ‘Heard’. Transect count was also done in Ho Sheung Heung *feng-shui* wood area (Fig. 3). Surveys were separated into two parts: (1) The core part of Long Valley and (2) The northern part of Long Valley and Ho Sheung Heung *feng-shui* wood. Total surveying times for each of the two parts were maintained at about 3.0 hours and they were conducted simultaneously in the morning.

2.2. Surveys in the core part and northern part of Long Valley were done once a week in except that they were conducted once per two weeks in June and July. A total of 48

surveys were conducted for the core area and northern part of Long Valley respectively as shown below:

2012 March: 5, 14, 19, 26
2012 April: 2, 10, 16, 23, 30
2012 May: 7, 14, 21, 28
2012 June: 4, 18 (19)
2012 July: 2, 14 (16), 30
2012 August: 6, 13, 20, 27
2012 September: 3, 10, 17, 24
2012 October: 1, 8, 15, 22, 29
2012 November: 5, 12, 19, 26 (28)
2012 December: 3(4), 10, 18, 24 (25), 31
2013 January: (2), 7, 14, 21, 28
2013 February: 4, 11 (12), 18, 25

2.3.Each survey was conducted by two surveyors accredited by HKBWS. One surveyor would cover the core part of Long Valley (Fig. 1) and the other would survey the northern part of Long Valley (Fig. 2) and the *feng-shui* wood at Ho Sheung Heung (Fig.3).

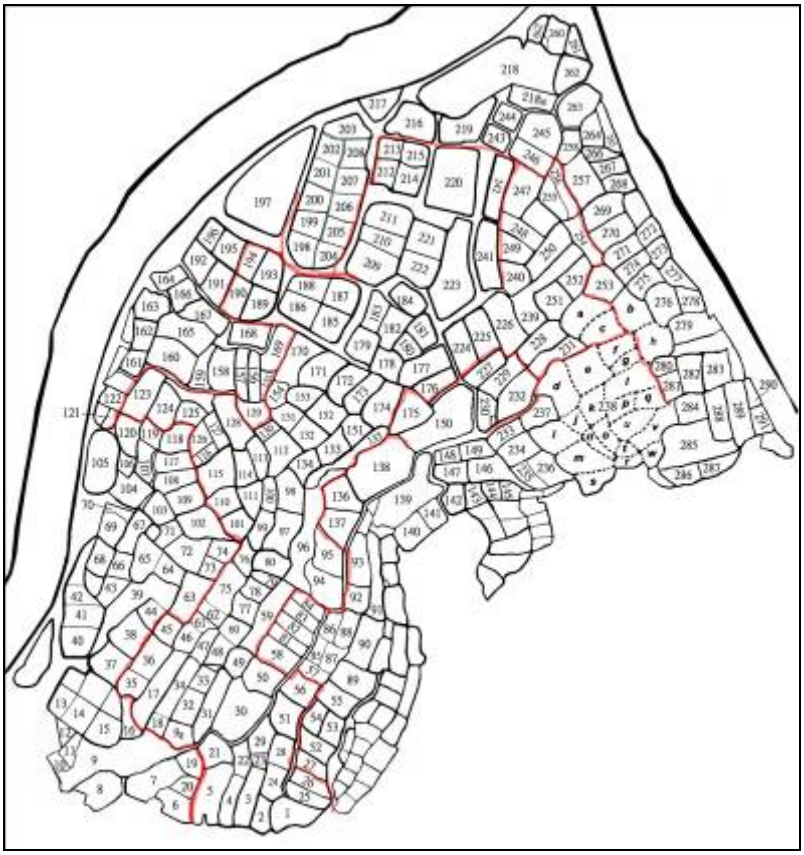

Figure 1. The transect (red line) and field numbers at the core part of Long Valley in this study.

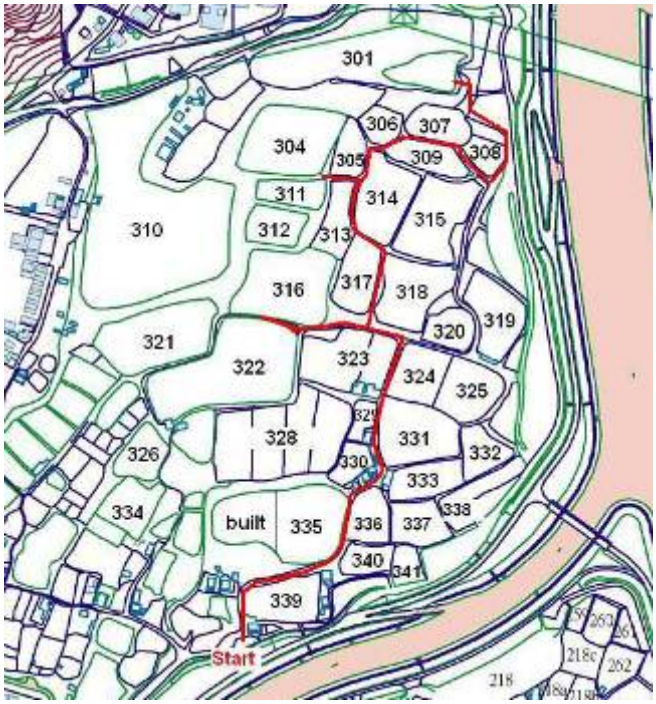

Figure 2. The transect (red line) and field numbers at the northern part of Long Valley in Ho Sheung Heung.

Figure 3. The transect (red line) at the Ho Sheung Heung *feng-shui* wood.

3. Results

Overview

3.1. 8 bird species were first recorded in both the core part and northern part of Long Valley during the reporting period. They are Mandarin Duck, Speckled Piculet,

Red-backed Shrike, Greater Short-toed Lark, Verditer Flycatcher, Hainan Blue Flycatcher, Eurasian Siskin and Pallas's Reed Bunting. Based on the revised HK bird list announced on 22 Nov 2012 and the latest revision by the Records Committee in late Feb 2013, Northern Goshawk and Red-headed Bunting which were previously in Category III is now moved to Category I, however, Russet Sparrow was moved to Category III. The total number of species recorded in the whole project site is 292.

3.2. For the core part of Long Valley, the peak counts of number of birds in this report period (i.e. March 2012 to February 2013) in four seasons were 634 on 14 March, 787 on 30 July, 1182 on 12 November and 1204 on 10 December respectively. The lowest abundances recorded were 127 on 14 May, 161 on 19 June,, 439 on 3 September and 515 on 18 February respectively. Notably, the numbers of birds recorded in autumn 2012 and winter 2012/13 were considerably higher than that recorded in previous years (Table 1).

Table 1. Numbers in each count, monthly mean number of birds counted at the core part of Long Valley, spring, summer, autumn 2012 and winter 2012/13, and the mean numbers (SD in parenthesis) in from spring 2006 to winter 2012/13

	Spring 2012			Summer 2012		
	March	April	May	June	July	August
Numbers of bird counted in each survey	478,634, 459,567	458,397, 324,284,175	131,127, 130,146	188,161	187,541, 787	491,351, 326,383
2012: Mean (SD)	535(81)	328(108)	136(8)	175(19)	505(302)	388(73)
2011: Mean (SD)	748(36)	560(85)	357(140)	196(19)	209(14)	246(23)
2010: Mean (SD)	387(93)	348(99)	225(93)	314(60)	223(0.71)	438(64)
2009: Mean (SD)	345(25)	286(80)	181(18)	275(54)	392(111)	232(64)
2008: Mean (SD)	458(78)	330(130)	191(101)	73*	199(47)	328(112)
2007: Mean (SD)	459(71)	292(29)	200(91)	170(19)	270(43)	430(99)
2006: Mean (SD)	289(36)	322(37)	133(44)	268(79)	96(66)	161(34)
	Autumn 2012			Winter 2012/13		
	September	October	November	December	January	February
Numbers of bird counted in each survey	439,711, 596,670	694,543, 594,820,793	1094,1182, 891,907	1139,1204, 1037,604	747,787, 695,696	704,537, 515,536
2012: Mean (SD)	604(120)	689(121)	1019(143)	996(270)	731(44)	573(88)
2011: Mean (SD)	398(118)	817(84)	795(113)	697(173)	582(127)	572(82)
2010: Mean (SD)	808(374)	831(119)	807(147)	834(275)	713(159)	589(67)
2009: Mean (SD)	477(200)	648(166)	488(97)	393(92)	445(86)	398(58)
2008: Mean (SD)	367(53)	541(95)	458(96)	656(193)	474(58)	538(133)
2007: Mean (SD)	343(65)	499(88)	634(205)	504(69)	373(110)	407(104)
2006: Mean (SD)	352(76)	468(138)	561(94)	436(136)	470(83)	476(158)

Remarks: * No SD can be provided as only one survey was conducted.

3.3. The highest numbers of species recorded in four seasons in the report period were 55 on 19 March, 41 on 30 July, 72 on 28 November and 77 on 4 December respectively. The number of species recorded in summer 2012, autumn 2012 and winter 2012/2013 were higher than that in previous years (Table 2).

Table 2. Mean numbers of species (SD in parenthesis) counted in core part of Long Valley, from spring 2007 to winter 2012/13.

	Spring	Summer
	No. of species	No. of species
2012: Mean (SD)	42 (9)	35 (3)
2011: Mean (SD)	44 (10)	32 (5)
2010: Mean (SD)	39 (6)	32 (3)
2009: Mean (SD)	40 (5)	27 (3)
2008: Mean (SD)	39 (8)	27 (3)

2007: Mean (SD)	32 (9)	28 (6)
	Autumn	Winter
	No. of species	No. of species
2012: Mean (SD)	59 (9)	55 (10)
2011: Mean (SD)	53 (8)	49 (6)
2010: Mean (SD)	54 (6)	50 (4)
2009: Mean (SD)	43 (8)	45 (4)
2008: Mean (SD)	40 (6)	44 (3)
2007: Mean (SD)	42 (6)	43(4)

3.4. For the agricultural land in the northern part of Long Valley, the peak counts in four seasons were 371 on 5 March, 308 on 27 August, 448 on 26 November and 632 on 11 February respectively. The number of birds counted in spring 2012 and winter 2012/13 were higher than that counted in previous years (Table 3). The highest number of species recorded were 47 on 14 March, 31 on 27 August, 50 on 5 November and 61 on 11 February.

3.5. The number of species recorded in agricultural land in the northern part of Long Valley in autumn 2012 and winter 2012/13 were higher than that recorded in previous years (Table 4).

Table 3. Numbers in each count in northern part of Long Valley, in spring, summer and autumn 2012 and winter 2012/13, and the mean numbers (SD in parenthesis) from 2008 to winter 2012/13.

	Spring 2012			Summer 2012		
	March	April	May	June	July	August
Numbers of bird counted	371,365, 299,152	289,348, 182,166,190	220,222, 157,160	262,210	135,206, 142	206,263, 232,308
2012: Mean (SD)	297(102)	235(79)	190(36)	236(37)	161(39)	252(44)
2011: Mean (SD)	257(71)	183(49)	186(52)	159(66)	205(50)	168(62)
2010: Mean (SD)	189(23)	163(49)	148(53)	66(21)	94(13)	77(17)
2009: Mean (SD)	148(39)	128(9)	105(9)	141(46)	149(27)	131(40)
2008: Mean (SD)	151(29)	141(44)	117(16)	298*	162(40)	136(16)
	Autumn 2012			Winter 2012/2013		
	September	October	November	December	January	February
Numbers of bird counted	255,283, 237,263	306,329, 394,306,294	386,371, 308,448	452,415, 258,335,449	394,365, 497,464	504,632, 488,427
2012: Mean (SD)	260(19)	326(40)	378(57)	382(84)	430(61)	513(86)
2011: Mean (SD)	231(31)	456(72)	278(114)	346(34)	255(91)	330(69)
2010: Mean (SD)	158(78)	217(55)	362(52)	304(42)	253(30)	295(24)
2009: Mean (SD)	122 (41)	144 (32)	202 (60)	142 (74)	125 (28)	136 (55)
2008: Mean (SD)	155(52)	148(14)	152(43)	140(34)	201(70)	162(36)

Remarks: * No SD can be provided as only one survey was conducted.

Table 4. Mean numbers of species (SD in parenthesis) counted in agricultural lands in the northern part of Long Valley, from spring 2008 to winter 2012/13.

	Spring	Summer
	No. of species	No. of species
2012: Mean (SD)	33 (7)	27 (3)
2011: Mean (SD)	31 (6)	25 (5)
2010: Mean (SD)	32 (6)	32 (3)
2009: Mean (SD)	35 (5)	25 (1)
2008: Mean (SD)	32 (4)	29 (4)
	Autumn	Winter
	No. of species	No. of species

2012: Mean (SD)	39 (8)	50 (5)
2011: Mean (SD)	37 (5)	41 (5)
2010: Mean (SD)	34 (8)	36 (3)
2009: Mean (SD)	31 (7)	32 (5)
2008: Mean (SD)	34 (6)	35 (6)

3.6. For the *feng-shui* wood, the peak count in four seasons were 98 on 14 March, 122 on 27 August, 140 on 8 October and 176 on 3 December respectively (Table 5). The number of birds recorded in winter 2012/13 was higher than that recorded in previous years (Table 5). The number of species recorded in the *feng-shui* wood was similar across years (Table 6). The highest number of species richness recorded were 15 on 7 May, 12 on 6 August, 13 on 5 and 26 November and 20 on 28 January.

Table 5. Numbers in each count in the *feng-shui* wood, from spring 2011 to winter 2012/13 and the mean numbers (SD in parenthesis) from spring 2008 to winter2011/12.

	Spring 2012			Summer 2012		
	March	April	May	June	July	August
Numbers of bird counted	88,98, 36,96	94,69, 79,65,42	55,37, 30,46	31,47	19,55, 42	84,64, 93,122
2012: Mean (SD)	80(29)	70(19)	42(11)	39(11)	39(18)	91(24)
2011: Mean (SD)	71(27)	59 (33)	47(14)	33(14)	39(1)	55(25)
2010: Mean (SD)	77(28)	52(14)	51(16)	5(0.71)	8(10)	30(36)
2009: Mean (SD)	85(15)	89(21)	67(32)	40(17)	68(10)	53(17)
2008: Mean (SD)	80(19)	88(13)	65(12)	48	40(17)	55(12)

	Autumn 2012			Winter 2012/2013		
	September	October	November	December	January	February
Numbers of bird counted	125,68, 81,85	124,140, 101,83,83	116,100, 105,113	176,147, 85,110,150	148,105, 122,141	123,128, 122,172
2012: Mean (SD)	90(25)	106(25)	109(7)	134(36)	129(19)	136(24)
2011: Mean (SD)	102(12)	141(20)	108(48)	88(15)	67(33)	84 (35)
2010: Mean (SD)	51(13)	71(36)	75(12)	72(27)	74(35)	114(21)
2009: Mean (SD)	54 (3)	60 (21)	81 (31)	56 (24)	58 (5)	72 (16)
2008: Mean (SD)	70(31)	60(16)	83(24)	77(22)	91(39)	116(47)

Table 6. Mean numbers of species (SD in parenthesis) counted in the *feng-shui* wood from spring 2008 to winter2012/2013.

	Spring No. of species	Summer No. of species
2012 Mean (SD)	11 (2)	10 (2)
2011: Mean (SD)	10 (2)	9 (2)
2010: Mean (SD)	10 (3)	6 (5)
2009: Mean (SD)	17 (3)	10 (2)
2008: Mean (SD)	16 (3)	12 (1)
	Autumn **No. of species**	**Winter** **No. of species**
2012: Mean (SD)	11 (2)	15 (2)
2011: Mean (SD)	12 (2)	11 (2)
2010: Mean (SD)	9 (3)	11 (2)
2009: Mean (SD)	11 (3)	14 (3)
2008: Mean (SD)	13 (3)	16 (3)

Managed area

3.7. The total surveyed area of agricultural fields is 504,000 m^2. The total area of agricultural fields in both parts of Long Valley managed by HKBWS and CA were different among months in the current study period (Table 7).

Table 7. Total surveyed area of managed and unmanaged fields in the core and northern part of Long Valley by the HKBWS and CA from March 2012 to February 2013.

Months	Area of managed fields (m^2)	Area of unmanaged fields (m^2)	Total (m^2)	% of fields managed
March	91,364	412,636	504,000	18.1
April	97,425	406,575	504,000	19.3
May	107,679	396,321	504,000	21.4
June	107,679	396,321	504,000	21.4
July	117,459	386,541	504,000	23.3
August	117,459	386,541	504,000	23.3
September	117,459	386,541	504,000	23.3
October	117,459	386,541	504,000	23.3
November	117,459	386,541	504,000	23.3
December	117,459	386,541	504,000	23.3
January	117,459	386,541	504,000	23.3
February	117,459	386,541	504,000	23.3

3.8. The ratio of mean bird density in managed fields to that in unmanaged fields of the same year reflected the utilization of managed fields by birds (Table 8). The mean densities of birds and the ratio in the current study period rose in all seasons compared with previous years.

Table 8. Mean (SD) bird density (per 10,000 m^2) in all managed and unmanaged fields and ratio of mean bird density in managed fields to that in unmanaged fields in from spring 2007 to winter 2012/13

	Spring 2007	Spring 2008	Spring 2009	Spring 2010	Spring 2011	Spring 2012
Managed fields	8.6 (5.9)	11.5 (10.1)	10.1 (5.2)	12.1 (5.7)	22.2 (12.4)	23.8 (11.6)
Unmanaged fields	13.4 (5.5)	5.0 (2.4)	5.5 (22.3)	5.7 (2.5)	10.6 (4.3)	7.4 (3.3)
Ratio	0.64	2.30	1.84	2.12	2.10	3.22
	Summer 2007	Summer 2008	Summer 2009	Summer 2010	Summer 2011	Summer 2012
Managed fields	6.2 (3.3)	19.9 (10.7)	11.4 (8.6)	9.4 (5.5)	8.1 (5.4)	26.3 (15.7)
Unmanaged fields	3.8 (2.0)	3.5 (1.7)	4.6 (2.0)	7.4 (2.1)	5.0 (2.6)	6.8 (1.9)
Ratio	1.63	5.69	2.48	1.27	1.62	3.87
	Autumn 2007	Autumn 2008	Autumn 2009	Autumn 2010	Autumn 2011	Autumn 2012
Managed fields	17.7 (8.8)	28.4 (9.0)	34.9 (10.0)	29.4 (9.7)	34.7 (14.7)	48.1 (14.1)
Unmanaged fields	18.9 (5.9)	7.5 (2.6)	9.8 (4.3)	14.2 (5.2)	15.0 (4.9)	12.3 (3.4)
Ratio	0.94	3.79	3.56	2.07	2.31	3.91
	Winter 2007/2008	Winter 2008/2009	Winter 2009/2010	Winter 2010/2011	Winter 2011/2012	Winter 2012/2013
Managed fields	21.3 (10.6)	34.0 (12.2)	20.9 (9.2)	30.7 (10.8)	25.7 (11.6)	50.3 (12.0)
Unmanaged fields	14.6 (2.8)	10.3 (2.9)	8.5 (3.7)	10.8 (3.8)	14.9 (3.7)	15.2 (2.1)
Ratio	1.46	3.30	2.46	2.84	1.72	3.31

Less Intensive Wet agricultural land (LI-WAL)

3.9. In the current study period, the management practices of different LI-WAL fields were started at different months. Therefore, the total areas of managed LI-WAL were different among months (Table 9).

Table 9. Total area of managed LI-WAL in the core and northern part of Long Valley from March 2012 to February 2013.

Months	Total area of managed fields (m^2.)

March	24,470
April	26,668
May	30,503
June	30,503
July	30,503
August	32,110
September	33,099
October	33,099
November	33,099
December	33,099
January	33,099
February	33,099

3.10. The management practice of LI-WAL from spring 2012 to winter 2012/2013 comprised of planting of Paddy Rice, Water Chestnut, Chinese Arrowhead, Water Bamboo, Canna, Lotus and Water Lily.

3.11. The mean bird density in the managed LI-WAL rose by 70%, 896%, 233% and 32% in spring, summer, autumn 2012 and winter 2012/2013 compared with the seasons in previous year respectively (Table 10).

Table 10. Mean (SD) bird density (per 10,000 m^2) in LI-WAL and its control fields from spring 2007 to winter 2012/2013.

	Spring 2007	Spring 2008	Spring 2009	Spring 2010	Spring 2011	Spring 2012
Managed fields	47.5 (33.0)	15.0 (13.3)	32.6 (21.1)	14.9 (23.9)	21.8 (17.6)	37.1 (15.6)
Control fields	36.5 (36.1)	12.4 (15.5)	7.2 (5.0)	15.1 (12.6)	9.5 (7.0)	23.0 (12.4)
	Summer 2007	**Summer 2008**	**Summer 2009**	**Summer 2010**	**Summer 2011**	**Summer 2012**
Managed fields	86.4 (105.3)	28.2 (18.9)	69.5 (66.9)	24.9 (23.9)	6.9 (0.7)	68.7 (60.0)
Control fields	9.5 (7.4)	8.8 (6.1)	3.7 (3.4)	8.7 (10.7)	8.8 (0.7)	18.8 (8.6)
	Autumn 2007	**Autumn 2008**	**Autumn 2009**	**Autumn 2010**	**Autumn 2011**	**Autumn 2012**
Managed fields	10.4 (5.4)	34.7 (15.0)	60.9 (25.5)	56.1 (39.2)	22.9 (30.9)	76.3 (33.6)
Control fields	1.2 (1.9)	5.0 (3.0)	15.8 (11.0)	24.7 (19.4)	17.8 (11.5)	38.3 (9.8)
	Winter 07/08	**Winter 08/09**	**Winter 09/10**	**Winter 10/11**	**Winter 11/12**	**Winter 12/13**
Managed fields	10.8 (11.9)	38.6 (11.9)	23.3 (10.8)	71.8 (41.4)	48.3 (43.9)	63.8 (14.0)
Control fields	2.1 (2.4)	7.5 (1.7)	10.8 (7.3)	20.0 (15.3)	17.9 (9.8)	46.8 (14.3)

Shallow water habitat (SWH)

3.12. The management practice of different fields of SWH started in different months in the

current study period (Table 11).

Table 11. Total area of managed SWH in the core and northern part of Long Valley from March 2012 to February 2013.

Months	Total area of managed fields (m^2)
March	27,354
April	27,354
May	30,054
June	30,054
July	30,054
August	28,447
September	27,458
October	27,458
November	27,458
December	27,458
January	27,458
February	27,458

3.13. The management practice of SWH included marsh management, water level maintenance and plowing and weeding.

3.14. The mean bird density of 2012 had 9% and 131% increase in autumn and winter respectively compared with the previous year whereas there were 46% and 7% decrease in spring and summer (Table 12).

Table 12. Mean (SD) bird density (per 10,000 m^2) in managed SWH from spring 2007 to winter 2012/13.

	2007 (07/08 for winter)	2008 (08/09 for winter)	2009 (09/10 for winter)	2010 (10/11 for winter)	2011 (11/12 for winter)	2012 (12/13 for winter)
Spring	21.0 (19.9)	11.4 (12.4)	26.4 (19.2)	14.9 (10.5)	37.3 (20.2)	20.3 (11.7)
Summer	10.2 (12.0)	15.7 (8.5)	20.4 (14.9)	5.3 (4.7)	18.7 (12.9)	17.3 (10.3)
Autumn	5.6 (4.6)	24.3 (13.2)	30.7 (11.3)	41.9 (12.5)	58.8 (28.1)	63.9 (27.4)
Winter	2.1 (1.6)	26.0 (15.7)	18.5 (12.4)	29.2 (19.3)	34.2 (16.7)	79.1 (34.1)

Fish/Marsh pond (FMP)

3.15. The managed area of FMP remained at 12,462 m^2 in the current study period (Table 13). These practices included marsh management and water lily planting.

Table 13. Total area of managed fish/marsh pond in the core and northern part of Long Valley in from March 2012 to February 2013.

Months	Total area of managed fields (m^2)
March	12,462
April	12,462
May	12,462
June	12,462
July	12,462
August	12,462
September	12,462

October	12,462
November	12,462
December	12,462
January	12,462
February	12,462

3.16. The mean bird densities in managed FMP recorded in 2012 increased from 2011 by 207%, 269%, 287% and 444% in spring, summer, autumn and winter respectively (Table 14).

Table 14. Mean (SD) bird density (per 10,000 m^2) in managed FMP and its control fields from spring 2008 to winter 2012/13.

	Spring 2008	Spring 2009	Spring 2010	Spring 2011	Spring 2012
Managed fields	1.0 (0.9)	13.3 (7.9)	11.1 (8.4)	7.5 (2.7)	23.0 (12.4)
Control fields	0.1 (0.1)	4.5 (3.9)	4.8 (4.6)	12.2 (6.2)	3.7 (4.2)
	Summer 2008	Summer 2009	Summer 2010	Summer 2011	Summer 2012
Managed fields	1.5 (2.0)	14.6 (8.3)	5.9 (3.1)	5.1 (2.2)	18.8 (8.6)
Control fields	0.3 (0.2)	3.0 (2.7)	12.4 (13.5)	4.4 (4.9)	1.7 (2.2)
	Autumn 2008	Autumn 2009	Autumn 2010	Autumn 2011	Autumn 2012
Managed fields	10.5 (7.2)	9.4 (10.8)	18.6 (12.3)	9.9 (3.5)	38.3 (9.8)
Control fields	2.0 (2.8)	0.9 (1.7)	12.7 (15.5)	7.3 (5.2)	4.7 (3.7)
	Winter 08/09	Winter 09/10	Winter 10/11	Winter 11/12	Winter 12/13
Managed fields	23.1 (16.7)	18.2 (16.1)	27.2 (16.9)	8.6 (2.0)	46.8 (14.3)
Control fields	5.0 (3.1)	1.4 (1.4)	15.7 (13.6)	16.2 (29.8)	6.1 (5.9)

Water flea pond (WFP)

3.17. In the period from March 2012 to February 2013, five WFP of total area 5,946 m^2 were managed. Water level management, fertilizers and fish stocking were done in this period.

3.18. The mean bird density in managed WFP rose from previous years by 21%, 35% and 11% in summer, autumn and winter while the mean density dropped by 1% in spring (Table 15).

Table 15. Mean (SD) bird density (per 10,000 m^2) in WFP from spring to spring 2007 to winter 2012/13.

	2007 (07/08 for winter)	2008 (08/09 for winter)	2009 (09/10 for winter)	2010 (10/11 for winter)	2011 (11/12 for winter)	2012 (12/13 for winter)
Spring	0.5 (0.4)	0.43 (0.42)	15.0 (9.8)	45.8 (25.7)	26.7 (28.4)	26.4 (27.2)
Summer	1.1 (1.2)	2.0 (2.6)	5.2 (4.5)	9.5 (6.9)	10.5 (4.7)	12.7 (12.8)
Autumn	4.6 (2.3)	24.2 (17.7)	26.0 (17.9)	32.4 (21.6)	40.8 (26.2)	55.2 (20.9)
Winter	4.0 (2.0)	33.1 (16.5)	33.7 (19.6)	47.0 (26.8)	34.7 (18.8)	38.4 (11.7)

4. Discussion

4.1. The management in the agricultural fields of Long Valley was effective in attracting birds, in particular autumn passage migrant and winter visitors. Of particular interest, there were 52%, 28% and 43% increases in the mean number of in September, November and December compared that in 2011 in the core part of Long Valley. Not only abundance, the diversity of birds in autumn and winter recorded was also higher than previous years. High diversity of passage migrants and winter visitors were

recorded in November and December 2012, as high as 77 species were recorded in the core part of Long Valley on 4 December 2012 that was the highest number of species recorded since the bird monitoring program in Long Valley started in 2005. Moreover, the monthly cumulative number of species recorded in October, November and December 2012 were very high, i.e. 100, 97 and 94 respectively. This indicated that Long Valley is important for many passage migrants and winter visitors.

4.2. It was successful to attract seed-eating birds by planting paddy rice in autumn 2011, it remained effective in autumn 2012. Nine bunting species were recorded by regular survey and bird watchers including Black-headed, Black-faced Chestnut-eared, Little, Rustic, Yellow-breasted, Yellow-browed, Pallas's Reed and Chestnut Bunting. Moreover, other seed-eating species, including White-rumped Munia and Scaly-breasted Munia, were also attracted. It is recommended that planting rice paddy should be continued so as to provide food resources and microhabitats for passage migrants and winter visitors.

4.3. The bird abundance in managed fields increased from previous years in all seasons that indicated the management was effective to enhance bird abundance. Of particular interest, there was over two times increase in the density of birds in managed fields in summer 2012 compared to that in summer 2011. High number of resident were recorded including Barn Swallow, Chinese Bulbul, Eurasian Tree Sparrow, Red-whiskered Bulbul, Scaly-breasted Munia and White-rumped Munia that may reveal that Long Valley serves as an important habitat for local breeding bird species. Very high number of Eurasian Tree Sparrow and munias were recorded in July and August 2012, that may be attributed by the ripe paddy rice during that period. (The high number of sparrows and munias may also due to the first season(早造) of paddy rice which is ready for harvest in Jul-Aug).

4.4. The bird abundance in managed LI-WAL and FP were high in the study period. For managed LI-WAL, there were obvious increase in the density of birds in summer and autumn, whereas there were significant increase in the density of birds in all season for managed FP. Owing to the high cost of past management activities, including fish stocking and drain-down, the management changed to marsh pond management and planting of water-lily. High abundance of waterbirds were recorded in managed FP including Chinese Pond Heron, Common Moorhen, Common Teal, Greater Painted Snipe, Little Egret, Little Grebe, White-breasted Waterhen and Wood Sandpiper that indicated the change of management practice was effective to attract birds, this management practice should be continued so as to explore the effectiveness for a longer period of time.

4.5. Despite intensive bird surveys have been conducted since 2005, there has been eight species newly recorded in Long Valley. This showed that a number of new species of birds will likely to be discovered in future surveys.

4.6. Intensive surveys have been conducted since 2008 in agricultural lands in the northern part of Long Valley, there was still an increasing trend in the mean abundance and diversity recorded. There has been more area under management in the northern part of Long Valley under this project, which may contribute to the increase of bird abundance and diversity in the area.

4.7. There are some notable sightings recorded from spring 2012 to winter 2012/13 (Status follows Carey et. al. 2001 unless stated otherwise). They include:

Black-headed Bunting
Only two individuals were recorded before 2002. One individual was recorded by the survey on 5 Nov 12. The species was regularly sighted and photographed during Oct to Jan.

Black-faced Spoonbill
Common winter visitor to Deep Bay and listed as Endangered in IUCN red list. Ten individual was recorded on 12 Dec 12, and one individual was recorded on 18 Dec 12, 21 Jan 12 and 18 Feb 12.

Collared Crow
Uncommon and localised resident and listed as Near Threatened in IUCN red list. The species were regularly recorded in small number (max. 4 individuals) in spring, autumn and winter throughout the reporting period.

Crested Bunting
This species was once a common resident but now is rare. One individual was detected on 21 Jan 13.

Eurasian Siskin
Scarce winter visitor. This is a new record in Long Valley. Sighted by bird watchers on 23 Oct 12

Greater Short-toed Lark
Only one record in 1982. One was photographed at Long Valley on 31 March 2012. This is a new record of Long Valley but condition of the bird suggests that might have an ex-captive or released origin.

Hainan Blue Flycatcher
Uncommon summer visitor and passage migrant. One individual was recorded in *feng-shui* wood on 23 Apr 12.

Mandarin Duck
Previously a rare winter visitor yet current status uncertain. One individual was found 2 Nov 12.

Pallas's Reed Bunting
One individual was photographed by birdwatcher on 12 Nov 12. This is a first record in Long Valley.

Red-backed Shrike
This is a new record in Long Valley. Photo taken by a bird photographer on 30 Sep 12.

Red-headed Bunting
This species was recently accepted by the Records Committee as Category I species of the HK bird list. Two individuals were recorded in Jan 2013.

Rosy Pipit
One individual was recorded 29 Oct 12. This is the third record of this species in Hong Kong.

Speckled Piculet
One individual was photographed by birdwatcher on 7 Jul 12. This is a first record in Long Valley.

Verditer Flycatcher
Scarce winter visitor. One individual was photographed by birdwatcher on 22 Nov 12. This is the first record of this species in Long Valley.

Yellow-legged Button-quail
Scarce passage migrant and rare winter visitor. One individual was recorded on 15 Oct 12.

5. References

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. and Young, L. (2001): The Avifauna of Hong Kong. Hong Kong Bird Watching Society, Hong Kong.

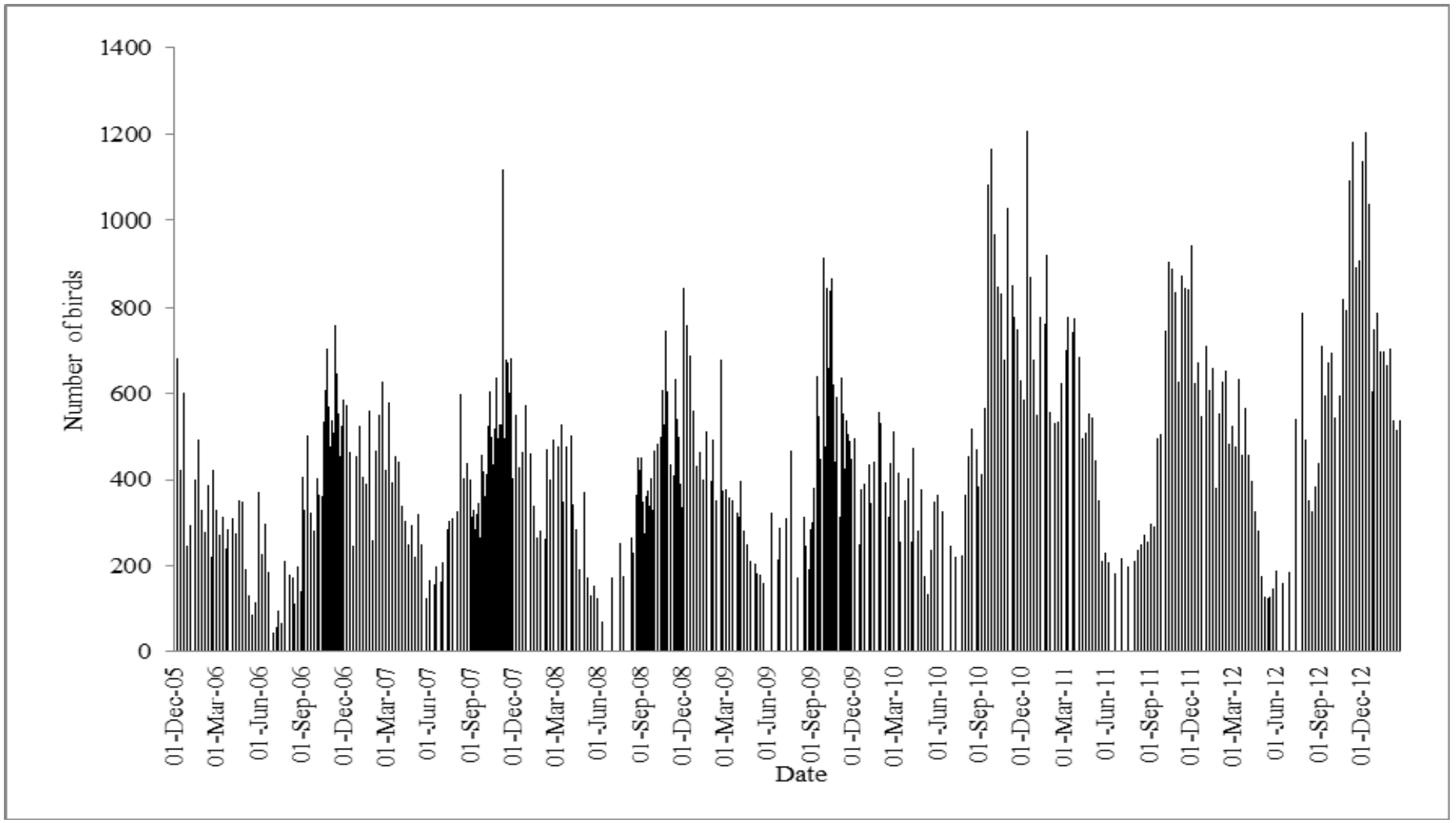

Figure 4. Total numbers of birds recorded in the core part of Long Valley from December 2005 to February 2013.

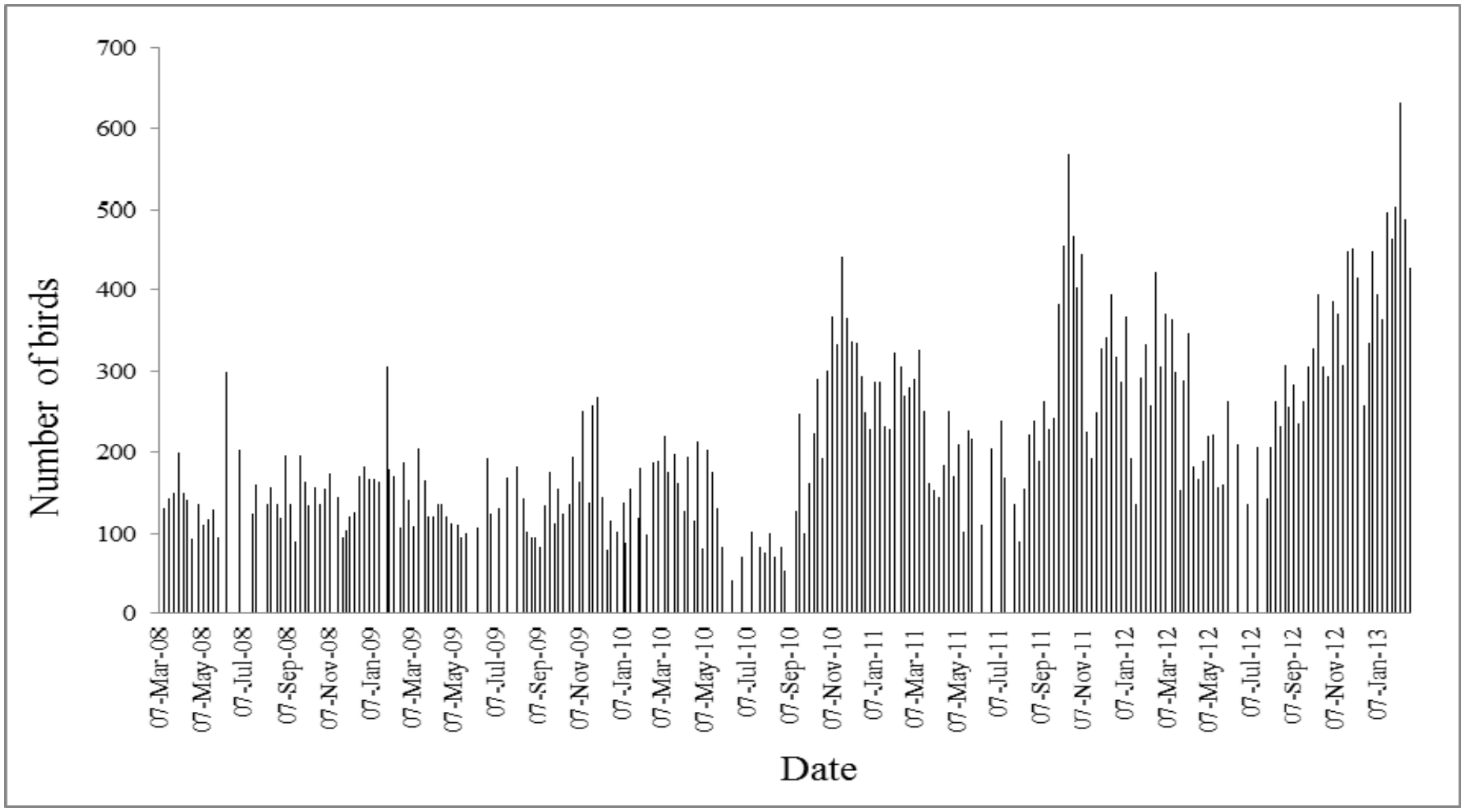

Figure 5. Total number of birds recorded in the northern part of Long Valley from March 2008 to February 2013.

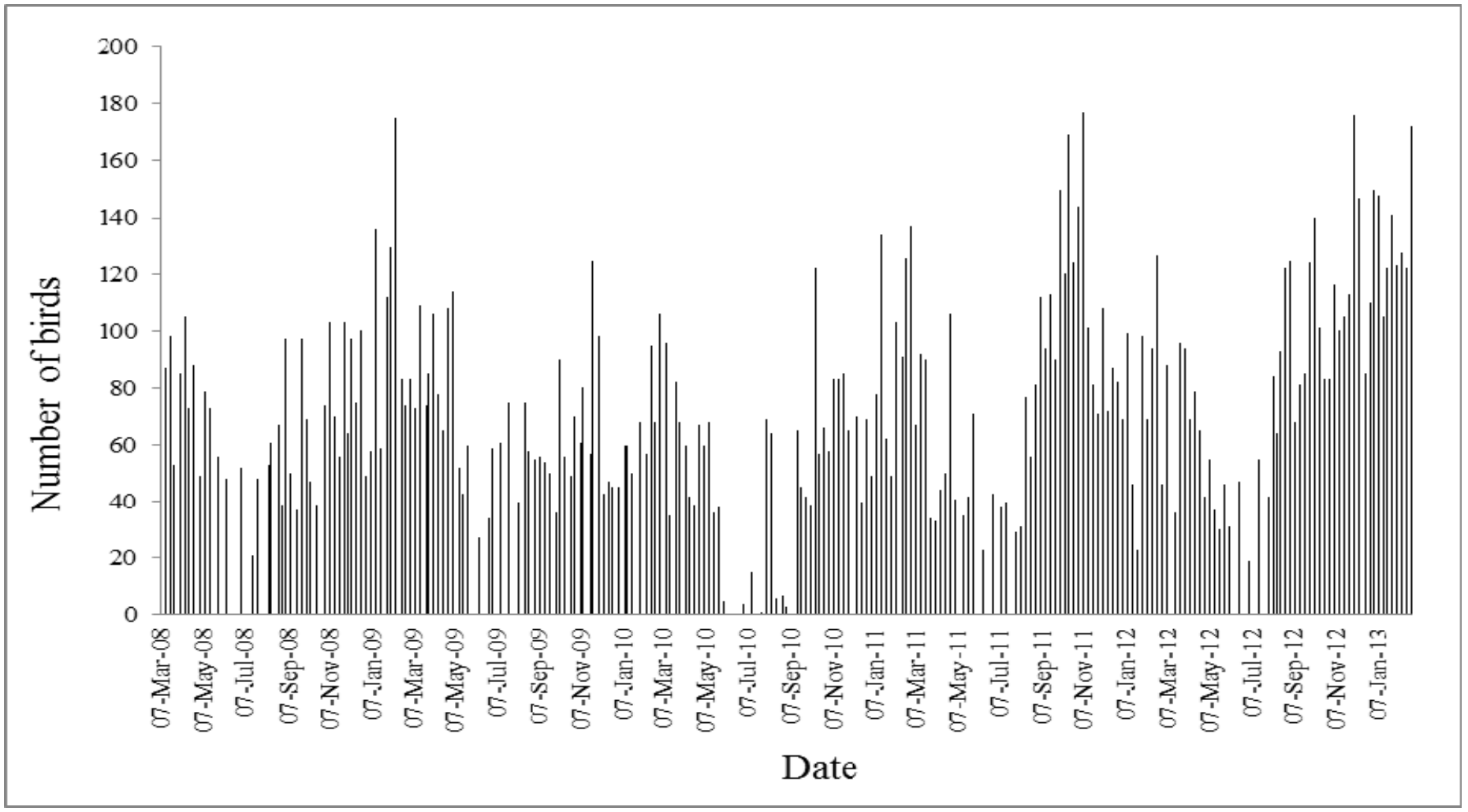

Figure 6. Total number of birds recorded in the *feng-shui* Wood of the northern part of Long Valley from March 2008 to February 2013.

Appendix

Appendix 1. List of bird species and their average abundance recorded in regular bird survey in the core part of Long Valley during March 2012 to February 2013.

Number	English Name	Scientific Name	Average abundance
2	Japanese Quail	*Coturnix japonica*	0.18
10	Mandarin Duck	*Aix galericulata*	0.04
14	Eurasian Wigeon	*Anas penelope*	0.02
20	Northern Pintail	*Anas acuta*	0.02
21	Garganey	*Anas querquedula*	0.10
41	Little Grebe	*Tachybaptus ruficollis*	0.63
42	Great Egret	*Podiceps cristatus*	0.73
51	Black-faced Spoonbill	*Platalea minor*	0.08
53	Yellow Bittern	*Ixobrychus sinensis*	0.14
53	Yellow Wagtail	*Ixobrychus sinensis*	9.00
55	Cinnamon Bittern	*Ixobrychus cinnamomeus*	0.06
59	Black-crowned Night Heron	*Nycticorax nycticorax*	0.02
61	Chinese Pond Heron	*Ardeola bacchus*	8.45
63	Grey Heron	*Ardea cinerea*	0.45
64	Purple-backed Starling	*Ardea purpurea*	0.02
66	Intermediate Egret	*Egretta intermedia*	0.16
66	Japanese Bush Warbler	*Egretta intermedia*	0.02
67	Little Egret	*Egretta garzetta*	4.00
77	Great Cormorant	*Phalacrocorax carbo*	0.02
83	Black Kite	*Milvus migrans*	0.35
87	Crested Serpent Eagle	*Spilornis cheela*	0.02
90	Crested Goshawk	*Accipiter trivirgatus*	0.02
92	Japanese Sparrowhawk	*Accipiter gularis*	0.02
93	Besra	*Accipiter virgatus*	0.02
102	Common Kestrel	*Falco tinnunculus*	0.24
105	Peregrine Falcon	*Falco peregrinus*	0.04
107	Slaty-breasted Rail	*Gallirallus striatus*	0.08
111	White-breasted Waterhen	*Amaurornis phoenicurus*	5.71
113	Ruddy-breasted Crake	*Porzana fusca*	0.20
117	Common Moorhen	*Gallinula chloropus*	1.69
121	Yellow-legged Button-quail	*Turnix tanki*	0.04
125	Black-winged Stilt	*Himantopus himantopus*	5.18
126	Pied Avocet	*Recurvirostra avosetta*	1.84
133	Little Ringed Plover	*Charadrius dubius*	2.55
139	Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	0.06

141	Pintail Snipe	*Gallinago stenura*	1.82
142	Swinhoe's Snipe	*Gallinago megala*	0.16
143	Common Snipe	*Gallinago gallinago*	7.65
149	Whimbrel	*Numenius phaeopus*	0.02
152	Spotted Redshank	*Tringa erythropus*	0.39
153	Common Redshank	*Tringa totanus*	0.02
154	Marsh Sandpiper	*Tringa stagnatilis*	0.08
155	Common Greenshank	*Tringa nebularia*	0.59
158	Green Sandpiper	*Tringa ochropus*	0.88
159	Wood Sandpiper	*Tringa glareola*	10.76
162	Common Sandpiper	*Actitis hypoleucos*	0.35
168	Little Swift	*Calidris minuta*	0.76
170	Long-toed Stint	*Calidris subminuta*	0.04
198	Cattle Egret	*Hydroprogne caspia*	0.61
201	Alexandrine Parakeet	*Onychoprion aleuticus*	0.06
202	Bright-capped Cisticola	*Onychoprion anaethetus*	0.10
215	Oriental Turtle Dove	*Streptopelia orientalis*	0.14
216	Eurasian Collared Dove	*Streptopelia decaocto*	0.04
217	Red Turtle Dove	*Streptopelia tranquebarica*	0.14
218	Spotted Dove	*Spilopelia chinensis*	7.20
226	Greater Coucal	*Centropus sinensis*	0.63
230	Plaintive Cuckoo	*Cacomantis merulinus*	0.35
232	Large Hawk Cuckoo	*Hierococcyx sparverioides*	0.02
236	Indian Cuckoo	*Cuculus micropterus*	0.04
245	Asian Barred Owlet	*Glaucidium cuculoides*	0.08
250	Himalayan Swiftlet	*Aerodramus brevirostris*	0.02
258	White-throated Kingfisher	*Halcyon smyrnensis*	0.86
261	Common Kingfisher	*Alcedo atthis*	1.06
261	Common Koel	*Alcedo atthis*	1.06
261	Common Magpie	*Alcedo atthis*	0.84
263	Pied Kingfisher	*Ceryle rudis*	0.10
268	Eurasian Wryneck	*Jynx torquilla*	0.02
276	Black-winged Cuckoo-shrike	*Coracina melaschistos*	0.02
278	Asian Azure-winged Magpie	*Pericrocotus divaricatus*	0.06
282	Bull-headed Shrike	*Lanius bucephalus*	0.06
283	Brown Shrike	*Lanius cristatus*	0.10
285	Long-tailed Shrike	*Lanius schach*	4.43
288	Black Drongo	*Dicrurus macrocercus*	1.49
302	Collared Crow	*Corvus torquatus*	0.49
303	Large-billed Crow	*Corvus macrorhynchos*	0.29

310	Eurasian Skylark	*Alauda arvensis*	0.20
312	Red-whiskered Bulbul	*Pycnonotus jocosus*	1.67
313	Chinese Bulbul	*Pycnonotus sinensis*	3.02
314	Sooty-headed Bulbul	*Pycnonotus aurigaster*	1.00
319	Pale Martin	*Riparia diluta*	0.06
320	Barn Swallow	*Hirundo rustica*	0.80
322	Asian House Martin	*Delichon dasypus*	0.04
323	Red-rumped Swallow	*Cecropis daurica*	0.18
332	Dusky Warbler	*Phylloscopus fuscatus*	5.24
335	Chinese Penduline Tit	*Phylloscopus yunnanensis*	0.10
337	Yellow-browed Warbler	*Phylloscopus inornatus*	0.53
350	Oriental Reed Warbler	*Acrocephalus orientalis*	0.76
351	Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	0.59
361	Lanceolated Warbler	*Locustella lanceolata*	0.16
362	Pallas's Grasshopper Warbler	*Locustella certhiola*	0.37
366	Zitting Cisticola	*Cisticola juncidis*	2.22
368	Yellow-bellied Prinia	*Prinia flaviventris*	4.86
369	Plain Prinia	*Prinia inornata*	4.69
370	Common Tailorbird	*Orthotomus sutorius*	0.49
370	Common Teal	*Orthotomus sutorius*	0.31
376	Masked Laughingthrush	*Garrulax perspicillatus*	2.45
377	Greater Painted Snipe	*Garrulax pectoralis*	2.57
388	Japanese White-eye	*Zosterops japonicus*	1.12
390	Crested Myna	*Acridotheres cristatellus*	5.10
391	Common Myna	*Acridotheres tristis*	0.20
392	Red-billed Starling	*Spodiopsar sericeus*	1.00
393	White-cheeked Starling	*Spodiopsar cineraceus*	0.33
394	Black-collared Starling	*Gracupica nigricollis*	7.61
397	White-shouldered Starling	*Sturnia sinensis*	0.27
400	Common Stonechat	*Sturnus vulgaris*	6.20
405	Grey-backed Thrush	*Turdus hortulorum*	0.14
407	Common Blackbird	*Turdus merula*	0.96
407	Common Buzzard	*Turdus merula*	0.18
409	Pale Thrush	*Turdus pallidus*	0.10
413	Dusky Thrush	*Turdus eunomus*	0.04
417	Bluethroat	*Luscinia svecica*	0.31
418	Siberian Rubythroat	*Luscinia calliope*	0.33
421	Red-flanked Bluetail	*Tarsiger cyanurus*	0.02
422	Oriental Magpie Robin	*Copsychus saularis*	3.27
425	Daurian Redstart	*Phoenicurus auroreus*	0.65

437	Asian Brown Flycatcher	*Muscicapa dauurica*	0.10
447	Red-throated Flycatcher	*Ficedula albicilla*	0.04
462	Eurasian Tree Sparrow	*Passer montanus*	2.33
464	White-rumped Munia	*Lonchura striata*	1.49
465	Scaly-breasted Munia	*Lonchura punctulata*	4.45
467	Forest Wagtail	*Dendronanthus indicus*	0.02
469	Citrine Wagtail	*Motacilla citreola*	0.33
470	Grey Wagtail	*Motacilla cinerea*	0.27
471	White Wagtail	*Motacilla alba*	11.24
472	Richard's Pipit	*Anthus richardi*	1.33
472	Rock Dove	*Anthus richardi*	0.71
474	Olive-backed Pipit	*Anthus hodgsoni*	1.80
475	Pechora Pipit	*Anthus gustavi*	0.04
476	Rosy Pipit	*Anthus roseatus*	0.02
477	Red-throated Pipit	*Anthus cervinus*	3.24
478	Buff-bellied Pipit	*Anthus rubescens*	0.20
479	Water Rail	*Anthus spinoletta*	0.10
482	Grey-capped Greenfinch	*Carduelis sinica*	0.02
487	Crested Bunting	*Emberiza lathami*	0.02
490	Chestnut-eared Bunting	*Emberiza fucata*	0.59
491	Little Bunting	*Emberiza pusilla*	0.33
492	Yellow-browed Bunting	*Emberiza chrysophrys*	0.04
493	Rustic Bunting	*Emberiza rustica*	0.02
495	Yellow-breasted Bunting	*Emberiza aureola*	0.63
496	Chestnut Bunting	*Emberiza rutila*	0.02
497	Black-headed Bunting	*Emberiza melanocephala*	0.02
499	Black-faced Bunting	*Emberiza spodocephala*	0.37

Appendix 2. List of bird species recorded in regular bird survey in the northern part of Long Valley during March 2012 to February 2013.

Number	English ame	Scientific name	Average abundance
2	Japanese Quail	*Coturnix japonica*	0.08
21	Garganey	*Anas querquedula*	0.08
41	Little Grebe	*Tachybaptus ruficollis*	0.94
42	Great Egret	*Podiceps cristatus*	0.22
53	Yellow Bittern	*Ixobrychus sinensis*	0.20
53	Yellow Wagtail	*Ixobrychus sinensis*	7.49
55	Cinnamon Bittern	*Ixobrychus cinnamomeus*	0.04
59	Black-crowned Night Heron	*Nycticorax nycticorax*	0.49
61	Chinese Pond Heron	*Ardeola bacchus*	7.61
63	Grey Heron	*Ardea cinerea*	1.10
64	Purple Heron	*Ardea purpurea*	0.02
66	Japanese Bush Warbler	*Egretta intermedia*	0.02
67	Little Egret	*Egretta garzetta*	2.76
77	Great Cormorant	*Phalacrocorax carbo*	0.14
83	Black Kite	*Milvus migrans*	0.35
93	Besra	*Accipiter virgatus*	0.04
100	Bonelli's Eagle	*Aquila fasciata*	0.04
102	Common Kestrel	*Falco tinnunculus*	0.16
111	White-breasted Waterhen	*Amaurornis phoenicurus*	3.12
117	Common Moorhen	*Gallinula chloropus*	2.08
125	Black-winged Stilt	*Himantopus himantopus*	0.82
126	Pied Avocet	*Recurvirostra avosetta*	0.29
133	Little Ringed Plover	*Charadrius dubius*	1.47
139	Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	0.04
141	Pintail Snipe	*Gallinago stenura*	0.37
143	Common Snipe	*Gallinago gallinago*	1.94
153	Common Redshank	*Tringa totanus*	0.08
154	Marsh Sandpiper	*Tringa stagnatilis*	0.47
155	Common Greenshank	*Tringa nebularia*	0.45
158	Green Sandpiper	*Tringa ochropus*	0.69
159	Wood Sandpiper	*Tringa glareola*	7.43
162	Common Sandpiper	*Actitis hypoleucos*	0.78
168	Little Swift	*Calidris minuta*	0.61
198	Cattle Egret	*Hydroprogne caspia*	3.82
215	Oriental Turtle Dove	*Streptopelia orientalis*	1.27
218	Spotted Dove	*Spilopelia chinensis*	8.69
226	Greater Coucal	*Centropus sinensis*	0.39

230	Plaintive Cuckoo	*Cacomantis merulinus*	0.27
232	Large Hawk Cuckoo	*Hierococcyx sparverioides*	0.10
236	Indian Cuckoo	*Cuculus micropterus*	0.06
258	White-throated Kingfisher	*Halcyon smyrnensis*	1.04
261	Common Kingfisher	*Alcedo atthis*	1.65
261	Common Koel	*Alcedo atthis*	0.61
261	Common Magpie	*Alcedo atthis*	1.04
263	Pied Kingfisher	*Ceryle rudis*	1.20
266	Eurasian Hoopoe	*Upupa epops*	0.04
268	Eurasian Wryneck	*Jynx torquilla*	0.02
283	Brown Shrike	*Lanius cristatus*	0.04
285	Long-tailed Shrike	*Lanius schach*	2.41
288	Black Drongo	*Dicrurus macrocercus*	0.47
303	Large-billed Crow	*Corvus macrorhynchos*	0.24
305	Yellow-billed Grosbeak	*Periparus venustulus*	0.16
306	Great Tit	*Parus major*	0.82
312	Red-whiskered Bulbul	*Pycnonotus jocosus*	21.06
313	Chinese Bulbul	*Pycnonotus sinensis*	32.51
314	Sooty-headed Bulbul	*Pycnonotus aurigaster*	2.71
320	Barn Swallow	*Hirundo rustica*	13.41
332	Dusky Warbler	*Phylloscopus fuscatus*	4.02
336	Pallas's Leaf Warbler	*Phylloscopus proregulus*	0.35
337	Yellow-browed Warbler	*Phylloscopus inornatus*	1.35
339	Arctic Warbler	*Phylloscopus borealis*	0.06
350	Oriental Reed Warbler	*Acrocephalus orientalis*	0.12
351	Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	0.10
360	Russet Bush Warbler	*Bradypterus mandelli*	0.02
362	Pallas's Grasshopper Warbler	*Locustella certhiola*	0.02
366	Zitting Cisticola	*Cisticola juncidis*	2.39
368	Yellow-bellied Prinia	*Prinia flaviventris*	3.00
369	Plain Prinia	*Prinia inornata*	0.90
370	Common Tailorbird	*Orthotomus sutorius*	1.06
370	Common Teal	*Orthotomus sutorius*	3.27
376	Masked Laughingthrush	*Garrulax perspicillatus*	14.73
377	Greater Painted Snipe	*Garrulax pectoralis*	0.14
388	Japanese White-eye	*Zosterops japonicus*	14.51
390	Crested Myna	*Acridotheres cristatellus*	16.06
391	Common Myna	*Acridotheres tristis*	0.94
392	Red-billed Starling	*Spodiopsar sericeus*	6.71
393	White-cheeked Starling	*Spodiopsar cineraceus*	3.98

394	Black-collared Starling	*Gracupica nigricollis*	13.02
397	White-shouldered Starling	*Sturnia sinensis*	0.86
400	Common Stonechat	*Sturnus vulgaris*	3.57
405	Grey-backed Thrush	*Turdus hortulorum*	0.71
406	Japanese Thrush	*Turdus cardis*	0.12
407	Common Blackbird	*Turdus merula*	2.14
407	Common Buzzard	*Turdus merula*	0.16
417	Bluethroat	*Luscinia svecica*	0.02
418	Siberian Rubythroat	*Luscinia calliope*	0.47
421	Red-flanked Bluetail	*Tarsiger cyanurus*	0.04
422	Oriental Magpie Robin	*Copsychus saularis*	6.55
425	Daurian Redstart	*Phoenicurus auroreus*	1.10
437	Asian Brown Flycatcher	*Muscicapa dauurica*	0.22
458	Scarly-breasted Munia	*Dicaeum cruentatum*	0.41
460	Fork-tailed Sunbird	*Aethopyga christinae*	0.04
462	Eurasian Tree Sparrow	*Passer montanus*	21.98
464	White-rumped Munia	*Lonchura striata*	0.04
465	Scaly-breasted Munia	*Lonchura punctulata*	8.90
468	Emerald Dove	*Motacilla tschutschensis*	0.04
469	Citrine Wagtail	*Motacilla citreola*	0.29
471	White Wagtail	*Motacilla alba*	9.18
472	Richard's Pipit	*Anthus richardi*	2.90
474	Olive-backed Pipit	*Anthus hodgsoni*	15.88
477	Red-throated Pipit	*Anthus cervinus*	2.78
479	Water Rail	*Anthus spinoletta*	0.02
490	Chestnut-eared Bunting	*Emberiza fucata*	0.06
491	Little Bunting	*Emberiza pusilla*	1.76
495	Yellow-breasted Bunting	*Emberiza aureola*	0.41
499	Black-faced Bunting	*Emberiza spodocephala*	1.12

Appendix 3. List of bird species recorded in regular bird survey in *Feng-shui* Wood of the northern part of Long Valley during March 2012 to February 2013.

Number	English Name	Scientific Name	Average abundance
1	Chinese Francolin	*Francolinus pintadeanus*	0.08
93	Besra	*Accipiter virgatus*	0.02
168	Little Swift	*Calidris minuta*	1.84
215	Oriental Turtle Dove	*Streptopelia orientalis*	0.51
218	Spotted Dove	*Spilopelia chinensis*	2.90
226	Greater Coucal	*Centropus sinensis*	0.10
227	Lesser Coucal	*Centropus bengalensis*	0.06
230	Plaintive Cuckoo	*Cacomantis merulinus*	0.18
232	Large Hawk Cuckoo	*Hierococcyx sparverioides*	0.22
236	Indian Cuckoo	*Cuculus micropterus*	0.10
245	Asian Barred Owlet	*Glaucidium cuculoides*	0.04
261	Common Koel	*Alcedo atthis*	0.71
283	Brown Shrike	*Lanius cristatus*	0.04
290	Hair-crested Drongo	*Dicrurus hottentottus*	0.51
291	Black-naped Monarch	*Hypothymis azurea*	0.14
305	Yellow-billed Grosbeak	*Periparus venustulus*	0.33
306	Great Tit	*Parus major*	1.47
312	Red-whiskered Bulbul	*Pycnonotus jocosus*	14.76
313	Chinese Bulbul	*Pycnonotus sinensis*	17.37
314	Sooty-headed Bulbul	*Pycnonotus aurigaster*	4.43
332	Dusky Warbler	*Phylloscopus fuscatus*	0.73
336	Pallas's Leaf Warbler	*Phylloscopus proregulus*	0.39
337	Yellow-browed Warbler	*Phylloscopus inornatus*	1.10
338	Hwamei	*Phylloscopus humei*	0.18
339	Arctic Warbler	*Phylloscopus borealis*	0.10
368	Yellow-bellied Prinia	*Prinia flaviventris*	0.12
370	Common Tailorbird	*Orthotomus sutorius*	0.80
376	Masked Laughingthrush	*Garrulax perspicillatus*	1.92
380	White-browed Laughingthrush	*Garrulax sannio*	0.41
388	Japanese White-eye	*Zosterops japonicus*	20.51
393	White-cheeked Starling	*Spodiopsar cineraceus*	0.29
405	Grey-backed Thrush	*Turdus hortulorum*	0.82
406	Japanese Thrush	*Turdus cardis*	0.18
407	Common Blackbird	*Turdus merula*	0.90
418	Siberian Rubythroat	*Luscinia calliope*	0.69
422	Oriental Magpie Robin	*Copsychus saularis*	2.39
425	Daurian Redstart	*Phoenicurus auroreus*	0.12

437	Asian Brown Flycatcher	*Muscicapa dauurica*	0.31
450	Hainan Blue Flycatcher	*Cyornis hainanus*	0.02
458	Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	0.57
460	Fork-tailed Sunbird	*Aethopyga christinae*	2.02
462	Eurasian Tree Sparrow	*Passer montanus*	3.51
468	Emerald Dove	*Motacilla tschutschensis*	0.06
474	Olive-backed Pipit	*Anthus hodgsoni*	6.61
491	Little Bunting	*Emberiza pusilla*	0.08
496	Chestnut Bunting	*Emberiza rutila*	0.06

Appendix 4. The monthly cumulative number of bird species in three areas in Long Valley.

	Core part of Long Valley	Agricultural fields in northern part of Long Valley	*Feng-shui* wood
March 2012	75	59	15
April 2012	68	55	22
May 2012	43	41	20
June 2012	40	34	16
July 2012	44	33	14
August 2012	47	40	17
September 2012	76	44	15
October 2012	100	70	23
November 2012	97	66	21
December 2012	94	69	26
January 2013	78	72	25
February 2013	69	73	21