Environmental Impact Assessment and Wetland Biodiversity in Hong Kong

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Introduction

The requirement for conservation of biodiversity has been an integral element of the Environmental Impact Assessment (EIA) process since the approval of a statutory EIA became a requirement for certain development projects in Hong Kong in 1998[(2)]. Biodiversity conservation criteria that must be satisfied are detailed in the EIA Ordinance Technical Memorandum (EIAO-TM)[(4)] and associated Guidelines; in essence these require that the project proponent demonstrates that feasible mitigation measures to address potential significant impacts on habitats and flora and fauna of conservation significance under local, national and international criteria will be implemented as an integral element of the project, prior to it being permitted to proceed.

Despite its small size, Hong Kong has a large network of protected areas, comprising 40% of its land area of 1104 square kilometres[(3)]. Arguably, the most important of these protected areas is the Mai Po and Inner Deep Bay wetlands, which were designated as a Ramsar Site in 1995[(1)]. In recognition of this importance, and in accordance with the requirements of the Ramsar Convention, most types of development which have the potential to adversely affect the Ramsar Site, together with its surrounding buffer areas, require approval under the EIA Ordinance before they are permitted to proceed[(4,5)].

In this study I have reviewed all 16 development projects which have been approved under the EIA Ordinance in the Ramsar Site and its buffer areas in order to assess how successful the project proponents have been in incorporating and implementing measures to address the requirement that the project results in no net loss in wetland function. A principle of the approach to mitigating impacts under the Hong Kong EIAO-TM is that avoidance of potential impacts is preferred to minimization of impacts, which in turn is preferred to compensation of impacts[(4)]. Whilst not ignoring or disputing this principle; the focus of this study has been to review the range of habitat compensation measures that have been proposed and, where feasible, to evaluate their success in achieving the stated mitigation objectives.

Methods

All statutory EIA studies in Hong Kong are required to be documented in an EIA Report which is permanently freely available for public inspection on a website

maintained by the Environmental Protection Department of the Hong Kong Government[(2)]. EIA Reports for all projects falling wholly or partly within the Mai Po Inner Deep Bay Ramsar Site and its buffer areas were reviewed and those projects where compensatory habitat creation or management measures were proposed were identified. Seven projects satisfied ecological mitigation requirements by avoidance and/or minimization of impacts; the habitat compensation measures proposed under the remaining nine projects were then categorized (**Table 1**). Where projects had been fully, or partially, implemented (six projects) the success of compensatory mitigation measures was reviewed by means of a site visit to gauge whether there was evidence as to whether the compensation measures had been implemented and remained effective. Locations of these projects relative to the Mai Po Inner Deep Bay Ramsar Site and its buffer areas are shown in **Figure 1**.

Table 1 Ecological Mitigation Measures Proposed to Compensate for Impacts of Development Projects in the Mai Po Inner Deep Bay Area and its Buffer Areas.

Type of Development (numbers refer to location on Fig.1)	Approval Year	Type of Compensation Measures (see description below)							
		1	2	3	4	5	6	7	8
1 Watercourse management	1998	✓	✓		✓	✓	✓		
2 Watercourse management	1999	✓	✓			(✓)			
3 Watercourse management	2000	✓	✓			×			
4 Railway/station infrastructure	2002			✓		✓	✓	✓	✓
5 Road/bridge infrastructure	2002		✓			×	✓		
6 Residential	2008		✓			✓	✓		✓
7 Residential*	2008		✓			✓	✓	✓	✓
8 Education/technology park*	2013	✓	✓		✓	✓	✓		
9 Residential*	2014		✓			✓	✓		

Notes:

Developments not yet commenced are indicated by an asterisk *. ✓indicates that the measures were adopted, × (in respect of long-term management commitment only), that this was not proposed/required and (✓) (again in respect of long-term management commitment only), that the measure was proposed but is apparently not being implemented – see discussion.

Types of compensation measures were categorized, as follows:

1. Design measures incorporated to improve ecological functions of development.
2. Habitat creation, restoration or enhancement within the development site area.
3. Habitat creation, restoration or enhancement in an enlarged development site area.
4. Off-site habitat, creation, restoration or enhancement.
5. Long-term ecological management measures designed and committed.
6. Species or group-specific management measures designed and committed.
7. Independent oversight and/or monitoring.
8. Adaptive management review process committed.

Findings

Unsurprisingly, compensation measures differed between developments. In part, these related to the nature of the project. Thus, in all three watercourse

management projects (two of which comprised creation of flood alleviation channels and one involving the rechanneling of an existing watercourse), design measures were incorporated in the developments to enhance their ecological function. In only one other project (an extensive education and technology park) were design measures proposed which would serve to enhance ecological functions in parallel with project implementation. A preferred approach, followed in all nine projects, was the creation, restoration or enhancement of compensatory wetland habitats, either within the development site but not within the development area (eight projects) or in an adjacent area incorporated within the development site solely in order to address ecological mitigation requirements (one project). Off-site compensatory habitat provision was only proposed in two instances. This is likely to be a consequence of the requirement of the EIAO-TM which states that 'all possible design measures and all practicable on-site ecological mitigation measures shall be fully investigated… …and exhausted' prior to off-site measures being considered[(4)].

Long-term ecological management measures were designed (and, importantly, committed to by the project proponent) in seven of the nine projects, including four of the six projects which have been implemented. In three of these, site visits suggested that management commitments were being met, in the fourth, as well as one of those where no long term management commitment had been made, observed habitat condition during site inspections indicated that the proposed habitat creation measures had been undertaken but that ecological habitat condition objectives were not being achieved.

All projects detailed monitoring requirements (at least during the construction phase). Such monitoring, and its reporting to Government, is an explicit requirement under the EIAO-TM[(4)], and hence it was not considered as an evaluation criterion. However, in the case of two projects (one of which is in operation and one of which has yet to commence) an independent monitoring committee made up of members of environmental non-governmental stakeholders were proposed. Three projects, including both of those where independent monitoring was proposed, also included an explicit requirement for the review and evaluation of monitoring findings and the review of the design and management of compensation measures in the event of objectives not being achieved.

Discussion

Merely by being on the statutes, the Hong Kong EIAO has been successful in addressing the objective of conserving the biodiversity of the Mai Po Inner Deep Bay

Ramsar Site, in that in the absence of the controls that it has imposed it is inevitable that the ecological value of more of the area would have been lost or compromised by development activities. It is highly unlikely that many of the ecological mitigation measures described in this review would have been planned or implemented in the absence of such statutory control. However, determining whether the proposed mitigation measures were the most appropriate means of meeting the stated objectives and measuring their success is more problematic.

In most of the projects reviewed, the primary means of compensatory habitat provision and impact mitigation was the allocation of part of a development site to the creation and/or ecological enhancement of wetland and the management of that wetland to meet stated target species' requirements; even in the case of watercourse management projects, where enhancement of ecological function was able to be integrated with the primary project objectives. Extension of the project area or utilisation of off-site locations to find or increase the area available for compensation only occurred in one instance and two instances, respectively, suggesting that project proponents were either unwilling or unable to acquire land primarily for the purposes of ecological mitigation and/or that they were discouraged from doing so by the EIAO-TM presumption that on-site mitigation is the preferred option.

Much undeveloped and degraded 'brownfield' land within the Ramsar Site and its buffer areas currently has zonings that would permit its development so long as EIAO-TM requirements are met[(5)]. Should the current approach to compensatory habitat provision continue in the future; as a corollary it is logical to assume that a series of on-site compensatory wetland habitat areas will be created. Is this likely to result in the most effective way of conserving the ecological integrity and value of the Ramsar Site as a whole? Objectively, it is reasonable to posit that the consequent resulting patchwork of developed areas and wetland habitats would be less likely to optimize ecological values than a more co-ordinated approach, with aggregated off-site compensation areas being identified.

One way to answer this question would be to examine, quantitatively if possible, the success of the current approved schemes described here. However, while monitoring of compensation measures and, at least by implication, their success is generally required (and has been required for all projects approved in the last ten years), and monitoring findings are required to be reported to the Government, the results of monitoring are not in the public domain except in the cases of the one completed project where independent oversight is required. Accordingly, except in the case of

the two projects described above where physical evidence of failure to maintain the compensatory habitats was visible, the one project where monitoring findings are in the public domain remains exceptional in that the success of this project in meeting compensation targets is open to public scrutiny. It is suggested, therefore, that ways to make monitoring findings more widely accessible should be identified. It is hoped that analysis of such findings would then serve to inform the process of identification and design of measures to best meet biodiversity conservation objectives required under the EIAO.

References

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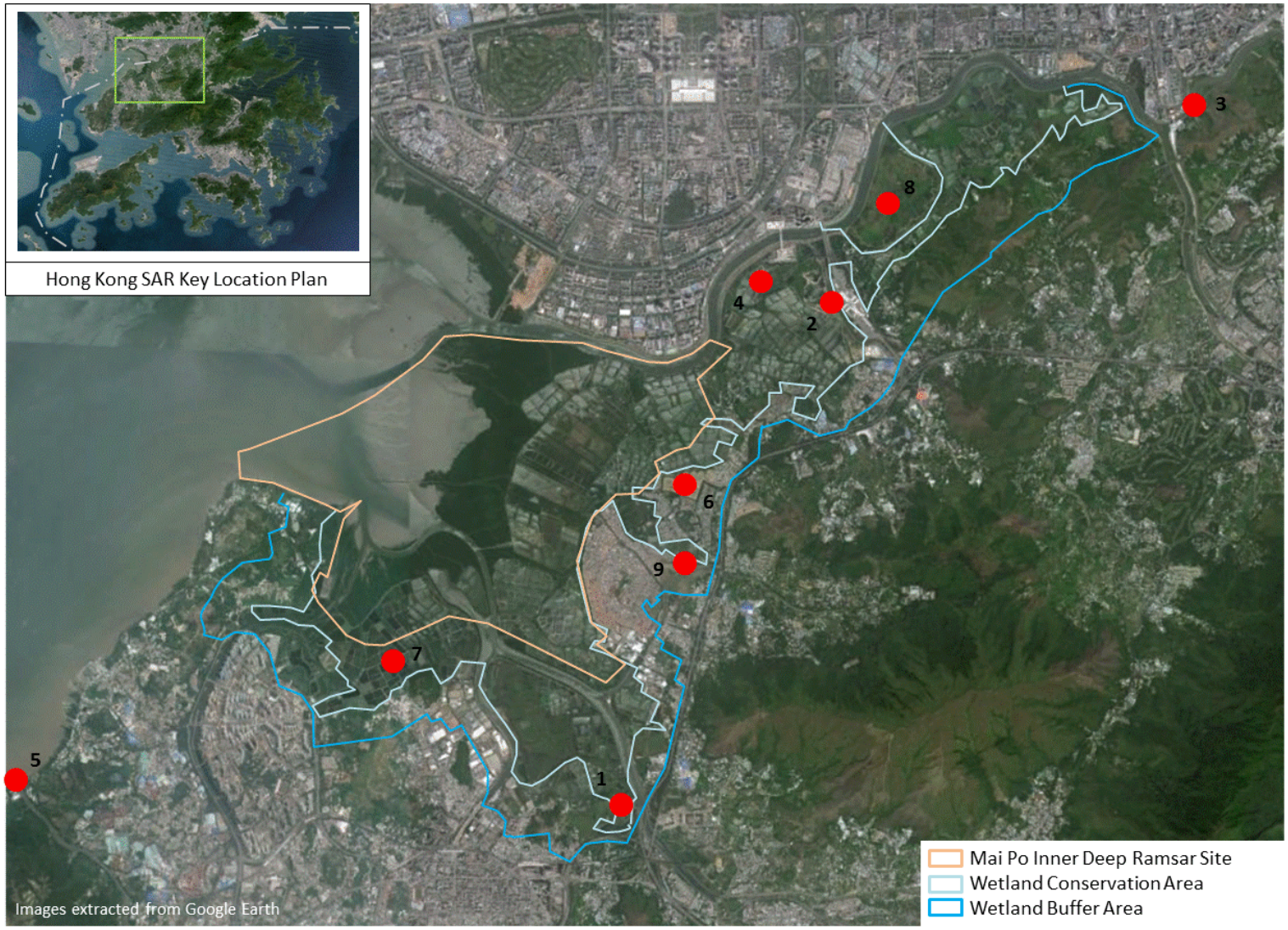

Figure 1. Mai Po Inner Deep Bay Ramsar Site showing location of development projects where habitat creation or management was proposed. *Numbers refer to development projects listed in Table 1.*