



33/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong  
香港灣仔告士打道5號稅務大樓33樓

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***For discussion on 27 March 2020***

**The Implementation of Nature Conservation Management  
Agreement Project at Long Valley**

**PURPOSE**

This paper briefs Members on the latest status of the Nature Conservation Management Agreement (MA) project at Long Valley and Ho Sheung Heung Priority Site (the Priority Site), as well as the experiences gained from this MA project over the years.

**BACKGROUND**

2. The Priority Site is widely recognised for its high ecological value primarily due to its patchwork mosaic of wet and dry farmlands and other habitats, which supports a high diversity of freshwater wetland-dependent species. To conserve this unique landscape and the associated biodiversity, the Conservancy Association (CA), in association with the Hong Kong Bird Watching Society (HKBWS), has been conducting MA projects at the Priority Site by implementing a series of active habitat management measures and species conservation programmes since 2005 under the financial support of the Environment and Conservation Fund on a renewal basis. The current MA project will expire on 31 August 2020.

3. Over the years, the projects have successfully conserved and enhanced the ecological values of the freshwater wetlands in the area through forming MAs with local farmers and landowners, and have become a showcase of the MA scheme to demonstrate a harmonious balance between agriculture and biodiversity conservation through collaboration.

4. On 27 December 2019, 37 hectares of agriculture land in Long Valley was resumed by the Government for the development of the Long Valley Nature Park (LVNP) under the Kwu Tung North and Fanling North New Development Areas project. While all MA activities in Long Valley were terminated after its reversion to Government Land, the conservation management activities has continued in Ho Sheung Heung, and the MA project team has proceeded with transitioning their operations in Long Valley to Ho Sheung Heung.

5. To facilitate the transition and pass on the management experience to the future LVNP, the MA project team had documented the conservation management work conducted over the past decade, and summarised the lessons learned with highlights set out in the ensuing paragraphs with details at **Annex**.

## **REVIEW OF CONSERVATION MANAGEMENT WORK**

6. Habitats in the MA site were delineated into four zonings, namely the core zone, eco-agriculture zone, wise use zone and buffer zone, each managed under different strategies with their specific combinations of habitat types where corresponding management practices or farming activities were carried out.

7. As different target species have different habitat requirements and preferences, it is important to manage the area as a mosaic of diverse habitats types. For example, “Shallow Water Habitats” and “Less Intensive Wet Agricultural Lands” were important foraging and breeding habitats for waterbirds and amphibians, including species of conservation concern such as the Great Painted Snipe and Chinese Bullfrog. “Paddy Rice Fields” provided secure food sources for seed-eating birds including the Yellow-breasted Bunting, which is critically endangered globally, during migratory season. The MA project team introduced specific habitat management measures to manage the above habitats supported by other activities under the MA projects, such as regular ecological surveys, creation of islands for breeding waterbirds and control of invasive species, in order to monitor and enhance the site conditions for the wildlife.

8. Through implementation of the conservation management work, the MA projects have successfully enhanced the biodiversity at Long Valley over the years. The number of bird species increased from 221 before the MA in 2005 to 314 in 2018, representing a growth of more than 40%. 37 species of breeding birds and 10 species of amphibians have been recorded at the site, accounting for over 25% and 40% of the total numbers recorded in Hong Kong respectively.

## **WAY FORWARD**

9. With the land resumption in Long Valley, the MA project team continues its conservation efforts in Ho Sheung Heung for the remaining of the MA project period. Upon the expiry of the MA project, the project team may apply for application of funding support from the newly established Countryside Conservation Funding Scheme in future to sustain its conservation efforts in the area.

10. Meanwhile, the Civil Engineering and Development Department has commenced the works for the development of the LVNP, and consulted green groups, including CA and HKBWS, on the interim and long-term maintenance of wetlands at Long Valley. During the construction period of the LVNP, habitat management measures and ecological surveys will be conducted regularly to maintain the conservation value and conditions of the site. Upon the completion of the necessary construction works, the land will be handed over in phases to the Agriculture, Fisheries and Conservation Department which will take into account the observations of the subject review for the long-term management of the LVNP.

## **ADVICE SOUGHT**

11. Members are invited to note and comment on the lessons learned from the implementation of the MA projects at the Priority Site.

**Agriculture, Fisheries and Conservation Department**  
**Environmental Protection Department**  
**March 2020**

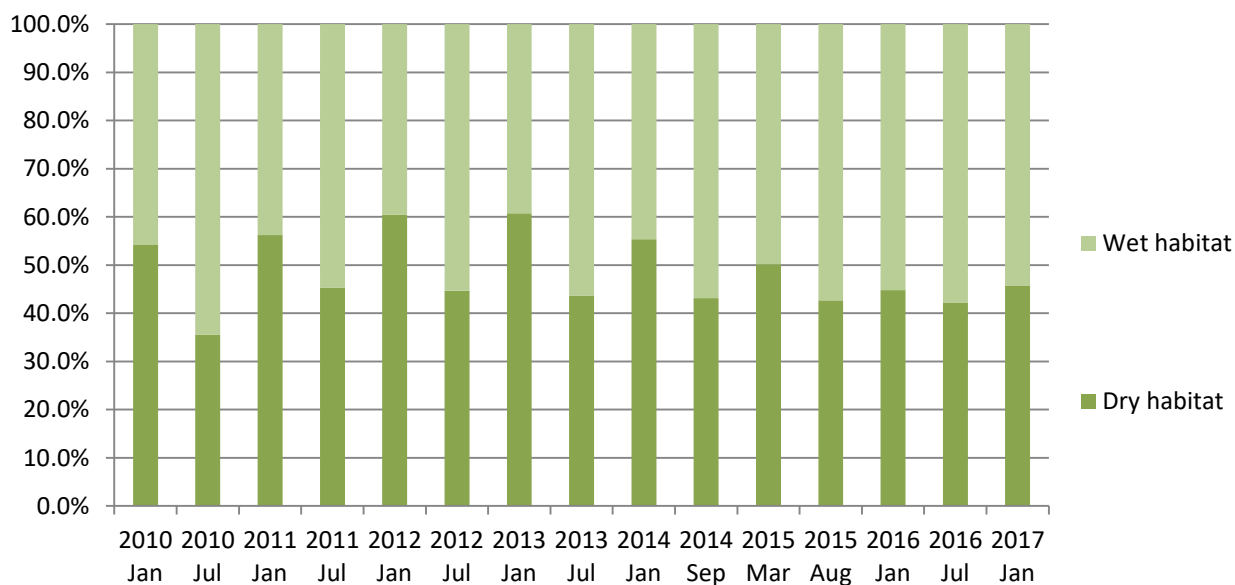
## Review on Nature Conservation Management for Long Valley (2005-2018)

### Summary

#### 1. Types and Zoning of Habitats Managed

##### 1.1 Mosaic pattern of diverse wet and dry habitats

- Long Valley (LV) consist of various types of wet and dry farmlands and other habitats (**Appendix 1**). The active and diversified farming activities, as well as the spatial and temporal mosaic pattern of their distribution, are keys to the high biodiversity and ecological value of the site.
- The proportion of wet to dry habitats varied between summers and winters over the years. From experience it was found that the ideal overall proportion of wet to dry habitats should be around 65% to 35% (with  $\pm 10\%$  variation depending on season), and 80-90% of the area in LV is suggested to be maintained as active farmland, in order to maintain the balance between wildlife that favours wetland and open country habitat as well as to obtain the highest species diversity.



##### 1.2 Habitat Zoning

- A conceptual management plan that delineated habitat management zonings with different management strategies was adopted to serve as guidance on the distribution of management effort and allocation of resources (**Appendix 2**).

<b>Zoning</b>	<b>Management strategies</b>	<b>Major habitats</b>
Core zone	<ul style="list-style-type: none"> <li>• Maintain minimal human disturbance</li> <li>• Less intensive farming activities only</li> <li>• No tourist activity</li> </ul>	<ul style="list-style-type: none"> <li>• Shallow Water Habitat</li> <li>• Less Intensive Wet Agricultural Land</li> </ul>
Eco-agriculture zone	<ul style="list-style-type: none"> <li>• High proportion of wetland agriculture</li> <li>• Encourage eco-farming (i.e. ecologically-friendly and wildlife-friendly practices for the whole farming cycle and farmland management)</li> <li>• Maintain a suitable ratio of wet-dry farmlands</li> </ul>	<ul style="list-style-type: none"> <li>• Less Intensive Wet Agricultural Land</li> <li>• Paddy Rice Field</li> <li>• Intensive Wet Agricultural Land</li> <li>• Water Flea Ponds</li> <li>• Fish and Marsh Pond</li> <li>• Shallow Water Habitat</li> </ul>
Wise use zone	<ul style="list-style-type: none"> <li>• Encourage eco-friendly practice (i.e. ecologically-friendly and wildlife-friendly practices for part of the farming cycle and farmland management).</li> <li>• Maintain a suitable ratio of wet-dry farmlands</li> </ul>	<ul style="list-style-type: none"> <li>• Paddy Rice Field</li> <li>• Intensive Wet Agricultural Land</li> <li>• Intensive Dry Agricultural Land</li> <li>• Fung Shui Wood</li> </ul>
Buffer zone	<ul style="list-style-type: none"> <li>• No management input allocated so far</li> </ul>	<ul style="list-style-type: none"> <li>• Intensive Dry Agricultural Land</li> <li>• Fallow Agricultural Land</li> <li>• Village area</li> <li>• Rivers</li> </ul>

**Remarks:**

- The suggested wet-dry farmland ratio for the eco-agriculture zone and wise use zone were the same, but more flexibility was allowed in the wise use zone since more dry farmlands were encouraged to be located within this zone. However, the overall wet-dry farmland ratio for the whole LV area should follow the suggested ratio mentioned in section 1.1.
- The Intensive Dry Agricultural Land and Fallow Agricultural Land habitats were not managed under the MA projects.

## **2. Habitat Management Practices**

### **2.1 *Shallow Water Habitat (SWH)***

- Open water type (SWH-OW): Only limited vegetation coverage (less than 20%) was allowed in the farmland. Regular ploughing and vegetation control were performed to maintain the habitat. Target bird species include sandpipers, Little Ringed Plover, Black-winged Stilt, egrets and herons.
- Marshy type (SWH-M): Vegetation coverage was more than 20%. Vegetation was allowed to be overgrown in the farmland. Ploughing and vegetation control/clearance were needed only when the vegetation turns shrubby. Target bird species include snipes, crakes and rails, as well as Chinese Bullfrog
- Since the number of birds recorded in SWH-OW may decline after several years due to food depletion, it is suggested to rotate the farmland to other habitat types with vegetation/crops after being managed as SWH-OW for around 4-5 years.

### **2.2 *Paddy Rice Field (PRF)***

- In Hong Kong, two seasons of paddy rice can be planted each year. For the first season, rice transplantation begins around late March to early April. Rice can be harvested at around mid-late July. Once the first season of rice is harvested, the farmland is then ploughed and prepared for rice transplantation again. Rice transplantation of the second season begins around early August and rice is then ready for harvesting in early November.
- PRF played a significant role in attracting seed-eating birds, especially buntings, and it is important to continue this management practice in the future Long Valley Nature Park (LVNP) to maintain the attractiveness of LV to buntings. Since buntings are mainly autumn migrants, it is suggested to plant more paddy rice in the second season and leave around 30-40% of PRF unharvested, keeping them over winter to provide food for the birds.
- Besides buntings, PRF was also important for amphibians, especially Chinese Bullfrog, a species of conservation concern. Although occasional drainage of PRF during the growing stage of paddy rice could increase crop yield, the drainage will affect the growth of tadpoles, it is thus suggested to keep PRF inundated during the whole growing stage of paddy rice in the future LVNP.

### **2.3 *Less Intensive Wet Agricultural Land (LI-WAL)***

- Crops that require less management effort such as Water Chestnut, Chinese Arrowhead, Lotus, Water Bamboo and Water Lily were planted.
- It was very important to maintain the water level at LI-WAL, which depended on the crops planted.
- Strict ecologically-friendly requirements (e.g. modified inundation and drying periods to tie in with wildlife breeding and wintering seasons, less disturbance to wildlife, chemical-free) were applied in LI-WALs.
- Besides applying sufficient fertilizers, rotation for every 4-5 years between different crop types or habitat types (SWH and LI-WAL) was also important to produce crops with

marketable size, especially for Water Chestnut and Chinese Arrowhead.

- Chemical contamination from peripheral farmland was the key problem on producing ecologically-friendly crops. The main solution was to establish large eco-farming area by linking several LI-WAL together to decrease edge effect.
- Greater Painted Snipe and White-breasted Waterhen were found building nests in Water Chestnut farmlands, thus it is important to maintain this kind of habitat in the future LVNP.

#### ***2.4 Intensive Wet Agricultural Land (I-WAL)***

- Watercress and Water Spinach farmlands were the most common types and crucial components of I-WAL in LV. Farmers used conventional farming methods, rather than organic or ecologically-friendly methods, to plant Watercress and Water Spinach, due to serious pest problem.
- Water Spinach is planted in the summer time. Farmers kept some of the Water Spinach over the winter to serve as a source of planting stock for the next planting season. These farmlands were important for waterbirds such as sandpipers, wagtails and Cattle Egret. Sandpipers and wagtails were common in the farmlands during ploughing stage, while large flocks of Cattle Egrets gathered to search for insects.
- Watercress is planted in winter. These farmlands were important for waterbirds and butterflies. During flowering stage, Watercress flowers were the nectar source for butterflies such as Common White; Yellow Wagtail and snipes were commonly found in Watercress farmlands throughout the winter.
- Due to their ecological importance, cultivation of these two crops should be maintained in the future LVNP.

#### ***2.5 Fish/Marsh Ponds (FMP)***

- There were two FMPs maintained in LV.
- Deep water levels were maintained and Water Lilies were planted to serve as bird islands in these ponds to provide favourable habitats for ducks, rails and crakes, grebes and jacana.
- Although stocking ponds with fish and conducting drain-down in winter could attract egrets, herons and spoonbills, this practice was conducted only during the MA project 2008-2010 and terminated afterwards due to low cost-effectiveness.

#### ***2.6 Water Flea Pond (WFP)***

- This is the only remaining WFP in Hong Kong.
- Chicken manure was used to feed the water fleas. Water level was maintained at about 6-13 inches (15-33 cm).
- This habitat was the favourable feeding and resting ground for waterbirds such as Black-winged Stilt, Pied Avocet and ducks all year round. It was also an important breeding site for Chinese Bullfrog.

## **2.7 Fung Shui Wood (FSW)**

- FSW refers to the woodland behind Ho Sheung Heung. The area of the FSW is about 34,000m<sup>2</sup>. Some woodland bird species such as Chestnut Bulbul, Black Bulbul, Hainan Blue Flycatcher, Emerald Dove, Black-napped monarch, Speckled Piculet, etc., could be found utilizing this area.
- To increase the rate of forest recovery and enhance the ecological value of this habitat, mature fruits of the native tree species Guangdong Machilus, which grows at the fringe of FSW, were collected and propagated in nursery and then transplanted to the FSW.

## **3. Conservation of Avifauna**

### **3.1 Overall performance**

- Regular weekly transect surveys had been conducted in LV and Ho Sheung Heung for over 10 years to monitor bird species diversity and abundance and to provide data for assessing the effectiveness of the habitat management practices. Results from the surveys showed that the total number of bird species recorded in the area increased from 221 in 2005 to 314 in 2018, more than 40% of increase since the implementation of the MA project.
- Japanese Quail and Yellow-breasted Bunting, listed as “Near Threatened” and “Critically Endangered” by the International Union for Conservation of Nature's Red List of Threatened Species (IUCN), were regularly recorded in LV every year.
- LV is an important breeding site for resident bird species. The breeding bird surveys recorded 37 bird species breeding at the site, which accounts for around 26% of breeding bird species recorded in Hong Kong.

### **3.2 Yellow-breasted Bunting (YBB)**

- YBB was once a very common autumn migrant in Hong Kong and also a globally common species in range countries. However, due to habitat destruction and hunting, the number of YBB dropped drastically in last 14 years that IUCN has listed this species as “Critically Endangered” in 2017. As one of its stopover sites, Hong Kong has become an important site for YBB that is safe with abundant food source.
- The number of YBB recorded in LV has increased and then became stable since the restoration of PRF in 2009. As PRF was effective in attracting YBB, it is recommended that rice planting be maintained every year even during the transitional and construction stage of the LVNP.
- Since 2017, autumn bird banding was conducted in LV to collect more data on the migratory patterns of YBB and other birds, contributing the global research and conservation of YBB. It is thus suggested to continue the bird banding monitoring in the future LVNP.

### **3.3 Greater Painted Snipe**

- Greater Painted Snipe breeds only in a few wetlands in Hong Kong such as Mai Po and LV. It is important to protect and provide breeding habitats in LV for this species of local conservation concern. Bird islands were created in the center of SWH, with an area of at

least 4m x 4m, to provide suitable habitats with less disturbance for this species.

## **4. Conservation of Amphibians**

### ***4.1 Overall performance***

- Amphibian surveys had been conducted in LV for over 10 years to study the distribution of the amphibian species and their habitat utilisation. There were 10 native amphibian species recorded, including
  - Ornate Pigmy Frog
  - Paddy Frog
  - Günther's Frog
  - Marbled Pigmy Frog
  - Asian Common Toad
  - Chinese Bullfrog
  - Brown Tree Frog
  - Butler's Pigmy Frog
  - Asiatic Painted Frog
  - Spotted Narrow-mouthed Frog

### ***4.2 Effectiveness of habitat management practices***

- The survey result indicated high amphibian species richness in SWH-M, LI-WAL and PRF. LI-WAL was very productive for tadpoles and WFP had consistent records of Chinese Bullfrog. Concrete ponds without chemical fertilizers or pesticides also provided favourable conditions for diverse breeding amphibian species. In sum, the species assemblages were found to differ significantly among the different habitats, thus it is important to maintain the mosaic of different habitat types in order to maintain the high amphibian species diversity.
- Amphibian abundance and species distribution were significantly different among months, with May being the peak breeding month in general. Tadpoles and adults of Brown Tree Frog, Günther's frog, Chinese Bullfrog and Paddy Frog were detected in high abundance in May, whereas Common Toad were detected in highest abundance in April.

## **5. Control of Invasive Species**

### ***5.1 Red Imported Fire Ants (RIFA)***

- RIFA are widely distributed in LV, and have negative impacts on the native biodiversity, especially amphibians. They also pose health and safety risks to visitors to the site.
- RIFA did not show any specific preference for plant species for nest construction, and RIFA nests were usually located on bunds and unmanaged areas, such as abandoned bushes, weeds etc. The possible reason was that pesticide or herbicide were seldom used in unmanaged areas, and there was less human disturbance to their nests.
- In a study on the control of RIFA conducted in 2016, baking soda containing bait, with a ratio of 1g of sugar mixed with 5g of soda powder, was found to be the most effective in killing

the ants.

### **5.2 *Apple Snail***

- Apple Snails are very abundant in LV. They are known to prey on the eggs of amphibians, and therefore are considered a threat to the amphibian community. In addition, they also feed on seedlings of crops. Farmers mainly used lime or tea seed powders to kill the Apple Snails one or two days before planting.

### **5.3 *Greenhouse Frog***

- The exotic Greenhouse Frog is mainly found in disturbed areas and near human settlement in LV. Their distribution and impact on other local amphibian species are still unknown. Close monitoring of this species is suggested in order to prevent their impact and spread in the future LVNP.

### **5.4 *Captive-bred Chinese Bullfrog***

- In recent years, there has been increasing records of captive-bred Chinese Bullfrog. The source of these individuals is believed to be from mercy release activities in surrounding rivers (Beas' River, Shek Sheung River and Ng Tung River). Captive-bred individuals should be removed to avoid polluting the native gene pool of the species.

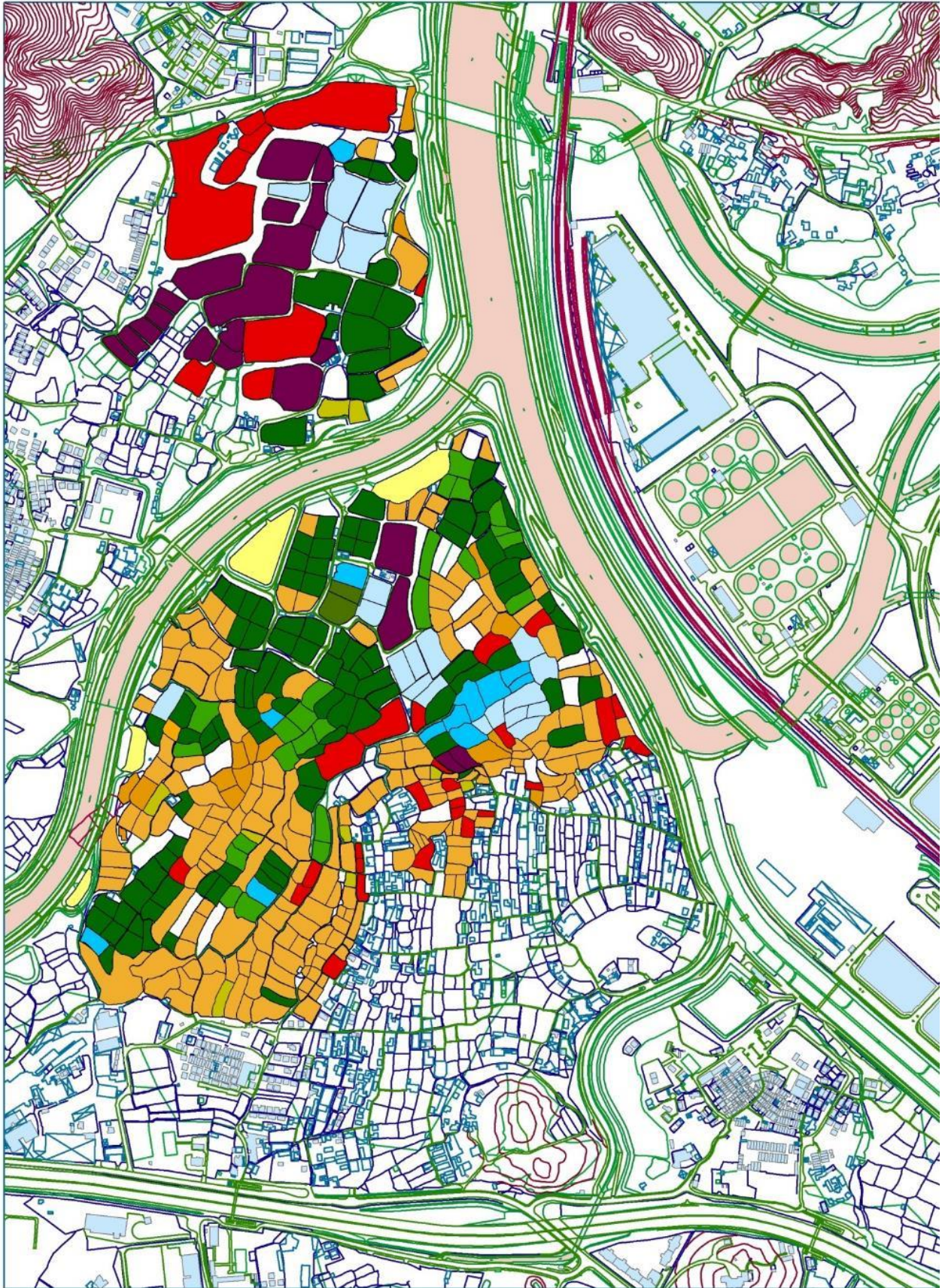
### **5.5 *Exotic weeds***

- Mikania is not widespread in LV, and is found in just a few locations near one of the farmlands.
- Water Hyacinth is also not widespread in LV, and is sometimes found in the water channel near Yin Kong to the south of LV.
- Para Grass can be found in marshy SWH and dry abandoned farmland in LV. They provide favourable roosting habitats for warblers, and this weed is thus suggested to be kept in the future LVNP. However, since Para Grass grows very fast and invades farmland quickly, it needs close monitoring and frequent management.

### **5.6 *Cats***

- Cats sometimes appear in the fields in LV. They are pets of farmers or stray cats.
- Cats are one of the threats to the bird species, especially the critically endangered YBB, in LV. Cases of cats killing birds such as YBB and snipes were recorded every year, especially when the PRF were dried for harvesting in the autumn.
- Cats must be removed before the establishment of the future LVNP to provide a safe habitat for birds and other wildlife.

## Appendix 1. Mosaic Pattern of Different Habitat Types in January 2017



## Appendix 2. Conceptual Management Plan for the Priority Site



<p><b>Core zone</b></p> <ul style="list-style-type: none"> <li>- Major habitat : SWH</li> <li>- Management strategy : <ol style="list-style-type: none"> <li>1. Minimal human disturbance</li> <li>2. No farming activity</li> </ol> </li> </ul>	<p><b>Eco-agriculture zone</b></p> <ul style="list-style-type: none"> <li>- Major habitat : WAL / FP / WFP / SWH</li> <li>- Management strategy : <ol style="list-style-type: none"> <li>1. Increase wetland agriculture</li> <li>2. Encourage eco-farming</li> </ol> </li> </ul>	<p><b>Wise use zone</b></p> <ul style="list-style-type: none"> <li>- Major habitat : I-WAL / DAL / FSW</li> <li>- Management strategy : <ol style="list-style-type: none"> <li>1. Encourage eco-friendly practice</li> <li>2. Maintain WAL ratio</li> </ol> </li> </ul>	<p><b>Buffer zone</b> (Consistent with the boundary of priority site for enhance conservation)</p> <ul style="list-style-type: none"> <li>- Major habitat : DAL / FSW /</li> <li>- Management strategy : <ol style="list-style-type: none"> <li>1. No mangement input allocated so far but potential for future extention</li> </ol> </li> </ul>
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