Bird Ringing Programme at Hong Kong Wetland Park
2017 – 2019

Summary Report (March 2017 to February 2019)

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Content

1. Introduction

Hong Kong Wetland Park (HKWP) is one of the largest ecological mitigation area in the territory to compensate for the wetlands lost due to Tin Shui Wai New Town development in 1980s. The HKWP is 61 hectares in size, and is situated adjacent to the Mai Po and Inner Deep Bay Ramsar Site in the northwestern part of Hong Kong. HKWP was managed to provide habitats for various wildlife, and wetland-dependent birds are one of the most important targets.

Regular bird monitoring is performed in the HKWP in order to document avifauna usage of this wetland area. It is acknowledged that species diversity recorded in the HKWP is noticeable where globally threatened species (e.g. Black-faced Spoonbill) are regularly recorded in the Park, indicating a high ecological importance of the area. The rich diversity of birds also provides many opportunities for public appreciation.

In order to deepen our understanding on the habitat utilization of birds in the HKWP, our society has started bird-ringing programme in the reedbed of the HKWP using mist-netting since March 2017. The programme aimed at supplementing the visual surveys as birds active in the reed bed are difficult to detect. Mist-netting is also known to be effective in surveying rare or skulking species, which are important component for evaluating the ecological value of the habitat.

Carrying out regular mist-netting and bird-ringing would enhance our understanding on the bird composition of wetland-associated birds in the HKWP. The objectives of bird-ringing programme with the HKWP in order to (i) supplement the bird inventory in the HKWP; (ii) estimate the population of bird species.

2. Methodologies

2.1 Study site

Our study was carried out in the reedbed area in the HKWP during the reporting period because (1) birds utilising such habitat are harder to be detected using visual approach; (2) the reedbed forms a relatively large area of dense vegetation where both wintering and breeding birds may utilize; (3) the location is away from the visitation area with minimal disturbance to the public and (4) bird-capturing is logistically easier to arrange. The exact bird-capturing area is shown in Figure 1.

Figure 1. Bird-capturing area in the Hong Kong Wetland Park.

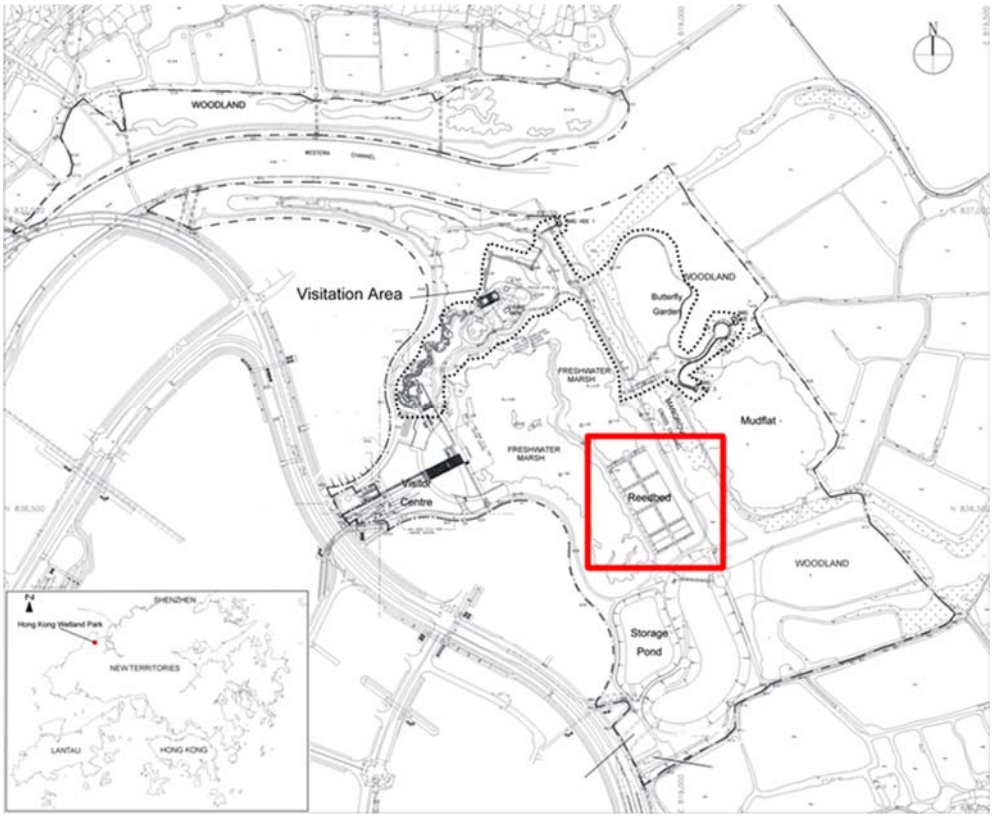
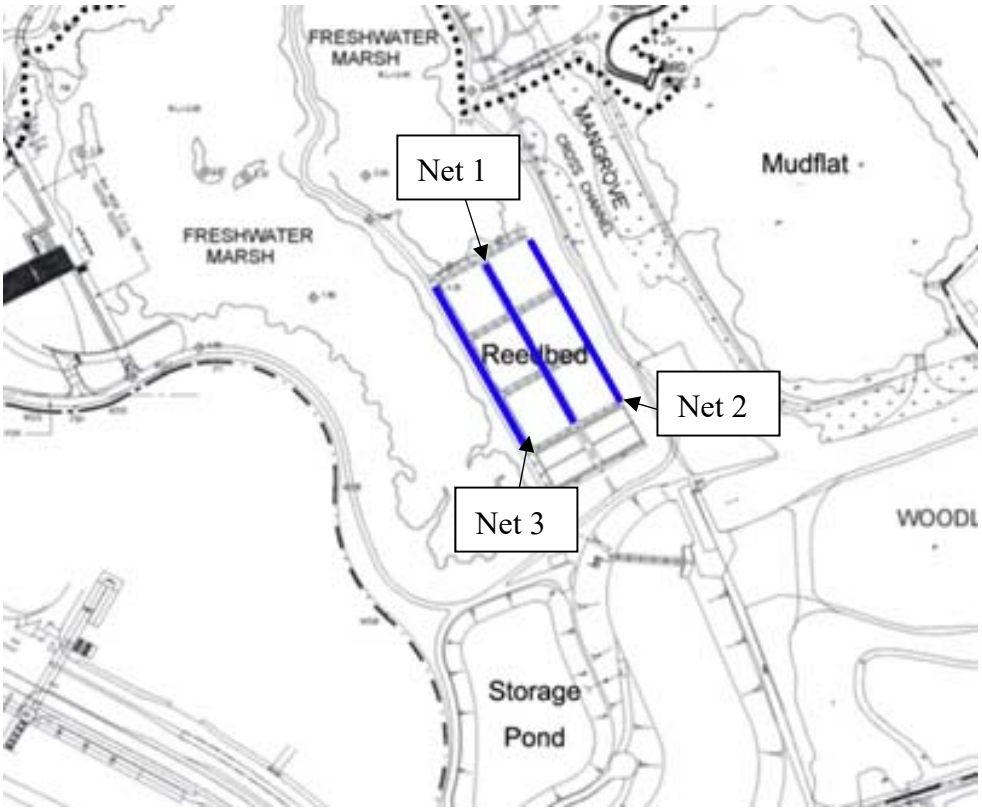


Figure 2. Alignment of mist-net (in blue) in the reedbed area in the Hong Kong Wetland Park.



2.2 Mist-netting and ringing

All capturing activities were conducted on Tuesdays when the HKWP is closed to the public, subject to prior agreement by HKWP. HKWP assisted to arrange necessary preparation works before mist-netting (e.g. grass-cutting, adjustment of water level of reedbed, provision of general materials such as bamboo sticks etc.), subject to prior agreement in a reasonable timeframe. Mist-netting was used to capture birds in each capturing day which started at sunrise until about mid-day. Approximately 300-meters-long mist-net were set up in the reedbed area (Figure 2). The mist-net is 2.5 meters in height and were supported by bamboo sticks and nylon threads, if necessary (Plate 1). Mist-net were regularly checked every hour. All the birds captured were identified, measured, put on a metal ring, recorded and released. Selected bird species were fitted with Darvic coloured rings (with colour and code to be designed), that increases the chance of recovery of these individuals for a home range study (see below). A total of 40 mist-netting surveys was conducted between March 2017 and February 2019 (Table 1). The capture effort is measured in net-hour. One net-hour (nhr) represents the effort of operating a 12m mist-net in an hour (Ralph, 1976).

Table 1. Dates of mist-netting surveys in HKWP between 2017 and 2019

2017	**2018**	**2019**
21/3/2017	23/1/2018	22/1/2019
11/4/2017	30/1/2018	12/2/2019
9/5/2017	6/2/2018	19/2/2019
25/7/2017	13/2/2018	
15/8/2017	13/3/2018	
29/8/2017	27/3/2018	
5/9/2017	10/4/2018	
19/9/2017	12/6/2018	
26/9/2017	26/6/2018	
17/10/2017	10/7/2018	
24/10/2017	17/7/2018	
31/10/2017	21/8/2018	
14/11/2017	4/9/2018	
5/12/2017	11/9/2018	
12/12/2017	9/10/2018	
	23/10/2018	
	30/10/2018	
	13/11/2018	
	20/11/2018	
	27/11/2018	
	18/12/2018	

3. Result

3.1 Number of captures by species in each session

Study period 2017 – 18

A total of 728 individuals were captured in the study period from March 2017 to February 2018, including 543 newly captured individuals and 185 recaptured individuals. The most abundant species captured by the mist-net is Plain Prinia *Prinia inornata* with 120 captured individuals (63 new captures and 57 recaptures). Please see table 2 for the ten most abundant species captured in the study period 2017 - 18.

Table 2. The ten most abundant species captured during study period 2017 - 18.

Species	Status	New captures	Recaptures	Total
Plain Prinia	Resident	63	57	120
Japanese White-eye	Resident & Migrant	75	15	90
Dusky Warbler	Migrant	66	23	89
Yellow-bellied Prinia	Resident	44	27	71
Scaly-breasted Munia	Resident	50	0	50
Black-browed Reed Warbler	Migrant	35	9	44
Chinese Penduline Tit	Migrant	33	1	34
Oriental Reed Warbler	Migrant	25	2	27
Cinereous Tit	Resident & Migrant	16	7	23
Siberian Rubythroat	Migrant	10	13	23

The two prinia species were the most common species captured during study period 2017 – 18. Plain Prinia presented all 20 surveys and Yellow-bellied Prinia *Prinia flaviventris* presented 17 out of 20 surveys. Please see table 3 for the ten most frequently captured species in the study period 2017 - 18.

Table 3. The ten most frequently captured species during study period 2017 – 18.

Species	Status	Frequency
Plain Prinia	Resident	20
Yellow-bellied Prinia	Resident	17
Dusky Warbler	Migrant	14
Black-browed Reed Warbler	Migrant	11
Siberian Rubythroat	Migrant	11
Chinese Penduline Tit	Migrant	9
Stejneger's Stonechat	Migrant	9
Yellow Bittern	Migrant	9
Common Kingfisher	Resident	8
Oriental Reed Warbler	Migrant	8

Study period 2018 – 19

A total of 662 individuals were captured in the study period Mar 2018 to Feb 2019 including 463 new captures and 199 recaptures. The most abundance species captured by the mist-net is Plain Prinia with 105 captured individuals (45 individuals of new captures and 60 recaptures) (Table 4).

Table 4. The ten most abundance species captured during study period 2018 - 19.

Species	**Status**	**New captures**	**Recapture**	**Total**
Plain Prinia	Resident	45	60	105
Yellow-bellied Prinia	Resident	41	57	98
Dusky Warbler	Migrant	58	15	73
Black-browed Reed Warbler	Migrant	37	16	53
Scaly-breasted Munia	Resident	53	0	53
Chinese Penduline Tit	Migrant	49	1	50
Chinese Bulbul	Resident & Migrant	21	2	23
Oriental Reed Warbler	Migrant	17	3	20
Japanese White-eye	Resident & Migrant	9	8	17
Common Kingfisher	Resident	11	4	15

The two prinia species were the most common captured species during study period 2018 – 19. The Plain Prinia presented in a total of 19 out of 20 surveys and the Yellow-bellied Prinia presented in a total of 19 out of 20 surveys. Please see the table 5 for the ten most frequently captured species being captured in the study period 2018 - 19.

Table 5. The ten most frequently captured species during study period 2018 – 19.

Species	**Status**	**Frequency**
Plain Prinia	Resident	19
Yellow-bellied Prinia	Resident	19
Chinese Bulbul	Resident & Migrant	13
Black-browed Reed Warbler	Migrant	11
Dusky Warbler	Migrant	11
Common Kingfisher	Resident	10
Oriental Reed Warbler	Migrant	9
Siberian Rubythroat	Migrant	9
Yellow Bittern	Migrant	9
Scaly-breasted Munia	Resident	8

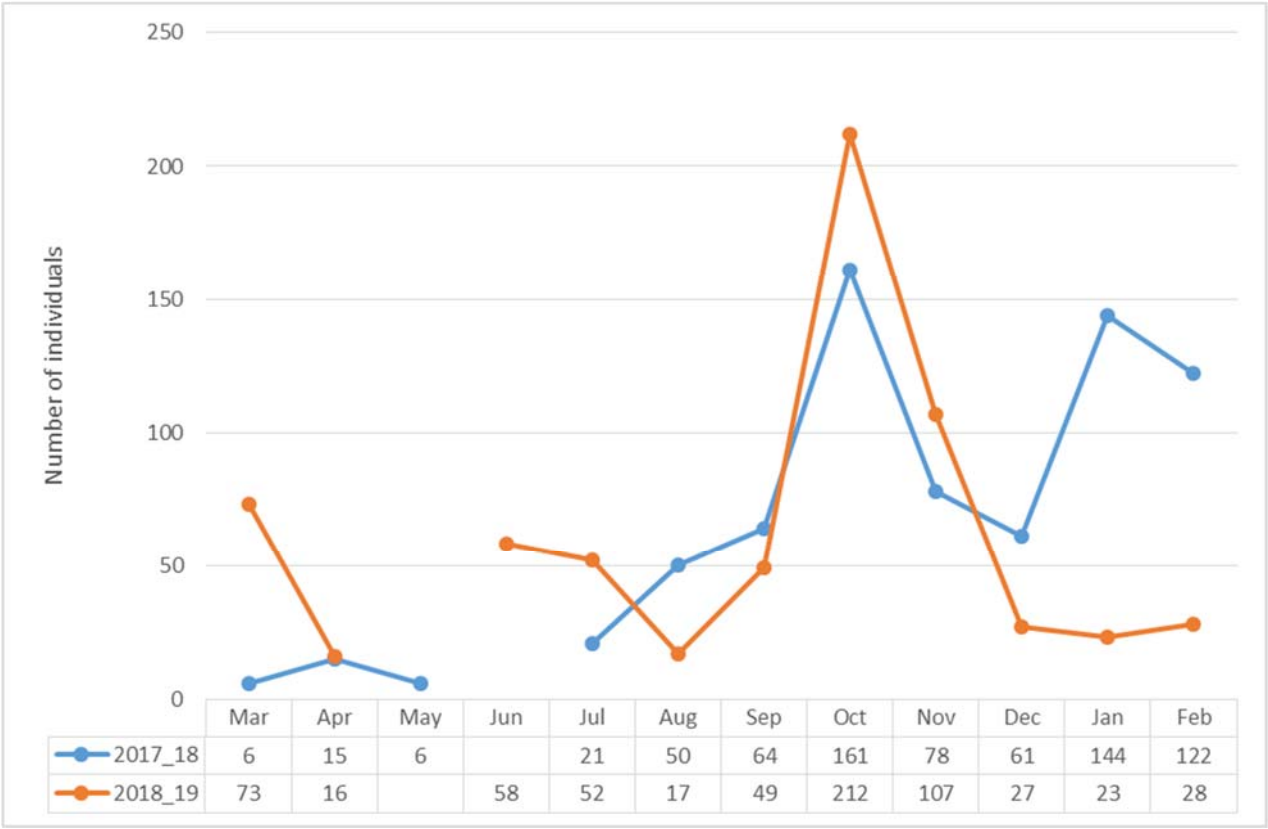
3.2 Species diversity

A total of 65 species was recorded between Mar 2017 and Feb 2019. Among them, 52 species were recorded in the first year and 49 species in second year. The highest species diversity was recorded on 23 Jan 2018 that 20 species was captured.

Species diversity and abundance over time (by month and/or by season)

The highest number of individuals was recorded in October in both 1st year and 2nd year (Figure 3). A total of 161 individuals was recorded in October 2017 and 212 individuals were recorded in October 2018.

Figure 3. Monthly abundance of captured individuals in 2017/18 and 2018/19.

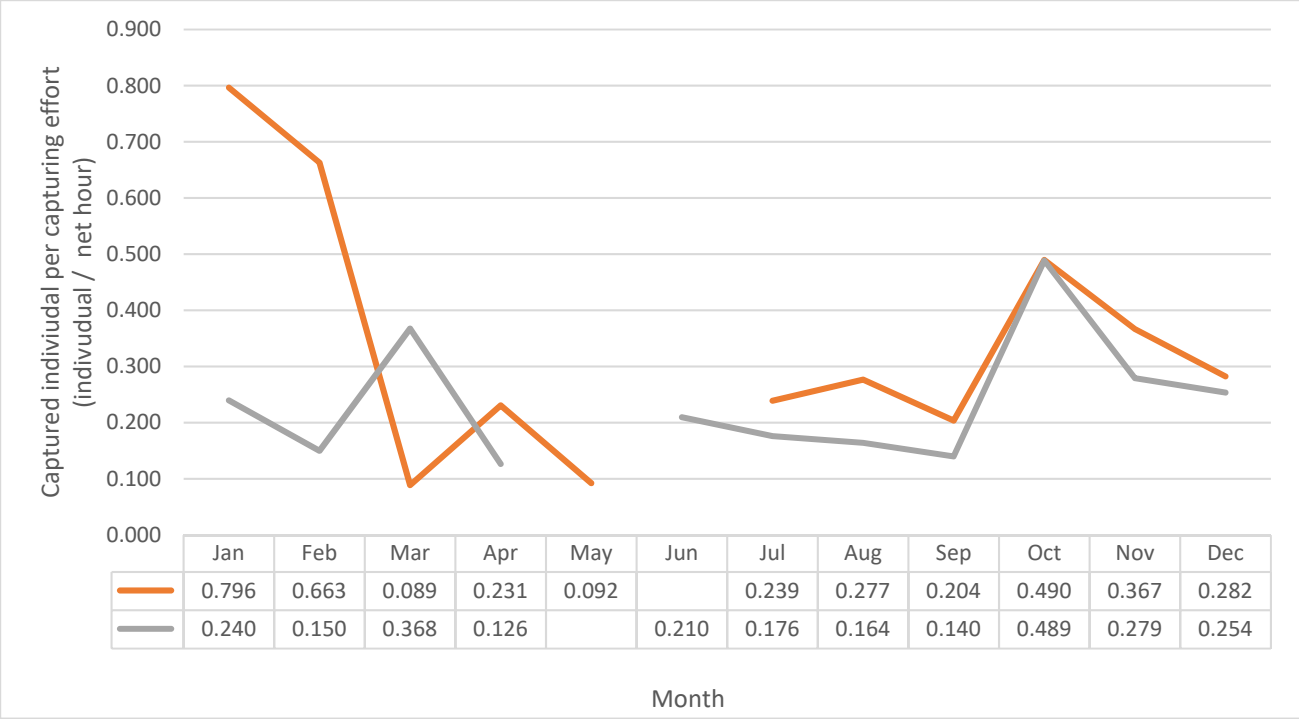


	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
2017_18	6	15	6		21	50	64	161	78	61	144	122
2018_19	73	16		58	52	17	49	212	107	27	23	28

Captured individual vs capturing effort

The captured individual per unit effort is usually used to compare the capture rate between season and site. The lowest capture rate was recorded in spring in both 2017 and 2018 (0.089 individual per nhr in 2017 and 0.126 individual per nhr in 2018) (Figure 4). The highest capture rate was recorded in Jan 2018 with 0.796 individual per nhr in and the highest capture rate was recorded in October 2018 with 0.489 individual per nhr[1] . The capture rate in October of both years were very similar (0.49 in 2017 and 0.489 in 2018).

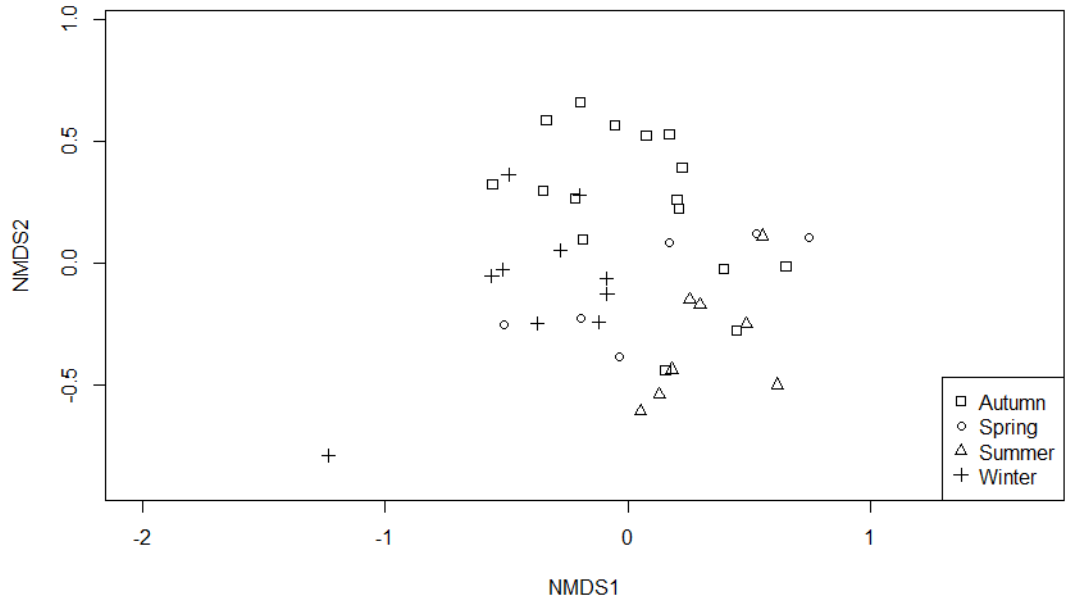
Figure 4. Monthly trend of captured individual per capturing effort in 1st and 2nd year.



3.3 Species community

The Non-metric Multidimensional Scaling (NMDS) is a statistic method commonly used for the analysis of species community versus different environmental factors (Kenkel & Orlóci, 1986). The ANOSIM was used to test the significant of the result of NMDS. The bird composition was shown to vary among seasons according to our NMDS analysis ($p<0.001$) (Figure 5).

Figure 5. NMDS plot of bird community among seasons.



4. Discussion

4.1 Bird composition in reedbeds of HKWP

The most frequently captured species in HKWP was Plain Prinia throughout the reporting period (Table 6). This species was recorded in almost all the surveys with 39 out of 40 surveys between Mar 2017 and Feb 2019. Four species in top 10 commonly recorded in the surveys were resident species in Hong Kong. The two prinia species, Chinese Bulbul *Pycnonotus sinensis* and Common Kingfisher *Alcedo atthis* are local residents which are present in Hong Kong throughout the year. The two prinia species are highly associated with tall grass habitat especially in reedbeds. This explained their high frequency of occurrence in the HKWP (Plain Prinia: 117 out of 225 captured individuals; Yellow-bellied Prinia: 84 out of 169 captured individuals). The Dusky Warbler *Phylloscopus fuscatus* is a common autumn migrant and winter visitor in Hong Kong (Carey et al., 2001). This species is known to inhabit a wide range of habitats, ranged from open country to dense vegetation. The two *Acrocephalus* species, Black-browed Reed Warbler *A. bistrigiceps* and Oriental Reed Warbler *A. orientalis*, are both common autumn migrants and winter visitors in Hong Kong (Carey et al., 2001) which are mostly associated with reedbeds. In our surveys, we captured a large number of individuals during autumn but fewer individuals in winter. It showed a clear seasonal pattern as in Carey et al. (2001). Japanese White-eye *Zosterops japonicas* was the fourth most commonly captured species in the study following the two prinia species and Dusky Warbler. Japanese White-eye was seldom recorded in the study (recorded in 12 out of 40 survey days) with occasional high number of captures. It is uneasy to explain the occasional high number of the Japanese White-eye captured. Japanese White-eye mainly forages for nectar and fruits (van Balen, 2019)

so the flowering and fruiting season of plants growing nearby might explain their activity pattern. The high number of Japanese White-eyes were recorded in two survey within 2 weeks (30 Jan and 6 Feb 2018) may be depend on food source available near the study area with flowering or fruiting plants.

Table 6. Top 10 frequently recorded bird species between 2017 and 2019

Species	**Frequency**
Plain Prinia	39
Yellow-bellied Prinia	36
Dusky Warbler	25
Black-browed Reed Warbler	22
Siberian Rubythroat	20
Chinese Bulbul	19
Common Kingfisher	18
Yellow Bittern	18
Oriental Reed Warbler	17
Stejneger's Stonechat	17

Table 7. Top 10 most abundant bird species between 2017 and 2019

Species	**Number**
Plain Prinia	225
Yellow-bellied Prinia	169
Dusky Warbler	162
Japanese White-eye	107
Scaly-breasted Munia	103
Black-browed Reed Warbler	97
Chinese Penduline Tit	84
Oriental Reed Warbler	47
Siberian Rubythroat	35

4.2 Recommendations on reedbed management in HKWP

The capture rate was changing across months and seasons. The capture rate is much higher in dry season (autumn and winter) than in wet season (spring and summer). The highest capture rate in the study is Jan and Feb in 2018. The cold weather of the year may be the main factor for the high capture rate with higher number of winter visitors presenting in the study area. The seasonal factor is affecting the capture rate of the study area due to the presenting of migrants with both passage migrants and winter visitor especially in autumn and winter.

The two species of reedbed associated species is recorded in the high number during autumn period. Due to the high number presenting of those migrant especially of the two species reedbed associate species, the reedbed management work would be suggested to conduct during early spring period before the breeding season start. The reason why not conduct the management work in summer is that the management work e.g. cutting reeds and remodified substrate of the reedbed may affect the breeding activity in late spring and summer. If the management work conduct in late summer, the working period may not finish before the migration season start and affect the habitat use of migrants.

4.3 Rarities and globally threaten species reports and sightings

Rarities

Tiger Shrike *Lanius tigrinus* (recorded on 11 Sep 2018)

A single individual was recorded in early autumn period. It was a first winter individual with good condition. This species is a rare autumn passage migrant in Hong Kong recorded between 29 Aug and 28 Sep (Hong Kong Bird Watching Society, 2018).

Buff-throated Warbler *Phylloscopus subaffinis* (recorded on 9 Oct 2018)

A single individual was recorded in the net 2. It was a first winter individual with good condition. It will be the first record for Hong Kong, subject to the acceptance of the Hong Kong Bird Watching Society Record Committee. This species is an altitudinal migrant and this species is recorded in lower elevation after the breeding period.

Pallas's Reed Bunting *Emberiza pallasi* (recorded on 17 Oct 2017)

A single individual was record in the net 1. It was a first winter male. The Pallas's Reed Bunting is a rare autumn migrant with extreme date between 28 Sep and 14 Dec.

Globally Threatened Species

Yellow-breasted Bunting *Emberiza aureola*

Two single individuals were recorded in two surveys (20 and 27 Nov 2018). Both two individuals were first winter individuals of a male and a female. In Hong Kong, this species is mainly autumn passage migrant with small number of wintering individuals. This species is listed as Critically Endangered in the IUCN Red List. The main threat of this species comes from illegal trapping in mainland China and Southeast Asia (BirdLife International, 2017).

Re-sighting records of individuals with engraved colour rings

There are five re-sighting records of engraved individuals. Those individuals are listed in the following:

Long-tailed Shrike (Engraved ring: A01)
There were two re-sighting records of this individuals between March 2017 and February 2019. This individuals was recorded on 20th September and 14th November 2017.

Black-faced Bunting (Engraved ring: D07)
This individual was recorded on 11th November 2018.

Chinese Pond Heron (Engraved ring: A15)
This individual was recorded on 11th November 2018.

Little Egret (Engraved ring: A26)
This individual was recorded on 30th November 2018.

5. Reference

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Annex

Annex 1. Number of individuals of different species recorded in 1st and 2nd year.

Species	**2017 to 18**	**2018 to 19**
Arctic Warbler		2
Asian Brown Flycatcher		1
Besra		1
Black Drongo	1	
Black-browed Reed Warbler	44	53
Black-collared Starling		6
Black-faced Bunting	3	
Bluethroat		3
Brown Shrike	1	1
Brown-flanked Bush Warbler	3	1
Buff-throated Warbler		1
Chestnut Bunting		2
Chinese Bulbul	9	23
Chinese Francolin	1	
Chinese Grosbeak	2	
Chinese Penduline Tit	34	50
Chinese Pond Heron		5
Cinereous Tit	23	6
Cinnamon Bittern	1	3
Common Emerald Dove	1	
Common Kingfisher	12	15
Common Moorhen	2	
Common Tailorbird	3	7
Crested Myna	2	11
Daurian Redstart	6	4
Dusky Warbler	89	73
Eastern Water Rail	1	
Eurasian Wryneck	1	
Greater Coucal	1	2
Greater Painted-snipe	2	
Grey-backed Thrush	5	5
Japanese Swamp Warbler		1
Japanese White-eye	90	17
Little Bunting	3	1
Long-tailed Shrike	6	6
Manchurian Bush Warbler	3	3

Species	2017 to 18	2018 to 19
Masked Laughingthrush	1	
Olive-backed Pipit	5	1
Oriental Magpie Robin	1	5
Oriental Reed Warbler	27	20
Oriental Turtle Dove	1	2
Pallas's Grasshopper Warbler	7	3
Pallas's Reed Bunting	1	
Pintail Snipe	1	
Plain Prinia	120	105
Red-throated Flycatcher	3	1
Red-whiskered Bulbul	2	6
Richard's Pipit		1
Scaly-breasted Munia	50	53
Siberian Blue Robin		1
Siberian Rubythroat	23	12
Sooty-headed Bulbul	4	
Spotted Dove	5	9
Stejneger's Stonechat	13	11
Thick-billed Warbler	1	3
Tiger Shrike		1
White Wagtail	1	
White-breasted Waterhen	1	
White-throated Kingfisher	1	4
Yellow Bittern	19	13
Yellow-bellied Prinia	71	98
Yellow-breasted Bunting		2
Yellow-browed Bunting	1	
Yellow-browed Warbler	14	5
Zitting Cisticola	6	3