

Biodiversity Baseline and Management Plan of Freshwater and Terrestrial Habitats of Lai Chi Wo

Authors: Billy C.H. HAU, Kimchi W.F. LO and Ken Y.K. SO

Publisher: Policy for Sustainability Lab, Faculty of Social Sciences, The University of Hong Kong

August 2018

This research is part of the “Living Water and Community Revitalization –
An Agricultural-led Action, Engagement and Incubation Programme at Lai Chi Wo”



Biodiversity Baseline and Management Plan of Freshwater and Terrestrial Habitats of Lai Chi Wo

By

Billy C.H. HAU¹, Kimchi W.F. LO² and Ken K.Y. SO¹

¹ School of Biological Sciences, The University of Hong Kong

² Policy for Sustainability Lab, Faculty of Social Sciences, The University of Hong Kong

This report was prepared as part of the “Living Water and Community Revitalization – An Agricultural-led Action, Engagement and Incubation Programme at Lai Chi Wo” (The Programme). The Programme was launched in October 2013 and led by the Policy for Sustainability Lab (PSL) of the Faculty of Social Sciences at The University of Hong Kong. The Programme aimed at rejuvenating Lai Chi Wo village and, through which, developing a viable model for rural revitalization grounded upon a sustainability approach. To achieve this goal, the PSL worked closely with villagers of Lai Chi Wo and other community stakeholders on agricultural rehabilitation, community revitalization, education, and research, with a focus on forging social innovation and cross-sectoral collaboration. More details could be found in the project website: <http://www.socsc.hku.hk/psl/laichiwo>

Citation

Hau, B. C. H., Lo, K. W. F., & So, K. Y. K. (2018). *Living Water and Community Revitalization- An Agricultural-led Action, Engagement and Incubation Programme at Lai Chi Wo: Biodiversity Baseline and Management Plan of Freshwater and Terrestrial Habitats of Lai Chi Wo*. Hong Kong: Policy for Sustainability Lab, Faculty of Social Sciences, The University of Hong Kong.

ISBN 978-988-78521-4-8

Published by

Policy for Sustainability Lab (PSL) of the Faculty of Social Sciences at The University of Hong Kong
2018

Acknowledgement

The study was made possible with the support by The Hongkong and Shanghai Banking Corporation Limited to the “Living Water and Community Revitalization – An Agricultural-led Action, Engagement and Incubation Programme at Lai Chi Wo”. Special thanks are also given to Produce Green Foundation for their facilitation on the farmland for the field survey.

Contents

1. Introduction	1
2. Biodiversity Survey Methods.....	2
2.1 Vascular Plants	2
2.2 Terrestrial Fauna.....	3
2.2.1 Birds, Butterflies and Dragonflies	3
2.2.2 Amphibians	5
2.2.3 Reptiles	6
2.2.4 Mammals	6
2.3 Freshwater Fauna.....	6
2.3.1 Wetland Species	6
2.3.2 Stream Species	7
3. Results	9
3.1 Vascular Plants	9
3.2 Terrestrial Fauna.....	9
3.3 Freshwater Fauna.....	10
4. Habitat Management Plan	11
4.1 Terrestrial Fauna.....	11
4.2 Freshwater Fauna.....	12
4.2.1 Freshwater Macroinvertebrates	12
4.2.2 Freshwater Fish	14
4.2.3 Other General Conservation Management.....	14
5. References	16

Annex 1. List of plant species recorded in Areas A, B and C

Annex 2. List of plant species recorded at the Lai Chi Wo Fung Shui Wood

Annex 3. Mammal species recorded at LCW during this study

Annex 4. Bird species recorded in LCW in this study

Annex 5. Amphibian and reptile species recorded in LCW in this study

Annex 6. Butterfly species recorded in LCW in this Study

Annex 7. Dragonfly species recorded in LCW in this study

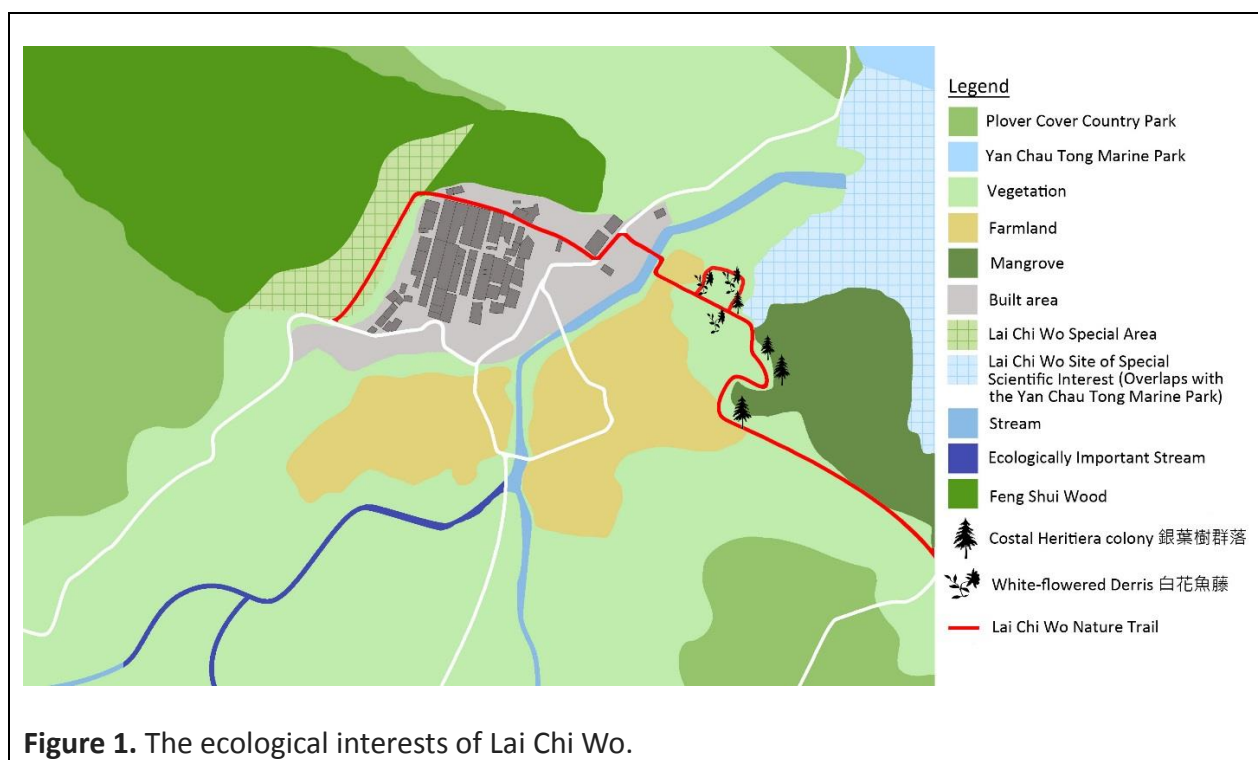
Annex 8. Macroinvertebrate species recorded in wetlands of LCW in this study

Annex 9. Macroinvertebrate species recorded in stream of LCW in this study

Annex 10. Freshwater fish species recorded in stream of LCW in this study

1. Introduction

Lai Chi Wo (LCW) is located in an enclave of Plover Cove Country Park. LCW is a biodiversity hotspot which is enclosed by the Yan Chau Tong Marine Park to the northeast and Plover Cove Country Park on the landward sides (Figure 1). It is also part of the Hong Kong UNESCO Global GeoPark. The farmland in LCW has been abandoned for more than 40 years which was overgrown with shrubs and small trees. Yet, there was no published information about the terrestrial biodiversity of LCW. On the contrary, there were quite a few studies on the mangrove (Tam et al., 1997; Lu et al. 1998), seagrass (Fong et al. 2000) and associated marine fauna of LCW (Shin et al. 2009). There are also some unpublished records of the freshwater marsh communities at Lai Chi Wo (Dudgeon, pers. Comm.).



Farming revitalization in LCW led by the Programme would imply a certain degree of land use change from abandoned farmland to active farmland. The biodiversity assessment and monitoring programme was planned right at the beginning of the Programme to establish a baseline of the terrestrial and freshwater biodiversity of LCW. The biodiversity monitoring programme would inform the project team which specific areas of LCW need to be conserved in the course of farming revitalization. It would also enable us to assess the impact of farming revitalization on LCW's biodiversity. Eventually, the results of the biodiversity monitoring programme would inform a habitat management plan for LCW for the future.

The objectives of the biodiversity assessment and monitoring programme at LCW are:

- a. To establish a baseline of the terrestrial and freshwater biodiversity of LCW covering vascular plants, mammals, birds, amphibians and reptiles, butterflies, dragonflies, freshwater fishes and invertebrates.
- b. To identify local biodiversity hotspots in LCW and provide habitat management recommendations.

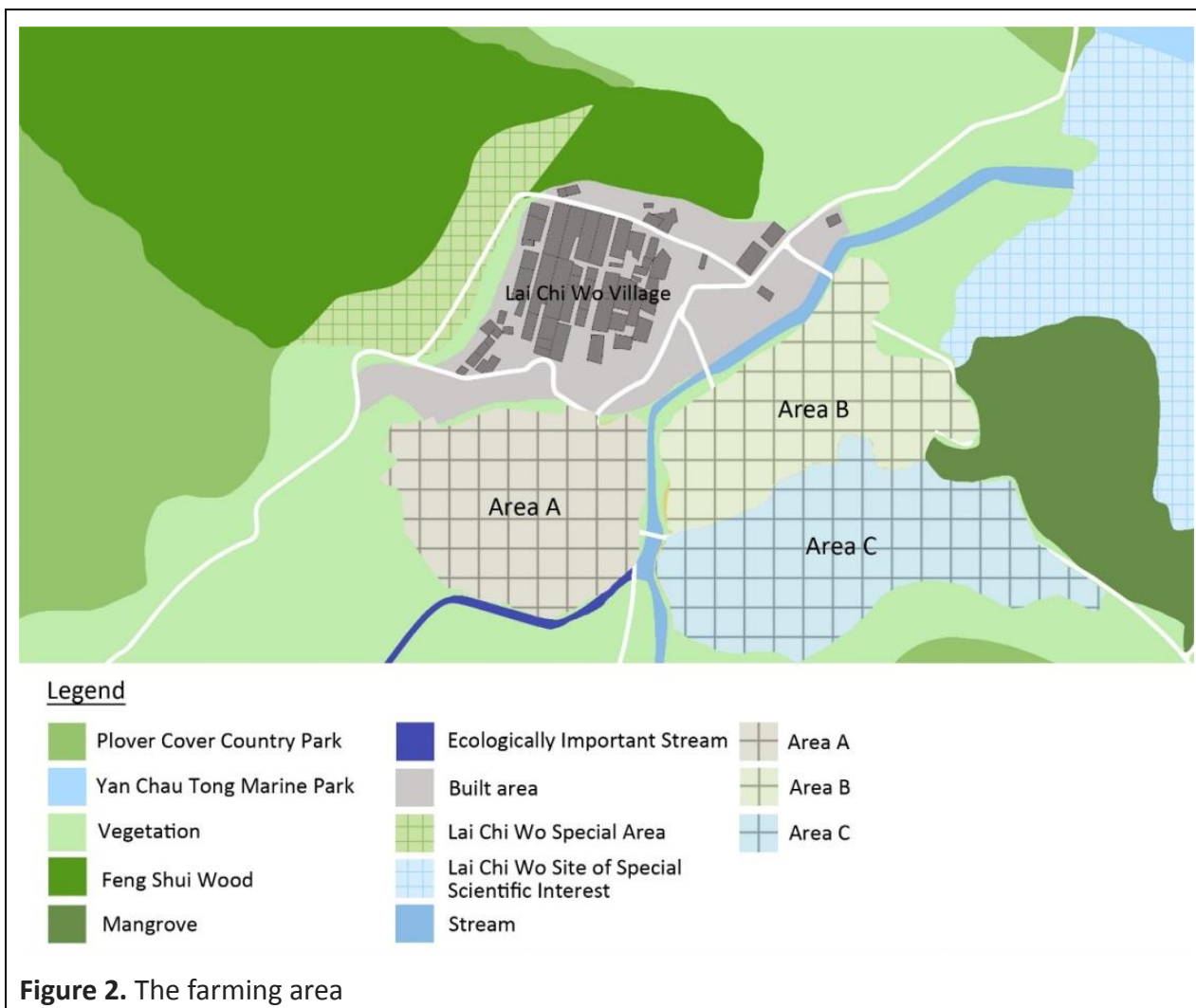
2. Biodiversity Survey Methods

The biodiversity assessment and monitoring programme covers vascular plants, mammals, birds, amphibians and reptiles, butterflies, dragonflies, freshwater fishes and invertebrates. Plant surveys were only conducted once in the Fung Shui Wood and farmlands respectively. For birds, amphibians and reptiles, mammals, butterflies and dragonflies, regular bi-weekly surveys were conducted from March 2014 to October 2017 i.e. 3.5 years. Extra mammal survey by camera-traps was also done occasionally in 2015 and 2016. For freshwater fauna, survey was done three times per season (wet, dry and transitional period) from December 2014 to October 2015. From April 2016 onwards, survey was done bimonthly.

2.1 Vascular Plants

The vascular plant survey was conducted in the farming areas A, B and C (Figure 2) in the wet and dry seasons of 2014/15 respectively. Plant survey of Fung Shui Wood behind the LCW village was carried out in 2014/15. An additional tree survey was conducted at areas B and C in the summer of 2015 prior to site clearance for marking large trees for protection from site clearance. The survey method is a simple walk through of the study areas. All vascular plant species were recorded on the way. Plant surveys on the farming areas were conducted prior to the start of the re-farming work in order to safeguard species of conservation concern, if any. The results of the survey would also inform the planning of the farming plots to avoid sensitive species or large trees.

Plant surveys in the farming areas A, B and C (Figure 2) was completed in the wet and dry seasons of 2014/15 respectively.



2.2 Terrestrial Fauna

2.2.1 Birds, Butterflies and Dragonflies

Five transect routes from A to E (Figure 3) were designed in LCW covering different habitats. Surveyors walked through the five transects in random sequence in each survey day and mark down every bird, butterfly and dragonfly species encountered on each transect and their abundance. Since January 2016, one additional transect has been drawn covering the area of Siu Tan (小灘) (Figure 4).



Figure 3. Schematic diagram shown the transect routes at LCW for birds, butterflies and dragonflies.

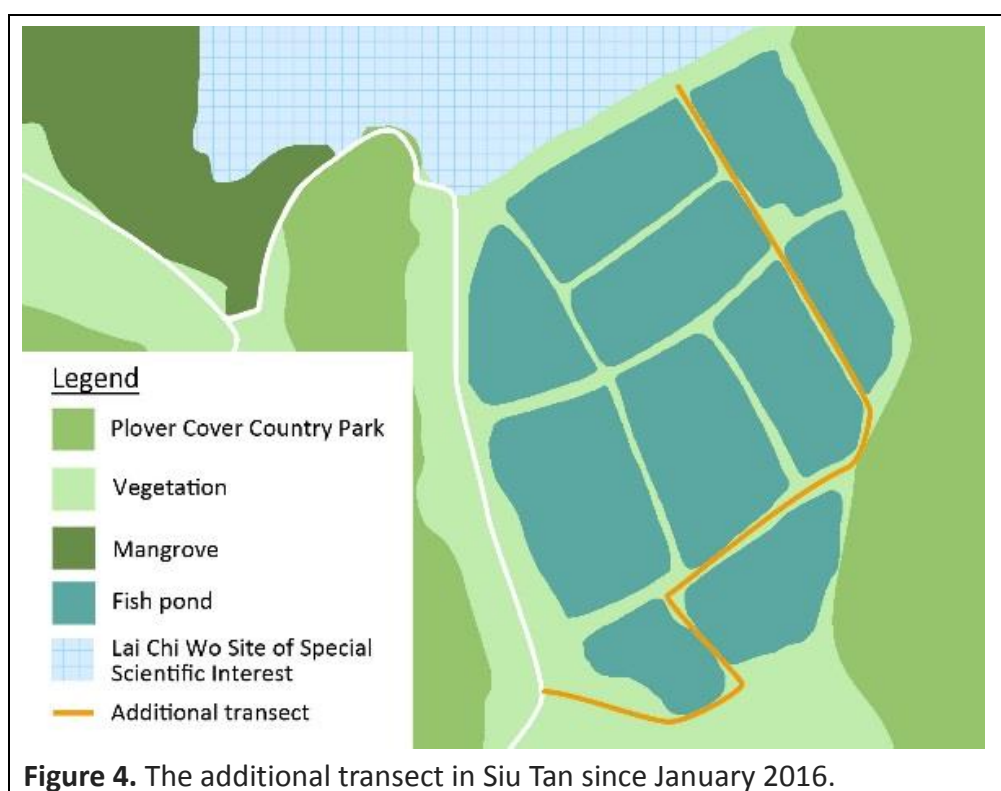


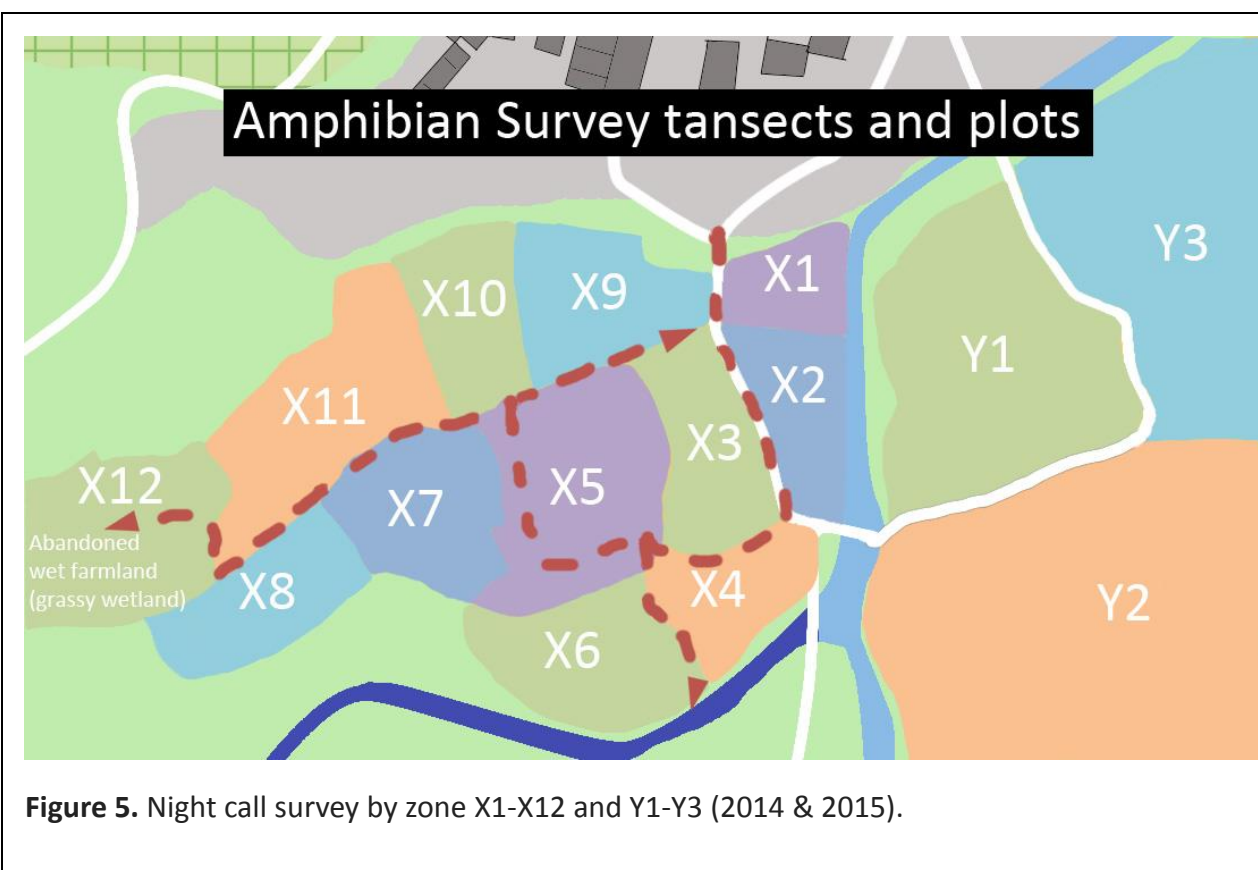
Figure 4. The additional transect in Siu Tan since January 2016.

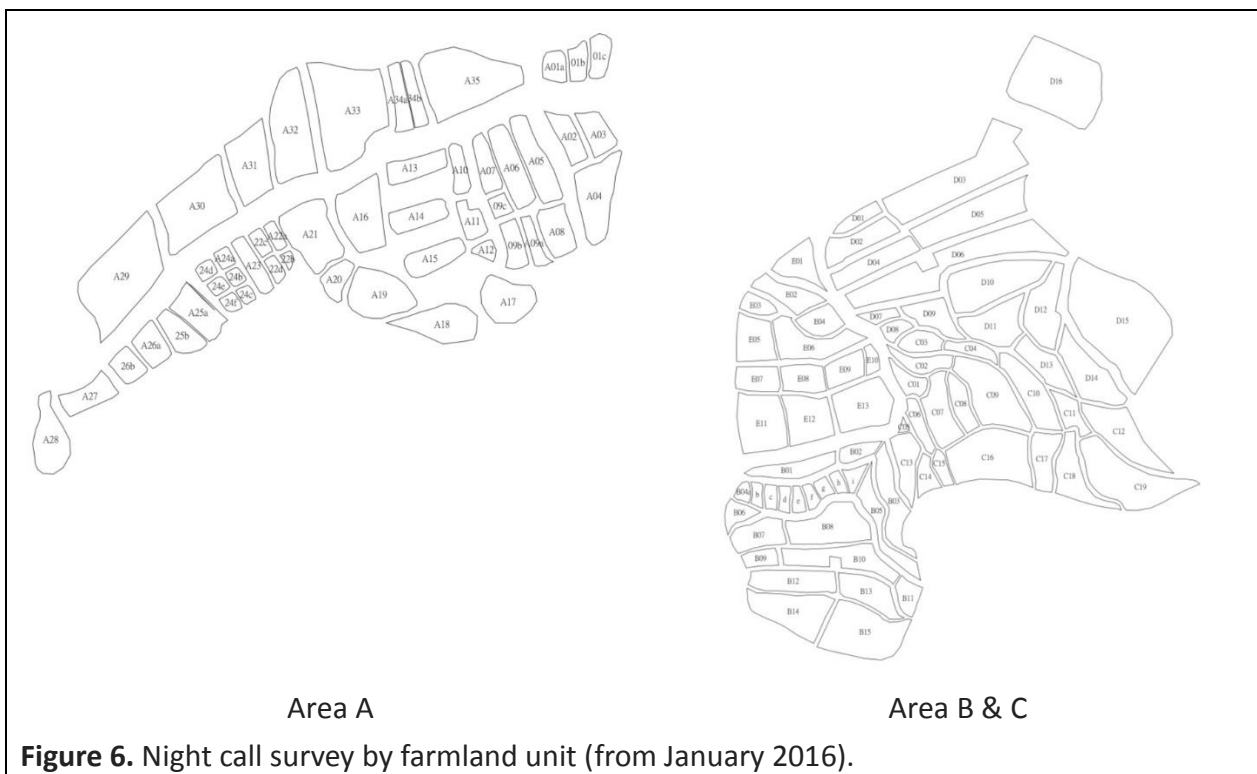
2.2.2 Amphibians

Call survey was conducted at night time (usually starting at 7:30pm) from April to July. In 2014 and 2015, twelve zones were drawn (X1-X12 in Figure 5) on farmland Area A and 3 zones were drawn (Y1-Y3 in Figure 5) on farmland Area B & C. Surveyors stand aside each zone randomly and count the abundance of each calling frog individual for three minutes. Overall call level (Table 1) on each zone will also be marked. Since 2016, the call records are marked according to the individual farmland code (Figure 6).

Table 1. Call level of frogs used in the amphibian surveys at LCW.

Call level	Notes
0	None
1	Individuals can be counted; calls not simultaneous.
2	Calls distinguishable, some simultaneous calling and overlapping.
3	Full chorus; calls continuous and overlapping.





2.2.3 Reptiles

No designated survey was arranged for reptiles. Only casual qualitative records were taken whenever reptile was encountered during the regular survey and night safari.

2.2.4 Mammals

Three infra-red triggered cameras were set up in Lai Chi Wo area to capture the photo of nocturnal mammals. Casual qualitative visual and call records were also made during the regular surveys and night safari.

2.3 Freshwater Fauna

2.3.1 Wetland Species

From December 2014 to October 2015, wetland surveys were conducted three times per seasons (i.e. the wet, the dry and the transitional seasons) in 9 wetlands within Area A at Lai Chi Wo (Figure 7). From April 2016 onwards, the surveys were conducted bimonthly in 3 of the 9 wetlands (Starred area in Figure 7). Both macroinvertebrate and fish sampling were conducted with a D-framed dip-net of 500 μm mesh size using sweep-netting technique, i.e. the net was held in a vertical position and swept repeatedly and vigorously from the water surface through the water column and struck against the sediment for 30 seconds. Ten samples were collected for each site in each visit. The samples collected were preserved in 70% ethanol and brought back to the laboratory for further processing. In the laboratory, unwanted materials were washed with a 212 μm sieve. Macroinvertebrates were identified down to morphospecies/genus level with the aid of a stereomicroscope. Presence/absence of each taxon was recorded for each sample.



Figure 7. Locations of the wetland surveys (Fields marked with a star were surveyed bimonthly).

2.3.2 Stream Species

From December 2014 to February 2016, surveys were conducted three times in the wet season and three times in the dry season) at each of the three sampling points along the main stream at Lai Chi Wo (indicated by the black circles in Figure 8). Additional surveys were done at the tributary to Mui Tsz Lam (indicated by the red circle in Figure 8) in July & August 2015. From July 2016 onwards, monthly surveys were conducted at 5 sampling points along the main river at Lai Chi Wo (Figure 9).

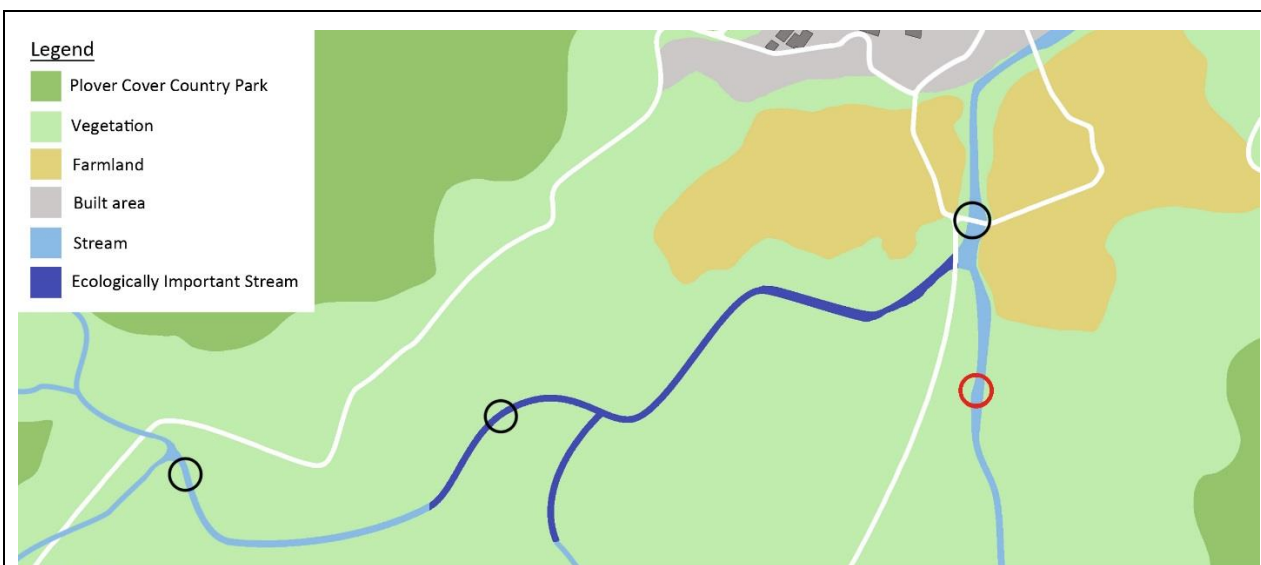


Figure 8. Sampling points for the stream survey before July 2016 (red and black circles).

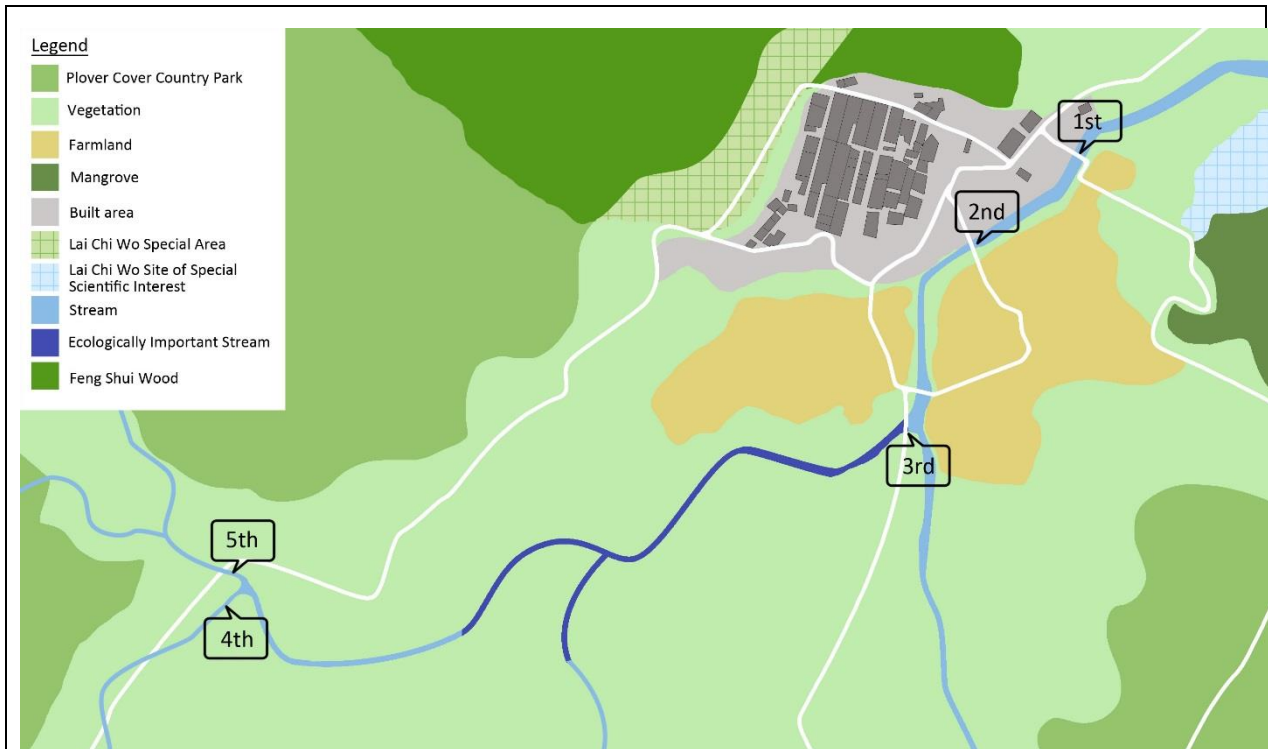


Figure 9. Five sampling points for stream survey after July 2016.

For macroinvertebrates sampling, one-minute kick-net sampling using a D-framed dip-net of 500 μm mesh size was employed to collect macroinvertebrates. Before July 2016, 4 samples were collected at each of the sampling points, while 1 sample was collected at each point since July 2016. The samples collected were preserved in 70% ethanol and brought back to the laboratory for further processing. In the laboratory, unwanted materials were washed with a 212 μm sieve. Macroinvertebrates were identified down to morphospecies/genus level with the aid of a stereomicroscope.

For fish sampling, qualitative fish surveys were conducted before July 2016 which consisted of direct observation aided by a pair of binoculars at the river bank right before the macroinvertebrate sampling. Fish observed were identified to species. Since July 2016, three survey methods were deployed for fish:

- i) Direct observation aided by a pair of binoculars at the river bank;
- ii) Active searching with a D-framed hand net of 3mm mesh size, and
- iii) Pot trapping.

A 10-minute bank-side observation followed by a 10-minute active search was conducted at each site. Two baited pot traps of 3mm mesh size were placed at each site. The traps were set in the water for approximately one hour to attract nearby fishes. No other surveys were conducted in the river during the trapping period to prevent any disturbances. Fish observed or captured were

identified to species; and the relative abundance of each species was determined. All organisms captured will be released on-site immediately after identification. For all the surveys conducted at the stream, they were planned at fine weather conditions and scheduled surveys were postponed due to bad weather e.g. typhoon or heavy rainstorm. No surveys were conducted within three days after any heavy rainfall.

3. Results

3.1 Vascular Plants

In Areas A, B and C, 167 plant species have been recorded (Annex 1). The majority of them are native species whilst a small proportion is comprised of naturalized exotic species. A few individuals of a species with conservation concern, Water Fern (*Ceratopteris thalictroides* 水蕨), was found in the wetland in Area A. This species is listed in the Rare and Previous Plants of Hong Kong by AFCD. All Water Ferns were transplanted to the channel banks and those plots preserved from farming resumption and the species continues to thrive in the farming areas afterwards. All other species are common or very common in Hong Kong.

Plant surveys of the Lai Chi Wo Fung Shui Wood were conducted from May to July 2016. It serves to provide an extra baseline record of the Lai Chi Wo Fung Shui Wood. A total of 116 plant species were recorded during the survey, including 58 tree, 14 shrub, 10 herbaceous, 30 climbing and 4 fern species (Annex 2). The canopy of the woodland is dominated by *Bischofia javanica*, *Symplocos glauca*, *Cinnamomum camphora* and *Sterculia lanceolata*. The two very large specimens of *Bischofia javanica* at the entrance of the Fung Shui Wood are Old and Valuable Trees. In addition, some protected and/or rare species had also been recorded in this Fung Shui Wood (*Gnetum luofuense*; *Artabotrys hongkongensis*; *Cibotium barometz*; *Pavetta hongkongensis*; *Aquilaria sinensis*, *Artocarpus hypargyreus*, *Artocarpus tonkinensis* and *Ailanthus fordii*).

3.2 Terrestrial Fauna

Eight large to medium sized mammals plus the feral cattle were recorded at LCW (Annex 3). The most common species are the Wild Boar, Malayan Porcupine and feral cattle. These three species are agricultural pests in LCW making significant damages to the crops produced. Solar powered electric fences have been used to protect crops from these three species with a varying degree of success. The Fung Shui Wood is a local hotspot for mammals according to camera trap records.

For birds, 141 species were recorded at LCW in this study (Annex 4). Twelve species were considered rare and with conservation concern in Hong Kong (Table 2). The Fung Shui Wood, wet farmland, coastal mangroves and the fish ponds in Siu Tan are local hotspots for birds.

Table 2. Bird species recorded in LCW that are considered rare in Hong Kong and have certain degrees of conservation concerns.

Scientific Name	English Name	Chinese Name	IUCN	China Red Data Book
<i>Caprimulgus jotaka</i>	Grey Nightjar	普通夜鷹		
<i>Strix leptogrammica</i>	Brown Wood Owl	褐林鴞		NT
<i>Ketupa zeylonensis</i>	Brown Fish Owl	褐漁鴞		EN
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	白腹海鵰		VU
<i>Lanius bucephalus</i>	Bull-headed Shrike	牛頭伯勞		
<i>Saxicola ferrea</i>	Grey Bush Chat	灰林(即鳥)		
<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	栗頭鷦鶯		
<i>Emberiza aureola</i>	Yellow-breasted Bunting	黃胸鵪	EN	EN
<i>Chloris sinica</i>	Grey-capped Greenfinch	金翅雀		
<i>Ixobrychus cinnamomeus</i>	Cinnamon Bittern	栗葦鴉		
<i>Gorsachius melanolophus</i>	Malayan Night Heron	黑冠虎斑鴉		NT
<i>Gallicrex cinerea</i>	Watercock	董雞		

For amphibians and reptiles, 9 frog species and 28 reptile species were recorded (Annex 5). Of these, all native turtle species are of conservation concern especially the freshwater species. The Chinese Bullfrog is a key species of the agricultural wetland and its abundance increased with increasing area of wet farmland. The wet farmlands (active and abandoned) are local hotspots for amphibians and reptiles.

For butterflies, 149 species were recorded in LCW in this study in which 7 species are considered rare with conservation concern (Annex 6). Local hotspots include the Fung Shui Wood, wet farmland and streams.

For dragonflies, 55 species were recorded in LCW in this study in which one species *Anotogaster* cf. *klossi* is considered rare with conservation concern (Annex 7).

3.3 Freshwater Fauna

The diversity of freshwater macroinvertebrates at LCW is exceptionally high, with 175 morphospecies recorded in marshland habitat and 157 morphospecies recorded in stream of LCW (Annex 8-9). It is much higher than other similar habitats in Hong Kong according to published data and believed to be due to the high diversity of habitats at LCW. All freshwater marshes are hotspots for macroinvertebrates.

There are 46 species of freshwater fish recorded at LCW streams (Annex 10) and most of them are

found at the downstream and close to the estuary, including the endangered Japanese eel *Anguilla japonica* and the near-threatened Archpatch Puffer *Takifugu ocellatus*.

4. Habitat Management Plan

4.1 Terrestrial Fauna

Six local biodiversity hotspots have been identified based on the baseline data for the terrestrial fauna (Figure 10). They are:

- i. Fung Shui Wood for plants, birds, butterflies, dragonflies, snakes and turtles.
- ii. Seasonal wetland and streams for butterflies, dragonflies and snakes.
- iii. Farmlands (especially freshwater wetlands) for birds, butterflies, dragonflies, snakes and amphibians.
- iv. Water storage ponds and marshes for dragonflies
- v. Mangroves and shrubs for plants, birds and butterflies.
- vi. A seasonal wetland near Kop Tong for dragonflies and amphibians.

In terms of management of future activities in LCW with respect to these local biodiversity hotspots, basically, disturbance to these hotspots should be minimized. Whereas disturbances cannot be avoided, such as on farmland, a proportion of wetland crops, ideally up to 50%, should be maintained at any time. Plant clearance in all hotspots (except iii) should be avoided and ecologists should be consulted. Wetlands (hotspots ii, iii, iv and vi) should be regularly monitored to avoid them to become dry.

For alien invasive species, The Red Imported Fire Ants *Solenopsis invicta* (入侵紅火蟻) has been a major problem in the farming areas. Its impact on native biodiversity is not known but it has been a major nuisance to the farmers. Various attempts have been made to control them but no one single method is successful. However, keeping its population suppressed is necessary. Regular destruction of obvious mounts should be carried out at Lai Chi Wo.

The invasive climber Mile-a-minute weed *Mikania micrantha* (薇甘菊) is also common in Lai Chi Wo in village and farmland edges. Given the rather intact and close canopy forest in LCW, the impact of *Mikania* would unlikely be severe. However, when any particular patches are becoming large, controlled removal following the government guidelines should be conducted.

Lastly, biodiversity crime is also a cause of concern. Turtle traps have been found in streams in LCW and illegal collectors of Incense Trees for agarwood have also been detected. All cases have been reported to AFCD. It is recommended that farmers and researchers in LCW should be regularly briefed on such problems such that they would pay attention to turtle traps in streams and signs of incense tree cutting. A reporting line for such incidents should be established such that AFCD would be informed for appropriate actions immediately.



Figure 10. Terrestrial biodiversity hotspots identified in LCW in this study.

- i. Fung Shui Wood for plants, birds, butterflies, dragonflies, snakes and turtles.
- ii. Seasonal wetland and streams for butterflies, dragonflies and snakes.
- iii. Farmlands (especially freshwater wetlands) for birds, butterflies, dragonflies, snakes and amphibians.
- iv. Water storage ponds and marshes for dragonflies
- v. Mangroves and shrubs for plants, birds and butterflies.
- vi. A seasonal wetland near Kop Tong for dragonflies and amphibians.

4.2 Freshwater Fauna

4.2.1 Freshwater Macroinvertebrates

Diversity of freshwater macroinvertebrates at LCW is exceptionally high, with 175 morphospecies recorded in marshland habitat and 157 morphospecies recorded in stream of Lai Chi Wo (Annex 8-9). It is much higher than other similar habitats in Hong Kong according to published data and believed to be due to the high diversity of habitats at LCW. Thus, we should try to maintain all types of freshwater habitats in general to conserve the high diversity of freshwater macroinvertebrates. The characteristics of each habitat type and management suggested are listed below. All of them are hotspots for macroinvertebrates, except paddy field (Figure 11):

- i. Permanent natural marsh (Red 1 in Figure 11)

It is a shallow-water marsh with dense vegetation and infrequent human disturbance. It is connected to the deep-water channel which is used for irrigation. Cattles can come freely and their herbivory habit can help to control the growth of vegetation and maintain the structure

of the marsh. Several species of macroinvertebrates can only be found there and the population of the endangered and endemic crab *Somanniathelphusa zanklon* is stable there.

Management & suggestion:

The water level of deep water channel (Blue 2 in Figure 11) should not be lower than that of the permanent marsh for more than 3 days in the dry season and one week in the wet season to avoid drying off the marsh due to drainage.

ii. Deep-water channel (Blue 2 in Figure 11)

It is a deep-water (~1 m depth) channel that is used to store water for agricultural use. Water can be released for irrigation by lowering the opening of the pipe. It is a biodiversity hotspot for dragonflies, diving beetles (Dytiscidae) and other species that associated with pond.

Management & suggestion:

Sedimentation might reduce the water storage capacity of the channel. Digging and removal of sediments are suggested to be done only during the wet season when the macroinvertebrates are active and in adult stage that dispersal is more possible.

iii. Managed shallow-water marsh (Green 3a & 3b in Figure 11)

There are two abandoned fields (3a & 3b in Figure 11) that can hold a layer of shallow water. Macroinvertebrate community is different between these two fields and it is suggested both of the fields should be maintained. Diversity of scavenger beetle (Hydrophilidae) is high. These detritivores help to recycle nutrients and prefer shallow water habitat.

Management & suggestion:

Mowing is required to control the growth of vegetation and maintain the structure of wetland. It is suggested that mowing should be done during early-spring (March/April) and mid-summer (August/September). Avoid drying out of the whole field for more than a week.

iv. Lotus pond (Purple 4 in Figure 11)

The recreation of lotus pond has successfully attracted various macroinvertebrates that are associated with shallow-water pond.

Management & suggestion:

Maintain at least one lotus pond each summer.

v. Paddy field (Yellow 5 in Figure 11)

Diversity of macroinvertebrates at paddy field is not high due to frequent human disturbance and occasional drying.

Management & suggestion:

One Critically Endangered Yellow-breasted Bunting was recorded in LCW in 2014. Given that paddy field is a major foraging habitat for this species, a paddy field without protection from birds may be provided during the winter season for attracting more seed-eating birds.

vi. Agriculture ditch (Orange line in Figure 11)

Ditch along the farming site serves as an excellent refuge for macroinvertebrates if there is enough aquatic vegetation. However, ditches at LCW are frequently disturbed, e.g. digging and removal of vegetation and sediment, to prevent flooding during storm.

Management & suggestion:

It is suggested to maintain a small proportion of ditches (orange line in Figure 11) relatively undisturbed. Frequent digging should be minimized and mowing should be done to prevent overgrowth of vegetation.

4.2.2 Freshwater Fish

There are 46 species of freshwater fish recorded at LCW (Annex 10) and most of them are found at the downstream and close to the estuary (blue line in Figure 11), including the endangered Japanese eel *Anguilla japonica* and the near-threatened Archpatch Puffer *Takifugu ocellatus*.

Management & suggestion:

Education to local villagers is necessary to avoid hunting and enhance their awareness of fish and stream conservation.

4.2.3 Other General Conservation Management

Population of invasive fish species: green swordtail *Xiphophorus helleri* is very large and might possess adverse effect on native fish and macroinvertebrates species. Green swordtail at LCW is concentrated in the stream pool right beyond the blue line (yellow star in Figure 11) and throughout the ditches in agricultural area A.

Management & suggestion:

Bait trapping is suggested to be conducted on a daily basis if possible to control the population of green swordtail. Three to five food-baited traps were employed in each of the (1) stream pool, (2) main ditch of area A, and (3) the deep-water channel mentioned above. It is suggested to put the traps in the morning and collect the fish trapped after at least 2 hours within the same day. Fish collected can be used to make organic compost for agricultural use.



Figure 11 Wetland management plan for LCW for macroinvertebrates and freshwater fish. (Photo credit: Kin-Ming Lau)

5. References

- Fong WF, Lee SY and Wu RSS. 2000. The effects of epiphytic algae and their grazers on the intertidal seagrass *Zostera japonica*. *Aquatic Botany* 67:251-261.
- Lu CY, Wong YS, Tam NFY, and Berry R. 1998. Vegetation analysis of a typical mangrove swamp-Lai Chi Wo coast of Hong Kong. *Chinese Journal of Oceanology and Limnology* 16(1):72-77.
- Shin PKS, Li HY and Cheung SG. 2009. Horseshoe Crabs in Hong Kong: Current Population Status and Human Exploitation. In: J.T. Tanacredi et al. (eds.), *Biology and Conservation of Horseshoe Crabs*, Springer Science + Business Media, LLC 2009.
- Tam NFY, Wong YS, Lu CY and Berry R. 1997. Mapping and characterization of mangrove plant communities in Hong Kong. *Asia-Pacific Conference on Science and Management of Coastal Environment*: 25-37.

Annex 1. List of plant species recorded in Areas A, B and C

“+” = Uncommon; “++” = Common and “+++” = Very common

				Season	Wet	Wet	Wet	Wet	Wet	Dry	Dry	Dry	Dry
Species name	Chinese name	Family	Origin	Form	AREA A	AREA A	AREA A	AREA A	AREA C	AREA B	AREA C	AREA A	AREA A
					Active Farmland	Riparian area	Orchard	Fellow farmland				Fellow farlamd	Riparian area
<i>Aegiceras corniculatum</i>	桐花樹	MYRSINACEAE	Native	Shrub							+		
<i>Ageratum conyzoides</i>	藿香薊	ASTERACEAE	Exotic	Herb			+++						
<i>Ageratum houstonianum</i>	熊耳草	ASTERACEAE	Exotic	Herb	+			++				+	
<i>Alangium chinense</i>	八角楓	ALANGIACEAE	Native	Tree					+		+		
<i>Alocasia macrorrhizos</i>	海芋	ARACEAE	Native	Herb	+	+			+				
<i>Alternanthera sessilis</i>	蝦鉗菜	AMARANTHACEAE	Native	Herb	++		+++						
<i>Antidesma bunius</i>	五月茶	EUPHORBIACEAE	Native	Tree		++			+		+		
<i>Aporusa dioica</i>	銀柴	EUPHORBIACEAE	Native	Tree							+		
<i>Ardisia crenata</i>	朱沙根	MYRSINACEAE	Native	Shrub		+							
<i>Atalantia buxifolia</i>	酒餅簕	RUTACEAE	Native	Shrub							+		
<i>Benincasa hispida</i>	冬瓜	CUCURBITACEAE	Exotic	Climber			+						
<i>Bischofia javanica</i>	秋楓	EUPHORBIACEAE	Native	Tree		++	+		+	++	+		
<i>Boehmeria nivea</i>	苧麻	URTICACEAE	Exotic	Herb	++								
<i>Brassica oleracea</i> var. <i>albiflora</i>	芥蘭	BRASSICACEAE	Exotic	Herb								+	
<i>Bridelia tomentosa</i>	土蜜樹	EUPHORBIACEAE	Native	Tree					++	+			
<i>Brucea javanica</i>	鴉膽子	SIMAROUBACEAE	Native	Shrub					++	+++	++		
<i>Bruguiera gymnorhiza</i>	木欖	RHIZOPHORACEAE	Native	Shrub					+		+		
<i>Callicarpa formosana</i>	杜虹花	VERBENACEAE	Native	Tree						+			
<i>Celtis sinensis</i>	朴樹	ULMACEAE	Native	Tree					+		+		
<i>Centella asiatica</i>	崩大碗	APIACEAE	Native	Herb			++		++		++	++	
<i>Ceratopteris thalictroides</i>	水蕨	PARKERIACEAE	Native	Herb	+	+	+++	+				+	
<i>Cerbera manghas</i>	海杧果	APOCYNACEAE	Native	Tree					++		++		
<i>Cinnamomum camphora</i>	樟	LAURACEAE	Native	Tree					+		+		
<i>Claoxylon indicum</i>	白桐樹	EUPHORBIACEAE	Native	Tree					+				
<i>Cleistocalyx nervosum</i>	水翁	MYRTACEAE	Native	Tree						+			
<i>Clematis chinensis</i>	威靈仙	RANUNCULACEAE	Native	Climber					+				
<i>Clerodendrum inerme</i>	苦郎樹	VERBENACEAE	Native	Shrub					++		++		
<i>Cocculus orbiculatus</i>	木防己	MENISPERMACEAE	Native	Climber							+		
<i>Colocasia esculenta</i>	芋	ARACEAE	Exotic	Herb		+							
<i>Commelina communis</i>	鴨跖草	COMMELINACEAE	Native	Herb	+		++	+++				++	
<i>Cosmos bipinnatus</i>	波斯菊	ASTERACEAE	Exotic	Herb								+	
<i>Crinum asiaticum</i> var. <i>sinicum</i>	文殊蘭	LILIACEAE	Native	Herb					+		+		
<i>Cyathula prostrata</i>	杯莧	AMARANTHACEAE	Native	Herb							+		
<i>Cyclosorus interruptus</i>	毛蕨	THELYPTERIDACEAE	Native	Fern		++		+				+	
<i>Cyclosorus parasiticus</i>	華南毛蕨	THELYPTERIDACEAE	Native	Fern	+				+		+		
<i>Cyperus difformis</i>	異型莎草	CYPERACEAE	Native	Herb	++		+						
<i>Cyperus haspan</i>	畦畔莎草	CYPERACEAE	Native	Herb	++		++	+++				+	
<i>Daphniphyllum calycinum</i>	牛耳楓	DAPHNIPHYLLACEAE	Native	Tree		++			+	+	+		
<i>Derris alborubra</i>	白花魚藤	FABACEAE	Native	Climber					+		+		
<i>Desmodium triflorum</i>	三點金	FABACEAE	Native	Herb				+	+				
<i>Desmos chinensis</i>	假鷹爪	ANNONACEAE	Native	Shrub		++			+	+	+		
<i>Dichrocephala integrifolia</i>	魚眼草	ASTERACEAE	Native	Herb						+			

<i>Dimocarpus longan</i>	龍眼	SAPINDACEAE	Exotic	Tree					+	+	+		
<i>Duchesnea indica</i>	蛇莓	ROSACEAE	Native	Herb		++					++		
<i>Echinochloa</i> sp.	稗屬	POACEAE	Native	Herb	+								
<i>Eclipta prostrata</i>	鱧腸	ASTERACEAE	Native	Herb	+			+	+++				
<i>Eleocharis retroflexa</i>	貝殼葉荸薺	CYPERACEAE	Native	Herb			+					+++	
<i>Elephantopus scaber</i>	地膽草	ASTERACEAE	Native	Herb			+		+				
<i>Eleusine indica</i>	牛筋草	POACEAE	Native	Herb			+						
<i>Fagopyrum esculentum</i>	蕎麥	POLYGONACEAE	Exotic	Herb								+++	
<i>Ficus fistulosa</i>	水同木	MORACEAE	Native	Shrub					+		+		
<i>Ficus microcarpa</i>	細葉榕	MORACEAE	Native	Tree					+		+		
<i>Ficus pumila</i>	薜荔	MORACEAE	Native	Climber							+		
<i>Fimbristylis littoralis</i>	日照飄拂草	CYPERACEAE	Native	Herb	++		+	++					
<i>Fimbristylis dichotomos</i>	兩歧飄拂草	CYPERACEAE	Native	Herb			+						
<i>Glochidion hirsutum</i>	厚葉算盤子	EUPHORBIACEAE	Native	Tree			+	+					
<i>Glochidion zeylanicum</i>	香港算盤子	EUPHORBIACEAE	Native	Tree		++	+	+				+	
<i>Glycosmis parviflora</i>	山小橘	RUTACEAE	Native	Shrub						+			
<i>Hedyotis corymbosa</i>	傘房花耳草	RUBIACEAE	Native	Herb	+++		+++						
<i>Hedyotis diffusa</i>	白花蛇舌草	RUBIACEAE	Native	Herb			+						
<i>Helianthus annuus</i>	向日葵	ASTERACEAE	Exotic	Herb								+	
<i>Heritiera littoralis</i>	銀葉樹	STERCULIACEAE	Native	Tree					++		++		
<i>Hibiscus sabdariffa</i>	洛神花	MALVACEAE	Exotic	Herb			++					+	
<i>Hydrocotyle sibthorpioides</i>	天胡荽	APIACEAE	Native	Herb	+++		+++	+++				+++	
<i>Hypericum japonicum</i>	田基黃	CLUSIACEAE	Native	Herb								++	
<i>Ipomoea batatas</i>	番薯	CONVOLVULACEAE	Exotic	Herb			++						
<i>Ipomoea nil</i>	牽牛	CONVOLVULACEAE	Exotic	Climber	+								
<i>Ischaemum</i> sp.	鴨嘴草屬	POACEAE	Native	Herb	+							+++	
<i>Juncus prismatocarpus</i>	芥石菖	JUNCACEAE	Native	Herb	+			+	+				
<i>Kyllinga brevifolia</i>	短葉水蜈蚣	CYPERACEAE	Native	Herb	+		++	++	++			+	
<i>Kyllinga nemoralis</i>	單穗水蜈蚣	CYPERACEAE	Native	Herb	+				+				
<i>Lantana camara</i>	馬纓丹	VERBENACEAE	Native	Shrub					++	+			
<i>Lemmaphyllum microphyllum</i>	伏石蕨	POLYGONACEAE	Native	Fern					++		++		
<i>Limnophila chinensis</i>	中華石龍尾	SCROPHULARIACEAE	Native	Herb			+	+				+	
<i>Lindernia antipoda</i>	泥花草	SCROPHULARIACEAE	Native	Herb	++	++							
<i>Lindernia crustacea</i>	母草	SCROPHULARIACEAE	Native	Herb	++		+++	++	+			+	
<i>Lindernia procumbens</i>	陌上菜	SCROPHULARIACEAE	Native	Herb	+								
<i>Lindernia pusilla</i>	細莖母草	SCROPHULARIACEAE	Native	Herb	+		++	++					
<i>Lindernia rotundifolia</i>	迷你虎耳草	SCROPHULARIACEAE	Exotic	Herb	+	+++							
<i>Lindernia rotundifolia</i>	圓葉母草	SCROPHULARIACEAE	Exotic	Herb								+	
<i>Litsea monopetala</i>	假柿木薑子	LAURACEAE	Native	Tree		+			+	++	++		
<i>Lophatherum gracile</i>	淡竹葉	POACEAE	Native	Herb					+++				
<i>Ludwigia hyssopifolia</i>	草龍	ONAGRACEAE	Native	Herb	++		+++					+	
<i>Ludwigia octovalvis</i>	毛草龍	ONAGRACEAE	Native	Herb	+++			++				+	
<i>Lycopersicon esculentum</i>	番茄	SOLANACEAE	Exotic	Herb								++	
<i>Lygodium japonicum</i>	海金沙	LYGODIACEAE	Native	Fern		+			+	+	+		
<i>Lygodium scandens</i>	小葉海金沙	LYGODIACEAE	Native	Fern				+					
<i>Machilus chekiangensis</i>	浙江潤楠	LAURACEAE	Native	Tree					+		+		
<i>Machilus pauhoi</i>	刨花潤楠	LAURACEAE	Native	Tree						+			
<i>Maclura tricuspidata</i>	柘樹	MORACEAE	Native	Shrub		+			+				

<i>Maesa perlaris</i>	鯽魚膽	MYRSINACEAE	Native	Shrub		+++			++	+++	+++		
<i>Mallotus paniculatus</i>	白楸	EUPHORBIACEAE	Native	Tree					++	+	++		
<i>Mangifera indica</i>	芒果	ANACARDIACEAE	Exotic	Tree					+		+		
<i>Maranta arundinacea</i>	竹芋	MARANTACEAE	Exotic	Herb			++					+	
<i>Mazus pumilus</i>	通泉草	SCROPHULARIACEAE	Native	Herb	+								
<i>Melastoma malabathricum</i>	野牡丹	MELASTOMATACEAE	Native	Shrub		++		++	+	+++	++	++	
<i>Melastoma sanguineum</i>	毛稔	MELASTOMATACEAE	Native	Shrub						+			
<i>Melinis repens</i>	紅毛草	POACEAE	Exotic	Herb			+		+				
<i>Merremia hederacea</i>	魚黃草	CONVOLVULACEAE	Native	Climber						+			
<i>Microcos nervosa</i>	破布樹	TILIACEAE	Native	Tree					++	+	+++		
<i>Mikania micrantha</i>	微甘菊	ASTERACEAE	Exotic	Herb	+	+	+		+	++	++	++	
<i>Mimosa diplotricha</i> var. <i>inermis</i>	無刺含羞草	MIMOSACEAE	Exotic	Herb				++					
<i>Murraya paniculata</i>	九里香	RUTACEAE	Exotic	Shrub					+	+	+		
<i>Oenanthe javanica</i>	水芹	APIACEAE	Native	Herb	+								
<i>Oryza sativa</i>	稻	POACEAE	Exotic	Herb	+++		+					++	
<i>Oxalis corniculata</i>	酢漿草	OXALIDACEAE	Exotic	Herb						++	+		
<i>Oxyceros sinensis</i>	雞爪筋	RUBIACEAE	Native	Shrub		++			+	+++	+++		
<i>Paederia scandens</i>	雞矢藤	RUBIACEAE	Native	Climber		+			+		+	+	
<i>Paliurus ramosissimus</i>	馬甲子	RHAMNACEAE	Native	Shrub					+++		+++		
<i>Pandanus tectorius</i>	露兜樹	PANDANACEAE	Native	Tree					+		+		
<i>Paspalum conjugatum</i>	兩耳草	POACEAE	Native	Herb			+					+	
<i>Passiflora foetida</i>	龍珠果	PASSIFLORACEAE	Exotic	Climber						+			
<i>Pavetta hongkongensis</i>	香港大沙葉	RUBIACEAE	Native	Shrub		+							
<i>Phyllanthus tenellus</i>	纖梗葉下珠	EUPHORBIACEAE	Native	Herb	+								
<i>Phyllanthus urinaria</i>	葉下珠	EUPHORBIACEAE	Native	Herb			+						
<i>Physalis angulata</i>	苦蕒	SOLANACEAE	Native	Herb	+				+				
<i>Polygonum chinense</i>	火炭母	POLYGONACEAE	Native	Herb				++				+	
<i>Polygonum dichotomum</i>	二歧蓼	POLYGONACEAE	Native	Herb								++	
<i>Polygonum glabrum</i>	光蓼	POLYGONACEAE	Native	Herb	+								
<i>Polygonum pubescens</i>	伏毛蓼	POLYGONACEAE	Native	Herb								+	
<i>Pongamia pinnata</i>	水黃皮	FABACEAE	Native	Tree					+		+		
<i>Premna serratifolia</i>	傘序臭黃荊	VERBENACEAE	Native	Shrub					+				
<i>Psychotria asiatica</i>	九節	RUBIACEAE	Native	Shrub		++			++	++	+++		
<i>Pteridium aquilinum</i> var. <i>latiusculum</i>	蕨	PTERIDIACEAE	Native	Fern	+								
<i>Pueraria lobata</i>	葛	FABACEAE	Native	Climber		+++				+			
<i>Pueraria lobata</i> var. <i>montana</i>	葛麻姆	FABACEAE	Native	Climber					+				
<i>Pycneus polystachyos</i>	多枝扁莎	CYPERACEAE	Native	Herb			+	++				++	
<i>Pycneus sanguinolentus</i>	紅鱗扁莎	CYPERACEAE	Native	Herb								++	
<i>Raphanus sativus</i>	蘿蔔	BRASSICACEAE	Exotic	Herb								++	
<i>Rhus chinensis</i>	鹽膚木	ANACARDIACEAE	Native	Shrub						+	+		
<i>Rhus hypoleuca</i>	白芎漆	ANACARDIACEAE	Native	Shrub					++				
<i>Rorippa indica</i>	蔊菜	BRASSICACEAE	Native	Herb	++								
<i>Rosa henryi</i>	軟條七薔薇	ROSACEAE	Native	Climber	+								
<i>Rosa luciae</i>	光葉薔薇	ROSACEAE	Native	Climber						+++	+++	+	
<i>Sageretia thea</i>	雀梅藤	RHAMNACEAE	Native	Climber							+		
<i>Sapium sebiferum</i>	烏柏	EUPHORBIACEAE	Native	Tree		++			++	++	++		
<i>Scoparia dulcis</i>	野甘草	SCROPHULARIACEAE	Exotic	Herb		+	+						
<i>Senna tora</i>	決明	CAESALPINIACEAE	Exotic	Herb	+		+						

<i>Sesbania cannabina</i>	田菁	FABACEAE	Exotic	Herb			+					
<i>Sida rhombifolia</i>	白背黃花稔	MALVACEAE	Native	Shrub					++	+		
<i>Solanum erianthum</i>	假煙葉樹	SOLANACEAE	Exotic	Shrub						+		
<i>Solanum melongena</i>	茄	SOLANACEAE	Exotic	Herb							+	
<i>Solanum torvum</i>	水茄	SOLANACEAE	Exotic	Shrub	+				++			
<i>Spilanthes paniculata</i>	金鈕扣	ASTERACEAE	Native	Herb							+	
<i>Sterculia lanceolata</i>	假蘋婆	STERCULIACEAE	Native	Tree					++		+	
<i>Symplocos cochinchinensis</i> var. <i>laurina</i>	黃牛奶樹	SYMPLOCACEAE	Native	Tree						+		
<i>Syzygium hancei</i>	韓氏蒲桃	MYRTACEAE	Native	Tree		++						
<i>Syzygium levinei</i>	山蒲桃	MYRTACEAE	Native	Tree		+					++	
<i>Teucrium viscidum</i>	血見愁	LAMIACEAE	Native	Herb				+				
<i>Thespesia populnea</i>	恆春黃槿	MALVACEAE	Native	Tree					+		+	
<i>Urena lobata</i>	肖梵天花	MALVACEAE	Native	Shrub				+		+		
<i>Urena procumbens</i>	梵天花	MALVACEAE	Native	Shrub		++						
<i>Uvaria macrophylla</i>	紫玉盤	ANNONACEAE	Native	Climber		+			+		+	
<i>Viburnum odoratissimum</i>	珊瑚樹	CAPRIFOLIACEAE	Native	Tree		++			++	+++	++	
<i>Vigna unguiculata</i> subsp. <i>sesquipedalis</i>	長豇豆	FABACEAE	Exotic	Climber			+					
<i>Vitex negundo</i>	黃荊	VERBENACEAE	Native	Shrub		+++			+++	+++	+++	
<i>Vitex negundo</i> L. var. <i>cannabifolia</i>	牡荊	VERBENACEAE	Native	Shrub	++			+	+++	+++	+++	
<i>Wedelia chinensis</i>	蜆蜷菊	ASTERACEAE	Native	Herb					+			
<i>Xanthium sibiricum</i>	蒼耳	ASTERACEAE	Native	Shrub					++			
<i>Youngia japonica</i>	黃鶉菜	ASTERACEAE	Native	Herb	+							
<i>Zanthoxylum nitidum</i>	兩面針	RUTACEAE	Native	Climber						++	+	
<i>Zea mays</i>	粟米	POACEAE	Exotic	Herb								+
<i>Zehneria japonica</i>	老鼠拉冬瓜	CUCURBITACEAE	Native	Climber			+					
<i>Zingiber officinale</i>	薑	ZINGIBERACEAE	Exotic	Herb			++					

Annex 2. List of plant species recorded at the Lai Chi Wo Fung Shui Wood

“+” = Uncommon; “++” = Common and “+++” = Very common

Species name	Chinese name	Form	Status	<i>Fung-shui</i> wood
<i>Cocculus orbiculatus</i>	木防己	Climber	Common	+
<i>Dalbergia hancei</i>	藤黃檀	Climber	Common	+
<i>Embelia ribes</i>	白花酸藤子	Climber	Common	++
<i>Smilax lanceifolia</i>	暗色菝葜	Climber	Common	+
<i>Strychnos angustiflora</i>	牛眼馬錢	Climber	Common	+
<i>Ampelopsis cantoniensis</i>	廣東蛇葡萄	Climber	Very common	+
<i>Bauhinia glauca</i>	羊蹄甲藤	Climber	Very common	+
<i>Byttneria aspera</i>	刺果藤	Climber	Very common	++
<i>Caesalpinia crista</i>	華南雲實	Climber	Very common	++
<i>Dendrotrophe frutescens</i>	寄生藤	Climber	Very common	++
<i>Gnetum luofuense</i>	羅浮買麻藤	Climber	Very common	+
<i>Jasminum lanceolarium</i>	清香藤	Climber	Very common	+
<i>Paederia scandens</i>	雞矢藤	Climber	Very common	+
<i>Pothos chinensis</i>	石柑子	Climber	Very common	++
<i>Psychotria serpens</i>	蔓九節	Climber	Very common	++
<i>Tetracera asiatica</i>	錫葉藤	Climber	Very common	+
<i>Capparis cantoniensis</i>	廣州槌果藤	Climber	Common	+
<i>Millettia</i> sp.	崖豆藤屬	Climber	N/A	+
<i>Tinospora sagittata</i>	青牛膽	Climber	Restricted	+
<i>Rourea microphylla</i>	紅葉藤	Climber	Common	+
<i>Pericampylus glaucus</i>	細圓藤	Climber	Common	+
<i>Rhaphidophora hongkongensis</i>	獅子尾	Climber	Restricted	+
<i>Fissistigma glaucescens</i>	白葉瓜馥木	Climber	Restricted	+
<i>Bowringia callicarpa</i>	藤槐	Climber	Very common	+
<i>Rourea minor</i>	大葉牛栓藤	Climber	Common	+
<i>Dioscorea</i> sp.	薯莨屬	Climber	N/A	+
<i>Artabotrys hongkongensis</i>	香港鷹爪花	Climber	Restricted	+
<i>Fissistigma uonicum</i>	香港瓜馥木	Climber	Restricted	+
<i>Uvaria macrophylla</i>	紫玉盤	Climber	Common	+
<i>Oxyceros sinensis</i>	雞爪筋	Climber	Common	+
<i>Lemmaphyllum microphyllum</i>	伏石蕨	Fern	Common	+++
<i>Pteris semipinnata</i>	半邊旗	Fern	Very common	++
<i>Lygodium japonicum</i>	海金沙	Fern	Very common	+++

<i>Cibotium barometz</i>	金毛狗	Fern	Very common	+++
<i>Bambusa sp.</i>	-	Herb	N/A	+
<i>Pandanus austrosinensis</i>	露兜草	Herb	Common	++
<i>Adenosma glutinosum</i>	毛麝香	Herb	Very common	+
<i>Polygonum chinense</i>	火炭母	Herb	Very common	+
<i>Vernonia solanifolia</i>	茄葉斑鳩菊	Herb	Very common	+
<i>Hylodesmum leptopus</i>	細長柄山螞蝗	Herb	N/A	+
<i>Kyllinga nemoralis</i>	單穗水蜈蚣	Herb	Very common	+
<i>Daemonorops margaritae</i>	黃藤	Herb	Very common	+
<i>Cyathula prostrata</i>	杯莧	Herb	Common	++
<i>Dianella ensifolia</i>	山菅	Herb	Very common	+
<i>Callicarpa kochiana</i>	枇杷葉紫珠	Shrub	Common	+
<i>Desmos chinensis</i>	假鷹爪	Shrub	Common	+
<i>Mallotus hookerianus</i>	粗毛野桐	Shrub	Common	+++
<i>Syzygium buxifolium</i>	赤楠	Shrub	Common	++
<i>Glochidion eriocarpum</i>	毛果算盤子	Shrub	Very common	+
<i>Justicia austrosinensis</i>	華南爵床	Shrub	N/A	+
<i>Murraya paniculata</i>	九里香	Shrub	N/A	+
<i>Maesa perlaris</i>	鯽魚膽	Shrub	Common	++
<i>Blastus cochinchinensis</i>	柏拉木	Shrub	Common	+
<i>Duranta erecta</i>	假連翹	Shrub	Cultivated	+
<i>Psychotria tutcheri</i>	假九節	Shrub	Restricted	+
<i>Alangium chinense</i>	八角楓	Shrub	Common	+
<i>Pavetta hongkongensis</i>	香港大沙葉	Shrub	Common	+
<i>Psychotria asiatica</i>	山大刀	Shrub	Very common	++
<i>Memecylon ligustrifolium</i>	谷木	Tree	Common	+
<i>Aidia pycnantha</i>	多毛茜草樹	Tree	Common	+
<i>Aquilaria sinensis</i>	土沉香	Tree	Common	+
<i>Archidendron clypearia</i>	猴耳環	Tree	Common	+
<i>Archidendron lucidum</i>	亮葉猴耳環	Tree	Common	+
<i>Artocarpus hypargyreus</i>	白桂木	Tree	Common	+
<i>Bischofia javanica</i>	秋楓	Tree	Common	+++
<i>Celtis sinensis</i>	朴樹	Tree	Common	+
<i>Cinnamomum camphora</i>	樟	Tree	Common	++
<i>Ficus fistulosa</i>	水同木	Tree	Common	++
<i>Ficus variegata var. chlorocarpa</i>	青果榕	Tree	Common	+
<i>Ficus vasculosa</i>	白肉榕	Tree	Common	+

<i>Machilus velutina</i>	絨毛潤楠	Tree	Common	+
<i>Symplocos glauca</i>	羊舌樹	Tree	Common	++
<i>Symplocos lancifolia</i>	光葉山礬	Tree	Common	++
<i>Syzygium jambos</i>	蒲桃	Tree	Common	+
<i>Zanthoxylum avicennea</i>	筍欖花椒	Tree	Common	+
<i>Acronychia pedunculata</i>	山油柑	Tree	Very common	+
<i>Aidia canthioides</i>	香楠	Tree	Very common	+
<i>Aporosa dioica</i>	銀柴	Tree	Very common	++
<i>Ardisia quinquegona</i>	羅傘樹	Tree	Very common	++
<i>Diospyros eriantha</i>	烏柿	Tree	Very common	++
<i>Diospyros morrisiana</i>	羅浮柿	Tree	Very common	++
<i>Mallotus paniculatus</i>	白楸	Tree	Very common	+
<i>Machilus pauhoi</i>	刨花潤楠	Tree	Common*	+
<i>Adenanthera microsperma</i>	海紅豆	Tree	Restricted	+
<i>Clausena lansium</i>	黃皮	Tree	Cultivated	+
<i>Microcos nervosa</i>	布渣葉	Tree	Common	+
<i>Sterculia lanceolata</i>	假蘋婆	Tree	Very common	+++
<i>Pterospermum heterophyllum</i>	翻白葉樹	Tree	Restricted	+
<i>Ficus nervosa</i>	九丁榕	Tree	Restricted	+
<i>Syzygium levinei</i>	李萬蒲桃	Tree	Common	+
<i>Syzygium odoratum</i>	香花蒲桃	Tree	Very rare	+
<i>Dimocarpus longan</i>	龍眼	Tree	Cultivated	+
<i>Pygeum topengii</i>	臀果木	Tree	Common	+
<i>Sarcosperma laurinum</i>	肉實樹	Tree	Very common	+
<i>Callicarpa nidiflora</i>	裸花紫珠	Tree	Common	+
<i>Vitex negundo</i>	黃荊	Tree	Common	+
<i>Litsea monopetala</i>	假柿樹	Tree	Restricted	+
<i>Ficus microcarpa</i>	榕樹	Tree	Common	+
<i>Gironniera subaequalis</i>	白顏樹	Tree	Restricted	+
<i>Claoxylon indicum</i>	白桐	Tree	Common	+
<i>Litchi chinensis</i>	荔枝	Tree	Cultivated	+
<i>Scolopia saeva</i>	廣東刺柊	Tree	Common	+
<i>Antidesma fordii</i>	黃毛五月茶	Tree	Restricted	+
<i>Chrysophyllum lanceolatum</i> var. <i>stellatocarpon</i>	金葉樹	Tree	Restricted	+
<i>Antidesma buniuz</i>	五月茶	Tree	Common	+
<i>Machilus gamblei</i>	黃心樹	Tree	Restricted	+
<i>Garcinia oblongifolia</i>	黃牙果	Tree	Common	+

<i>Artocarpus tonkinensis</i>	胭脂樹	Tree	Rare	+
<i>Macaranga sampsonii</i>	鼎湖血桐	Tree	Restricted	+
<i>Cryptocarya concinna</i>	黃果厚殼桂	Tree	Restricted	+
<i>Endospermum chinense</i>	黃桐	Tree	Restricted	+
<i>Schefflera heptaphylla</i>	鴨腳木	Tree	Very common	++
<i>Reevesia thyrsoidea</i>	梭羅樹	Tree	Common	+
<i>Cyclobalanopsis neglecta</i>	竹葉青岡	Tree	Restricted	+
<i>Helicia cochinchinensis</i>	越南山龍眼	Tree	Restricted	+
<i>Ailanthus fordii</i>	常綠臭椿	Tree	Rare	+

Annex 3. Mammal species recorded at LCW during this study

Scientific Name	Chinese Name	Chin. Red Data Book	National protection	Common in LCW	Notes
<i>Hystrix brachyura</i>	東亞豪豬			Yes	
<i>Sus scrofa</i>	野豬			Yes	
<i>Muntiacus muntjak</i>	赤麂				
<i>Paguma larvata</i>	果子狸	NT			
<i>Prionailurus bengalensis</i>	豹貓	VU			
<i>Macaca mulatta</i>	獼猴				
<i>Viverricula indica</i>	小靈貓	VU	II		
<i>Callosciurus erythraeus</i>	赤腹松鼠				
<i>Bos taurus</i>	黃牛			Yes	Feral

Annex 4. Bird species recorded in LCW in this study.

Notes: Rare species are in blue fonts and species with high conservation values are in red fonts

Scientific Name	English Name	Chinese Name	IUCN	Chin. Red Data Book	National protection	LCW's common sp.	Remarks
<i>Anthus hodgsoni</i>	Olive-backed Pipit	樹鵲				yes	
<i>Anthus richardi</i>	Richard's Pipit	田鵲(理氏鵲)					
<i>Anthus cervinus</i>	Red-throated Pipit	紅喉鵲					
<i>Aethopyga christinae</i>	Fork-tailed Sunbird	叉尾太陽鳥				yes	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鵲				yes	
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鵲				yes	
<i>Hemixos castanonotus</i>	Chestnut Bulbul	栗背短腳鵲				yes	
<i>Chloropsis hardwickii</i>	Orange-bellied Leafbird	橙腹葉鵲					
<i>Streptopelia orientalis</i>	Oriental Turtle Dove	山斑鳩					
<i>Streptopelia chinensis</i>	Spotted Dove	珠頸斑鳩				yes	
<i>Chalcophaps indica</i>	Common Emerald Dove	綠翅金鳩					
<i>Streptopelia tranquebarica</i>	Red Turtle Dove	火斑鳩					
<i>Copsychus saularis</i>	Oriental Magpie Robin	鵲鵲				yes	
<i>Phoenicurus aureoreus</i>	Daurian Redstart	北紅尾鵲				yes	
<i>Larviora sibilans</i>	Rufous-tailed Robin	紅尾歌鵲					
<i>Falco subbuteo</i>	Eurasian Hobby	燕隼			II		
<i>Accipiter soloensis</i>	Chinese Sparrowhawk	赤腹鷹					
<i>Accipiter trivirgatus</i>	Crested Goshawk	鳳頭鷹					
<i>Accipiter virgatus</i>	Besra	松雀鷹					
<i>Milvus migrans</i>	Black Kite	麻鷹				yes	
<i>Buteo japonicus</i>	Eastern Buzzard	普通鵟					
<i>Pandion haliaetus</i>	Western Osprey	魚鷹(鵟)		NT			
<i>Caprimulgus jotaka</i>	<i>Grey Nightjar</i>	普通夜鷹					Observed in 2014 and 2015 winter in farmland Area A
<i>Otus lettia</i>	Collared Scops Owl	領角鵂				yes	
<i>Strix leptogrammica</i>	<i>Brown Wood Owl</i>	褐林鵂		NT			
<i>Ketupa zeylonensis</i>	<i>Brown Fish Owl</i>	褐漁鵂		EN			At least 2 individuals
<i>Spilornis cheela</i>	Crested Serpent Eagle	蛇鵂		NT			
<i>Haliaeetus leucogaster</i>	<i>White-bellied Sea Eagle</i>	白腹海鵂		VU			
<i>Glaucidium cuculoides</i>	Asian Barred Owlet	斑頭鵂鵂					
<i>Parus cinereus</i>	Cinereous Tit	大山雀(蒼背山雀)				yes	
<i>Centropus sinensis</i>	Greater Coucal	褐翅鴉鵂			II	yes	
<i>Centropus bengalensis</i>	Lesser Coucal	小鴉鵂			II		
<i>Hierococcyx sparverioides</i>	Large Hawk Cuckoo	(大)鷹鵂					
<i>Eudynamys scolopacea</i>	Asian Koel	噪鵂					
<i>Hierococcyx nisicolor</i>	Hodgson's Hawk Cuckoo	棕腹杜鵑(霍氏鷹鵂)					
<i>Cuculus micropterus</i>	Indian Cuckoo	四聲杜鵑					
<i>Cuculus merulinus</i>	Plaintive Cuckoo	八聲杜鵑					
<i>Clamator coromandus</i>	Chestnut-winged Cuckoo	紅翅鳳頭鵂					
<i>Zosterops japonicus</i>	Japanese White-eye	暗綠繡眼鳥				yes	
<i>Leiothrix lutea</i>	Red-billed Leiothrix	紅嘴相思鳥					
<i>Leiothrix argenteauris</i>	Silver-eared Mesia	銀耳相思鳥		NT			
<i>Sitta frontalis</i>	Velvet-fronted Nuthatch	絨額鵂					
<i>Acridotheres cristatellus</i>	Crested Myna	八哥				yes	
<i>Motacilla alba</i>	White Wagtail	白鵲鵂				yes	
<i>Motacilla cinerea</i>	Grey Wagtail	灰鵲鵂				yes	

<i>Motacilla tschutschensis</i>	Eastern Yellow Wagtail	(東)黃鶺鴒					
<i>Dendronanthus indicus</i>	Forest Wagtail	林鶺鴒(山鶺鴒)					
<i>Lanius schach</i>	Long-tailed Shrike	棕背伯勞				yes	
<i>Lanius cristatus</i>	Brown Shrike	紅尾伯勞					
<i>Lanius bucephalus</i>	Bull-headed Shrike	牛頭伯勞					
<i>Pnoepyga pusilla</i>	Pygmy Wren-babbler	小鷦鷯					
<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar Babbler	棕頸鈎咀鷦				yes	
<i>Yuhina zantholeuca</i>	White-bellied Erpornis	白腹鳳鶯					
<i>Stachyris ruficeps</i>	Rufous-capped Babbler	紅頭穗鶯				yes	
<i>Minla cyanouroptera</i>	Blue-winged Minla	藍翅希鶯					
<i>Garrulax perspicillatus</i>	Masked Laughingthrush	黑臉噪鶯				yes	
<i>Garrulax chinensis</i>	Black-throated Laughingthrush	黑喉噪鶯					
<i>Garrulax pectoralis</i>	Greater Necklaced Laughingthrush	黑領噪鶯					
<i>Saxicola stejnegeri</i>	Stejneger's Stonechat	黑喉石(即鳥)				yes	
<i>Saxicola ferrea</i>	Grey Bush Chat	灰林(即鳥)					
<i>Garrulax canorus</i>	Chinese Hwamei	畫眉		NT			
<i>Phylloscopus fuscatus</i>	Dusky Warbler	褐柳鶯				yes	
<i>Phylloscopus proregulus</i>	Pallas's Leaf Warbler	黃腰柳鶯				yes	
<i>Phylloscopus inornatus</i>	Yellow-browed Warbler	黃眉柳鶯				yes	
<i>Phylloscopus borealis</i>	Arctic Warbler	極北柳鶯					
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯				yes	
<i>Phyllergates cuculatus</i>	Mountain Tailorbird	金頭縫葉鶯					
<i>Cisticola juncidis</i>	Zitting Cisticola	棕扇尾鶯					
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹山鷦鶯					
<i>Urosphena squameiceps</i>	Asian Stubtail	鱗頭樹鶯					
<i>Horornis fortipes</i>	Brown-flanked Bush Warbler	強腳樹鶯					
<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	栗頭鷦鶯					
<i>Corvus macrorhynchos</i>	Large-billed Crow	大咀烏鴉				yes	
<i>Lonchura punctulata</i>	Scaly-breasted Munia	斑文鳥				yes	
<i>Lonchura striata</i>	White-rumped Munia	白腰文鳥				yes	
<i>Emberiza aureola</i>	Yellow-breasted Bunting	黃胸鵪	EN	EN			Only 1 individual found from Nov-Dec 2014, never seen forage on paddy field
<i>Emberiza fucata</i>	Chestnut-eared Bunting	栗耳鵪					
<i>Emberiza melanocephala</i>	Black-headed Bunting	黑頭鵪					
<i>Emberiza pusilla</i>	Little Bunting	小鵪					
<i>Hirundo daurica</i>	Red-rumped Swallow	金腰燕					
<i>Hirundo rustica</i>	Barn Swallow	家燕				yes	
<i>Apus nipalensis</i>	House Swift	小白腰雨燕					
<i>Chloris sinica</i>	Grey-capped Greenfinch	金翅雀					50+ individuals on Nov 2015. Never seen forage on paddy field. Often stay on 牡荊. Number dropped in 2016
<i>Passer montanus</i>	Eurasian Tree Sparrow	樹麻雀					
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	白胸苦惡鳥				yes	
<i>Dicaeum cruentatum</i>	Scarlet-backed Flowerpecker	朱背啄花鳥				yes	
<i>Jynx torquilla</i>	Eurasian Wryneck	蟻鴷					
<i>Psilopogon virens</i>	Great Barbet	大擬啄木鳥					
<i>Pericrocotus solaris</i>	Grey-chinned Minivet	灰喉山椒鳥					
<i>Pericrocotus speciosus</i>	Scarlet Minivet	赤紅山椒鳥				yes	
<i>Tachybaptus ruficollis</i>	Little Grebe	小鸕鶿					

<i>Tringa ochropus</i>	Green Sandpiper	白腰草鷸					
<i>Tringa glareola</i>	Wood Sandpiper	林鷸					
<i>Actitis hypoleucos</i>	Common Sandpiper	磯鷸				yes	
<i>Scolopax rusticola</i>	Eurasian Woodcock	丘鷸					5 individuals found in Jan 2015 on farmland Area A (grassland)
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler	灰尾漂鷸	NT				
<i>Phalaropus lobatus</i>	Red-necked Phalarope	紅頸瓣蹼鷸					
<i>Himantopus himantopus</i>	Black-winged Stilt	黑翅長腳鷸					
<i>Charadrius alexandrinus</i>	Kentish Plover	環頸鴉					
<i>Gallinago</i> sp.	Pintail / Swinhoe's Snipe	大沙錐/針尾沙錐					
<i>Vanellus cinereus</i>	Grey-headed Lapwing	灰頭麥雞					
<i>Sterna sumatrana</i>	Black-naped Tern	黑枕燕鷗					
<i>Egretta garzetta</i>	Little Egret	小白鷺				yes	
<i>Egretta intermedia</i>	Intermediate Egret	中白鷺					
<i>Ardea alba</i>	Great Egret	大白鷺				yes	
<i>Egretta sacra</i>	Pacific Reef Heron	岩鷺			II		
<i>Bubulcus coromandus</i>	Eastern Cattle Egret	牛背鷺				yes	22 individuals found on Oct 2015 in farmlands
<i>Ardeola bacchus</i>	Chinese Pond Heron	池鷺					
<i>Ardea cinerea</i>	Grey Heron	蒼鷺					
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	夜鷺					
<i>Phalacrocorax carbo</i>	Great Cormorant	普通鸕鶿				yes	
<i>Ixobrychus sinensis</i>	Yellow Bittern	黃斑葦鶺					
<i>Ixobrychus eurhythmus</i>	Von Schrenck's Bittern	紫背葦鶺					
<i>Ixobrychus cinnamomeus</i>	Cinnamon Bittern	栗葦鶺					
<i>Gorsachius melanolophus</i>	Malayan Night Heron	黑冠虎斑鶺	NT				Observed in May 2015, stayed for at least 1 week
<i>Rallina eurizonoides</i>	Slaty-legged Crane	白喉斑秧雞(灰腳秧雞)	VU				
<i>Gallinula chloropus</i>	Common Moorhen	黑水雞					
<i>Gallicrex cinerea</i>	Watercock	董雞					Observed in Sep 2016 in Lotus pond, stayed for at least 2 weeks
<i>Francolinus pintadeanus</i>	Chinese Francolin	鷓鴣	NT				
<i>Monticola solitarius</i>	Blue Rock Thrush	藍磯鶇					
<i>Turdus hortulorum</i>	Grey-backed Thrush	灰背鶇					
<i>Turdus mandarinus</i>	Chinese Blackbird	烏鶇					
<i>Myophonus caeruleus</i>	Blue Whistling Thrush	紫嘯鶇				yes	
<i>Brachypteryx leucophrys</i>	Lesser Shortwing	白喉短翅鶇					
<i>Dendrocitta formosae</i>	Grey Treepie	灰樹鵲				yes	
<i>Urocissa erythrorhyncha</i>	Red-billed Blue Magpie	紅咀藍鵲					
<i>Terpsiphone paradisi</i>	Asian Paradise Flycatcher	壽帶鳥	NT				
<i>Eumyias thalassina</i>	Verditer Flycatcher	銅藍鶇					
<i>Cyornis hainanus</i>	Hainan Blue Flycatcher	海南藍仙鶇				yes	
<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	烏鶇					
<i>Muscicapa latirostris</i>	Asian Brown Flycatcher	北灰鶇					
<i>Muscicapa griseictta</i>	Grey-streaked Flycatcher	灰紋鶇					
<i>Ficedula albicilla</i>	Red-throated Flycatcher	紅喉姬鶇					
<i>Dicrurus macrocerus</i>	Black Drongo	黑卷尾				yes	
<i>Dicrurus hottentottus</i>	Hair-crested Drongo	髮冠卷尾					
<i>Alcedo atthis</i>	Common Kingfisher	普通翠鳥				yes	
<i>Halcyon smyrnensis</i>	White-throated Kingfisher	白胸翡翠					
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領棕鳥					

<i>Spodiopsar cineraceus</i>	White-cheeked Starling	灰椋鳥					
<i>Spodiopsar sericeus</i>	Red-billed Starling	絲光椋鳥					
<i>Sturnia sinensis</i>	White-shouldered Starling	灰背椋鳥					

Annex 5. Amphibian and reptile species recorded in LCW in this study

Scientific Name	Chinese Name	IUCN Red List	China Red Data Book	National protection	Common in LCW	Species with Conservation concern	Remarks
<i>Bufo melanostictus</i>	黑眶蟾蜍				yes		
<i>Fejervarya limnocharis</i>	澤蛙				yes		
<i>Hoplobatrachus chinensis</i>	虎紋蛙(田雞)	EN		II	yes	yes	
<i>Limnonectes fujianensis</i>	大頭蛙	NT					
<i>Rana guentheri</i>	沼蛙				yes		
<i>Polypedates megacephalus</i>	斑腿泛樹蛙				yes		
<i>Kalophrynus interlineatus</i>	花細狹口蛙	NT					Only heard in Siu Tan
<i>Kaloula pulchra pulchra</i>	花狹口蛙						
<i>Microhyla butleri</i>	粗皮姬蛙						
<i>Gehyra mutilata</i>	截趾虎		VU				
<i>Hemidactylus bowringii</i>	原尾蜥虎(鹽蛇)						
<i>Hemidactylus frenatus</i>	疣尾蜥虎						
<i>Hemidactylus garnotii</i>	鋸尾蜥虎						
<i>Gekko chinensis</i>	中國壁虎						
<i>Mabuya longicaudata</i>	長尾藍蜥						
<i>Scincella reevesii</i>	南滑蜥						
<i>Scincella modesta</i>	寧波滑蜥						
<i>Sphenomorphus incognitus</i>	股鱗蜓蜥		NT		yes		
<i>Calotes versicolor</i>	變色樹蜥						
<i>Ramphotyphlops braminus</i>	鈎盲蛇						
<i>Opisthotropis balteata</i>	橫紋後棱蛇						
<i>Pareas margaritophorus</i>	橫紋鈍頭蛇		NT				
<i>Enhydryis plumbea</i>	鉛色水蛇		VU				
<i>Sinonatrix percarinata</i>	烏游蛇						
<i>Xenochrophis piscator</i>	漁游蛇						
<i>Coelognathus radiatus</i>	三索錦蛇		EN				
<i>Naja atra</i>	眼鏡蛇	VN	VN				
<i>Cyclophiops major</i>	翠青蛇						
<i>Trimeresurus albolabris</i>	青竹蛇						
<i>Boiga multomaculata</i>	繁花林蛇						
<i>Python bivittatus</i>	蟒蛇	VN	CR			yes	
<i>Rhabdophis subminiatus helleri</i>	紅勃游蛇						
<i>Oligodon formosanus</i>	台灣小頭蛇		NT				
<i>Lycodon subcinctus</i>	細白環蛇						
<i>Bungarus multicinctus</i>	銀腳帶		EN		yes		

Annex 6. Butterfly species recorded in LCW in this Study.

Family	Scientific Name	Chinese Name	AFCD (2011)	Common in LCW	Rare species with conservation concern	Remarks
Browns	<i>Ypthima baldus</i>	矍眼蝶	C	yes		
	<i>Melanitis leda</i>	暮眼蝶	C			
	<i>Ypthima lisandra</i>	黎桑矍眼蝶	C			
	<i>Melanitis phedima</i>	睇暮眼蝶	UC	yes		
	<i>Lethe confusa</i>	白帶黛眼蝶	C			
	<i>Lethe europa</i>	長紋黛眼蝶	UC	yes		
	<i>Lethe chandica</i>	曲紋黛眼蝶	N/A			
	<i>Mycalesis mineus</i>	小眉眼蝶	VC	yes		
	<i>Mycalesis zonata</i>	平頂眉眼蝶	C			
	<i>Elymnias hypermnestra</i>	翠袖鋸眼蝶	C	yes		
	<i>Neope muirheadii muirheadii</i>	蒙鏈陰眼蝶	UC			
Swallowtails, Birdwings	<i>Lamproptera curius</i>	燕鳳蝶	R			
	<i>Graphium sarpedon</i>	青鳳蝶	VC	yes		
	<i>Graphium cloanthus</i>	寬帶青鳳蝶	UC			
	<i>Graphium doson</i>	木蘭青鳳蝶	C			
	<i>Papilio memnon</i>	美鳳蝶	VC			
	<i>Papilio protenor</i>	藍鳳蝶	VC	yes		
	<i>Papilio bianor</i>	碧鳳蝶	C			
	<i>Papilio dialis</i>	穹翠鳳蝶	VR			
	<i>Pathysa antiphates</i>	綠鳳蝶	C	yes		
	<i>Papilio polytes</i>	玉帶鳳蝶	VC	yes		
	<i>Papilio helenus</i>	玉斑鳳蝶	VC	yes		
	<i>Papilio paris</i>	巴黎翠鳳蝶	VC	yes		
	<i>Chilasa clytia</i>	班鳳蝶	C			
	<i>Papilio demoleus</i>	達摩鳳蝶	C			
	<i>Troides helenia</i>	裳鳳蝶	UC			Local protected sp.
	<i>Graphium agamemnon</i>	統帥青鳳蝶	C			
Metalmarks	<i>Abisara echerius</i>	蛇目褐蛺蝶	VC	yes		
	<i>Zemeros flegyas</i>	波蛺蝶	C	yes		
Yellows and Whites	<i>Eurema</i> spp.	黃粉蝶屬	VC-R			
	<i>Eurema hecabe</i>	寬邊黃粉蝶	VC	yes		
	<i>Eurema brigitta</i>	無標黃粉蝶	R			
	<i>Pieris canidia</i>	東方菜粉蝶	VC	yes		
	<i>Ixias pyrene</i>	橙粉蝶	UC	yes		
	<i>Hebomoia glaucippe</i>	鶴頂粉蝶	C	yes		
	<i>Pieris rapae</i>	菜粉蝶	R			
	<i>Catopsilia pomona</i>	遷粉蝶	C			

	<i>Catopsilia pyranthe</i>	梨花遷粉蝶	VC			
	<i>Dercas verhuelli</i>	檀方粉蝶	R			
	<i>Cepora nerissa</i>	黑脈園粉蝶	C			
	<i>Prioneris thestylis</i>	鋸粉蝶	R		yes	
	<i>Delias hyparete</i>	優越斑粉蝶	UC			
	<i>Delias pasithoe</i>	報喜斑粉蝶	VC	yes		
Tigers, Crows	<i>Ideopsis similis</i>	擬旖斑蝶	VC	yes		
	<i>Parantica aglea</i>	絹斑蝶	C			
	<i>Tirumala limniace</i>	青斑蝶	C			
	<i>Danaus genutia</i>	虎斑蝶	C			
	<i>Danaus chrysippus</i>	金斑蝶	UC			
	<i>Euploea mulciber mulciber</i>	異型紫斑蝶	UC	yes		
	<i>Euploea core</i>	幻紫斑蝶	C			
	<i>Euploea midamus</i>	藍點紫斑蝶	VC			
Blues	<i>Spindasis lohita</i>	銀線灰蝶	C			
	<i>Spindasis syama</i>	豆粒銀線灰蝶	UC			
	<i>Celastrina lavendularis</i>	薰衣琉璃灰蝶	VR			
	<i>Acytolepis puspa</i>	鈕灰蝶	C	yes		
	<i>Megisba malaya</i>	美姬灰蝶	VR			
	<i>Pithecops corvus</i>	黑丸灰蝶	VR		yes	
	<i>Nacaduba kurava</i>	古樓娜灰蝶	C	yes		
	<i>Zizina otis</i>	毛眼灰蝶	C			
	<i>Pseudozizeeria maha</i>	酢漿灰蝶	VC	yes		
	<i>Udara albocaerulea</i>	白斑嫵灰蝶	VR			
	<i>Udara dilectus</i>	珍貴嫵灰蝶	VR		yes	
	<i>Taraka hamada</i>	蚜灰蝶	R			
	<i>Neopithecops zalmora</i>	一點灰蝶	UC	yes		
	<i>heliophorus epicles</i>	斜斑彩灰蝶	C	yes		
	<i>Artipe eryx</i>	綠灰蝶	UC			
	<i>Curetis dentata</i>	尖翅銀灰蝶	UC			
	<i>Jamides bochus</i>	雅灰蝶	C	yes		
	<i>Jamides alecto</i>	素雅灰蝶	VR			
	<i>Iraota timoleon</i>	鐵木萊異灰蝶	UC			
	<i>Arhopala bazalus</i>	百嬌灰蝶	R			
	<i>Remelana jangala</i>	萊灰蝶	C			
	<i>Horago onyx</i>	斑灰蝶	R			
	<i>Pratapa deva</i>	珀灰蝶	VR			
	<i>Ceron cleobis</i>	克灰蝶	VR			
	<i>Deudorix epijarbas</i>	玳灰蝶	R			
	<i>Rapala manea</i>	燕灰蝶	C			

	<i>Sinthusia chandrana</i>	生灰蝶	R			
	<i>Lampides boeticus</i>	亮灰蝶	C			
	<i>Euchrysops cnejus</i>	棕灰蝶	UC			
	<i>Catochrysops strabo</i>	咖灰蝶	VR			
	<i>Everes lacturnus</i>	長尾藍灰蝶	C			
	<i>Chilades pandava</i>	曲紋紫灰蝶	UC			
	<i>Chilades lajus</i>	紫灰蝶	C	yes		
Nymphs	<i>Charaxes bernardus</i>	白帶螯蛱蝶	C			
	<i>Cupha erymanthis</i>	黃襟蛱蝶	VC	yes		
	<i>Neptis clinia</i>	珂環蛱蝶	C			
	<i>Junonia almana</i>	美眼蛱蝶	C			
	<i>Junonia iphita</i>	鉤翅眼蛱蝶	C	yes		
	<i>Junonia atlites</i>	波紋眼蛱蝶	C	yes		
	<i>Athyma selenophora</i>	新月帶蛱蝶	C	yes		
	<i>Athyma perius</i>	玄珠帶蛱蝶	UC			
	<i>Neptis hylas</i>	中環蛱蝶	VC	yes		
	<i>Phaedyra columella</i>	柱菲蛱蝶	C			
	<i>Parathyma sulphitia</i>	殘鏢線蛱蝶	C			
	<i>Symbrenthia lilaia</i>	散紋盛蛱蝶	C	yes		
	<i>Pantoporia hordonia</i>	金蟠蛱蝶	UC			
	<i>Kaniska canace</i>	琉璃蛱蝶	C			
	<i>Hypolimnna bolina</i>	幻紫斑蛱蝶	C			
	<i>Cyrestis thyodamas</i>	網絲蛱蝶	C	yes		
	<i>Junonia lemonias</i>	蛇眼蛱蝶	C			
	<i>Athyma nefte seitzii</i>	相思帶蛱蝶	C			
	<i>Athyma ranga</i>	離斑帶蛱蝶	UC			
	<i>Hestina assimilis</i>	黑脈蛱蝶	C			
	<i>Argyreus hyperbius</i>	斐豹蛱蝶	C			
	<i>Rohana parisatis</i>	羅蛱蝶	C			
	<i>Ariadne ariadne alterna</i>	波蛱蝶	C			
	<i>Phalanta phalantha</i>	珙蛱蝶	VR		yes	
	<i>Polyura athamas</i>	窄斑鳳尾蛱蝶	UC			
	<i>Dichorragia nesimachus</i>	電蛱蝶	R			
	<i>Modura procris</i>	穆蛱蝶	VR		yes	
	<i>Cethosia biblis</i>	紅鋸蛱蝶	UC			
	<i>Euthalia aconthea</i>	矛翠蛱蝶	UC			
	<i>Euthalia lubentina</i>	紅斑翠蛱蝶	UC			
	<i>Euthalia phemius</i>	尖翅翠蛱蝶	C			
	<i>Euthalia niepelti</i>	綠裙邊翠蛱蝶	N/A			
	<i>Polyura nepenthes</i>	忘憂尾蛱蝶	UC			

	<i>Vanessa indica</i>	大紅蛺蝶	UC			
	<i>Bibasis gomata</i>	白傘弄蝶	UC			
	<i>Choaspes benjaminii/ hemixanthus</i>	綠弄蝶/半黃綠弄蝶	VR			
	<i>Udaspes folus</i>	薑弄蝶	R			
	<i>Notocrypta paralyos</i>	窄紋袖弄蝶	N/A			
	<i>Caltoris bromus</i>	無斑珂弄蝶	VR		yes	
	<i>Iambrix salsala</i>	雅弄蝶	UC			
	<i>Isoteinon lamprospilus</i>	旖弄蝶	VR			
	<i>Suastus gremius</i>	素弄蝶	UC			
	<i>Matapa aria</i>	瑪弄蝶	UC			
	<i>Aeromachus jhora</i>	寬鐐弄蝶	R			
	<i>Astictopterus jama</i>	腌翅弄蝶	C			
	<i>Ampittia dioscorides</i>	黃斑弄蝶	UC	yes		
	<i>Tagiades litigiosa</i>	沾邊裙弄蝶	C			
	<i>Tagiades menaka</i>	黑邊裙弄蝶	UC			
	<i>Hasora chromus</i>	雙斑趾弄蝶	R	yes		
	<i>Hasora badra</i>	三斑趾弄蝶	VR			
	<i>Parnara ganga</i>	曲紋稻弄蝶	UC	yes		
	<i>Parnara guttata</i>	直紋稻弄蝶	C			
	<i>Pelopides agna/mathias</i>	南亞/隱紋穀弄蝶	UC			
	<i>Borbo cinnara</i>	秣弄蝶	C			
	<i>Zographetus satwa</i>	黃裳腫脈弄蝶	R			
	<i>Odontoptilum angulatum angulatum</i>	角翅弄蝶	C			
	<i>Gerosis phisara</i>	匪夷捷弄蝶	R			
	<i>Hyarotis adrastus</i>	希弄蝶	UC	yes		
	<i>Pelopidas conjuncta</i>	古銅穀弄蝶	R			
	<i>Pelopidas assamensis</i>	印度穀弄蝶	R			
	<i>Polytremis lubricans lubricans</i>	黃紋孔弄蝶	C			
	<i>Telicota besta</i>	黑脈長標弄蝶	VR		yes	
	<i>Faunis eumeus</i>	串珠環蝶	C			
	<i>Discophora sondaica tulliana</i>	鳳眼方環蝶	UC			
Skipper						
Duffer, Faun						

Annex 7. Dragonfly species recorded in LCW in this study.

Scientific Name	Chinese Name	IUCN	Common in LCW	Rare species with conservation concern	Remarks
<i>Mnais mneme</i>	煙翅綠色蟬				
<i>Rhinocypha perforata</i>	三斑鼻蟬		yes		
<i>Ceragrion auranticum</i>	琉球橘黃蟬		yes		
<i>Protosticta taipokauensis</i>	白瑞原扁蟬				
<i>Ischnura senegalensis</i>	褐斑異痣蟬		yes		
<i>Prodasnerura croconota</i>	朱背齒原蟬				
<i>Mortonagrion hirosei</i>	廣賴妹蟬				
<i>Agriocnemis femina</i>	杯斑小蟬		yes		
<i>Prodasineura autumnalis</i>	烏齒原蟬				
<i>Pseudagrion microcephalum</i>	綠斑蟬		yes		
<i>Copera marginipes</i>	黃狹扇蟬		yes		
<i>Pseudocopera ciliata</i>	白狹扇蟬		yes		
<i>Philoganga vetusta</i>	大溪蟬				
<i>Euphaea decorata</i>	方帶幽蟬				
<i>Agriocnemis pygmaea</i>	黃尾小蟬				
<i>Pantala flavescens</i>	黃蜻		yes		
<i>Crocothemis servilia</i>	紅蜻				
<i>Neurothemis fulvia</i>	網脈蜻		yes		
<i>Lyriothemis elegantissima</i>	華麗寬腹蜻				
<i>Orthetrum luzonicum</i>	呂宋灰蜻		yes		
<i>Acisoma panorpoides</i>	錐腹蜻		yes		
<i>Orthetrum sabina</i>	狹腹灰蜻		yes		
<i>Zygonyx iris</i>	彩虹蜻				
<i>Trithemis festiva</i>	慶褐蜻		yes		
<i>Rhyothemis variegata arria</i>	斑麗翅蜻				
<i>Rhyothemis triangularis</i>	三角麗翅蜻				
<i>Macrodiplax cora</i>	高翔潁蜻		yes		
<i>Orthetrum chrysis</i>	華麗灰蜻		yes		
<i>Orthetrum glaucum</i>	黑尾灰蜻		yes		
<i>Orthetrum pruinosum</i>	赤褐灰蜻		yes		
<i>Orthetrum triangulare</i>	鼎異色灰蜻				
<i>Trithemis aurora</i>	曉褐蜻		yes		
<i>Neurothemis tullia</i>	截斑脈蜻				
<i>Brachydiplax chalybea</i>	藍額疏脈蜻				

<i>Aethriamanta brevipennis</i>	短腹異蜻				
<i>Idionyx victor</i>	威異偽蜻				
<i>Epophthalmia elegans</i>	閃藍麗大蜻				
<i>Anax parthenope julius</i>	碧偉蜓				
<i>Anax guttatus</i>	斑偉蜓				
<i>Diplacodes nebulosa</i>	斑藍小蜻				
<i>Diplacodes trivialis</i>	紋藍小蜻				
<i>Zyxomma petiolatum</i>	細腹綠眼蜻				
<i>Pseudothemis zonata</i>	玉帶蜻				
<i>Palpopleura sexmaculata</i>	六斑曲緣蜻				
<i>Urothemis signata</i>	赤斑曲鈎脈蜻				
<i>Orthetrum poecilops</i>	斑灰蜻	VU			
<i>Rhodothemis rufa</i>	紅姻蜻				
<i>Anotogaster cf. klossi</i>	圓臀大蜓屬			yes	Probably the HK 2nd record (28 Jan 2016)
<i>Tetracanthagyna waterhousei</i>	沃氏短痣蜓				
<i>Gynacantha japonica</i>	日本長尾蜓				
<i>Asiagomphus hainanensis</i>	海南亞春蜓				
<i>Ictinogomphus pertinax</i>	霸王葉春蜓		yes		
<i>Tholymis tillarga</i>	雲斑蜻				
<i>Hydrobasileus croceus</i>	臀斑楔翅蜻				
<i>Tramea virginia</i>	華斜痣蜻		yes		

Annex 8. Macroinvertebrate species recorded in wetlands of LCW in this study.

Order	Family	Taxon
Nematoida	Nematoida	Nematode spp.
Annelida	Erpobdellidae	Erpobdellid sp.
Annelida	Glossiphoniidae	Glossiphoniid sp.3
Annelida	Oligochaeta	Oligochaeta spp.
Ephemeroptera	Baetidae	Cloeon gilliesi
Ephemeroptera	Baetidae	Cloeon harveyi
Ephemeroptera	Baetidae	Cloeon spp.
Ephemeroptera	Caenidae	Caenis sp.
Anisoptera	Aeshnidae	Anax guttatus
Anisoptera	Aeshnidae	Anax parthenope
Anisoptera	Gomphidae	Ictinogomphus pertinax
Anisoptera	Libellulidae	Acisoma panorpoides
Anisoptera	Libellulidae	Acisoma panorpoides
Anisoptera	Libellulidae	Brachydiplax chalybea flavovittata
Anisoptera	Libellulidae	Crocothemis servilia
Anisoptera	Libellulidae	Diplacodes trivialis
Anisoptera	Libellulidae	Neurothemis fulvia
Anisoptera	Libellulidae	Neurothemis sp.
Anisoptera	Libellulidae	Orthetrum chrysis
Anisoptera	Libellulidae	Orthetrum glaucum
Anisoptera	Libellulidae	Orthetrum luzonicum
Anisoptera	Libellulidae	Orthetrum pruinatum neglectum
Anisoptera	Libellulidae	Pantala flavescens
Anisoptera	Libellulidae	Tamea virginia
Anisoptera	Libellulidae	Trithemis aurora
Anisoptera	Libellulidae	Trithemis festiva
Zygoptera	Coenagrionidae	Agriocnemis femina oryzae
Zygoptera	Coenagrionidae	Agriocnemis pyraea
Zygoptera	Coenagrionidae	Ceragrion auranticum ryukyuanum
Zygoptera	Coenagrionidae	Ischnura senegalensis
Zygoptera	Platycnemididae	Copera ciliata
Zygoptera	Platycnemididae	Copera marginipes
Zygoptera	Platycnemididae	Onychargia atrocyana
Trichoptera	Calamoceratidae	Ganonema sp.

Trichoptera	Hydroptilidae	Oxyethira sp.1
Trichoptera	Hydroptilidae	Oxyethira sp.2
Trichoptera	Leptoceridae	Leptocerid sp.
Trichoptera	Leptoceridae	Oecetis sp.
Lepidoptera	Crambidae	Eoophyla sp.
Lepidoptera	Crambidae	Paracymoriza sp.
Lepidoptera	Crambidae	Parapoynx sp.
Hemiptera	Corixidae	Corixid sp.1
Hemiptera	Corixidae	Corixid sp.2
Hemiptera	Gerridae	Limnogonus fossarum
Hemiptera	Hebridae	Hebrus sp.1
Hemiptera	Hebridae	Hebrus sp.2
Hemiptera	Hydrometridae	Hydrometra sp.1
Hemiptera	Hydrometridae	Hydrometra sp.2
Hemiptera	Mesoveliidae	Mesovelvia sp.1
Hemiptera	Naucoridae	Heleocoris sp.1
Hemiptera	Nepidae	Laccotrephes chinensis
Hemiptera	Nepidae	Ranatra chinensis
Hemiptera	Notonectidae	Notonectid sp.4
Hemiptera	Ochteridae	Ochterus sp.1
Hemiptera	Pleidae	Paraplea sp.1
Hemiptera	Pleidae	Paraplea sp.2
Hemiptera	Veliidae	Angilovelvia sp.
Hemiptera	Veliidae	Microvelvia sp.1
Coleoptera Larvae	Dytiscidae	Cybister sp. Larvae
Coleoptera Larvae	Dytiscidae	Hydaticus rhanoides Larvae
Coleoptera Larvae	Dytiscidae	Hydaticus vittatus Larvae
Coleoptera Larvae	Dytiscidae	Hydrovatus spp. Larvae
Coleoptera Larvae	Dytiscidae	Leiodytes spp. Larvae
Coleoptera Larvae	Gyrinidae	Gyrinid sp.1 Larvae
Coleoptera Larvae	Hydrophilidae	Berosus sp. Larvae
Coleoptera Larvae	Hydrophilidae	Coelostoma spp. Larvae
Coleoptera Larvae	Hydrophilidae	Enochrus sp. Larvae
Coleoptera Larvae	Hydrophilidae	Helochaers sp.1 Larvae
Coleoptera Larvae	Hydrophilidae	Helochaers sp.2 Larvae
Coleoptera Larvae	Hydrophilidae	Helochaers sp.3 Larvae
Coleoptera Larvae	Hydrophilidae	Hydrophilid sp.1 Larvae

Coleoptera Larvae	Hydrophilidae	Hydrophilus sp. Larvae
Coleoptera Larvae	Hydrophilidae	Sternolophus sp. Larvae
Coleoptera Larvae	Noteridae	Noterid spp. Larvae
Coleoptera Larvae	Scirtidae	Scirtes sp.1 Larvae
Coleoptera Larvae	Scirtidae	Scirtes sp.2 Larvae
Coleoptera Adult	Dytiscidae	Copelatus sp.
Coleoptera Adult	Dytiscidae	Cybister sp.
Coleoptera Adult	Dytiscidae	Hydaticus rhantoides
Coleoptera Adult	Dytiscidae	Hydaticus vittatus
Coleoptera Adult	Dytiscidae	Hydroglyphus sp.
Coleoptera Adult	Dytiscidae	Hydroporinae sp.
Coleoptera Adult	Dytiscidae	Hydrovatus sp.1
Coleoptera Adult	Dytiscidae	Hydrovatus sp.3
Coleoptera Adult	Dytiscidae	Leiodytes sp.1
Coleoptera Adult	Hydrophilidae	Amphiops mater
Coleoptera Adult	Hydrophilidae	Berosus sp.
Coleoptera Adult	Hydrophilidae	Coelostoma fallaciosum
Coleoptera Adult	Hydrophilidae	Coeolostoma sp.
Coleoptera Adult	Hydrophilidae	Enochrus sp.1
Coleoptera Adult	Hydrophilidae	Helochares atropiceus
Coleoptera Adult	Hydrophilidae	Helochares lentus
Coleoptera Adult	Hydrophilidae	Helochares pallens
Coleoptera Adult	Hydrophilidae	Hydrobiomorpha sp.
Coleoptera Adult	Hydrophilidae	Hydrophilus sp.
Coleoptera Adult	Hydrophilidae	Paracymus sp.
Coleoptera Adult	Hydrophilidae	Sternolophus sp.
Coleoptera Adult	Limnichidae	Pelochares sp.
Coleoptera Adult	Noteridae	Neohydrocoptus sp.
Coleoptera Adult	Scirtidae	Scirtes sp.4
Diptera	Ceratopogonidae	Atrichopogon sp.1
Diptera	Ceratopogonidae	Atrichopogon sp.3
Diptera	Ceratopogonidae	Bezzia sp.1
Diptera	Ceratopogonidae	Bezzia sp.2
Diptera	Ceratopogonidae	Ceratopogon sp.1
Diptera	Ceratopogonidae	Ceratopogon sp.2
Diptera	Ceratopogonidae	Culicoides sp.
Diptera	Ceratopogonidae	Dasyhelea sp.

Diptera	Ceratopogonidae	Forcipomyia sp.2
Decapoda	Ceratopogonidae	Forcipomyia sp.3
Diptera	Ceratopogonidae	Forcipomyiinae sp.1
Diptera	Ceratopogonidae	Probezzia sp.1
Diptera	Ceratopogonidae	Probezzia sp.2
Diptera	Ceratopogonidae	Sphaeromias sp.
Diptera	Chironomidae	Chironominae spp.
Diptera	Chironomidae	Orthoclaadiinae spp.
Diptera	Chironomidae	Tanypondinae spp.
Diptera	Corethrellidae	Corethrella sp.
Diptera	Culicidae	Aedes sp.1
Diptera	Culicidae	Aedes sp.2
Diptera	Culicidae	Anopheles sp.1
Diptera	Culicidae	Culex sp.3
Diptera	Culicidae	Culex sp.4
Diptera	Culicidae	Mansonia sp.
Diptera	Culicidae	Mimomyia sp.1
Diptera	Culicidae	Mimomyia sp.2
Diptera	Dixidae	Dixid sp.
Diptera	Dolichopodidae	Dolichopodid sp.1
Diptera	Ephydriidae	Ephydrid sp.1
Diptera	Ephydriidae	Ephydrid sp.12
Diptera	Ephydriidae	Ephydrid sp.2
Diptera	Ephydriidae	Ephydrid sp.3
Diptera	Ephydriidae	Ephydrid sp.4
Diptera	Ephydriidae	Ephydrid sp.5
Diptera	Ephydriidae	Ephydrid sp.6
Diptera	Ephydriidae	Ephydrid sp.7
Diptera	Ephydriidae	Ephydrid sp.9
Diptera	Limoniidae	Limoniid sp.1
Diptera	Limoniidae	Limoniid sp.10
Diptera	Limoniidae	Limoniid sp.11
Diptera	Limoniidae	Limoniid sp.12
Diptera	Limoniidae	Limoniid sp.5
Diptera	Limoniidae	Limoniid sp.6
Diptera	Limoniidae	Limoniid sp.8
Diptera	Limoniidae	Limoniid sp.9

Diptera	Muscidae	cf. Haematobia
Diptera	Muscidae	Muscid sp.2
Diptera	Muscidae	Muscid sp.3
Diptera	Psychodidae	Psychodid sp.1
Diptera	Psychodidae	Psychodid sp.10
Diptera	Psychodidae	Psychodid sp.11
Diptera	Psychodidae	Psychodid sp.2
Diptera	Psychodidae	Psychodid sp.3
Diptera	Psychodidae	Psychodid sp.4
Diptera	Psychodidae	Psychodid sp.6
Diptera	Psychodidae	Psychodid sp.7
Diptera	Sciomyzidae	Sciomyzid sp.
Diptera	Simuliidae	Simuliid sp.
Diptera	Stratiomyidae	Nemotelus sp.
Diptera	Stratiomyidae	Odontomyia sp.
Diptera	Syrphidae	Syrphid sp.
Diptera	Tabanidae	Tabanid sp.2
Diptera	Thaumaleidae	Thaumaleid sp.
Diptera	Tipulidae	Tipulid sp.1
Decapoda	Atyidae	Caridina cantonensis
Decapoda	Atyidae	Caridina serrata
Decapoda	Gecarcinucidae	Somanniathelphusa zanklon
Bivalvia	Corbiculidae	Corbiculid sp.
Gastropoda	Bithyniidae	Bithyniid sp.
Gastropoda	Lymnaeidae	Radix sp.1
Gastropoda	Lymnaeidae	Radix sp.2
Gastropoda	Planorbidae	Biomphalaria sp.
Gastropoda	Planorbidae	Gyraulus sp.
Gastropoda	Planorbidae	Hippeutis sp.
Gastropoda	Stenothyridae	Stenothyria sp.1

Annex 9. Macroinvertebrate species recorded in stream of LCW in this study.

Class / Order / Suborder	Family	Species
Amphipoda		Sp. A
Coleoptera	Dytiscidae	Neptosternus sp. A
	Elmidae (adult)	Sp. A
	Elmidae (larva)	Sp. A
		Sp. B
		Sp. C
		Sp. D
		Sp. E
	Eulichadidae	Eulichas dudgeoni
	Hydrophilidae	Berosus sp. A
		Enochrus sp. A
	Lampyridae	Sp. A
	Psephenidae	Eubrianax sp. A
		Eubrianax sp. B
		Mataeopsephus sp. A
		Mataeopsephus sp. B
		Metanopsephenus sp. B
		Psephenoides sp. A
	Ptilodactylidae	Sp. A
	Scirtidae	Sp. A
		Sp. B
		Sp. C
		Sp. D
	Staphylinidae (adult)	Sp. A
Decapoda	Atyidae	Caridina cantonensis
		Caridina longirostris
	Grapsidae	Eriocheir japonicus
	Isolapotamidae	Cryptopotamon anacoluthon
	Palaemonidae	Macrobrachium sp. A
	(blank)	Larva sp. A
		Larva sp. B
Diptera	Ceratopogonidae	Atrichopogon sp. A
		Bezzia sp. A
		Sp. A

		Sp. B
		Sp. C
		Sp. D
	Chironomidae	Chironominae sp. A
		Chironominae sp. B
		Chironominae sp. C
		Orthoclaadiinae sp. A
		Orthoclaadiinae sp. B
		Orthoclaadiinae sp. C
		Orthoclaadiinae sp. D
		Orthoclaadiinae sp. E
		Orthoclaadiinae sp. F
		Tanypondinae sp. A
		Tanypondinae sp. B
		Tanypondinae sp. C
	Dixidae	Dixa sp. A
		Sp. A
	Empididae	Hemerodromia sp. A
	Ephydriidae	Sp. A
	Limoniidae	Sp. A
	Psychodidae	Psychoda sp. A
	Simuliidae	Simulium sp. A
		Sp. A
	Tanyderidae	Sp. A
	Tipulidae	Antocha sp. A
		Hexatoma sp. A
		Sp. A
		Sp. B
		Sp. C
		Sp. D
		Sp. E
		Sp. F
		Sp. G
		Sp. H
Ephemeroptera	Baetidae	Alainites acutulus
		Alainites lingulatus
		Baetis illiesi

		Baetis maculosus
		Baetis tatuensis
		Chopralla fusina
		Cloedes longisetosus
		Labiobaetis a. orientalis
		Labiobaetis diffundus
		Labiobaetis mutus
		Liebebiella vera
		Nigrobaetis facetus
		Nigrobaetis sp. A
		Platybaetis bishopi
	Caenidae	Caenis aspera
		Caenis bicornis
		Caenis lubrica
		Caenis sp. A
	Ephemera	Ephemera pilosa
	Ephemerellidae	Torleya arenosa
	Ephemeridae	Ephemera pictipennis
		Ephemera sp. A
		Ephemera sp. B
		Ephemera pilosa
	Heptageniidae	Cinygmina dudgeoni
		Iron herklosi
		Paegniodes cupulatus
	Leptophlebiidae	Choroterpes sp. A
		Habrophlebiodes gilliesi
		Habrophlebiodes sp. A
		Isca purpurea
		Paraleptophlebia sp. A
Gastropoda	Pachychilidae	Sulcospira hainanensis
Heteroptera	Gerridae	Metrocoris lituratus
		Onychotrechus esakii
		Ptilomera tigrina
	Helotrephidae	Platytrephes sp. A
		Sp. A
		Sp. B
		Sp. C

		Sp. D
	Veliidae	Rhagovelia sp. A
Megaloptera	Corydalidae	Sp. A
		Sp. B
Odonata	Calopterygidae	Mnias mneme
	Chlorocyphidae	Rhinocypha perforata
	Diphlebiidae	Philoganga vetusta
	Euphaeidae	Euphaea decorata
	Gomphidae	Heliogomphus scorpio
	Libellulidae	Zygonix iris
	Megapodagrionidae	Agriomorpha fusca
	Platystictidae	Protosticta taipokauensis
Oligochaeta	(blank)	Sp. A
Plecoptera	Leuctridae	Sp. A
	Nemouridae	Nemoura sp. A
		Nemoura sp. B
	Perlidae	Agnetina A
		Claassenia sp. A
		Neoperla A
		Neoperla sp. A
		Neoperla sp. B
		Paragnetina sp. A
		Tyloperla sp. A
		Tyloperla sp. B
Trichoptera	Calamoceratidae	Anisoncentropus sp. A
		Ganonema sp. A
	Dipseudopsidae	Pseudoneureclipsis sp. A
	Ecnomidae	Ecnomus sp. A
		Ecnomus sp. B
		Ecnomus sp. C
	Glossosomatidae	Agapetus sp. A
		Glossosoma sp. A
	Hydropsychidae	Cheumatopsyche sp. A
		Cheumatopsyche sp. B
		Cheumatopsyche sp. C
		Cheumatopsyche ventricosa
		Herbertorossia sp. A

		Hydropsyche sp. A
		Hydropsyche sp. B
		Macrostemum sp. A
		Macrostemum sp. B
	Lepidostomatidae	Goerodes sp. A
	Philopotamidae	Chimarra sp. A
	Polycentropodidae	Polycentropus A
	Psychomyiidae	Sp. A
	Rhyacophilidae	Rhyacophila sp. A
		Sp. A
		Sp. B
	Xiphocentronidae	Melanotrichia serica

Annex 10. Freshwater fish species recorded in stream of LCW in this study.

Scientific Name	Common Name	Chinese Name	Sp. No.	Nativeness	Order	Family	Fellowes <i>et al.</i> (2002)	Red List of China's Vertebrates (2016)	China Species Red List (2004)	China Red Data Book (1998)	IUCN (2016.3)	China State Major Protection Status	AFCD Assessment from HK Biodiversity Database (2017)	Lee <i>et al.</i> (2004)	Remarks
<i>Anguilla japonica</i>	Japanese Eel	日本鰻鱺	1	Native	Anguilliformes	Anguillidae	-	EN	-	-	EN	-	-	Uncommon	-
<i>Anguilla marmorata</i>	Giant Mottled Eel	花鰻鱺	2	Native	Anguilliformes	Anguillidae	GC	EN	EN	EN	LC	II	Species of Conservation Concern	Uncommon	-
<i>Misgurnus anguillicaudatus</i>	Oriental Weatherfish	泥鰍	3	Native	Cypriniformes	Cobitidae	-	LC	-	-	LC	-	Common	Common	-
<i>Oreonectes platycephalus</i>	Flat-headed Loach	平頭嶺鰍	4	Native	Cypriniformes	Balitoridae	-	LC	-	-	DD	-	Common	Common	-
<i>Schistura fasciolata</i>	Striped Loach	橫紋南鰍	5	Native	Cypriniformes	Balitoridae	-	DD	-	-	DD	-	Common	Common	-
<i>Clarias fuscus</i>	Whitespotted Walking Catfish	鰻鯰	6	Native	Siluriformes	Clariidae	-	LC	-	-	LC	-	Common	Common	-
<i>Plotosus lineatus</i>	Striped Eel Catfish	線紋鰻鯰	7	Native	Siluriformes	Plotosidae	-	-	-	-	-	-	Common	Common	-
<i>Mugil cephalus</i>	Grey Mullet	鯰	8	Native	Mugiliformes	Mugilidae	-	-	-	-	LC	-	Common	Common	-
<i>Xiphophorus hellerii</i>	Swordtail	劍尾魚	9	Introduced	Cyprinodontiformes	Poeciliidae	-	-	-	-	-	-	Common	Common	-
<i>Monopterus albus</i>	Swampy Eel	黃鱔	10	Native	Synbranchiformes	Synbranchidae	-	LC	-	-	LC	-	Common	Common	-
<i>Ambassis</i> sp.	Unidentified Glassy Perchlet	雙邊魚屬	11	Native	Perciformes	Ambassidae	-	LC	-	-	LC	-	Common	Common	-
<i>Lateolabrax japonicus</i>	Japanese Seaperch	花鱸	12	Native	Perciformes	Lateolabracidae	-	-	-	-	-	-	-	-	-
<i>Sillago</i> sp.	Unidentified Sillago	鱸屬	13	Native	Perciformes	Sillaginidae	-	-	-	-	-	-	-	-	-
<i>Upeneus tragula</i>	Freckled Goatfish	黑斑緋鯉	14	Native	Perciformes	Mullidae	-	-	-	-	-	-	-	-	Not on AFCD's freshwater fish list
<i>Lutjanus argentimaculatus</i>	Mangrove Snapper	紫紅笛鯛	15	Native	Perciformes	Lutjanidae	-	-	-	-	-	-	Common	Common	-
<i>Gerres filamentosus</i>	Long Rayed Silverbiddy	長棘銀鱸	16	Native	Perciformes	Gerreidae	-	-	-	-	LC	-	-	-	-
<i>Gerres macracanthus</i>	Longspine Silverbiddy	大棘銀鱸	17	Native	Perciformes	Gerreidae	-	-	-	-	-	-	-	-	-
<i>Gerres oyena</i>	Common Silverbiddy	奧奈銀鱸	18	Native	Perciformes	Gerreidae	-	-	-	-	-	-	-	Common	-
<i>Acanthopagrus latus</i>	Yellowfin Seabream	黃鰭棘鯛	19	Native	Perciformes	Sparidae	-	-	-	-	DD	-	Common	Common	-
<i>Acanthopagrus schlegelii</i>	Black Porgy	黑棘鯛	20	Native	Perciformes	Sparidae	-	-	-	-	LC	-	-	-	-
<i>Terapon jarbua</i>	Jarbua Terapon	細鱗鯽	21	Native	Perciformes	Terapontidae	-	-	-	-	LC	-	Common	Common	-

<i>Kuhlia marginata</i>	Dark-margined Flagtail	黑邊湯鯉	22	Native	Perciformes	Kuhliidae	RC	-	-	-	LC	-	-	-	-
<i>Oreochromis niloticus</i>	Nile Tilapia	尼羅口孵非鯽	23	Introduced	Perciformes	Cichlidae	-	-	-	-	-	-	Common	Common	-
<i>Omobranchus ferox</i>	Gossamer blenny	猛肩鰓鰈	24	Native	Perciformes	Blenniidae	-	-	-	-	LC	-	-	-	-
<i>Butis melanostigma</i>	Crimson-tipped Flathead Gudgeon	黑點嵴塘鱧	25	Native	Perciformes	Eleotridae	-	-	-	-	-	-	Uncommon	Uncommon	-
<i>Eleotris acanthopoma</i>	Spinecheek Gudgeon	刺蓋塘鱧	26	Native	Perciformes	Eleotridae	-	LC	-	-	LC	-	Uncommon	Uncommon	-
<i>Eleotris oxycephala</i>	Sharphead Sleeper	尖頭塘鱧	27	Native	Perciformes	Eleotridae	-	LC	-	-	LC	-	Common	Common	-
<i>Bathygobius fuscus</i>	Brown Frillfin goby	深鰕虎魚	28	Native	Perciformes	Gobiidae	-	-	-	-	LC	-	Common	Common	-
<i>Favonigobius gymnauchen</i>	Short-nosed Sand Goby	裸項蜂巢鰕虎魚	29	Native	Perciformes	Gobiidae	-	-	-	-	-	-	-	-	-
<i>Favonigobius reichei</i>	Indo-Pacific Tropical Sand Goby	賴氏蜂巢鰕虎魚	30	Native	Perciformes	Gobiidae	-	-	-	-	NT	-	Common	-	-
<i>Glossogobius giuris</i>	Fork Tongue Goby	舌鰕虎魚	31	Native	Perciformes	Gobiidae	-	-	-	-	LC	-	Common	Common	-
<i>Glossogobius olivaceus</i>	Spotty Band Goby	斑紋舌鰕虎魚	32	Native	Perciformes	Gobiidae	-	LC	-	-	LC	-	Uncommon	Uncommon	-
<i>Luciogobius</i> sp.	Unidentified <i>Luciogobius</i>	竿鰕虎魚屬	33	Native	Perciformes	Gobiidae	-	-	-	-	-	-	-	-	-
<i>Mugilogobius abei</i>	Estuarine goby	阿部鯮鰕虎魚	34	Native	Perciformes	Gobiidae	-	-	-	-	LC	-	Common	Common	-
<i>Periophthalmus modestus</i>	Common Mudskipper	彈塗魚	35	Native	Perciformes	Gobiidae	-	-	-	-	-	-	Common	Common	-
<i>Psammogobius biocellatus</i>	Two Spot Goby	雙眼斑砂鰕虎魚	36	Native	Perciformes	Gobiidae	-	-	-	-	LC	-	Uncommon	Uncommon	-
<i>Pseudogobius javanicus</i>	Javanese Fatnose Goby	爪哇擬鰕虎魚	37	Native	Perciformes	Gobiidae	-	-	-	-	-	-	Common	Common	-
<i>Redigobius bikolanus</i>	Speckled Goby	斑紋雷鰕虎魚	38	Native	Perciformes	Gobiidae	-	-	-	-	LC	-	-	-	-
<i>Rhinogobius duospilus</i>	-	溪吻鰕虎魚	39	Native	Perciformes	Gobiidae	-	DD	-	-	-	-	Common	Common	-
<i>Rhinogobius giurinus</i>	Barcheek Goby	子陵吻鰕虎魚	40	Native	Perciformes	Gobiidae	-	LC	-	-	LC	-	Common	Common	-
<i>Tridentiger trigonocephalus</i>	Chameleon Goby	紋縐鰕虎魚	41	Native	Perciformes	Gobiidae	-	DD	-	-	-	-	Common	Common	-
<i>Scatophagus argus</i>	Spotted Scat	金錢魚	42	Native	Perciformes	Scatopontidae	-	-	-	-	LC	-	Common	Common	-
<i>Siganus canaliculatus</i>	White-spotted Rabbitfish	長鰭籃子魚	43	Native	Perciformes	Siganidae	-	-	-	-	-	-	Common	Common	-