



# **Proposed Comprehensive Development at Wo Shang Wai, Yuen Long**

Biannual EM&A Summary Report on Ecology for  
May 2017 – October 2017 (Rev A)

February 2018

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Pursuant to Condition 4.6 of Environmental Permit No. EP-311/2008/E,  
this Biannual EM&A Report on ecological aspects for May 2017 to  
October 2017 has been reviewed, certified by Environmental Team  
Leader (ETL) and verified by the Independent Environmental Checker  
(IEC).

Certified by:



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Brandon Wong  
Environmental Team Leader (ETL)  
Mott MacDonald Hong Kong Ltd.

Date

22 February 2018

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Verified by:



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David Yeung  
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Date

22 February 2018

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# 1 Introduction

## 1.1 Background

In March 2005, the Project Proponent, Profit Point Enterprises Limited, acquired the development site in Yuen Long at Wo Shang Wai. An Environmental Impact Assessment (EIA) was then carried out under the EIA Ordinance (EIAO), and the Environmental Permit (EP-311/2008) for construction of the comprehensive development in Wo Shang Wai was first granted by EPD on 9 September 2008 and has been subsequently varied, with the current version (EP-311/2008/E) issued by EPD on 19 December 2017.

The Project involves the residential development and associated infrastructure and wetland restoration area and linear landscape area. The construction works under the Environmental Permit commenced on 12 May 2010. The site formation construction works of the Wetland Restoration Area (hereafter WRA) were completed on 15 November 2010, while the 30-month establishment period of the WRA was concluded in October 2012 – this indicated that planting works as scheduled in the approved Wetland Restoration and Creation Scheme (WRCS; November 2009) was completed, except along the western and southern boundary where the planting is affected by the existing site boundary and noise barrier, and for which a Variation to Environmental Permit (EP-311/2008/C) to defer planting at the location was approved. The current valid EP (EP-311/2008/E) includes specific mitigation measures to minimise certain identified noise impacts during the operation phase of the Project.

Mott MacDonald Hong Kong Ltd. ("MMHK") has been commissioned by the Contractor, Heng Shung Construction Co. Ltd., to undertake the Environmental Team (ET) services to carry out environmental monitoring and audit (EM&A) for both pre-construction and construction phases of the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long. From August 2016, the Project Proponent, Profit Point Enterprises Limited, commissioned MMHK to continue the ET services.

According to the EP Condition 4.6, the EM&A results on ecological aspects during the construction phase should be reported to the EIA Subcommittee of the Advisory Council on the Environment (ACE), EPD and Agriculture, Fisheries and Conservation Department (AFCD) on a biannual basis. This is the 15<sup>th</sup> Biannual EM&A report and it summarises the findings on EM&A results of ecological aspects during the period from 1 May 2017 to 31 October 2017. This report documents surveys and management activities conducted in the Survey Area and WRA from 1 May 2017 to 31 October 2017, which is based on ecological surveys and advices on management which were undertaken by the appointed Non-government Organisations (Green Power / Eco-Education & Resources Centre) during the reporting period.

## 1.2 Survey Area

Surveys were conducted within 500m of the Project area. The WRA was surveyed since early September 2010. The survey area and transect are provided in **Figure 1.1**.

### 1.3 EM&A Requirement on Ecological Impact

The EM&A programme requires environmental monitoring of ecology as specified in the approved EM&A Manual. A summary of ecological impact EM&A requirements is presented in **Table 1.1**:

**Table 1.1: Summary of Ecological Impact EM&A Requirements**

Descriptions	Locations	Frequencies
Birds	Within the Project Area and Assessment Area of 500m	Weekly
Dragonflies and Butterflies	Within the Project Area and Assessment Area of 500m	Once per month during Mar and Sep to Nov, and twice per month during Apr to Aug
Herpetofauna	Within the Project Area and Assessment Area of 500m	Daytime: Once per month during Apr to Nov
Water quality of Wetland Restoration Area (WRA)	WRA	After filling of WRA with water, monthly for in situ water quality and every six months (end of wet season and end of dry season) for laboratory testing
Site Inspections	Within the Project Area and Assessment Area of 500m	Weekly

## 2 Ecological Monitoring

### 2.1 Ecological Monitoring

In accordance with the EM&A requirements, monitoring of birds, dragonflies and butterflies, and herpetofauna were carried out during the reporting period. In addition, monitoring of mammals was also conducted concurrently with other surveys and the results were reported although it is not required by the EM&A Manual. The dates of surveys are summarised in **Appendix A**.

### 2.2 Monitoring of Birds

Monitoring was undertaken following the survey methodology in the EM&A Manual (Table 7-1). Since September 2010, monitoring included the newly formed cells to monitor faunal usage of this area. All bird species of conservation importance and/or wetland dependent were identified and enumerated. Flying birds were not recorded unless they were foraging and/or associated with the habitat (such as swifts). Further, notable bird observations during other surveys were also recorded.

Bird surveys were conducted on a weekly basis throughout the period. A total of 59 bird species were recorded in the Survey Area (excluding the WRA) in May 2017 to October 2017, 28 of which were species of conservation importance and/or wetland-dependence. A summary of survey data is provided in **Appendix B**.

A total of 52 species were recorded in the WRA in the survey periods, 26 of which were species of conservation importance and/or wetland-dependent species. Of all three target species, two of them (i.e. Little Egret, *Egretta garzetta*, and Chinese Pond Heron, *Ardeola bacchus*) were recorded in the WRA during regular survey. The WRA continues to attract a number of species of conservation importance, including Grey Heron, *Ardea cinerea*, Great Egret, *Ardea alba*, Black-crowned Night Heron, *Nycticorax nycticorax*, Yellow Bittern, *Ixobrychus sinensis*, Cinnamon Bittern, *Ixobrychus cinnamomeus*, Black Kite, *Milvus migrans*, Black-winged Stilt, *Himantopus himantopus*, Little Ringed Plover, *Charadrius dubius*, Wood Sandpiper, *Tringa glareola*, White-throated Kingfisher, *Halcyon smyrnensis*, Common Kingfisher, *Alcedo atthis*, White-cheeked Starling, *Spodiopsar cineraceus* and Collared Crow, *Corvus torquatus*. Black-crowned Night Heron, Yellow Bittern, Cinnamon Bittern, Little Ringed Plover, Wood Sandpiper and White-throated Kingfisher are listed by Fellowes *et al.* as of “Local Concern” in 2002. Black Kite and Black-winged Stilt are listed by Fellowes *et al.* as of “Regional Concern” in 2002. Great Egret and Grey Heron are listed by Fellowes *et al.* as of “Potential Regional Concern” in 2002. Collared Crow is listed by Fellowes *et al.* as of “Local Concern” in 2002, and Collared Crow is also listed as “Near Threatened” species on the International Union for Conservation of Nature (IUCN) red list. White-cheeked Starling are listed by Fellowes *et al.* as of “Global Concern” in 2002.

In addition to wetland dependent birds, the WRA also attracts a number of terrestrial birds including Greater Coucal, *Centropus sinensis* which are listed as vulnerable (VU) in the China Red Data Book and it is protected under terrestrial wildlife state protection (category II). Survey findings indicate that the WRA not only provides important habitat for wetland-dependence birds but also the terrestrial birds.

The fish ponds to the north of the WRA are at a greater distance from the residential portion and any disturbance impact(s) from the construction works would have first affected the WRA. Further, 26 bird species of conservation importance and /or wetland dependence, were observed using the site during survey period, including some bird species which are highly sensitive to disturbance and three target species (i.e. Little Egret, Eastern Cattle Egret and Chinese Pond Heron). Thus, the WRA is considered to be effective both in acting as a buffer against potential disturbance impacts from the construction site, and in providing suitable wetland habitats at the fringe of the Deep Bay system.

### 2.3 Monitoring of Herpetofauna

Monitoring was undertaken following the survey methodology in the EM&A Manual. Day-time herpetofauna surveys were conducted once per month between May 2017 and October 2017. Further, notable herpetofauna observations during other surveys were also recorded.

Gunther's Frog, *Hylarana guentheri* and Asian Common Toad, *Duttaphrynus melanostictus*, were recorded in the survey area (excluding WRA) in the survey period. No reptile species were recorded in the survey area within the survey period.

Gunther's Frog, *Hylarana guentheri*, was recorded in the WRA within the survey period. Checkered Keelback, *Xenochrophis flavipunctatus*, was recorded in the WRA within the survey period. A summary of survey data is provided in **Appendix C**.

### 2.4 Monitoring of Dragonfly and Butterflies

Monitoring of dragonflies and butterflies were conducted once per month in September 2017 and October 2017 and twice per month from May 2017 to August 2017. Further, notable dragonfly and butterfly observations during other surveys were recorded.

A total of 7 dragonfly species and 5 butterfly species were recorded using the ponds in the Survey Area (excluding WRA) in the reporting period. At the WRA, a higher diversity of dragonfly species (12 species) and butterfly species (14 species) were recorded. A summary of the survey findings is provided in **Appendix C**.

### 2.5 Monitoring of Mammals

Monitoring of mammals was conducted concurrently with other surveys. No mammal species was recorded in the Survey Area (excluding WRA) within the reporting period.

Two unidentified bat species, one Leopard Cat, *Prionailurus bengalensis* and one Small Indian Civet, *Viverricula indica*, were recorded in the WRA during the reporting period. A summary of the survey findings is provided in **Appendix C**.

### 2.6 Monitoring of Water Quality

Monthly water quality monitoring continued during the reporting period. Monitoring parameters followed that in the EM&A Manual. In May 2017, Water level of Cell 2 and 4 reached action level and the pH of Cell 1, Cell 2, Cell 3, Cell 4 reached action level; In October 2017, the pH of Cell 1 and Cell 2 reached the action level. According to the ecological monitoring data, the low water level in the WRA attracted wetland-dependent species including Grey Heron, Great Egret, Black-crowned Night Heron, Yellow Bittern, Cinnamon Bittern, Black Kite, Black-winged Stilt, Little Ringed Plover, Wood Sandpiper, White-throated Kingfisher, Common Kingfisher, White-cheeked Starling, and Collared Crow. As the low water level attracts wetland-dependent birds, the existing water level will be maintained. Monitoring data are presented in **Appendix D**.

Locations for the monitoring of water quality for the ecological monitoring are shown in **Figure 1.2.**

## 3 Ecological Issues

### 3.1 Vegetation Management

Removal of exotic vegetation in all cells was undertaken; these included but not limited to *Ipomoea* sp., *Mikania* sp., *Mimosa* sp., *Pennisetum* sp. and *Typha* sp..

Vegetation management activities undertaken at the site primarily involved watering of plants, weeding and grass cutting.

### 3.2 Wildlife Management

Golden Apple Snails were removed on an “as-seen” basis.

All red fire ant nests were treated with approved pesticide and covered with overturn baskets for a week. All pesticide used was in powder form and the pesticide usage was confined to Fire Ants’ nest found on terrestrial area which were further away from the Cells to prevent the contamination of water. All treated fire ant nests were inactive within one week of treatment.

Preliminary actions have been taken to increase the WRA utilization by birds. The mitigation actions are:

1. Lowering the water level of Cell1, Cell2, Cell 3 and Cell 4;
2. Controlling the vegetation at Cell 1 and Cell 4.

These two mitigation actions aim to increase the foraging area and maintain suitable habitat for target species.

## 4 Summary of Wetland Restoration Area Performance

### 4.1 Summary of Findings

Ecological monitoring between 1 May 2017 and 31 October 2017 was carried out following the survey methodology and frequency outlined in the EM&A Manual.

Summary of ecological monitoring in the Survey Area and WRA between May 2017 and October 2017 (**Table 4.1**):

**Table 4.1: Summary of Ecological Monitoring in WRA and Survey Area**

Species	Number of species recorded in Survey Area (excluding WRA)	Number of species recorded in WRA
Birds (total)	59	52
Birds (of conservation importance and/or wetland-dependence)	28	26
Amphibians	2	1
Reptiles	0	1
Mammals	0	4
Dragonflies	7	12
Butterflies	5	14

A total of 52 bird species, 1 amphibian species, 1 reptile species, 4 mammal species, 12 dragonfly species and 14 butterfly species were recorded in the WRA, including 26 bird species of conservation importance and/or wetland-dependence, while all dragonfly species are wetland-dependent. These findings indicate that the WRA is supporting wetland-dependent birds and other species of conservation importance.

Survey findings indicate that the WRA is attracting the three target species to varying degrees. During the survey period (i.e. May 2017 to October 2017), the site was particularly attractive to Little Egret. Little Egret was recorded on nearly weekly basis, with monthly means ranging from 0.3 to 19.4 birds per survey; while Chinese Pond Heron was also recorded on nearly weekly basis in regular survey period (i.e. May 2017 to October 2017) with monthly means ranging from 0.8 to 4.2 bird per survey. Eastern Cattle Egret was least attracted to the site. Although no Eastern Cattle Egret was recorded within the WRA during the survey period (i.e. May 2017 to October 2017); Eastern Cattle Egret was recorded once in an additional survey during the survey period (i.e. May 2017 to October 2017). A list of the bird species recorded at the WRA since completion of site formation is provided in **Appendix B (Table B4 to B7)**.

With the completion of planting as scheduled in the approved Habitat Creation and Management Plan (HCMP) in August 2012, establishment work at the WRA is considered complete (except along the western and southern boundary where the planting is affected by the existing site boundary and noise barrier, and for which an approved Variation to Environmental Permit (EP-311/2008/D) to defer planting at the location applies), and the 30 month establishment period concluded in October 2012. A review of the performance of the

WRA during the review period in terms of target species attraction is provided in Section 4.2 below.

It should be noted that the high planting density was intended to ensure a rapid establishment of the site prior to occupation intake, and not intended to be maintained as a long-term tree density at the WRA. It is a standard arboricultural practice to apply appropriate horticultural/ arboricultural maintenance methods in the subsequent five or six years after initial planting to remove less desired specimens to facilitate the successful growth of those which are of higher landscape and/or ecological value. Further, some fine tuning of planting locations and tree/shrub mix is required in order to fulfill the design intent of the habitat structure at WRA after reviewing the site configuration following site formation. Vegetation management hereafter should largely consist of maintenance of planted trees and shrubs for the creation of suitable habitats for target species and long-term habitat structure of the site.

## 4.2 WRA Performance for the Bird Target Species

The provision, maintenance and operation of a WRA are a requirement under the Environmental Permit for compensation for predicted ecological impacts to species of conservation importance. Three bird target species were identified during the EIA process; they are Little Egret, Eastern Cattle Egret and Chinese Pond Heron. Target levels of these species are the annual mean number recorded during the Baseline Ecological Monitoring (i.e. a mean of 5.5 Little Egret, 1.3 Eastern Cattle Egret and 1.3 Chinese Pond Heron over a 12 month period) thus, the ecological impact of the project to the species concerned is considered to have been fully compensated when the target level for each of the three species is achieved. Whilst further discussion and agreement regarding the target level is yet to be undertaken with the relevant Government departments prior to the operation of the WRA, the proposed level offers a clear reference to the effectiveness of the mitigation measures. According to the approved Wetland Creation and Restoration Scheme (November 2009, hereafter WCRS), the WRA is anticipated to be fully operational after an establishment period of 2.5 years (30 months).

Of the three target species, two of them (i.e. Little Egret and Chinese Pond Heron) were recorded using the site under survey period (May 2017 – October 2017). Among all target species, Little Egret and Chinese Pond Heron were recorded in all six months and Eastern Cattle Egret was recorded once during the six month survey period.

**Table 4.2: Annual Mean of the three Bird Target Species Recorded at the WRA between May 2010 and April 2017 (including Biannual Mean between May 2017 and October 2017)**

Common Name	Scientific Name	Conservation Status (2)	Baseline Annual Mean (3)	Annual Mean							Biannual Mean	
				May 10- Apr 11	May 11- Apr 12	May 12- Apr 13	May 13- Apr 14	May 14- Apr 15	May 15- Apr 16	May 16- Apr 17	Nov 16- Apr 17	May 17- Oct 17
Chinese Pond Heron	Ardeola bacchus	PRC, (RC)	1.3	0.2	2.7	1.3	1.9	2.0	2.7	4.2	4.6	2.4
Little Egret	Egretta garzetta	PRC, (RC)	5.5	1.6	1.0	0.9	2.3	2.0	2.6	4.7	5.9	6.6
Eastern Cattle Egret	Bubulcus coromandus	(LC)	1.3	0.0	1.2	0.0	0.1	0.0	0.1	0.1	0.0	0.0

Note:

- (1) Value in **bold** indicated the Target Level was achieved.
- (2) Conservation Status follows that of Fellow *et. al.* (2002). See Appendix B (Table B3).
- (3) Annual mean number recorded during Baseline Ecological Monitoring.

Based on **Table 4.2** above, the target level of the Chinese Pond Heron was achieved between May 2017 and October 2017 while the target levels for Eastern Cattle Egret was not achieved.

As the Proposed Comprehensive Development at Wo Shang Wai is still under construction phase, it is considered acceptable. According to the ecological monitoring data of the survey area (excluding the WRA), Eastern Cattle Egret was observed only in 12 of the regular ecological survey (i.e. 12 out of 29) and the annual mean of the Eastern Cattle Egret of survey area (excluding the WRA) is 2.3 bird per survey (May 2017 – October 2017), the results indicated that the number of Eastern Cattle Egret in the whole area is low and the low number of Eastern Cattle Egret in the WRA is considered acceptable. However, should this situation continue, a review of the management of the WRA and adaptive management steps will be required.

The mitigation actions including: 1) Lowering the water level; 2) Restocking the Cell in the WRA; 3) Installing flooding platform; and 4) Controlling the vegetation; have been taken in the WRA since November 2014 to increase the WRA utilization by birds, especially for the three target species of the WRA. Since the implementation of the mitigation actions, the annual means of two (Little Egret and Chinese Pond Heron) out of three target species increased gradually from 3.3 to 3.5 and 3.1 to 6.3 for Chinese Pond Heron and Little Egret respectively (**Table 4.2**). This may indicate the mitigation actions taken in the WRA are effective. The mitigation actions will be continued in the WRA and monitoring will be continued to investigate the effectiveness of the mitigation actions.

In addition, though the target levels for Eastern Cattle Egret have not been achieved between May 2017 and October 2017, the WRA continues to attract wetland dependent species. Among all the wetland dependent species, Black-crowned Night Heron, Yellow Bittern, Cinnamon Bittern, Little Ringed Plover, Wood Sandpiper and White-throated Kingfisher are listed by Fellowes *et al.* as of “Local Concern” in 2002. Black Kite and Black-winged Stilt are listed by Fellowes *et al.* as of “Regional Concern” in 2002. Great Egret, Grey Heron and White-cheeked Starling are listed by Fellowes *et al.* as of “Potential Regional Concern” in 2002. Collared Crow is listed by Fellowes *et al.* as of “Local Concern” in 2002, and Collared Crow is also listed as “Near Threatened” species on the International Union for Conservation of Nature (IUCN) red list.

Among all 21 species of conservation importance and/or wetland-dependence recorded in previous baseline ecological monitoring, 16 of them were recorded during the ecological monitoring between May 2017 and October 2017. A summary of the annual mean of bird species of conservation importance and/or wetland-dependence recorded in the WRA from May 2017 to October 2017 is shown in **Table 4.3**.

The increase of the number of the species of conservation interest indicates the WRA is providing suitable habitat for them.

**Table 4.3: Mean number of bird species of conservation importance and/or wetland-dependence in the WRA during reporting period**

Common Name	Scientific Name (3)	Wetland Dependence	Conservation Status (1)	Annual mean number recorded during the Baseline Ecological Monitoring	Mean number recorded between May 2017 & Oct 2017 (2)
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC	-	0.8

Common Name	Scientific Name (3)	Wetland Dependence	Conservation Status (1)	Annual mean number recorded during the Baseline Ecological Monitoring	Mean number recorded between May 2017 & Oct 2017 (2)
Great Cormorant	<i>Phalacrocorax carbo</i>	Y	PRC	0.5	/
Grey Heron	<i>Ardea cinerea</i>	Y	PRC	0.1	0.2
Great Egret	<i>Ardea alba</i>	Y	PRC, (RC)	V	0.9
Little Egret	<i>Egretta garzetta</i>	Y	PRC, (RC)	5.5	6.6
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC, (RC)	1.3	2.4
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)	0.2	0.1
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)	-	0.9
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Y	LC	-	<0.1
Black Kite	<i>Milvus migrans</i>	Y	(RC)	1.2	0.1
White-breasted Waterhen	<i>Amauornis phoenicurus</i>	Y	-	0.2	0.3
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC	-	<0.1
Oriental Pratincole	<i>Glareola maldivarum</i>	Y	LC	V	/
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)	0.1	V
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC	-	V
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-	0.2	0.1
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Y	(LC)	-	0.2
Common Kingfisher	<i>Alcedo atthis</i>	Y	-	-	0.7
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-	10.0	0.1
White Wagtail	<i>Motacilla alba</i>	Y	-	2.2	0.7
Lanceolated Warbler	<i>Locustella lanceolata</i>	Y	-	-	V
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	Y	-	-	V
Red-billed Starling	<i>Spodiopsar sericeus</i>	Y	(RC)*	0.9	V
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Y	PRC	-	V
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)	0.1	0.5
Collared Crow	<i>Corvus torquatus</i>	Y	LC, NT	-	0.1

Common Name	Scientific Name (3)	Wetland Dependence	Conservation Status (1)	Annual mean number recorded during the Baseline Ecological Monitoring	Mean number recorded between May 2017 & Oct 2017 (2)
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	Y	-	0.1	-
Common Snipe	<i>Gallinago gallinago</i>	Y	-	0.1	-
Pacific Swift	<i>Apus pacificus</i>	N	(LC)	V	-
Grey Wagtail	<i>Motacilla cinerea</i>	Y	-	2.2	-
Zitting Cisticola	<i>Cisticola juncidis</i>	Y	LC	0.1	-

Note:

(1) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010). Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence. (Fellowes *et al.* 2002)

(2) Refers to the mean number of individuals recorded between May 2017 – Oct 2017 in the WRA

(3) Follows HK bird list (dated 2015-1-12)

V indicates the species is recorded outside regular surveys

- indicates the species is not recorded during the survey

\* Red billed Starling is considered by Fellowes *et al* (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

### 4.3 Conclusions

A total of 131 bird species have been recorded within the WRA since completion of site formation. Of the 131 species, 85 were species of conservation importance and/or wetland dependence – indicating that the WRA provides suitable habitats for these species despite the construction work within the residential portion of the Project Site.

The site is also considered achieving the no net loss of wetland in terms of area and function because it continuously attracts bird species of conservation importance, indicating that the WRA not only provides a buffer for potential disturbance during construction phase, but also a valuable habitat for wetland dependent species and species of conservation importance.

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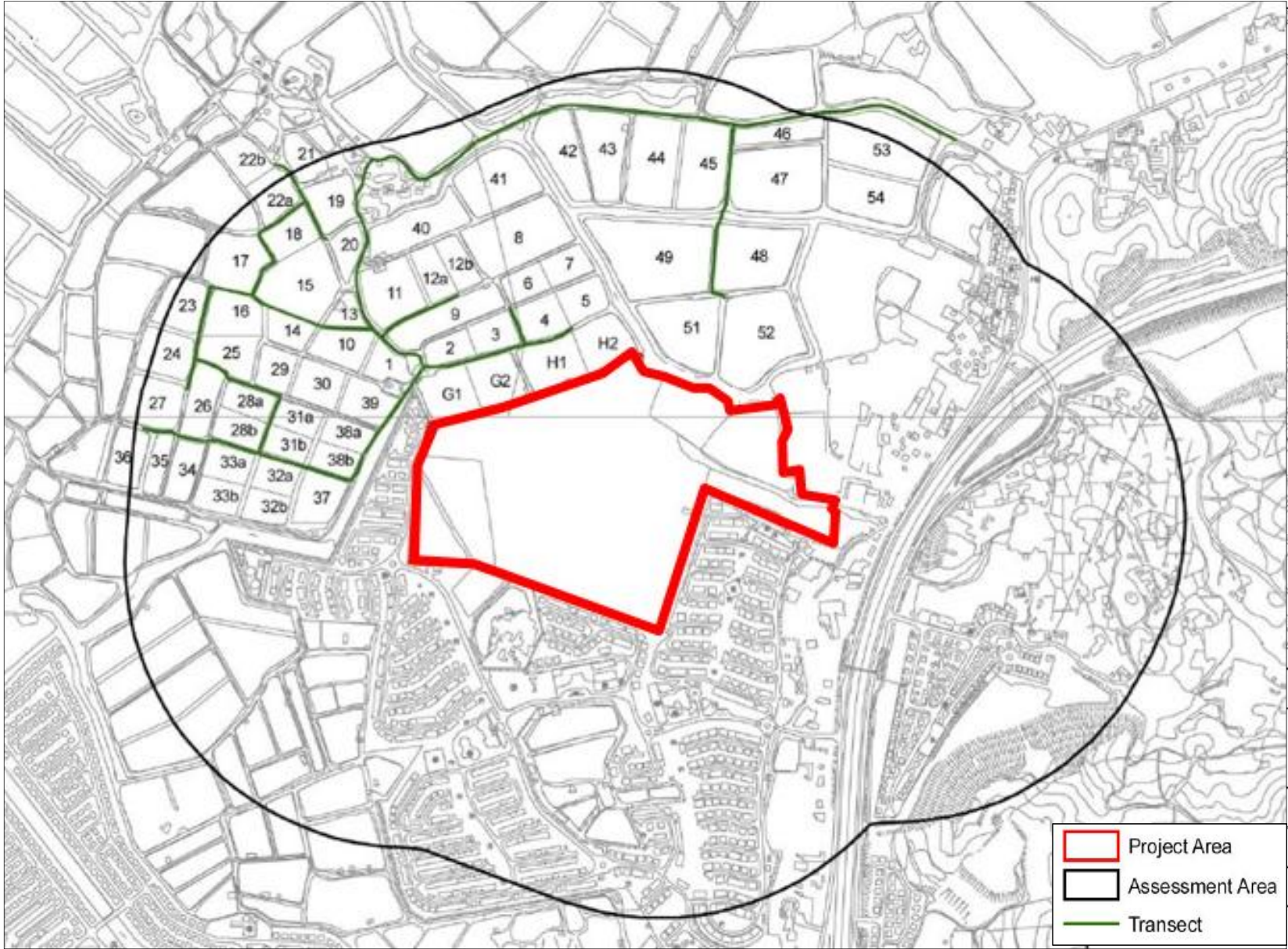
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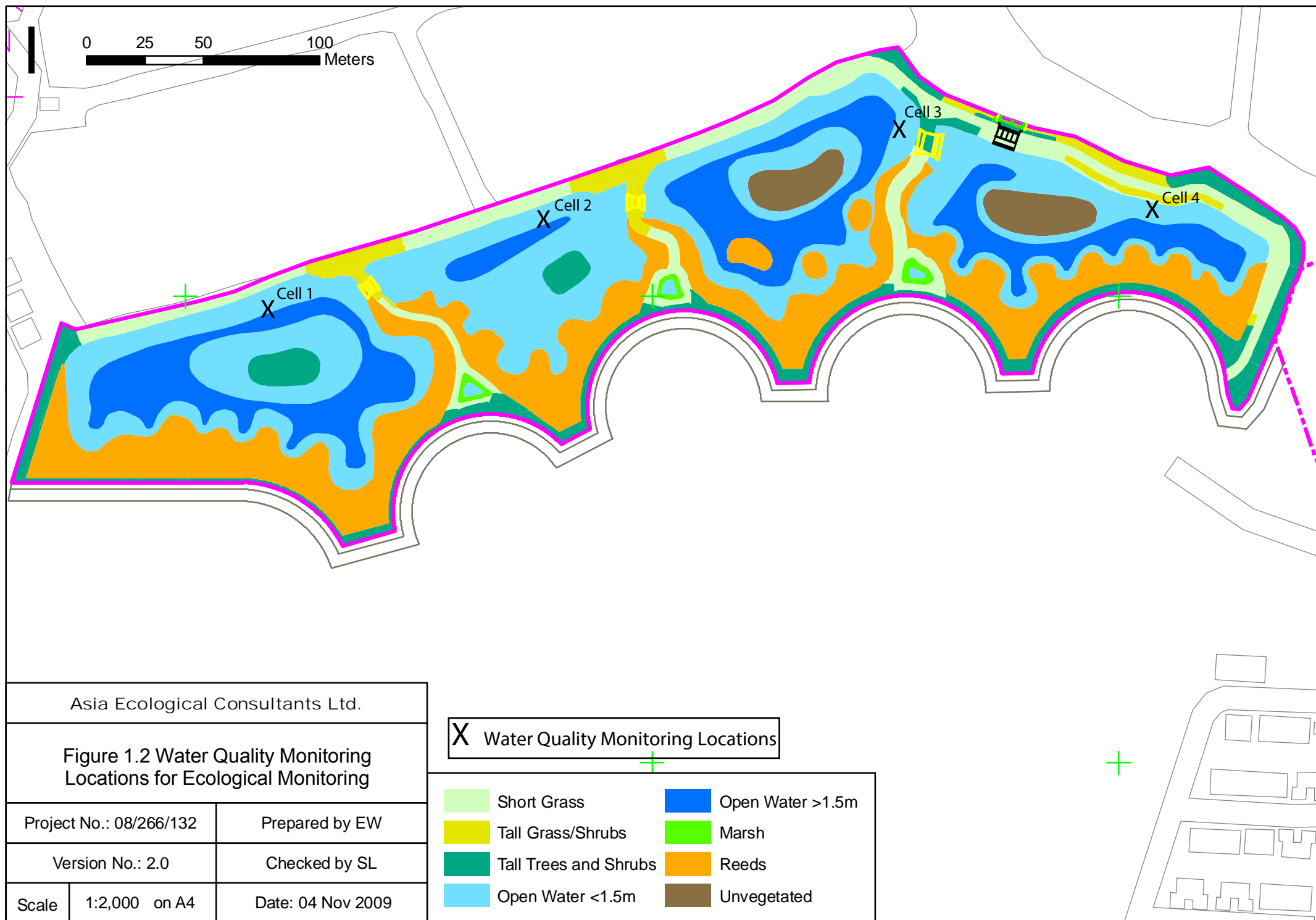
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Notes					
Key to symbols					
<div><div><div></div></div>Project Area</div> <div><div><div></div></div>Assessment Area</div> <div><div><div></div></div>Transect</div>					
Reference drawings					
Rev	Date	Drawn	Description	Ch'k'd	App'd
M		M	20/F AJA Kowloon Tower Landmark East 100 How Ming Street Kauun Tong, Kowloon Hong Kong T +852 2828 5757 F +852 2027 1623 W motmac.com		
MOTT MACDONALD					
Client					
PROFIT POINT ENTERPRISES LIMITED					
Project					
PROPOSED COMPREHENSIVE DEVELOPMENT AT WO SHANG WAI, YUEN LONG					
Title					
Survey Area and Transect Walked					
Designed			Eng check		
Drawn			Coordination		
Dwg check			Approved		
Scale at A1		Status		Rev	
Drawing Number					
Figure 1.1					



# Appendix A. Schedule of Ecological Monitoring

May 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals		✓							✓							✓							✓								✓
Birds		✓							✓							✓							✓								✓
Herpetofauna																✓															
Dragonflies & butterflies		✓														✓															✓
Water Quality																			✓												
Inspection Visits		✓		✓					✓			✓				✓			✓		✓		✓#			✓					✓
Jun 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Mammals		✓				✓								✓						✓							✓				
Birds		✓				✓								✓						✓							✓				
Herpetofauna						✓d								✓n																	
Dragonflies & butterflies		✓												✓																	
Water Quality																					✓						✓#				
Inspection Visits		✓				✓			✓					✓		✓				✓			✓				✓			✓	
Jul 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals				✓						✓										✓				✓							
Birds				✓						✓										✓				✓							
Herpetofauna										✓d														✓n							
Dragonflies & butterflies				✓																✓											
Water Quality																														✓	
Inspection Visits				✓			✓			✓				✓						✓	✓				✓		✓				

Aug 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals	✓							✓							✓						✓								✓		
Birds	✓							✓							✓						✓								✓		
Herpetofauna								✓d										✓n													
Dragonflies & butterflies								✓																					✓		
Water Quality																														✓	
Inspection Visits	✓			✓				✓			✓				✓			✓			✓				✓				✓		
Sep 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Mammals	✓				✓							✓							✓							✓					
Birds	✓				✓							✓							✓							✓					
Herpetofauna															✓																
Dragonflies & butterflies												✓																			
Water Quality																		✓#													
Inspection Visits	✓				✓			✓				✓			✓				✓							✓			✓		
Oct 2017	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Mammals			✓		✓				✓								✓		✓				✓		✓					✓	
Birds			✓		✓				✓								✓		✓				✓		✓					✓	
Herpetofauna																		✓													
Dragonflies & butterflies																		✓													
Water Quality																														✓	
Inspection Visits			✓		✓		✓			✓							✓			✓				✓		✓					✓

Note: Light grey cells indicate public holidays, Saturdays or Sundays.  
 # Additional pH and /or water level monitoring.  
 "d" and "n" indicate day time and night time herpetofauna surveys respectively.

## Appendix B. Summary of Bird Surveys

**Table B1: Summary of bird monitoring (for species of conservation importance and/or wetland-dependence) within the Survey Area (excluding the WRA)**

Common Name	Scientific Name (3)	Wetland Dependent	Conservation Status (1)	May Mean (2)	Jun Mean (2)	Jul Mean (2)	Aug Mean (2)	Sep Mean (2)	Oct Mean (2)
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC	5.2	5.2	3.5	2.4	6.8	7.0
Great Cormorant	<i>Phalacrocorax carbo</i>	Y	PRC						3.4
Grey Heron	<i>Ardea cinerea</i>	Y	PRC					1.4	3.6
Great Egret	<i>Ardea alba</i>	Y	PRC, (RC)	2.2	8.6	10.5	5.6	11.8	4.8
Little Egret	<i>Egretta garzetta</i>	Y	PRC, (RC)	12.4	4.6	13.3	8.8	31	13.6
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Y	(LC)	8.2			1.4	3.6	0.8
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC, (RC)	5.4	5.8	9.8	9.6	14	9.2
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)	0.2	0.4		0.2		V
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)	0.4	0.2	V	0.2	0.4	
Black Kite	<i>Milvus migrans</i>	Y	(RC)	0.2	V	0.3	0.8	0.8	0.6
White-breasted Waterhen	<i>Amauornis phoenicurus</i>	Y	-	0.4	0.8	1.3	1.6	0.2	0.4
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC					2.2	3.2
Pacific Golden Plover	<i>Pluvialis fulva</i>	Y	LC					0.6	0.4

Common Name	Scientific Name (3)	Wetland Dependent	Conservation Status (1)	May Mean (2)	Jun Mean (2)	Jul Mean (2)	Aug Mean (2)	Sep Mean (2)	Oct Mean (2)
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)					0.6	7.2
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Y	RC						0.4
Green Sandpiper	<i>Tringa ochropus</i>	Y	-	0.8		0.3			0.2
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC					1	1.2
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-	0.4		0.3	0.2	1.4	2.4
Whiskered Tern	<i>Chlidonias hybrida</i>	Y	-	1.4				0.2	1.6
Pied Kingfisher	<i>Ceryle rudis</i>	Y	(LC)		V				
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Y	(LC)			0.5	0.4	0.4	
Common Kingfisher	<i>Alcedo atthis</i>	Y	-	V	V	V	0.8	0.8	0.6
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-	0.2					0.8
Grey Wagtail	<i>Motacilla cinerea</i>	Y	-	V				0.2	
White Wagtail	<i>Motacilla alba</i>	Y	-	1.0	0.8	0.5	1.0	1.0	3.4
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Y	PRC	V	V				
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)	2.8	1.2	1.8			
Collared Crow	<i>Corvus torquatus</i>	Y	LC, NT	0.4	V	0.3		0.2	1.0
No. of Species Recorded				19	14	14	13	20	22

(1) Conservation status follows that of Fellowes *et al.* (2002) and BirdLife International listing (2010). Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and for roosting sites rather than in general occurrence. (Fellowes *et al.* 2002)

(2) Refers to the mean number of individuals recorded in each survey in the Survey Area (excluding the WRA)

(3) Follows HK bird list (dated 2015-1-12)

V indicates the species is recorded outside regular surveys

**Table B2: Summary of bird monitoring (for species of conservation importance and/or wetland-dependence) in the WRA**

Common Name	Scientific Name (3)	Wetland Dependent	Conservation Status (1)	May Mean (2)	Jun Mean (2)	Jul Mean (2)	Aug Mean (2)	Sep Mean (2)	Oct Mean (2)
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC	0.4	0.6	V	0.8	2.0	0.8
Grey Heron	<i>Ardea cinerea</i>	Y	PRC						1.2
Great Egret	<i>Ardea alba</i>	Y	PRC, (RC)	2.2	0.8	0.8	0.6	0.2	0.8
Little Egret	<i>Egretta garzetta</i>	Y	PRC, (RC)	19.4	2.4	0.3	4.6	2.6	10.2
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Y	(LC)						V
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC, (RC)	2.0	0.8	1.5	4.0	1.6	4.2
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)	0.8	2.0	0.5	1.2	0.6	0.2
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Y	LC	0.2					
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)	0.4	V	V		0.2	
Black Kite	<i>Milvus migrans</i>	Y	(RC)			V	0.2	0.6	
White-breasted Waterhen	<i>Amauornis phoenicurus</i>	Y	-	0.6	0.2	0.5	0.2	0.4	
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC		V				
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)		V				
Green Sandpiper	<i>Tringa ochropus</i>	Y	-			V			
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC			V			0.2
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-			V		0.2	0.6

Common Name	Scientific Name (3)	Wetland Dependent	Conservation Status (1)	May Mean (2)	Jun Mean (2)	Jul Mean (2)	Aug Mean (2)	Sep Mean (2)	Oct Mean (2)
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Y	(LC)	0.2	0.2	0.3			0.2
Common Kingfisher	<i>Alcedo atthis</i>	Y	-	1.0	0.2	0.8	0.4	0.4	1.2
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-	0.4					
White Wagtail	<i>Motacilla alba</i>	Y	-	0.6	0.4	V		1.4	2.0
Lanceolated Warbler	<i>Locustella lanceolata</i>	Y	-						V
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	Y	-						V
Red-billed Starling	<i>Spodiopsar sericeus</i>	Y	(RC)*			V			
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Y	PRC	V					
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)	1.2	1.8				
Collared Crow	<i>Corvus torquatus</i>	Y	LC, NT						0.4
<b>No. of Species Recorded</b>				<b>14</b>	<b>13</b>	<b>15</b>	<b>8</b>	<b>11</b>	<b>15</b>

(1) Conservation status follows that of Fellows et al. (2002) and BirdLife international listing (2010). Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and for roosting sites rather than in general occurrence. (Fellows et al. 2002).

(2) Refers to mean number of individuals recorded in each survey in the Survey Area (excluding the WRA).

(3) Follows HK bird list (dated 2015-1-12).

V indicates the species is recorded outside regular surveys

\* Red billed Starling is considered by Fellows *et al* (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

**Table B3: Conservation Status Categories of Bird Species**

Code	Category	Brief Description	Source
GC	Global Concern	Habitat loss/ damage in Hong Kong would pose significant threat to global survival.	Fellowes <i>et al.</i> (2002)
RC	Regional Concern	Habitat loss/ damage in Hong Kong would pose significant threat to regional survival.	
LC	Local Concern	Habitat loss/ damage in Hong Kong would pose significant threat to local survival.	
PGC	Potential Global Concern	Large, secure population in Hong Kong is of global significance.	
PRC	Potential Regional Concern	Large, secure population in Hong Kong is of regional significance.	
CR	Critically Endangered	Best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.	BirdLife International (2010)
EN	Endangered	Best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a high risk of extinction in the wild.	
VU	Vulnerable	Best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.	
NT	Near Threatened	Does not qualify for Critically Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.	

**Table B4: Summary of Bird Species Recorded at WRA and their Respective Monthly Mean between September 2010 and October 2012**

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12	
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC				0.5							1.0	3.8	0.8	0.5	0.5		0.6		1.4	1.6	0.8	1.0	1.3	0.2		0.2	
Great Cormorant	<i>Phalacrocorax carbo</i>	Y	PRC				0.8										0.3	0.3	0.4	1.2	0.7	0.2								
Grey Heron	<i>Ardea cinerea</i>	Y	PRC			1.0	1.6	2.0	2.0	0.4							1.0	2.5	1.8	0.8	2.3	0.8				0.3			0.4	
Purple Heron	<i>Ardea purpurea</i>	Y	RC														0.3	0.3												
Great Egret	<i>Ardea alba</i>	Y	PRC				0.4	14.0	2.0	0.2	0.5	0.3	0.5	0.3			1.5	1.8	0.8	1.2	0.6	0.7	0.6	0.6	1.0	0.3		0.4	0.5	1.5
Intermediate Egret	<i>Egretta intermedia</i>	Y	RC				1.7	0.8	0.2								1.5	1.5	1.5	1.0	0.6	0.7	0.6	0.6				0.3	0.9	
Little Egret	<i>Egretta garzetta</i>	Y	PRC			1.8	8.0	2.0	0.4	0.5	0.8	0.3	0.3	1.0	1.0	0.5	1.5	1.6	1.4	2.0	1.6					0.8	0.3	1.2		
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Y	(LC)										0.3	11.8		1.3	0.3		0.4					0.3		0.2				
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC			1.0	0.2				0.3	0.3	0.3	1.5	4.2	7.8	4.5	5.3	2.4	0.3	2.3	2.6	1.4	0.8	1.0	0.8	2.0	1.8	2.2	
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)														0.3	0.3												
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Y	LC																											
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)																											
Eurasian Spoonbill	<i>Platalea leucorodia</i>	Y	LC																											
Black-faced Spoonbill	<i>Platalea minor</i>	Y	PGC, EN					0.3	10.3											0.4										
Mandarin Duck	<i>Aix galericulata</i>	Y	-														0.3													
Eurasian Wigeon	<i>Anas penelope</i>	Y	RC				1.6	2.5																						
Eurasian Teal	<i>Anas crecca</i>	Y	RC				1.0																							
Northern Pintail	<i>Anas acuta</i>	Y	RC				0.2	7.0																						

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12
Northern Shoveler	<i>Anas clypeata</i>	Y	RC																										
Tufted Duck	<i>Aythya fuligula</i>	Y	LC																										
Garganey	<i>Anas querquedula</i>	Y	-																										
Western Osprey	<i>Pandion haliaetus</i>	Y	RC				0.2																						
Black-winged Kite	<i>Elanus caeruleus</i>	Y	LC																										
Black Kite	<i>Milvus migrans</i>	N	(RC)					0.8	0.3	0.2		0.3				0.3				0.2			0.2	0.5					0.4
Crested Serpent Eagle	<i>Spilornis cheela</i>	N	(LC)																										
Eastern Buzzard	<i>Buteo japonicus</i>	N	-							0.2																			
Common Kestrel	<i>Falco tinnunculus</i>	N	-			1.0	0.4	1.0	0.3	0.4																			
Eurasian Hobby	<i>Falco subbuteo</i>	Y	(LC)																										
Peregrine Falcon	<i>Falco peregrinus</i>	N	-																										
Greater Spotted Eagle	<i>Clanga clanga</i>	N	GC																										
Eastern Imperial Eagle	<i>Aquila heliaca</i>	N	-																										
Japanese Quail	<i>Coturnix japonica</i>	Y	LC																										
Baillon's Crake	<i>Porzana pusilla</i>	Y	LC																										
White-breasted Waterhen	<i>Amauromis phoenicurus</i>	Y	-									0.5	0.8	1.3	2.6	1.3	1.5	0.3			0.4				0.5	1.0	0.5		
Watercock	<i>Gallicrex cinerea</i>	Y	RC																										
Common Moorhen	<i>Gallinula chloropus</i>	Y	-																								0.2		

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Y	LC															0.3											
Greater Painted-snipe	<i>Rostratula benghalensis</i>	Y	LC								0.5																		
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC	8.0													1.0												
Pied Avocet	<i>Recurvirostra avosetta</i>	Y	RC				0.2															0.2							
Oriental Pratincole	<i>Glareola maldivarum</i>	Y	LC								2.5																		
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)	3.0		24.5	7.4	3.8	9.0	6.8	10.5	5.5	0.5		0.2						1.0	0.6							
Kentish Plover	<i>Charadrius alexandrinus</i>	Y	RC																										
Spotted Redshank	<i>Tringa erythropus</i>	Y	RC																										
Common Redshank	<i>Tringa totanus</i>	Y	RC																										
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Y	RC																										
Common Greenshank	<i>Tringa nebularia</i>	Y	RC			0.5											0.3	0.8	0.2										
Green Sandpiper	<i>Tringa ochropus</i>	Y	-			1.0	0.4	0.5	0.5	0.4				0.3							0.2		0.2	0.4			0.2		
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC						0.5	1.2											0.8	0.3					0.6		
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-	1.0		0.5	1.0		0.5	0.6	1.0	0.3			0.2							0.4	0.2					0.9	
Eurasian Woodcock	<i>Scolopax rusticola</i>	Y	-																										
Pintail/ Swinhoe's Snipe^	<i>Gallinago stenura/ G. megala</i>	Y	LC^			0.5											0.3												
Common Snipe	<i>Gallinago gallinago</i>	Y	-						0.3	0.2																			

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12
Red-necked Stint	<i>Calidris ruficollis</i>	Y	LC	3.0																									
Temminck's Stint	<i>Calidris temminckii</i>	Y	LC			0.5			2.5	0.4	1.3																		
Long-toed Stint	<i>Calidris subminuta</i>	Y	LC																		0.3								
Whiskered Tern	<i>Chlidonias hybrida</i>	Y	-																					1.3					
Domestic Pigeon	<i>Columba livia</i>	N	-																	DS									
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	N	-																										
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	N	-														0.2												
Red Turtle Dove	<i>Streptopelia tranquebarica</i>	N	-																										
Spotted Dove	<i>Spilopelia chinensis</i>	N	-																DS		DS	DS		DS			DS		0.6
Asian Koel	<i>Eudynamys scolopaceus</i>	N	-																										
Greater Coucal#	<i>Centropus sinensis</i>	N																											
Eurasian Eagle Owl	<i>Bubo bubo</i>	N	RC																										
Savanna Nightjar	<i>Caprimulgus affinis</i>	N	-																										
Pacific Swift	<i>Apus pacificus</i>	N	(LC)								0.3																		
House Swift	<i>Apus nipalensis</i>	N	-	10.0						0.2												DS	DS						
Pied Kingfisher	<i>Ceryle rudis</i>	Y	(LC)				0.2	0.3	0.5	0.2			0.3									0.2					0.5		
Common Kingfisher	<i>Alcedo atthis</i>	Y	-				0.4	0.5	0.3		0.3	0.5	1.0	0.3	1.0	0.8	0.5	0.8	1.0	0.4		0.8					0.6		0.4
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	N	(LC)															0.3									0.3		

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12
Eurasian Hoopoe	<i>Upupa epops</i>	N	-																										
Barn Swallow	<i>Hirundo rustica</i>	N	-	25.0					1.5												DS	DS		DS		DS	DS	3.0	
Red-rumped Swallow	<i>Hirundo daurica</i>	N	-																										
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-			14.5	10.2	15.0	23.5	8.2	11.8	1.8			0.2	0.8	1.5	2.0	1.2	0.6		4.0	1.0						
Grey Wagtail	<i>Motacilla cinerea</i>	Y	-				0.2		0.3	0.2						0.3													
White Wagtail	<i>Motacilla alba</i>	Y	-	3.0			1.8												DS	DS	DS	DS	DS			DS	1.8	3.2	
Richard's Pipit	<i>Anthus richardi</i>	Y	-			1.5	0.8	0.5	1.0	1.0	1.8	0.5					0.3		DS		DS	DS	DS						
Olive-backed Pipit	<i>Anthus hodgsoni</i>	N	-			0.5												DS											
Red-throated Pipit	<i>Anthus cervinus</i>	N	LC		2.0	2.5	1.2	0.5	0.5	0.2												0.4						0.7	
Buff-bellied Pipit	<i>Anthus rubescens</i>	N	LC		1.0	1.5																							
Red- whiskered Bulbul	<i>Pycnonotus jocosus</i>	N	-																										
Chinese Bulbul	<i>Pycnonotus sinensis</i>	N	-																			DS		DS		DS			
Bull-headed Shrike	<i>Lanius bucephalus</i>	N	-																										
Brown Shrike	<i>Lanius cristatus</i>	N	-																										
Long-tailed Shrike	<i>Lanius schach</i>	N	-																	DS	DS					DS	DS		
Oriental Magpie Robin	<i>Copsychus sauralis</i>	N	-																		DS								
Daurian Redstart	<i>Phoenicurus aureus</i>	N	-																										
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	N	-		3.0	0.5	1.0	1.0	0.8	0.2	0.3						1.0		DS	DS		DS							
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	N	-																							DS			

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12
Lanceolated Warbler	<i>Locustella lanceolata</i>	Y	-														0.3												
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	Y	LC														0.3												
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	Y	-																										
Thick-billed Warbler	<i>Acrocephalus aedon</i>	Y	LC																										
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	Y	-														0.3												
Common Tailorbird	<i>Orthotomus sutorius</i>	N	-																										
Zitting Cisticola	<i>Cisticola juncidis</i>	Y	LC							0.2	1.5	2.5	2.5	1.0	0.4		0.3	0.8	1.8	0.2	0.3	0.6					0.2		
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	N	-																	DS		DS		DS		DS	DS	0.8	0.4
Plain Prinia	<i>Prinia inornata</i>	N	-																		DS		DS		DS	DS			
Dusky Warbler	<i>Phylloscopus fuscatus</i>	N	-														0.5		DS										
Pallas's Leaf Warbler	<i>Phylloscopus proregulus</i>	N	-																										
Yellow-browed warbler	<i>Phylloscopus inornatus</i>	N	-																										1.4
Chinese Penduline-Tit	<i>Remiz consobrinus</i>	Y	RC																		1.2	0.2							
Japanese White-eye	<i>Zosterops japonica</i>	N	-																										
Little Bunting	<i>Emberiza pusilla</i>	N	-			0.5																							
Black-faced Bunting	<i>Emberiza spodocephala</i>	N	-								0.5																		
Chinese Grosbeak	<i>Eophona migratoria</i>	N	LC														0.3												

Common name	Scientific name	Wetland Dependence	Conservation status	Sep- 10	Oct- 10	Nov- 10	Dec- 10	Jan- 11	Feb- 11	Mar- 11	Apr- 11	May- 11	Jun- 11	Jul- 11	Aug- 11	Sep- 11	Oct- 11	Nov- 11	Dec- 11	Jan- 12	Feb- 12	Mar- 12	Apr- 12	May- 12	Jun- 12	Jul- 12	Aug- 12	Sep- 12	Oct- 12
Scaly-breasted Munia	<i>Lonchura punctulata</i>	N	-	20.0				2.5		15.0	7.5													DS		DS	DS	1.5	
Eurasian Tree Sparrow	<i>Passer montanus</i>	N	-																			DS		DS		DS			
Red-billed Starling	<i>Spodiopsar sericeus</i>	Y	(RC)*													0.3		0.8	1.6	6.6	39.0	17.4							
White-cheeked Starling	<i>Spodiopsa cineraceus</i>	Y	PRC												6.6														
Black-collared Starling	<i>Gracupica nigricollis</i>	N	-																DS	DS	DS	DS					DS		
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)									0.3		0.5	2.4														
Common Myna	<i>Acridotheres tristis</i>	N	-																		DS								
Crested Myna	<i>Acridotheres cristatellus</i>	N	-	3.0															DS					DS		DS		V	
Black-napped Oriole	<i>Oriolus chinensis</i>	N	LC													1.0													
Black Drongo	<i>Dicrurus macrocercus</i>	N	-																							DS	DS		
Azure-winged Magpie	<i>Cyanopica cyanus</i>	N	-																										
Eurasian Magpie	<i>Pica pica</i>	N	-																			DS				DS	0.3		
Large-billed Crow	<i>Corvus macrorhynchos</i>	N	-				0.4			0.2																			
Collared Crow	<i>Corvus torquatus</i>	N	LC, NT				0.2	0.3			0.5		0.3		0.8	0.8	0.8	0.5							0.8				

Note: Conservation Status follows that of Fellows et. al. (2002)

^ Pintail Snipe and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe.

V Indicates the species is recorded outside regular surveys.

DS Indicates species recorded during survey.

# Greater Coucal is listed as vulnerable (VU) in China Red Data Book and it is protected terrestrial wildlife state protection (category II).

\* Red billed Starling is considered by Fellows *et al* (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

**Table B5: Summary of Bird Species Recorded at the WRA and their Respective Monthly Mean between November 2012 and October 2014**

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC	1.0	1.0	1.2	0.4	0.6	0.4	1.5	0.5		0.6	0.5	1.2	0.6	2.2	1.8	5.3	4.5	2.4	0.8	2.0	3.2	1.8	1.6	1.4
Great Cormorant	<i>Phalacrocorax carbo</i>	Y	PRC	0.8	3.2	0.8	1.0	0.0	0.0						0.2	V	0.4	0.6	0.5								V
Grey Heron	<i>Ardea cinerea</i>	Y	PRC	0.8	1.4	0.8	1.4	0.0	0.0					V	1.0	2.8	2.6	1.6	2.5							1.0	1.6
Purple Heron	<i>Ardea purpurea</i>	Y	RC																								
Great Egret	<i>Ardea alba</i>	Y	PRC	1.4	0.6	1.0	0.8	0.2	0.6		0.8	0.6			0.6	0.6	2.4	1.2	1.8	0.8	0.2	V	0.5	V	V	0.2	V
Intermediate Egret	<i>Egretta intermedia</i>	Y	RC	0.2	0.0	0.0	0.0	0.0	0.0										V								V
Little Egret	<i>Egretta garzetta</i>	Y	PRC	0.8	2.0	2.2	1.4	0.6	1.2	0.6	1.8	0.4	3.4	0.5	2.2	1.4	2.4	4.4	4.0	3.8	3.2	1.2	3.3	1.8	1.3	2.6	1.6
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Y	(LC)																	1.6		V					
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC	1.6	2.2	2.4	0.4	0.0	0.0			0.8	2.0	0.5	1.4	1.4	2.6	6.8	3.5	2.5	1.0	1.6	1.0	1.4	1.5	4.2	1.4
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)						V	1.0	2.5	0.2	1.4	1.3	0.8	0.4	0.2			V	V	0.4	1.3	1.0	0.8	0.2	0.2
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Y	LC																								
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)	V		0.2					0.3				V				V		V						V
Eurasian Spoonbill	<i>Platalea leucorodia</i>	Y	LC																								
Black-faced Spoonbill	<i>Platalea minor</i>	Y	PGC, EN																V	V							
Mandarin Duck	<i>Aix galericulata</i>	Y	-																								

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
Eurasian Wigeon	<i>Anas penelope</i>	Y	RC																								
Eurasian Teal	<i>Anas crecca</i>	Y	RC																								
Northern Pintail	<i>Anas acuta</i>	Y	RC																								
Northern Shoveler	<i>Anas clypeata</i>	Y	RC				V										1.2	7.0	5.5	V							
Tufted Duck	<i>Aythya fuligula</i>	Y	LC				V																				
Garganey	<i>Anas querquedula</i>	Y	-																								
Western Osprey	<i>Pandion haliaetus</i>	Y	RC																								
Black-winged Kite	<i>Elanus caeruleus</i>	Y	LC																								
Black Kite	<i>Milvus migrans</i>	N	(RC)	0.0	0.2	0.0	0.0	0.6	0.0	0.2	0.3		1.2	0.8	0.2	0.2		V	0.5	0.8	0.4	0.6	0.3	0.6			0.4
Crested Serpent Eagle	<i>Spilornis cheela</i>	N	(LC)																V								
Eastern Buzzard	<i>Buteo japonicus</i>	N	-																								V
Common Kestrel	<i>Falco tinnunculus</i>	N	-																								
Eurasian Hobby	<i>Falco subbuteo</i>	Y	(LC)																						V		
Peregrine Falcon	<i>Falco peregrinus</i>	N	-		V												V										
Greater Spotted Eagle	<i>Clanga clanga</i>	N	GC																								
Imperial Eagle	<i>Aquila heliaca</i>	N	-				V																				
Japanese Quail	<i>Coturnix japonica</i>	Y	LC													V											
Baillon's Crake	<i>Porzana pusilla</i>	Y	LC																								

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14	
White-breasted Waterhen	<i>Amauornis phoenicurus</i>	Y	-	0.2		0.2	0.0	0.4	0.2	V	1.8	0.2	0.2	V	0.8	0.4				V	0.2	0.2		V	1.4	0.5	0.5	0.2
Watercock	<i>Gallicrex cinerea</i>	Y	RC																									
Common Moorhen	<i>Gallinula chloropus</i>	Y	-																	V	0.2							
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Y	LC																									
Greater Painted-snipe	<i>Rostratula benghalensis</i>	Y	LC	0.2	0.0	0.0	0.0	0.0	0.0																			
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC									0.2	0.6	V	0.2	V										V	V	
Pied Avocet	<i>Recurvirostra avosetta</i>	Y	RC	0.0	0.2	0.0	0.0	0.0	0.0																			
Oriental Pratincole	<i>Glareola maldivarum</i>	Y	LC																									
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)	0.0	0.0	0.4	1.0	0.2	0.0						V	0.4		V	0.5	0.8			0.3				1.2	
Kentish Plover	<i>Charadrius alexandrinus</i>	Y	RC									0.8				V												
Spotted Redshank	<i>Tringa erythropus</i>	Y	RC												V													
Common Redshank	<i>Tringa totanus</i>	Y	RC																									
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Y	RC																									
Common Greenshank	<i>Tringa nebularia</i>	Y	RC	V	V	V		V									V	V		V							V	
Green Sandpiper	<i>Tringa ochropus</i>	Y	-						0.2						1.0	0.6	V		0.5						V		V	
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC		V		V	V							V	V	V	V	V					0.4	0.3		0.2	
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-	0.2					0.2	0.2		V	0.6	V	0.8	1.6	0.2	V	0.3	1.3	0.2	0.4	V	V	0.3	2.6	4.4	

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
Eurasian Woodcock	<i>Scolopax rusticola</i>	Y	-																								
Pintail/Swinhoe's Snipe^	<i>Gallinago stenura/ G. megala</i>	Y	LC^													V											
Common Snipe	<i>Gallinago gallinago</i>	Y	-		V				V																		
Red-necked Stint	<i>Calidris ruficollis</i>	Y	LC																								
Temminck's Stint	<i>Calidris temminckii</i>	Y	LC																								0.6
Long-toed Stint	<i>Calidris subminuta</i>	Y	LC																								
Whiskered Tern	<i>Chlidonias hybrida</i>	Y	-																								
Domestic Pigeon	<i>Columba livia</i>	N	-																								
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	N	-																								V
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	N	-																								
Red Turtle Dove	<i>Streptopelia tranquebarica</i>	N	-																								
Spotted Dove	<i>Spilopelia chinensis</i>	N	-	0.4	1.2	0.4		0.2	0.2	0.4	0.5	0.8	2.8	2.0	2.6	2.6	3.0	6.2	2.3	2.0	1.0	0.6	1.6	1.2	1.3	2.2	3.6
Asian Koel	<i>Eudynamis scolopaceus</i>	N	-																		V						
Greater Coucal#	<i>Centropus sinensis</i>	N								0.2	0.3	0.2	0.2		0.2	0.2					0.4	0.8	0.3	0.8	0.5	0.2	0.2
Eurasian Eagle Owl	<i>Bubo bubo</i>	N	RC											V		V			V								
Savanna Nightjar	<i>Caprimulgus affinis</i>	N	-				V				V									V							
Pacific Swift	<i>Apus pacificus</i>	N	(LC)																								

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
House Swift	<i>Apus nipalensis</i>	N	-		0.4		V											V	0.5								
Pied Kingfisher	<i>Ceryle rudis</i>	Y	(LC)						V				V				0.4	V	0.3	V					V		
Common Kingfisher	<i>Alcedo atthis</i>	Y	-	0.2	0.2	0.5	0.4	0.2	0.2	0.6	0.3	0.4	0.4	0.8	1.0	2.0	1.6	1.2	2.3	0.8	1.0				V		
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	N	(LC)													V	0.2					1.2	1.8	0.6	1.3	1.4	1.8
Eurasian Hoopoe	<i>Upupa epops</i>	N	-																								
Barn Swallow	<i>Hirundo rustica</i>	N	-	0.2	1.0		0.2	9.2	23.0	11.2		1.4	1.8	1.0		V			0.5	7.8	15.4	18.0	1.5	1.0	1.5	0.4	V
Red-rumped Swallow	<i>Hirundo daurica</i>	N	-	1.2	1.2													0.6									
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-	0.2	0.2	1.4	2.8	2.2	2.2	0.2					0.4	0.2	0.6	0.6	1.0	0.3	0.2					0.6	0.2
Eurasian Hoopoe	<i>Upupa epops</i>	N	-																								
Grey Wagtail	<i>Motacilla cinerea</i>	Y	-	0.6	0.0	0.0	0.0	0.0																			
White Wagtail	<i>Motacilla alba</i>	Y	-	2.6	1.0	1.0	3.0	4.8	2.0	1.0		1.2	0.4	3.5	2.8	3.6	2.6	1.2	1.3	2.5	1.6	0.6	1.2	0.8	1.8	1.8	3.2
Richard's Pipit	<i>Anthus richardi</i>	Y	-	0.2	0.4	1.2	0.4	0.4									0.4	0.8	2.0	2.3	3.0	V					V
Olive-backed Pipit	<i>Anthus hodgsoni</i>	N	-				0.6	1.2	1.4											0.2							
Red-throated Pipit	<i>Anthus cervinus</i>	N	LC																								
Buff-bellied Pipit	<i>Anthus rubescens</i>	N	LC																								
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	N	-						0.2		0.3		0.2			V		0.8	1.3	0.3	0.2			0.2	0.3	1.2	
Chinese Bulbul	<i>Pycnonotus sinensis</i>	N	-		0.2	2.0	0.2	0.2	3.2	2.0	3.8		2.4	3.5	0.2	1.8	4.0	3.8	0.5	0.8	1.6	1.8	2.3	2.2	2.3	0.4	4.6

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
Bull-headed Shrike	<i>Lanius bucephalus</i>	N	-																								V
Brown Shrike	<i>Lanius cristatus</i>	N	-																								
Long-tailed Shrike	<i>Lanius schach</i>	N	-	0.2		0.4			0.2		V	0.4	0.2	0.3	0.2		0.2	V	0.3			0.2	0.3	0.4	0.5	V	
Oriental Magpie Robin	<i>Copsychus saularis</i>	N	-	0.2					0.2	0.5		0.2	0.3	V	0.2	0.2	0.4			0.2		0.3	V	V	V		
Daurian Redstart	<i>Phoenicurus aureus</i>	N	-		0.2										0.2	0.2	0.4										V
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	N	-	0.4	0.4	0.8			0.6					V	0.2	0.2	0.4	0.5	0.3	V	0.2						0.4
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	N	-					0.6	1.2					1.0		0.4	0.8	V	0.5	0.2	0.2	0.5	V	1.5	0.8		
Lanceolated Warbler	<i>Locustella lanceolata</i>	Y	-																								
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	Y	LC																								
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	Y	-																								V
Thick-billed Warbler	<i>Acrocephalus aedon</i>	Y	LC																								
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	Y	-	0.2	0.0	0.0	0.0	0.0	0.0																		
Common Tailorbird	<i>Orthotomus sutorius</i>	N	-																								0.2
Zitting Cisticola	<i>Cisticola juncidis</i>	Y	LC	0.2				V										0.4		0.3	0.2						
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	N	-	0.8	0.6	0.8	1.4	4.6	4.4	5.0	2.4	1.8	3.0	2.4	0.8	1.0	0.8	1.3	2.8	0.8	0.8	0.4				0.4	
Plain Prinia	<i>Prinia inornata</i>	N	-	1.2	0.4	V	1.4	0.2	0.2	0.2	0.5	0.8	0.4	0.3		0.4	0.2	V	0.8	2.0	1.0		2.6	4.3	3.4		
Dusky Warbler	<i>Phylloscopus fuscatus</i>	N	-												V	0.4		0.4	0.8	1.5	V					V	V

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
Pallas's Leaf Warbler	<i>Phylloscopus proregulus</i>	N																									
Yellow-browed warbler	<i>Phylloscopus inornatus</i>	N	-	0.8	0.6																			0.8	0.5		V
Chinese Penduline-Tit	<i>Remiz consobrinus</i>	Y	RC														V		4.5	V							
Japanese White-eye	<i>Zosterops japonica</i>	N	-															0.2		0.6				V			
Little Bunting	<i>Emberiza pusilla</i>	N	-																								
Black-faced Bunting	<i>Emberiza spodocephala</i>	N	-																	V							
Chinese Grosbeak	<i>Eophona migratoria</i>	N	LC																								
Scaly-breasted Munia	<i>Lonchura punctulata</i>	N	-				1.0	2.2	1.0			2.0	0.4	0.3			1.8	1.8	V	1.8	V	3.2	5.8	0.8	1.5	1.3	
Eurasian Tree Sparrow	<i>Passer montanus</i>	N	-												0.8	V									V	8.8	3.6
Red-billed Starling	<i>Spodiopsar sericeus</i>	Y	(RC)*																V		V					V	
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Y	PRC																								
Black-collared Starling	<i>Gracupica nigricollis</i>	N	-			0.8	0.4	0.2	0.2	0.2				0.8		0.8	1.6	0.8	0.5	1.8	0.2	0.2	V	1.0	1.0	1.2	1.4
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)									0.2											V		V		V
Common Myna	<i>Acridotheres tristis</i>	N	-																						V		
Crested Myna	<i>Acridotheres cristatellus</i>	N	–	0.6						0.2	0.3	0.8	0.2			2.0	1.8	1.4	0.5	1.3	1.0	0.6	1.0	1.2	3.5	0.2	1.8

Common name	Scientific name	Wetland Dependence	Conservation status	Nov- 12	Dec- 12	Jan- 13	Feb- 13	Mar- 13	Apr- 13	May- 13	Jun- 13	Jul- 13	Aug- 13	Sep- 13	Oct- 13	Nov- 13	Dec- 13	Jan- 14	Feb- 14	Mar- 14	Apr- 14	May- 14	Jun- 14	Jul- 14	Aug- 14	Sep- 14	Oct- 14
Black-naped Oriole	<i>Oriolus chinensis</i>	N	LC																								
Black Drongo	<i>Dicrurus macrocercus</i>	N	-											0.3	0.4	V					V				1.5		0.2
Azure-winged Magpie	<i>Cyanopica cyanus</i>	N	-													V											
Eurasian Magpie	<i>Pica pica</i>	N	-								0.3					V		0.8	V	0.3	0.2						
Large-billed Crow	<i>Corvus macrorhynchos</i>	N	-								1.0												0.3				
Collared Crow	<i>Corvus torquatus</i>	N	LC, NT							V					0.2	0.2			V	0.5	0.8	0.4		0.6		0.4	V

Note: Conservation Status follows that of Fellows et. al. (2002)

^ Pintail Snip and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe.

V Indicates the species is recorded outside regular surveys.

DS Indicates species recorded during survey.

# Greater Coucal is listed as vulnerable (VU) in China Red Data Book and it is protected terrestrial wildlife state protection (category II).

\* Red billed Starling is considered by Fellows et al (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

**Table B6: Summary of Bird Species Recorded at the WRA and their Respective Monthly Mean between November 2014 and October 2016**

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC	2.5	1.2	2.0	2.0	2.0	0.8	1.2	2.8	1.6	1.8	1.0	2.0	2.3	2.4	3.2	3.3	3.8	2.4	1.4	0.8	1.5	1.4	0.8	V
Great Cormorant	<i>Phalacrocorax carbo</i>	Y	PRC	0.5	1.8	2.0	0.8	0.6							0.2		0.6	0.2	V	V							0.5
Grey Heron	<i>Ardea cinerea</i>	Y	PRC	2.3	2.6	5.3	4.8	0.8	V					0.4	1.8	1.3	2.0	1.2	2.0							0.8	0.8
Purple Heron	<i>Ardea purpurea</i>	Y	RC												0.2												
Great Egret	<i>Ardea alba</i>	Y	PRC	0.5	1.6	0.8	0.3	V	0.3	V		0.2	0.3	1.8	1.0	0.3	0.4	0.8	0.3	0.6	0.2	0.2	0.2	0.3	0.6	1.0	0.8
Intermediate Egret	<i>Egretta intermedia</i>	Y	RC											V				V	V								
Little Egret	<i>Egretta garzetta</i>	Y	PRC	3.0	3.6	5.3	3.5	4.6	6.3	1.4	0.6	0.2	1.8	2.0	1.8	2.3	4.8	8.2	3.0	1.6	2.6	1.2	2.4	2.8	4.6	3.6	6.3
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Y	(LC)			V									0.8						V		V	0.3		V	V
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC	2.0	2.8	2.3	2.8	1.2	1.8	0.6	0.8	1.8	1.3	2.8	5.4	3.3	8.2	3.6	2.0	1.8	0.6	1.2	1.6	5.3	2.6	5.6	6.3
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)	0.3	0.2			0.2	0.5	0.4	1.6	0.6	1.0	0.6	2.6	0.3	0.8	0.4	0.5	0.2	0.6	0.6	1.4	4.8	2.0	0.8	0.8
Cinnamon Bittern	<i>Ixobrychus cinnamomus</i>	Y	LC						V																		
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)								V	V	V		V				V			0.2	V	1.8	0.4	V	
Eurasian Spoonbill	<i>Platalea leucorodia</i>	Y	LC																								
Black-faced Spoonbill	<i>Platalea minor</i>	Y	PGC, EN		V	V		V											V								

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Mandarin Duck	<i>Aix galericulata</i>	Y	-																								
Eurasian Wigeon	<i>Anas penelope</i>	Y	RC																								
Eurasian Teal	<i>Anas crecca</i>	Y	RC																								
Northern Pintail	<i>Anas acuta</i>	Y	RC																								
Northern Shoveler	<i>Anas clypeata</i>	Y	RC	0.2															1.8	0.2							
Tufted Duck	<i>Aythya fuligula</i>	Y	LC																								
Garganey	<i>Anas querquedula</i>	Y	-																								
Western Osprey	<i>Pandion haliaetus</i>	Y	RC														0.4										
Black-winged Kite	<i>Elanus caeruleus</i>	Y	LC											V													
Black Kite	<i>Milvus migrans</i>	Y	(RC)	0.4		0.3	0.4	0.5	0.2	0.2				0.2	0.4	0.3	0.8	0.2	0.5	1.0	0.2	V	0.2	V	0.4		
Crested Serpent Eagle	<i>Spilornis cheela</i>	N	(LC)						0.4										0.6								
Crested Goshawk	<i>Accipiter trivirgatus</i>	N	-																								V
Greater Spotted Eagle	<i>Clanga clanga</i>	Y	GC	0.3												0.3											
Eastern Imperial Eagle	<i>Aquila heliaca</i>	Y	-			0.3																					
Eastern Buzzard	<i>Buteo japonicus</i>	Y	-			V	0.2								0.2	0.3											

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Common Kestrel	<i>Falco tinnunculus</i>	N	-												V	0.3											
Peregrine Falcon	<i>Falco peregrinus</i>	Y	-									V					V										
Eurasian Hobby	<i>Falco subbuteo</i>	Y	(LC)													0.3											V
Japanese Quail	<i>Coturnix japonica</i>	N	LC																								
Baillon's Crake	<i>Porzana pusilla</i>	Y	LC												0.2												
White-breasted Waterhen	<i>Amauornis phoenicurus</i>	Y	-	0.5	V	0.8	1.0	0.8	0.3	V	V	0.2	V	0.2	0.6		0.8	0.4	V	0.4	0.4	0.8	0.2	0.3	0.4	0.6	0.3
Watercock	<i>Gallicrex cinerea</i>	Y	RC								0.2																
Common Moorhen	<i>Gallinula chloropus</i>	Y	-	V		V		0.2							V				V		0.2		V		V		
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Y	LC												0.2	V											
Greater Painted-snipe	<i>Rostratula benghalensis</i>	Y	LC																								
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC				0.3	0.2						V		0.8		V	V		1.6				1.0	0.3	
Pied Avocet	<i>Recurvirostra avosetta</i>	Y	RC																								
Oriental Pratincole	<i>Glareola maldivarum</i>	Y	LC																								V
Pacific Golden Plover	<i>Pluvialis fulva</i>	Y	LC																		0.4						
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)	1.8	0.2	0.8	0.5	1.6	1.8	2.0								V	V		V		V				

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Kentish Plover	<i>Charadrius alexandrinus</i>	Y	RC																								
Spotted Redshank	<i>Tringa erythropus</i>	Y	RC																	0.2							
Common Redshank	<i>Tringa totanus</i>	Y	RC																								
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Y	RC																								
Common Greenshank	<i>Tringa nebularia</i>	Y	RC	V	V	V											V	V	V		V						0.3
Green Sandpiper	<i>Tringa ochropus</i>	Y	-	0.3	0.2		0.3	0.2							V	0.8	0.4	0.2	V	V	V					2.4	0.8
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC		2.2	V	V	V	1.0								1.0	V	0.5		0.4			V	V	0.6	V
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-	0.8	1.2	3.0	2.0	2.2	0.5				0.3	1.2	0.6	0.3	1.2	1.4	0.5	0.6	1.0	1.0		0.5	V	0.2	1.5
Eurasian Woodcock	<i>Scolopax rusticola</i>	Y	-		V																						
Pintail/ Swinhoe's Snipe^	<i>Gallinago stenura/G. megala</i>	Y	LC^																								
Common Snipe	<i>Gallinago gallinago</i>	Y	-					V									0.2	V	V							0.2	
Red-necked Stint	<i>Calidris ruficollis</i>	Y	LC																								
Temminck's Stint	<i>Calidris temminckii</i>	Y	LC																								
Long-toed Stint	<i>Calidris subminuta</i>	Y	LC																								
Whiskered Tern	<i>Chlidonias hybrida</i>	Y	-																								
Domestic Pigeon	<i>Columba livia</i>	N	-																								

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	N	-														0.2	V		V							
Red Turtle Dove	<i>Streptopelia tranquebarica</i>	N	-							0.4																	
Spotted Dove	<i>Spilopelia chinensis</i>	N	-	1.5	4.2	3.8	1.3	2.2	6.0	3.6	1.6	2.2	2.0	3.0	3.4	1.3	4.8	6.0	3.5	3.4	2.2	2.2	1.8	3.0	3.4	2.2	2.5
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	N	-						0.5	0.4							1.2	4.6	11.0	0.2		0.4			0.6	0.4	0.5
Asian Koel	<i>Eudynamys scolopaceus</i>	N	-					V		0.2	0.2		0.3	V							0.2	0.2	0.2	0.3	0.2	V	
Greater Coucal <sup>#</sup>	<i>Centropus sinensis</i>	N	-	V	0.2	0.3	0.3	0.6	1.0	0.4	0.2	0.2	V	V		0.5	1.0		0.8	V	0.2	0.6	0.6	0.8	0.4	0.2	0.3
Eurasian Eagle Owl	<i>Bubo bubo</i>	N	RC				V																				
Savanna Nightjar	<i>Caprimulgus affinis</i>	N	-				V												V			V	V				
Pacific Swift	<i>Apus pacificus</i>	N	(LC)																							0.2	
House Swift	<i>Apus nipalensis</i>	N	-			14.5	105.8	14.4	0.8		0.2								V								
Pied Kingfisher	<i>Ceryle rudis</i>	Y	(LC)		0.4	0.5	0.3	0.2		0.2			0.8			0.3		0.2	0.3		V	0.2				V	
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Y	(LC)		0.2				0.3					0.2	0.4	0.3	0.4	0.4	0.3		0.2	V	V	0.5	0.2	0.4	V
Common Kingfisher	<i>Alcedo atthis</i>	Y	-	1.3	0.8	1.8	2.8	1.4	1.5	0.8	0.8	0.2	0.5	0.6	2.2	1.5	3.0	3.0	1.3	1.6	1.4	2.0	0.6	2.0	0.2	0.6	0.8
Eurasian Hoopoe	<i>Upupa epops</i>	N	-				0.3																				
Barn Swallow	<i>Hirundo rustica</i>	N	-	0.5		13.0	15.3	14.4	9.8	0.2	2.2	0.8	V	0.8	V	2.0	V		V	1.6	1.6	V	1.4	V	V	0.2	

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Red-rumped Swallow	<i>Hirundo daurica</i>	N	-														2.4		V								
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-	1.8	0.4	2.0	4.3	2.0	1.0							V	1.8	1.4	2.0	1.2	1.0						0.3
Grey Wagtail	<i>Motacilla cinerea</i>	Y	-														V	0.2	0.3								
White Wagtail	<i>Motacilla alba</i>	Y	-	4.0	5.6	6.3	9.5	4.8	3.3	1.4	V		0.3	0.4	0.4	0.8	3.8	4.0	2.0	1.0	1.2	0.2	V	0.3	0.4	0.6	1.0
Richard's Pipit	<i>Anthus richardi</i>	Y	-	0.3		0.5	V											0.2	0.3	0.4	0.2						
Olive-backed Pipit	<i>Anthus hodgsoni</i>	N	-	0.3	2.2	0.3	1.5	0.4									0.2		2.8	0.2	V						
Red-throated Pipit	<i>Anthus cervinus</i>	N	LC																								
Buff-bellied Pipit	<i>Anthus rubescens</i>	N	LC																								
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	N	-	0.8	3.4	7.3	1.3	0.6	0.8	1.0	2.6	5.8	4.5	1.4	1.0	5.3	11.0	20.0	6.5	1.6	4.6	2.6	4.6	1.8	4.0	4.4	8.0
Chinese Bulbul	<i>Pycnonotus sinensis</i>	N	-	5.3	3.0	24.8	10.0	4.8	6.3	5.6	4.6	2.6	1.8	2.6	1.4	3.0	10.2	9.0	5.8	1.0	1.8	2.2	3.0	7.8	7.8	0.4	1.5
Sooty-headed Bulbul	<i>Pycnonotus aurigaster</i>	N	-															V		V	0.4	2.0					
Bull-headed Shrike	<i>Lanius bucephalus</i>	N	-																								
Brown Shrike	<i>Lanius cristatus</i>	N	-						0.3																		
Long-tailed Shrike	<i>Lanius schach</i>	N	-		0.2	0.8	0.5	0.4					0.3	0.4	0.4	0.3	0.6	0.2	0.3	V	0.6	0.4	V	0.5	0.4	0.4	

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Oriental Magpie Robin	<i>Copsychus saularis</i>	N	-		0.2	0.5	0.8	0.6	0.5	0.2	1.2	0.2			0.2	0.5	0.2	0.4	0.5	1.0	0.6	V	V	1.3	1.2	0.2	
Daurian Redstart	<i>Phoenicurus aureus</i>	N	-	0.3	1.6	0.8	0.5	0.6								0.3	1.0	0.8	0.8	V							
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	N	-	0.3	0.2	0.3	0.8	0.8	0.3						2.2	0.5	1.0	0.6	0.5	V	V					0.4	V
Grey-backed thrush	<i>Turdus hortulorum</i>	N	-																0.3								
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	N	-		1.2		1.5	1.0	1.3	1.2	0.4	2.4	3.0	1.2	V	V	2.6	2.0	2.5	2.6	1.6	2.8	1.6	0.8	1.4	0.4	
Lanceolated Warbler	<i>Locustella lanceolata</i>	Y	-																								
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	Y	LC																								
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	Y	-																						V	0.4	
Thick-billed Warbler	<i>Acrocephalus aedon</i>	Y	LC											V													
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	Y	-		V										V												
Common Tailorbird	<i>Orthotomus sutorius</i>	N	-	0.5	1.2	1.0	1.5	0.4					0.8				V					0.2				0.2	0.3
Dusky Warbler	<i>Phylloscopus fuscatus</i>	N	-				V	V								0.3		0.2	V		V						
Pallas's Leaf Warbler	<i>Phylloscopus proregulus</i>	N	-		V												0.4	0.2									

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
Yellow-browed warbler	<i>Phylloscopus inornatus</i>	N	-	0.3	0.2	0.3									0.3			0.8			V		V				
Zitting Cisticola	<i>Cisticola juncidis</i>	Y	LC													0.6		0.2									
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	N	-	0.5		0.3	0.3	2.6	0.8	2.0	1.5							0.2	0.8	0.6	0.8		0.2	1.3	0.2	V	V
Plain Prinia	<i>Prinia inornata</i>	N	-	2.8	0.2	1.3	3.5	1.6	2.8	1.2	1.0	1.6	1.5	0.6	0.6	2.3	1.0	0.6	0.8	1.0	0.6	2.8	1.8	0.8	1.0	0.2	0.5
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	N	-														0.2										
Chinese Penduline-Tit	<i>Remiz consobrinus</i>	Y	RC		0.4	1.5	4.5	3.2	V									0.2	V	0.2							
Great Tit	<i>Parus major</i>	N	-															0.5	0.2								
Japanese White-eye	<i>Zosterops japonica</i>	N	-		1.0	V	V	0.2		0.2	V	3.8	4.3				0.4	3.2	V	V		1.4	0.4	V	0.8	0.8	V
Little Bunting	<i>Emberiza pusilla</i>	N	-																								
Black-faced Bunting	<i>Emberiza spodocephala</i>	N	-					V											V								
Chinese Grosbeak	<i>Eophona migratoria</i>	Y	LC																								
Scaly-breasted Munia	<i>Lonchura punctulata</i>	N	-	3.3	0.6	V	V	4.0	11.3	0.6	V	V	3.3	1.6	0.4	2.3	2.2	1.4		0.2	V				2.2	V	
Eurasian Tree Sparrow	<i>Passer montanus</i>	N	-		V	4.5	4.0	1.4		0.2		0.4		0.6	0.4	V						1.4	1.4		V	V	
Red-billed Starling	<i>Spodiopsar sericeus</i>	Y	(RC)*				24.5	V		V	0.4							2.0	8.0								

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Y	PRC		V									0.2		V		V		0.8	V	1.0					
Black-collared Starling	<i>Gracupica nigricollis</i>	N	-	0.3	3.0	1.3	2.0	4.2	2.3	2.0	1.0	1.6	1.8	0.4	1.6	V	2.2	1.0	3.5	0.4	1.0	1.0	0.8	0.8	2.2	0.6	1.8
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)								0.8	V	V						V	0.2	V			V		V	
Common Myna	<i>Acridotheres tristis</i>	N	-											0.4				V					0.5	V			
Crested Myna	<i>Acridotheres cristatellus</i>	N	-	2.8	4.0		0.5	2.2	2.3	2.8	6.8	0.4	1.8	0.2	0.6	V	4.8	1.2	3.8	1.2	4.6	0.6	1.8	0.3	4.4	1.0	
Black-naped Oriole	<i>Oriolus chinensis</i>	Y	LC																								
Black Drongo	<i>Dicrurus macrocerus</i>	N	-		V							2.3	1.6	0.6		V	0.2	0.3					1.0	1.2	1.5		
Azure-winged Magpie	<i>Cyanopica cyanus</i>	N	-																								
Eurasian Magpie	<i>Pica pica</i>	N	-			0.3	0.8	V	0.5			V						0.2	1.0	0.2	0.2	V		V		V	
Large-billed Crow	<i>Corvus macrorhynchos</i>	N	-										0.5						0.2	0.8	0.6						
Collared Crow	<i>Corvus torquatus</i>	Y	LC, NT						V	0.2				V	0.4		V	0.4		V	0.2		V	V	V	0.4	

- (1) Conservation Status follows that of Fellowes et. al. (2002) ). Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence. (Fellowes et al. 2002)
- ^Pintail Snipe and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe
- V indicates the species is recorded outside regular surveys
- DS indicates species recorded during surveys
- # Greater Coucal is listed as vulnerable (VU) in China Red Data Book and it is protected under terrestrial wildlife state protection (category II).

\* Red billed Starling is considered by Fellows *et al* (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

**Table B7: Summary of Bird Species Recorded at the WRA and their Respective Monthly Mean between November 2016 and October 2017**

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Little Grebe	<i>Tachybaptus ruficollis</i>	Y	LC	1.8	3.4	2.3	4.0	5.0	1.3	0.4	0.6	V	0.8	2.0	0.8
Great Cormorant	<i>Phalacrocorax carbo</i>	Y	PRC	0.8	1.8	0.3	0.4	0.2							
Grey Heron	<i>Ardea cinerea</i>	Y	PRC	1.4	3.4	2.3	4.2	2.2							1.2
Purple Heron	<i>Ardea purpurea</i>	Y	RC												
Great Egret	<i>Ardea alba</i>	Y	PRC, (RC)	0.8	2.2	1.5	2.4	1.2	1.3	2.2	0.8	0.8	0.6	0.2	0.8
Intermediate Egret	<i>Egretta intermedia</i>	Y	RC												
Little Egret	<i>Egretta garzetta</i>	Y	PRC, (RC)	5.8	5.6	9.3	4.2	6.4	4.0	19.4	2.4	0.3	4.6	2.6	10.2
Eastern Cattle Egret	<i>Bubulcus coromandus</i>	Y	(LC)												V
Chinese Pond Heron	<i>Ardeola bacchus</i>	Y	PRC, (RC)	5.6	4.4	6.5	6.2	3.6	1.0	2.0	0.8	1.5	4.0	1.6	4.2
Yellow Bittern	<i>Ixobrychus sinensis</i>	Y	(LC)	0.2	0.8		0.2	0.4	0.5	0.8	2.0	0.5	1.2	0.6	0.2
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>	Y	LC					V		0.2					
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Y	(LC)	V		V	V		V	0.4	V	V		0.2	
Eurasian Spoonbill	<i>Platalea leucorodia</i>	Y	LC												
Black-faced Spoonbill	<i>Platalea minor</i>	Y	PGC, EN		0.2										
Mandarin Duck	<i>Aix galericulata</i>	Y	-												
Eurasian Wigeon	<i>Anas penelope</i>	Y	RC												
Eurasian Teal	<i>Anas crecca</i>	Y	RC			V									
Northern Pintail	<i>Anas acuta</i>	Y	RC			V									

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Northern Shoveler	<i>Anas clypeata</i>	Y	RC												
Tufted Duck	<i>Aythya fuligula</i>	Y	LC												
Garganey	<i>Anas querquedula</i>	Y	-												
Western Osprey	<i>Pandion haliaetus</i>	Y	RC	V											
Black-winged Kite	<i>Elanus caeruleus</i>	Y	LC												
Black Kite	<i>Milvus migrans</i>	Y	(RC)	V	0.4	0.3	1.0	0.4	0.3			V	0.2	0.6	
Crested Serpent Eagle	<i>Spilornis cheela</i>	N	(LC)												
Crested Goshawk	<i>Accipiter trivirgatus</i>	N	-												
Greater Spotted Eagle	<i>Clanga clanga</i>	Y	GC												
Eastern Imperial Eagle	<i>Aquila heliaca</i>	Y	-												
Eastern Buzzard	<i>Buteo japonicus</i>	Y	-				0.4	0.2							
Common Kestrel	<i>Falco tinnunculus</i>	N	-	0.2											
Peregrine Falcon	<i>Falco peregrinus</i>	Y	(LC)		V		0.2								
Eurasian Hobby	<i>Falco subbuteo</i>	Y	(LC)												
Japanese Quail	<i>Coturnix japonica</i>	N	LC												
Baillon's Crane	<i>Porzana pusilla</i>	Y	LC												
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Y	-		0.4	0.3	0.2	0.6	1.0	0.6	0.2	0.5	0.2	0.4	

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Watercock	<i>Gallicrex cinerea</i>	Y	RC												
Common Moorhen	<i>Gallinula chloropus</i>	Y	-	V	V	0.3	0.6	V	0.8						
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Y	LC												
Greater Painted-snipe	<i>Rostratula benghalensis</i>	Y	LC												
Black-winged Stilt	<i>Himantopus himantopus</i>	Y	RC	0.6	V						V				
Pied Avocet	<i>Recurvirostra avosetta</i>	Y	RC	V											
Oriental Pratincole	<i>Glareola maldivarum</i>	Y	LC				V								
Pacific Golden Plover	<i>Pluvialis fulva</i>	Y	LC												
Little Ringed Plover	<i>Charadrius dubius</i>	Y	(LC)		1.4	V	0.8	0.8	0.3		V				
Kentish Plover	<i>Charadrius alexandrinus</i>	Y	RC	0.6											
Spotted Redshank	<i>Tringa erythropus</i>	Y	RC			V									
Common Redshank	<i>Tringa totanus</i>	Y	RC	V											
Common Greenshank	<i>Tringa nebularia</i>	Y	RC	V	V	V	V	V							
Marsh Sandpiper	<i>Tringa stagnatilis</i>	Y	RC						2.3						
Green Sandpiper	<i>Tringa ochropus</i>	Y	-	0.6	2.0	0.8	0.8	0.4	0.8			V			
Wood Sandpiper	<i>Tringa glareola</i>	Y	LC	0.6	0.2	V	0.2	0.2				V			0.2
Common Sandpiper	<i>Actitis hypoleucos</i>	Y	-	0.4	0.4	0.8	2.2	0.6	1.0			V		0.2	0.6

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Eurasian Woodcock	<i>Scolopax rusticola</i>	Y	-												
Pintail/Swinhoe's Snipe^	<i>Gallinago stenura/G. megala</i>	Y	LC^												
Common Snipe	<i>Gallinago gallinago</i>	Y	-												
Red-necked Stint	<i>Calidris ruficollis</i>	Y	LC												
Temminck's Stint	<i>Calidris temminckii</i>	Y	LC												
Long-toed Stint	<i>Calidris subminuta</i>	Y	LC												
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	Y	PRC						V						
Whiskered Tern	<i>Chlidonias hybrida</i>	Y	-												
Domestic Pigeon	<i>Columba livia</i>	N	-												
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	N	-												
Red Turtle Dove	<i>Streptopelia tranquebarica</i>	N	-												
Spotted Dove	<i>Spilopelia chinensis</i>	N	-	2.6	3.8	7.0	4.2	4.4	2.0	1.0	1.4	1.8	2.8	5.3	4.8
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	N	-	0.2	0.6	2.8	0.8	0.2	0.3	0.4	1.0	V	0.4	0.8	2.0
Asian Koel	<i>Eudynamys scolopaceus</i>	N	-												
Greater Coucal#	<i>Centropus sinensis</i>	N	-	V	0.6	0.3	0.6	0.8	0.5	0.4	V	0.5	0.4	0.3	0.4
Eurasian Eagle Owl	<i>Bubo bubo</i>	N	RC												
Savanna Nightjar	<i>Caprimulgus affinis</i>	N	-			V		V	V						

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Pacific Swift	<i>Apus pacificus</i>	N	(LC)												
House Swift	<i>Apus nipalensis</i>	N	-	V	V			V	V			V			
Pied Kingfisher	<i>Ceryle rudis</i>	Y	(LC)	0.2	0.6	0.5	V		0.3						
Black-capped Kingfisher	<i>Halcyon pileata</i>	Y	(LC)	V											
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Y	(LC)	0.2	0.4	V	0.4	0.2	V	0.2	0.2	0.3			0.2
Common Kingfisher	<i>Alcedo atthis</i>	Y	-	2.2	1.4	1.8	2.6	2.0	0.3	1.0	0.2	0.8	0.4	0.4	1.2
Eurasian Hoopoe	<i>Upupa epops</i>	N	-												
Barn Swallow	<i>Hirundo rustica</i>	N	-				1.4	1.2	1.5	1.6		0.8	V	1.3	
Red-rumped Swallow	<i>Hirundo daurica</i>	N	-												
Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i>	Y	-	0.6	0.4	V	V	0.4	0.5	0.4					
Grey Wagtail	<i>Motacilla cinerea</i>	Y	-		V	V		V							
White Wagtail	<i>Motacilla alba</i>	Y	-	1.6	2.2	V	1.0	1.0	1.0	0.6	0.4	V		1.4	2.0
Richard's Pipit	<i>Anthus richardi</i>	Y	-						V						
Olive-backed Pipit	<i>Anthus hodgsoni</i>	N	-		0.2	0.3									0.2
Red-throated Pipit	<i>Anthus cervinus</i>	N	LC												
Buff-bellied Pipit	<i>Anthus rubescens</i>	N	LC												
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	N	-	1.8	3.2	4.3	1.8	1.8	2.0	1.4	1.2	1.5		6.0	7.4
Chinese Bulbul	<i>Pycnonotus sinensis</i>	N	-	0.4	1.4	10.8	4.0	1.6	2.8	2.0	1.2	1.5	1.2	1.8	3.6

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Sooty-headed Bulbul	<i>Pycnonotus aurigaster</i>	N	-					0.2							
Red-flanked Bluetail	<i>Tarsiger cyanurus</i>	N	-												0.2
Bull-headed Shrike	<i>Lanius bucephalus</i>	N	-												
Brown Shrike	<i>Lanius cristatus</i>	N	-						0.3						
Long-tailed Shrike	<i>Lanius schach</i>	N	-	0.6	0.2	V	0.2	0.4			V	0.3	1.2	0.3	2.2
Oriental Magpie Robin	<i>Copsychus saularis</i>	N	-	0.6				V	0.8	0.6	0.8	1.3	1.2		
Daurian Redstart	<i>Phoenicurus aureus</i>	N	-	0.2	0.4	V	0.4	0.2							
Stejneger's Stonechat	<i>Saxicola stejnegeri</i>	N	-	0.2	0.6	0.3	0.4	0.4	0.5						0.4
Chinese Blackbird	<i>Turdus mandarinus</i>	N	-					V							
Grey-backed thrush	<i>Turdus hortulorum</i>	N	-												
Masked Laughingthrush	<i>Garrulax perspicillatus</i>	N	-	0.2	0.6	1.5	0.8	V	0.8	1.2	1.0	0.5	0.2		0.4
Lanceolated Warbler	<i>Locustella lanceolata</i>	Y	-												V
Pallas's Grasshopper Warbler	<i>Locustella certhiola</i>	Y	LC												
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	Y	-												
Thick-billed Warbler	<i>Acrocephalus aedon</i>	Y	LC												
Black-browed Reed Warbler	<i>Acrocephalus bistrigiceps</i>	Y	-						V						V
Common Tailorbird	<i>Orthotomus sutorius</i>	N	-	V		0.3	0.2	0.6	0.5		V	V	V		1.4

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Dusky Warbler	<i>Phylloscopus fuscatus</i>	N	-	V	V	V	V	V							
Pallas's Leaf Warbler	<i>Phylloscopus proregulus</i>	N	-				0.4								
Yellow-browed warbler	<i>Phylloscopus inornatus</i>	N	-	0.6	V	0.3									
Zitting Cisticola	<i>Cisticola juncidis</i>	Y	LC												
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	N	-				1.4	1.0	1.0	1.8	V				0.2
Plain Prinia	<i>Prinia inornata</i>	N	-	0.4	0.2	1.0	0.8	0.2	0.5	v	0.8	0.3	0.2	V	
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>	N	-												
Chinese Penduline-Tit	<i>Remiz consobrinus</i>	Y	RC												
Cinereous Tit	<i>Parus cinereus</i>	N	-					0.4			V				
Japanese White-eye	<i>Zosterops japonica</i>	N	-		1.6	V		0.4		0.2	0.4	V			0.2
Little Bunting	<i>Emberiza pusilla</i>	N	-												
Black-faced Bunting	<i>Emberiza spodocephala</i>	N	-												
Chinese Grosbeak	<i>Eophona migratoria</i>	Y	LC												
Scaly-breasted Munia	<i>Lonchura punctulata</i>	N	-	0.8		V			2.8		V	1.5		4.5	1.2
Eurasian Tree Sparrow	<i>Passer montanus</i>	N	-	0.2									0.6	2.0	1.4
Red-billed Starling	<i>Spodiopsar sericeus</i>	Y	(RC)*	V	V	0.5						V			
White-cheeked Starling	<i>Spodiopsar cineraceus</i>	Y	PRC			V	0.6			V					

Common name	Scientific name	Wetland Dependence	Conservation status	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17
Black-collared Starling	<i>Gracupica nigricollis</i>	N	-	0.2	0.2	0.3	0.6	0.4	0.5	0.4	0.4	1.0	1.4	1.0	2.2
White-shouldered Starling	<i>Sturnia sinensis</i>	Y	(LC)							1.2	1.8				
Common Myna	<i>Acridotheres tristis</i>	N	-		V		V	V							
Crested Myna	<i>Acridotheres cristatellus</i>	N	-	6.2	1.8	5.8	0.4	0.6	1.5	0.2	2.6	V	2.0	4.0	3.2
Black-naped Oriole	<i>Oriolus chinensis</i>	Y	LC												
Black Drongo	<i>Dicrurus macrocercus</i>	N	-	0.2					V					0.3	
Azure-winged Magpie	<i>Cyanopica cyanus</i>	N	-			0.5									0.2
Eurasian Magpie	<i>Pica pica</i>	N	-		0.2		0.4	0.2		0.2					1.4
Large-billed Crow	<i>Corvus macrorhynchos</i>	N	-					0.2			V				
Collared Crow	<i>Corvus torquatus</i>	Y	LC, NT												0.4

Note: Conservation Status follows that of Fellows et. al. (2002) Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence. (Fellows et al. 2002)

^ Pintail Snipe and Swinhoe's Snipe cannot be distinguished in field, conservation status refers to Swinhoe's Snipe.

V Indicates the species is recorded outside regular surveys.

DS Indicates species recorded during survey.

# Greater Coucal is listed as vulnerable (VU) in China Red Data Book and it is protected terrestrial wildlife state protection (category II).

\* Red billed Starling is considered by Fellows et al (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is not now considered globally threatened. A listing of Regional Concern (RC) based on the importance of the large roosts present near Deep Bay, is considered to be more appropriate. (Wetland Restoration Plan, Mott, 2008). Red billed Starling is now listed as Least Concern by IUCN. (IUCN, 2016)

# Appendix C. Summary of Herpetofauna Monitoring, Mammals and Insect Surveys

Table C1: Summary of herpetofauna monitoring within the Survey Area (excluding the WRA)

Common Name	Scientific Name	Conservation Status(1)	Mean(2)					
Amphibians			May	Jun	Jul	Aug	Sep	Oct
Gunther's Frog	<i>Hylarana guentheri</i>	-		2.0	1.0		3.0	
Asian Common Toad	<i>Duttaphrynus melanostictus</i>	-			1.0			
No. of Species Recorded			0	1	2	0	1	0
Reptiles			May	Jun	Jul	Aug	Sep	Oct
(No reptile was recorded during the survey period)								
No. of Species Recorded			0	0	0	0	0	0

(1) Conservation status follows that of Fellows that of Fellowes et al. (2002), Chan et al. (2005) and Karsen et al. (1998).  
(2) Refers to the mean number of individuals recorded in the reporting period (excluding the WRA)  
V Indicates the species is recorded outside regular surveys.

**Table C2: Summary of herpetofauna monitoring in the WRA**

Common Name	Scientific Name	Conservation Status	Mean(2)					
Amphibians			May	Jun	Jul	Aug	Sep	Oct
Gunther's Frog	<i>Hylarana guentheri</i>	-		2.0	1.0			
No. of Species Recorded			0	1	1	0	0	0
Reptiles			May	Jun	Jul	Aug	Sep	Oct
Checkered Keelback	<i>Xenochrophis flavipunctatus</i>	-				0.5		
No. of Species Recorded			0	0	0	1	0	0

(1) Conservation status follows that of Fellows that of Fellowes et al. (2002), Chan et al. (2005) and Karsen et al. (1998).

(2) Refers to the mean number of individuals recorded in the reporting period at WRA.

V Indicates the species is recorded outside regular surveys.

**Table C3: Summary of mammal monitoring in the Survey Area (excluding the WRA)**

Common Name	Scientific Name	Conservation Status (1)	Max (2)					
Mammal			May	Jun	Jul	Aug	Sep	Oct
(No mammal was record during the survey period)								

(1) Conservation status follows that of Fellows et al. (2002) and Shek (2006).

(2) Refers to the maximum number of individuals recorded in each month in the survey area (excluding WRA).

V Indicates the species is recorded outside regular surveys.

**Table C4: Summary of mammal monitoring in the WRA**

Common Name	Scientific Name	Conservation Status (1)	Max (2)					
Mammal			May	Jun	Jul	Aug	Sep	Oct
Bat	<i>indet. sp. 1</i>	-		V	V			V
Bat	<i>indet. sp. 2</i>	-						V
Leopard Cat	<i>Prionailurus bengalensis</i>	-	V	V	V			V
Small Indian Civet	<i>Viverricula indica</i>	-			V			
<b>No. of Species Recorded</b>			<b>1</b>	<b>2</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

(1) Conservation status follows that of Fellows et al. (2002) and Shek (2006).

(2) Refers to the maximum number of individuals recorded in each month at WRA.

V Indicates the species is recorded outside regular surveys.

(3) #Leopard Cat is listed on CITES Appendix II and vulnerable (VU) in China Red Data Book and it is protected under the Wild Animals Protection Ordinance (Cap. 170)

**Table C5: Summary of dragonfly and butterfly monitoring in the Survey Area (excluding the WRA)**

Common Name	Scientific Name	Conservation Status(1)	Mean(2)					
Odonate			May	Jun	Jul	Aug	Sep	Oct
Asian Amberwing	<i>Brachythemis contaminata</i>	-				0.5		
Common Bluetail	<i>Ischnura senegalensis</i>	-					2.0	
Common Flangetail	<i>Ictinogomphus pertinax</i>	-			0.5	2.0	5.0	3.0
Green Skimmer	<i>Orthetrum sabina sabina</i>	-			0.5	1.5	1.0	
Pied Skimmer	<i>Pseudothemis zonata</i>	-	0.7					
Variegated Flutterer	<i>Rhyothemis variegata arria</i>	-	1.3	10.7	3.5	12.5		
Wandering Glider	<i>Pantala flavescens</i>	-			3.5	69.5		
No. of Species Recorded			2	1	4	5	3	1
Butterfly			May	Jun	Jul	Aug	Sep	Oct
Common Sailer	<i>Neptis hylas hylas</i>	-						3.0
Great Egg-fly	<i>Hypolimnas bolina kezia</i>	-				0.5	3.0	4.0
Indian Cabbage White	<i>Pieris canidia canidia</i>	-						3.0
Lemon Emigrant	<i>Catopsilia pomona pomona</i>	-				1.0		
Pale Grass Blue	<i>Pseudozizeeria maha serica</i>	-		6.0				
No. of Species Recorded			0	1	0	2	1	3

(1) Conservation status follows that of Fellows et al. (2002) and Shek (2006), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).

(2) Refers to the mean number of individuals recorded in each month in the survey area (excluding the WRA)

**Table C6: Summary of dragonfly and butterfly monitoring in the WRA**

Common Name	Scientific Name	Conservation Status(1)	Mean (2)					
Odonate			May	Jun	Jul	Aug	Sep	Oct
Blue Dasher	<i>Brachydiplax chalybea flavovittata</i>	-	2.0	0.5	0.5	0.5		
Common Bluetail	<i>Ischnura senegalensis</i>	-	0.7		4.0	0.5	6.0	6.0
Common Flangetail	<i>Ictinogomphus pertinax</i>	-		2.0	3.0	2.0	8.0	3.0
Crimson Dropwing	<i>Trithemis aurora</i>	-		0.5				
Eastern Lilysquatter	<i>Paracercion melanotum</i>	-		0.5				
Green Skimmer	<i>Orthetrum sabina</i>	-	1.7	0.5	2.5	1.0	4.0	
Pied Percher	<i>Neurothemis tullia tullia</i>	-			2.5	2.0		
Saddlebag Glider	<i>Tramea virginia</i>	-	0.3	2.0	1.5	3.0		
Lesser Emperor	<i>Anax parthenope julius</i>	-				0.5		
Sapphire Flutterer	<i>Rhyothemis triangularis</i>	-		1.5				
Variegated Flutterer	<i>Rhyothemis variegata arria</i>	-	6.7	43.0	6.5	1.5		
Wandering Glider	<i>Pantala flavescens</i>	-	1.0	0.5		19.0	2.0	
No. of Species Recorded			6	9	7	9	4	2
Butterfly			May	Jun	Jul	Aug	Sep	Oct
Ceylon Blue Glassy Tiger	<i>Ideopsis similis similis</i>	-			0.5			
Chestnut Angle	<i>Odontoptilum angulatum angulatum</i>	-		0.5				
Common Bluebottle	<i>Graphium sarpedon sarpedon</i>	-	0.3					

Common Name	Scientific Name	Conservation Status(1)	Mean (2)				
Common Mapwing	<i>Cyrestis thyodamas chinensis</i>	-	0.3				
Common Grass Yellow	<i>Eurema hecabe hecabe</i>	-		4.0			
Common Indian Crow	<i>Euploea core amymone</i>	-			1.0		
Common Palmfly	<i>Elymnias hypermnestra hainana</i>	-			0.5		
Common Sailer	<i>Neptis hylas hylas</i>	-		0.5	1.0		4.0
Great Egg-fly	<i>Hypolimnas bolina kezia</i>	-		0.5	1.0	1.5	9.0 12.0
Indian Cabbage White	<i>Pieris canidia canidia</i>	-	0.7	1.0			3.0
Lemon Emigrant	<i>Catopsilia pomona pomona</i>	-				3.0	
Red Ring Skirt	<i>Hestina assimilis assimilis</i>	-			1.0		
Red-base Jezebel	<i>Delias pasithoe pasithoe</i>	-	0.3				
Rustic	<i>Cupha erymanthis erymanthis</i>	-		0.5			
No. of Species Recorded			4	6	6	1	2 3

(1) Conservation status follows that of Fellowes et al. (2002), Lo & Hui (2004), Wilson (2004) and Young & Yiu (2002).

(2) Refers to the mean number of individuals recorded in each month in the survey area at WRA

## Appendix D. Summary of Water Quality Monitoring

**Table D1. Water quality at WRA**

### May 2017

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (NTU)	DO (mg/L)	Water Level (cm)
1	28.1	<b>8.13</b>	0.34	6.7	8.3	160
2	27.6	<b>8.09</b>	0.31	5.4	7.9	<b>140</b>
3	28.3	<b>8.11</b>	0.33	6.6	7.8	160
4	28.5	<b>8.23</b>	0.33	8.9	7.9	<b>140</b>

### June 2017

Cell No.	Temp. (°C)	pH	Additional pH monitoring	Salinity (ppt)	Turbidity (NTU)	DO (mg/L)	Water Level (regular monitoring) (cm)	Water Level (additional monitoring)# (cm)
1	30.8	7.15	7.32	0.33	5.1	6.6	190	190
2	31.0	6.84	6.89	0.25	4.7	6.9	180	180
3	30.9	7.33	7.50	0.26	5.5	7.1	220	210
4	30.4	7.31	7.49	0.27	6.6	7.2	220	210

### July 2017

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (NTU)	DO (mg/L)	Water Level (cm)
1	33.4	7.43	0.13	6.6	6.3	220
2	33.2	7.00	0.13	15.1	6.8	180
3	32.6	7.61	0.14	14.4	7.0	210
4	33.8	7.60	0.15	19.3	6.9	210
Action Level	-	<6.5 or >8.0	>2	-	<2	<150 or >250
Limit Level	-	<6.0 or >8.5	>5	-	<1	-

Note: Values highlighted in **bold** indicate that action level is reached; whereas values in **bold and underline** indicate that limit level is reached.

# Additional pH and water level monitoring was conducted on 27 June 2017.

**August 2017**

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (NTU)	DO (mg/L)	Water Level (cm)
1	31.6	7.51	0.12	2.6	4.2	200
2	31.4	7.22	0.12	5.6	4.7	190
3	30.8	7.58	0.13	6.2	4.9	210
4	32.0	7.58	0.14	5.5	4.8	210

**September 2017**

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (NTU)	DO (mg/L)	Water Level (cm)
1	33.0	7.74	0.12	7.5	5.5	180
2	33.2	7.45	0.11	10.8	6.1	170
3	33.3	7.39	0.10	8.3	5.9	190
4	33.2	7.28	0.11	8.2	5.7	190

**October 2017**

Cell No.	Temp. (°C)	pH	Salinity (ppt)	Turbidity (NTU)	DO (mg/L)	Water Level (cm)
1	24.4	<b>8.11</b>	0.16	9.2	6.0	170
2	24.6	<b>8.05</b>	0.15	12.5	6.6	170
3	24.7	7.99	0.14	10.0	6.4	160
4	24.6	7.88	0.15	9.9	6.1	160
Action Level	-	<6.5 or >8.0	>2	-	<2	<150 or >250
Limit Level	-	<6.0 or >8.5	>5	-	<1	-

Note: Values highlighted in **bold** indicate that action level is reached; whereas values in **bold and underline** indicate that limit level is reached.

**Table D2. In situ water quality at WRA**

September 2017

Cell No.	Ammonia (mg/L)	Total oxidized nitrogen (mg/L)	Total P (mg/L)	Reactive P (mg/L)	BOD (mg/L)
1	0.01	<0.01	0.03	<0.01	<2
2	0.01	<0.01	0.03	<0.01	<2
3	0.04	<0.01	0.03	<0.01	<2
4	0.02	<0.01	0.04	<0.01	<2
Action Level	>3	>5	>5	-	-
Limit Level	>6	>10	>10	-	-

Note: Values highlighted in **bold** indicate that action level is reached; whereas values in **bold and underline** indicate that limit level is reached. The additional in situ water quality monitoring was carried out on 18 September 2017.