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Advisory Council on the Environment
Nature Conservation Subcommittee

Habitat Management of Fung Yuen Valley Site of Special Scientific Interest for Butterfly Conservation

Purpose

This paper briefs Members on the habitat management work carried out for the conservation of butterflies in the Fung Yuen Valley Site of Special Scientific Interest (SSSI).

Background

2. Situated on a south-facing hillside northeast of Tai Po, Fung Yuen Valley has long been known as one of Hong Kong's prime butterfly sites. Over 180 butterfly species have been recorded in the area. Due to the presence of rare butterflies and their larval food plants, the forested ravine was designated as an SSSI in 1980.

3. The SSSI covers an area of 42.8 hectares and about 93% of the SSSI falls on Government land. The SSSI is dominated by secondary woodland (64.3%). Extensive areas of grassland and shrubland-grassland mosaic are present on the more exposed sections of the hillside, along with a large area of shrubland at mid-altitude. Small horticultural areas, plantation and woodland-shrubland mosaic are present in the lowland (**Figure 1**).

4. Since 2001, the Agriculture, Fisheries and Conservation Department (AFCD) has been carrying out habitat management work in the Government land portion of the Fung Yuen Valley SSSI. The major tasks include clearance of the exotic vine, *Mikania micrantha* (薇甘菊), vegetation management to enhance habitat and plant diversity, enrichment planting of butterfly larval food plants and nectar source plants as well as maintenance of fire breaks to protect the SSSI from fire risk that may spread across from adjacent burial grounds. Over 20,000 seedlings of 16 plant species have

been planted. Examples include *Schefflera heptaphylla* (鵝掌柴), *Bridelia tomentosa* (土蜜樹), *Mussaenda pubescens* (玉葉金花) and *Cinnamomum camphora* (樟) which are nectar source plants or larval food plants for butterflies. In addition, an ecological monitoring programme on the species and abundance of butterflies occurring within the SSSI is also in place in order to keep track of the ecological value of the site.

5. Since 2005, some of the private land within the SSSI has been managed by the Tai Po Environmental Association (TPEA) as the "Fung Yuen Butterfly Reserve" for butterfly conservation and education (**Figure 2**). AFCD has been maintaining a close relationship with TPEA in order that management measures of both parties would be complimentary to each other and conservation efforts at the SSSI could be maximized. Our field supervisors would also liaise with the site staff of TPEA each time before we carry out our management work to ensure that TPEA's education programme would not be interfered by the work of our contractors.

6. With a view to developing an appropriate and long-term habitat management regime for the SSSI based on previous experience and efforts in conservation management at the site, AFCD initiated a study (the Study) in 2006 to review the ecological information and identify further management needs of the SSSI. A 5-year management plan for the Government land portion of the SSSI has also been formulated for butterfly conservation in the Study.

Diversity and Distribution of Butterflies

7. The Study has concluded that the SSSI is not only important for a number of rare species such as the Common Birdwing (*Troides helena* 裳鳳蝶), Golden Birdwing (*T. aeacus* 金裳鳳蝶) and White Dragontail (*Lamproptera curius* 燕鳳蝶), but it is also a site with high butterfly diversity. Based on records collected since the 1970s, a total of 186 butterfly species has been found in the Fung Yuen Valley SSSI, representing 80% of the territory's butterfly diversity. Amongst them, 29 are of conservation concern.

8. The Study has also found that there is a slight increasing trend in the overall butterfly abundance over the period from 2002 to 2006. The increases in abundance were observed in Satyrinae (眼蝶亞科), Danainae (斑蝶亞科), Lycaeninae (灰蝶亞科), Hesperiinae (弄蝶亞科) and Pyrginae (花弄蝶亞科). The increase in diversity and abundance of butterflies has

corresponded with the commencement of management activities in the SSSI, in particular with the planting of nectar source plants and larval food plants.

9. Based upon the combined butterfly distribution and abundance, the Study found that butterfly zonation exists within the SSSI. The zonation indicates that the greatest density of butterflies is found in the secondary woodland and associated/adjacent habitats in the lowland area, with moderate butterfly density in other secondary woodland across the SSSI, low density in shrubland and very low density in grassland or shrubland-grassland mosaic in the upland area.

10. The Study has also found a positive relationship between the number of larval food plant species and the number of butterfly species present. A clear relationship exists between the number of larval food plant species utilized by members of particular butterfly families, and the number of species of butterfly in those families. A similar relationship exists between the number of nectar source plant species and butterfly diversity. However, the relationships between butterfly abundance and larval food plants plus nectar source plants are less obvious.

Habitat Management Plan

11. Based on the findings of the Study, a habitat management plan was prepared for the long-term management of the Fung Yuen Valley SSSI. The plan has identified the conservation management priorities across the SSSI and designated management zones for specific management objectives and measures. The plan is initially designed to be valid for five years. It will then be subject to review and be revised, as necessary, for further implementation.

12. The designation of different management zones within the Government land of the SSSI is determined by a number of considerations. These include the pattern of past and current management practices, the butterfly zonation pattern within the SSSI, topography, accessibility, existing habitat and vegetation distribution, habitat management objectives, and manpower resources. Given that the distribution and abundance of butterfly species is governed by the presence and abundance of the larval food plants, nectar sources as well as habitat diversity and condition, habitat management with the goal to provide resource-rich habitats for butterflies is a prime focus of the plan. The underlying consideration beneath all these issues is the

conservation and enhancement of butterfly resources within the SSSI.

13. Based upon the above criteria, four broad Management Zones are identified across the SSSI (**Figure 2**). They are:

a) Management Zone 1 for intensive management for general butterfly enhancement
b) Management Zone 2 for the management for target butterfly species
c) Management Zone 3 for the management for hill fire prevention
d) Management Zone 4 for long-term afforestation

14. The recommended management measures for the management zones are highlighted in **Table 1**. AFCD will implement the recommended measures in each management zone according to a 5-year management programme.

Ecological Monitoring

15. In order to measure the effectiveness of the management measures undertaken in Management Zones 1, 2 and 3, regular butterfly monitoring will be conducted along specific survey routes (**Figure 2**) to monitor the diversity and abundance of butterflies inhabiting the Fung Yuen Valley SSSI, and their distribution across the site. Monitoring will be conducted in May/June and October/November each year.

16. Review of the habitat management plan will be conducted at the end of the first 5-year programme. AFCD will review how successfully the objectives in the Management Zones have been met and revise the management plan, if necessary, for subsequent implementation.

Advice Sought

17. Members are invited to note and comment on the recommended habitat management measures at different proposed management zones for the Fung Yuen Valley SSSI.

Agriculture, Fisheries and Conservation Department
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Figure 1. Habitat map of Fung Yuen Valley SSSI.

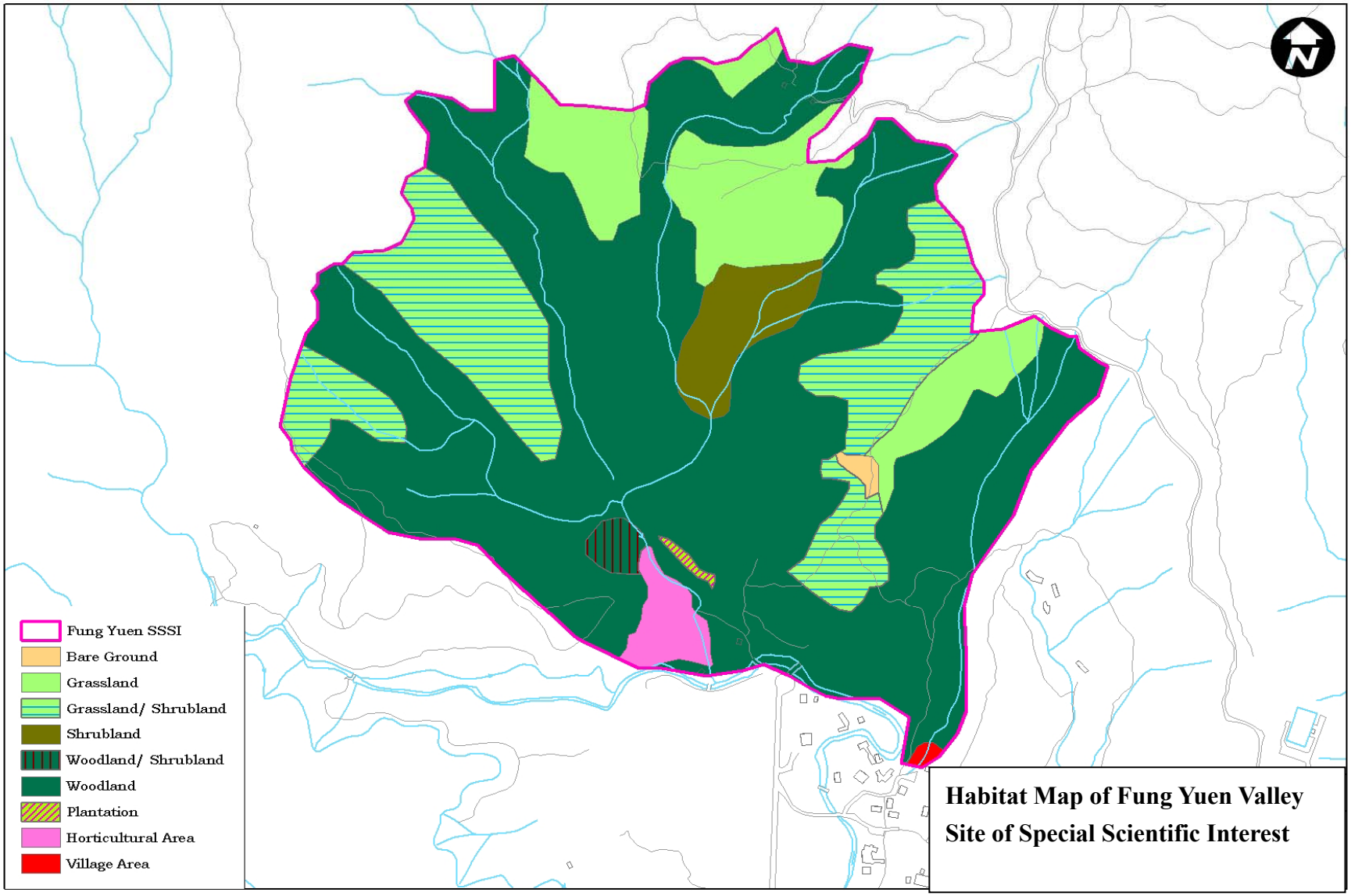

Figure 2. Management zones and monitoring routes of Fung Yuen Valley SSSI.

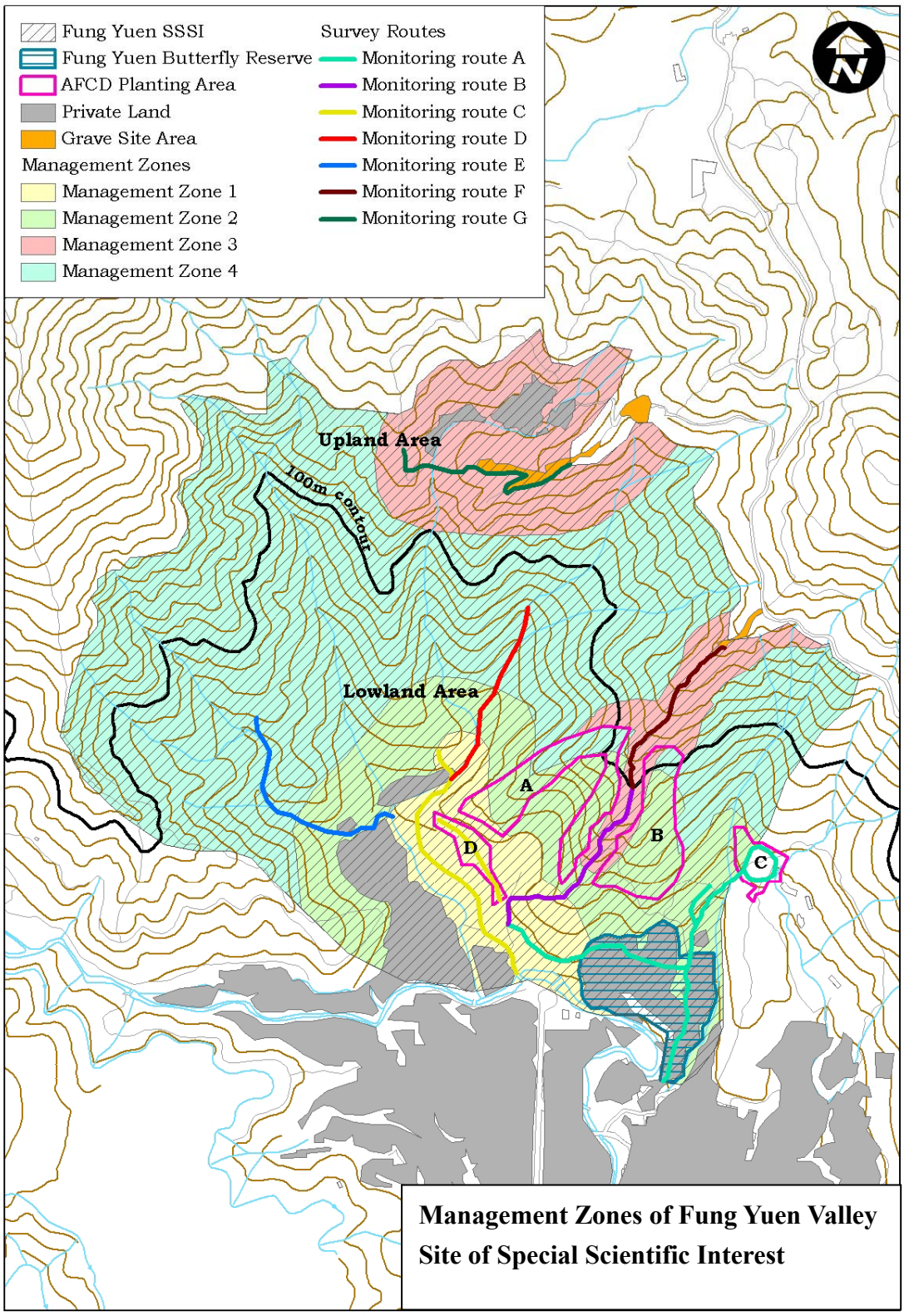

Table 1. Management Zones and Management Measures for the Fung Yuen Valley SSSI.

Zone	Objectives	Recommended Management Measures
1	To provide habitat and vegetation suitable for the broadest practicable range of butterfly species, in all families, in terms of larval food plants and nectar sources.	i) Coppicing along the woodland edge areas to create favourable habitats for butterflies inhabiting open woodland; ii) Selective vegetation clearance to remove/control undesirable plant species (e.g. Mile-a-minute weed); iii) Enhancement planting in freshwater marsh, woodland/shrubland mosaic and woodland edge areas to enrich the floral diversity and hence provide a broader food base to attract more butterfly species.
2	To provide vegetation suitable for the 17 butterfly target species selected from the species of conservation concern.	i) Trial of creating small woodland openings (of 3-5m diameter) to create more woodland edges to promote butterfly use and hence unlock the rich floral resources which were previously unavailable to butterflies due to their inaccessibility; ii) Enhancement planting at the openings by planting larval food plants of the selected butterfly target species.

Zone	Objectives	Recommended Management Measures
3	To protect the more ecologically valuable lowland area of the SSSI from the threat of hill fire, particularly hill fires caused by grave-clearing activities on the exposed hill side.	i) To establish conventional fire breaks around the extensive hillside grave areas in the upland area; ii) To establish a 'green fire break' by planting fire-resistant trees (*Schima superba* and *S. wallichii*) around a grave area in this zone.
4	To encourage the development of woodland cover in the area by a process of afforestation.	Enrichment planting of butterfly larval food plants and nectar source plants to be carried out after the establishment of the fire breaks in Management Zone 3.