

Study on Wetland Compensation

Purpose

This paper briefs Members on the key findings of the Study on Wetland Compensation (The Study) and seeks Members' views on them.

Background

2. Wetlands include a wide range of natural and artificial habitats ranging from foreshores, inter-tidal areas and estuaries to inland wetlands that include rivers and streams, marshes, ponds, irrigated or wet agricultural land and reservoirs.

3. In Hong Kong, inland wetlands in the northwestern New Territories near the Mai Po and Inner Deep Bay Ramsar Site have been subject to development pressure over the years. The loss of wetland due to development, if uncontrolled, is a concern.

4. Black & Veatch Hong Kong Ltd. has been commissioned by the Agriculture, Fisheries and Conservation Department to carry out the Study with the main objectives of providing systematic baseline information on the status of the existing wetlands, evaluating and identifying ecological important wetlands, defining the overall impact of development on wetlands, developing a strategy and action plans for implementing mitigation measures to address loss of wetland arising from development and proposing practical schemes for wetland compensation in Hong Kong. The key findings of the Study are highlighted in the following paragraphs.

Wetland Inventory

5. To determine the extent of the wetlands in Hong Kong, the Consultant used the Aerial Photographic Interpretation (API) technique as the initial tool to identify the distribution of the wetlands. This was followed by site surveys to confirm the wetland types of the wetlands and the current level of disturbance. The above baseline information was then translated by Geographic Information System (GIS) into a systematic wetland inventory. The wetlands identified have been categorized into six main types. A breakdown of the total area of each main inland wetland type is in Table 1 below:

Table 1: Main Inland Wetland Types in Hong Kong

Main Wetland Types		Total Area (ha)	Percentage (%)
Natural	Stream & River	395	4
	Marsh	2107	21
Artificial / Modified	Agricultural land	2791	28
	Aquaculture pond	1790	18
	Reservoir	2477	25
	Drainage Channel	423	4
Total		9983	100

6. Of the 9,983 ha of inland wetlands, reservoirs and drainage channels were excluded from further assessment as they are maintained for specific public functions and are unlikely to face any changes due to development. In addition, reservoirs within country parks are protected from development under the Country Parks Ordinance. The Study therefore focused on the remaining 7,083 ha of wetlands.

Land Use Zoning of Wetland

7. The town planning system is a planning tool to regulate the land use of different areas based on the planning intention which also reflects the overall development needs. To facilitate analysis of the degree of development threats faced by the wetlands, the land use zonings of the wetlands have been identified. Table 2 summarizes the land use zonings of the four wetland types which indicate the general development pattern in the wetland areas.

Table 2: Land use zoning and wetland types

Zoning Groups Wetland Type	Conservation-related zonings + WCA ^(a) (ha)	Non-development zonings ^(b) (ha)	Development zonings ^(c) (ha)	Village ^(d) (ha)	Unzoned Areas ^(e) (ha)	Total (ha)
Streams & Rivers	84	48	64	11	188	395
Marsh	457	452	171	180	847	2107
Agricultural land: irrigated or seasonally flooded	580	949	267	311	684	2791
Aquaculture: fishponds & gei wais	1258	107	184	41	200	1790
Total	2379 (33%)	1556 (22%)	686 (10%)	543 (8%)	1919 (27%)	7083 (100%)

Notes on definition of different zoning groups

- (a) "Conservation-related zonings + WCA" include Country Park, Site of Special Scientific Interest, Conservation Area and Coastal Protection Area. For the Wetland Conservation Area (WCA) in the Mai Po Deep Bay Area, the Town Planning Board will generally not accept development applications / proposals unless they are for public interest or they are under a private-public partnership approach supported by an ecological assessment to demonstrate no-net-loss in wetlands. Though WCA is not a land use zoning, it is included here as it is an important tool adopted for wetland protection. Developments are strictly restricted in this zoning group to protect the natural environment.
- (b) "Non-development zonings" include Green Belt, Open Space and Agriculture. These zonings are not intended for development but wetlands within this zoning group are subject to threats (though relatively small) arising from small-scale developments allowed in these areas such as picnic areas, camping grounds and barbecue spots.
- (c) "Development zonings" include Residential, Industrial, Commercial, GIC (Government, Institution or Community), Recreation (REC), etc. These zonings are intended for development that may lead to wetland loss.
- (d) Within the "Village" zoning, construction of new village houses that may lead to wetland loss is allowed.
- (e) "Unzoned areas" refer to land currently not covered by any statutory town plans and hence not subject to any zoning controls. The Government would have to rely solely on the land leases to regulate developments in these areas.

Ecologically Important Wetland Habitats

8. The Study has reviewed a number of representative ecological studies related to wetland habitats in Hong Kong as listed at Annex, and also the ecological information of the Mai Po Inner Deep Bay Ramsar Site, Hong Kong Wetland Park Phase II area (i.e. the ecological mitigation area for the development of the Tin Shui Wai new town) and data from the on-going AFCD ecological surveys.

9. The above review supplemented the wetland inventory compiled by the Study with ecological information on habitat, flora and fauna. The sites identified, which are of ecological importance, have been evaluated using qualitative analysis, taking into account trend in decline of the habitat type, naturalness, general diversity, rarity of habitat, use by wildlife, fragility and the ability to recreate if lost. The fragile and rare features and those that are difficult to replicate were accorded with higher priority for protection (e.g. natural river and stream, marshes) than sites with relatively low habitat value (e.g. active agricultural land).

10. A total of some 3,420 ha of ecologically important wetland habitats were identified consisting of streams, freshwater marsh, active and inactive wet agricultural land, fishponds, small reservoirs and mangrove. These habitats have diverse wetland flora and fauna and their unique combination of species including seagrass, mangrove, amphibian, bird, butterfly, dragonfly, fish, macro-invertebrates, mammals and reptiles.

11. By taking into account the ecological value, existing protection status and land status, the proximity to existing protected areas of Country Parks (CP) or Special Areas (SA), potential development threat (e.g. in unzoned areas) and the need for management input to maintain the ecological integrity of the site, the ecologically important wetland habitats identified as mentioned above can be grouped into five categories.

Category A: Sites currently under appropriate protection under the existing system including designation of CP/SA or conservation- related zonings (viz. Site of Special Scientific Interest (SSSI), Conservation Area (CA), Coastal Protection Area (CPA)). These sites are protected from development threat. Examples of high quality and ecologically important wetland habitats, which are already inside the protected area system of CP and SA, include the streams in the water catchments as well as those in remote areas, mangroves at the estuary of streams and coastal areas of CP. The streams in the water catchments include those feeding reservoirs inside Lantau South, Aberdeen, Pok Fu Lam, Tai Tam, Tai Lam, Shing Mun, Kam Shan, Sai Kung East and Plover Cove CPs. The streams inside SA include Tai Po Kau and Ng Tung Chai. The streams in remote areas inside CP include those in Pat Sin Leng, Plover Cove, Tai Mo Shan, Ma On Shan, Sai Kung West and Lantau North Country Parks. Examples of existing SSSIs that are ecologically important wetlands include mangrove and streams.

Category B: Sites to be considered for inclusion into the protected area system of CP/SA as conservation management input is necessary to maintain the ecological integrity of the habitats and no strong objection is anticipated. The Hong Kong Wetland Park Phase II area is an example. It is located on government land, which was developed as an ecological mitigation area for the development of the

Tin Shui Wai new town. The area consists of a variety of re-created habitats including freshwater marshes, reedbed, mudflats, ponds, woodland and grassland. Improved abundance of wildlife has been recorded in the area including various species of amphibian, bird, butterfly, dragonfly, fish, mammal and reptile. Resources have been allocated for the maintenance, operation and management of the park as a tourism, conservation and educational facility.

Category C: Sites to be considered for conservation-related zonings that would formally recognize their ecological value and alert authorities and project proponents of the need to avoid incompatible uses in planning of developments in the areas. These sites are currently unzoned areas or under non-development zonings.

Category D: Sites identified by the Expert Group convened in the context of the Nature Conservation Policy Review as priority sites for enhanced conservation by new measures. The issue of enhancing conservation of ecologically important sites under private ownership is being considered under the Policy Review. Two improvement options, viz. management agreements with landowners and private-public partnership, were proposed in the public consultation document released in July 2003 as practicable measures to better protect these sites. Subject to the results of the above Review, new conservation measures would be adopted for the identified priority sites.

Category E: Sites that were considered to have ecological value in the past but has not yet been confirmed by surveys. These sites are recommended for monitoring to re-evaluate the need for protection.

Development Control Mechanisms

12. The existing development control mechanisms under the Environmental Impact Assessment Ordinance (EIAO) and the Town Planning Ordinance (TPO) in checking development threats on important wetlands have been reviewed and are considered to be appropriate tools which should continue to be applied to avoid, minimize or compensate for loss of wetland.

13. Under the EIAO, the proponent of a designated project is required to assess all possible adverse environmental impacts arising from the project and when total avoidance is not practicable, to identify mitigation measures (including compensation) to reduce the impacts to acceptable levels. The proposed works cannot commence unless an Environmental Permit has been obtained through the statutory EIA process.

14. The town planning mechanism regulates land uses and developments through different land use zonings. In “Conservation-related zonings”, which include SSSI, CA and CPA, there are only a limited number of uses that can be carried out without the need to obtain prior approval from the Town Planning Board (TPB), viz. Column 1 uses. In addition, all developments within them, except for some minor works, are classified as designated projects under the EIAO and need to go through the EIA process. For all types of zonings, there are certain kinds of land uses, viz. Column 2 uses that require prior approval from TPB before the proposed developments can proceed. In the course of examining applications for the Column 2 uses, the authority may request the

proponent to conduct environmental assessment and to identify suitable mitigation or compensation measures, as necessary.

15. The above review of the land use zoning of the wetlands concerned indicates that about 33% of the four wetland types i.e. stream & river, marsh, aquaculture pond, agricultural land (seasonally flooded and irrigated) have been zoned in the group of “Conservation-related zonings and WCA”. Strict development controls are stipulated in the statutory town plans, which protect these wetland habitats from development and incompatible land uses. Ecological assessment is in general required to substantiate that the development proposals would not result in any adverse impact to the wetland habitats in these areas and to identify the necessary mitigation (including compensation) measures, as necessary before they are approved. This mechanism in general has been effective in avoiding impacts to these wetlands arising from developments.

16. About 22 % of the wetlands fall within the group of “Non-development zonings”. The development threat faced by these wetlands is relatively small, since only small-scale developments, such as barbecue spots, sitting-out areas and playgrounds, are permitted without the need to seek permission from TPB. Nevertheless, there are natural wetlands, i.e. stream & river and marsh falling under this group of zonings and hence are under low level of threats from these potential small-scale developments. It is difficult to justify special protection for these wetland features unless there is information showing that they are of particular conservation value. Among the wetlands zoned under “Non-development zonings”, the ecologically important wetland sites have been identified in Categories B, C, D & E as described in para. 11 above. The Study recommends as an interim measure that for development applications or rezoning proposals in these sites, an ecological assessment should be conducted and included in the submissions to TPB for approval, so as to ensure that the proposal including change of land use would not result in adverse impact on the wetland habitats within the sites in question. The assessment studies should assess the likely impact of the proposal on the wetlands and propose mitigation / compensation measures. This approach may also be gradually extended to all wetlands that fall on “Non-development zonings”.

17. About 10% of the wetlands fall within the group of “Development zonings”. Since these zonings are meant for development purpose, there is no requirement for ecological assessment of development proposals under the town planning system. Ecological assessment is required only if the proposed development involves any designated project under the EIAO. Wetland loss in these areas is not subject to any compensation except in the case of designated projects under the EIAO. Therefore the wetlands within these zonings are considered as “recognized loss”. There is no ecologically important wetland site identified under this group of zonings.

18. About 8% of the wetlands fall under “Village” zoning. Similar to the “Development zonings”, the wetlands under this zoning should be considered as “recognized loss” as the indigenous villagers may exercise their rights to construct new village houses i.e. NT Exempted Houses in these areas. There is no ecologically important wetland site identified under this group of zonings.

19. It should be noted that the “recognized loss” of wetland in “Development zonings” and “Village” zoning should not be exaggerated, as there is no ecologically

important wetlands within these zonings. Otherwise, they will not be so designated in the first instance. In addition, the Government has been making efforts through the TPB guidelines to encourage the private sector to restore the degraded / lost wetlands in the Wetland Buffer Area (WBA)^{Note f} by allowing a limited scale of development. This kind of measures, if successfully implemented, can compensate for the loss of wetlands in the “Development zonings” of WBA.

20. About 27% of the wetlands are currently not covered by any statutory town plans and hence are not subject to any zoning controls. The land lease conditions have been the tool to regulate developments in these areas. Most of the land within “Unzoned areas” are held under agricultural leases whereby developments in general may only be carried out subject to the approval of the Government. Landowners may be required to conduct an ecological assessment to support the development applications. The Study recommends that the existing lease control should be maintained to avoid changes of use that may result in adverse impact to the wetland habitats. If change of existing use is proposed, an ecological assessment should be required from the proponent to ascertain that adverse impact to the wetland habitat concerned would be mitigated. It is desirable to examine the status of sites possibly of high ecological value within these areas and to assess if there are wetlands that should be recommended for “Conservation-related zonings” so as to provide for appropriate protection and to subject them to the requirement for mitigation (including compensation) measures in the event of unavoidable adverse impact. Among the wetlands in “Unzoned areas”, the ecologically important wetland sites have been identified in Category C, D & E as described in para. 11 above.

21. The list of ecologically important wetland sites as mentioned in para.11 will also serve as a checklist of sites for both the control authorities and project proponents to conduct rigorous assessment when dealing with development proposals. When development proposals are circulated to AFCD for comments, advice and information on the ecological importance of the above sites will be offered to various authorities on planning, lands and environmental impact assessment matters. With such advice and information, the project proponents would be able to plan development works or projects in a way to avoid, minimize or compensate for wetland loss, as appropriate.

Potential Mitigation Areas

22. Land constraint is the single most important factor in the planning and implementation of wetland compensation in Hong Kong. In the case of a project proposal that would cause unavoidable wetland loss covered by the EIA and town planning system, project proponents have to justify and are required by the authorities to address the wetland loss by appropriate mitigation measures including compensation, as appropriate.

23. Current approaches to compensation are focused towards on-site measures but the nature of land assignments may dictate that there is very limited or no opportunity to

^{Note f} The Wetland Buffer Area adjoins the WCA on the landward boundary to protect the latter from possible development impact. It consists of about 1,000 ha of wetlands that have been lost or degraded over time by pond filling and the presence of open storage use and hence they are not included in the wetland inventory.

compensate within the assigned boundary of a site. Even if compensation is possible within the site boundary, the compensation area may be small, increase edge effects, and require intensive management. The Study suggests that larger wetland blocks on established wetland sites would offer an option to enhance the value of a wetland system in a more sustainable way.

24. In order to minimize the complication of land ownership issues, the Study suggests identifying wetlands on government land that are currently under conservation-related or non-development zonings, or in unzoned area as “Potential Mitigation Areas” (PMA) to be considered as an option for use as off-site compensation in respect of public works projects under the EIAO process. Nevertheless, on-site options would still need to be exhausted, as set out in the Technical Memorandum (TM) of the EIAO, before off-site options are considered. Guidelines as mentioned in paragraphs 27-29 below would be issued to facilitate project proponents in considering off-site mitigation.

25. The desirable characteristics for a PMA are: a variety / mix of wetland types; good hydrological / ecological linkage with existing wetlands; formation of a contiguous wetland habitat or a functional wetland cluster to existing wetland in the proximity; and detachment from disturbance. The GIS techniques will be applied to identify suitable sites from the wetland inventory for consideration when details of project requirements are known.

26. The PMA approach would streamline the process of identifying suitable locations for compensatory mitigation which is often a critical step during the planning or EIA process. Moreover, compensation of wetland loss can be provided in a more co-ordinated manner with the PMA consolidating piecemeal mitigation measures. In addition, wetland loss can be compensated in advance of project commencement. It is proposed that after being used for implementation of mitigation measures, the PMA site if not yet under Conservation-related zonings would be recommended for such zonings accordingly.

Guidelines for Consideration on Approaches for Ecological Compensation for Wetland and Preparation of Mitigation/Compensation Proposal

27. In order to facilitate the consideration of ecological compensation for wetland loss and preparation of mitigation/compensation proposals during the statutory EIA process, two sets of proposed guidelines have been prepared under the Study, i.e. one on the approaches for ecological compensation for wetlands and the other one on the preparation of wetland mitigation/compensation and management plans. The proposed guidelines which attempt to provide guidance on consideration of off-site mitigation are in line with the Technical TM of the EIAO and will be presented to the EIA Sub-committee for comments.

28. As a rule, the requirements for mitigating impacts on important habitats and wildlife as stated in the TM should be strictly adhered to i.e. all appropriate and practicable steps must be undertaken by the project proponent to first avoid and where avoidance is not practicable, to minimize adverse impacts to ecological resources, prior to recommendation of compensatory measures. Remaining unavoidable impact shall be compensated to the extent appropriate and practicable.

29. The proposed guidelines on the approaches for ecological compensation for wetlands will focus on consideration of wetland mitigation types, the objective and scope of compensation, the “like for like” issue and choosing of options between on-site and off-site measures without compromising the requirements of the TM.

30. The proposed guidelines on the preparation of wetland mitigation/compensation and management plans will focus on main elements such as additional information requirement of the impact site and mitigation site, setting goals and objectives, site preparation and construction, vegetation establishment, species stocking, as-built compliance monitoring and audit, habitat management, maintenance and monitoring, performance evaluation and adaptive management, and resources requirement.

Advice Sought

31. Members are invited to provide comments on the findings of the Study.

Agriculture, Fisheries and Conservation Department
Black & Veatch Hong Kong Ltd.
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A list of references on ecological studies reviewed under the Study on Wetland Compensation

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