APPENDIX 10A

Hong Kong-Zhuhai-Macao Bridge Hong Kong Section and North Lantau Highway Connection (now renamed as Hong Kong Link Road) – Final 9 Months Ecological Baseline Survey Report, Mouchel Parkman Asia Ltd. 2004

Highways Department
The Government of the Hong Kong Special Administrative Region

Agreement No. MW 01/2003

Hong Kong – Zhuhai – Macao Bridge: Hong Kong Section and the North Lantau Highway Connection

Ecological Baseline Survey

Final 9 Month Ecological Baseline Survey Report

Meinhardt Mouchel Ltd

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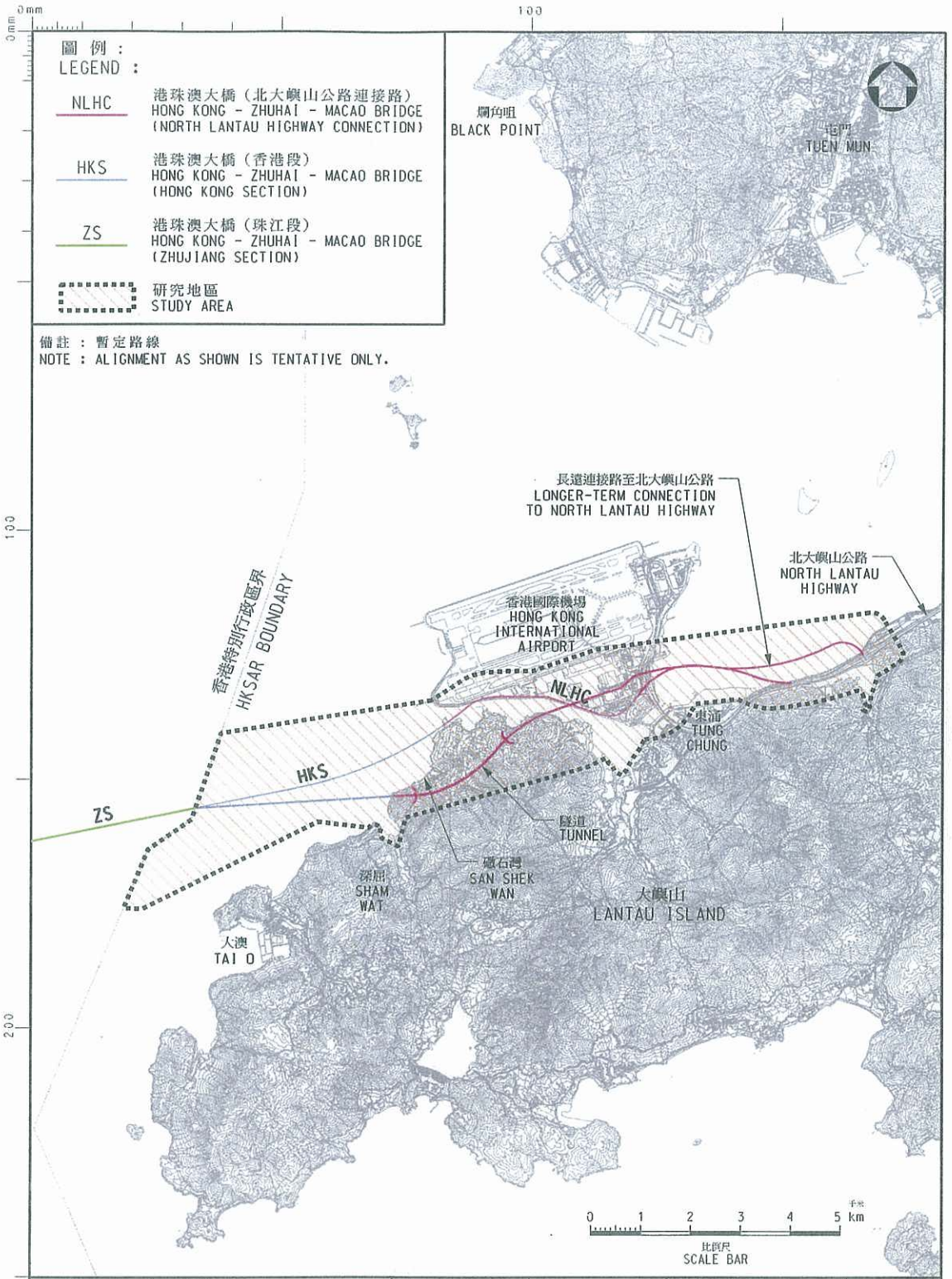
Volume 2 Marine Fisheries Review

1. PROJECT BACKGROUND

1.1 The proposed Hong Kong – Zhuhai - Macao Bridge (HZMB) comprises a dual-3 lane trestle bridge structure that links Hong Kong to the western Pearl River region. The tentative landing point in Hong Kong is either to the north of San Shek Wan comprising overland structure or to the south of San Shek Wan incorporating a tunnel option. The Hong Kong section of the HZMB in the coastal waters is approximately 5km long. A 5km highway (the North Lantau Highway Connection; NLHC) predominantly located to the south of the airport is also required to link the HZMB from the San Shek Wan landing point to the North Lantau Highway. Subsequent to the commencement of the Assignment, a long-term connection linking the NLHC to the existing North Lantau Highway via a reclamation off Tai Ho Wan has also been proposed and will require assessment under the present study. The whole study area to be assessed is presented in *Figure 1*.

1.2 An EIA is required to identify and where necessary recommended mitigation for any impacts from the development on ecologically sensitive species and habitats. The purpose of the present study is to conduct an ecological baseline survey within the Hong Kong SAR in order to provide up to date and accurate ecological data to allow the subsequent identification, prediction and evaluation of potential ecological impacts that may arise due to the construction and operation of the HZMB.

1.3 The Highways Department of the Hong Kong SAR has commissioned Meinhardt Mouchel Ltd to undertake the ecological baseline surveys for the HZMB under Agreement No. MW 01/2003. The present Study commenced on 11 September 2003 and is due for completion in June 2004.



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Ecological Baseline Survey - Study Area

Meinhardt Mouchel

Figure No. 1

2. PURPOSE OF THIS REPORT

2.1 The purpose of this Supplementary Ecological Baseline Survey Report is to report the results of the nine months ecological field surveys conducted during the period 11 September 2003 until the end of May 2004. The ultimate purpose of this assignment is to obtain adequate data to allow accurate prediction of the project's likely impacts upon the ecology of the study area, particularly those aspects identified for special attention in Para. 6.1(c) of the Study Brief namely the vicinities along marine portion of the Project which are frequented by the Chinese White Dolphin; the Site of Special Scientific Interest (SSSI) at San Tau and the proposed Lantau North (Extension) Country Park. An assessment of the ecological characteristics of the proposed connection of the NLHC to Tai Ho is also required. As required under Para 6.1(g) of the Brief, the ecological baseline survey should investigate and describe the existing wildlife uses of the various habitats including but not limited to inter-tidal mudflat; mangrove; seagrass bed; woodlands; natural stream courses and rivers; vertebrates (avifauna, mammals, fish, herpetofauna); macroinvertebrates (e.g., insects, crustaceans); intertidal and sub-tidal benthic faunal communities; horseshoe crabs; Lantau North Country Park and Proposed Lantau North (Extension) Country Park; any other habitats and wildlife groups identified as having special conservation interest during the ecological field surveys. The programme of field study has been designed to meet these requirements.

2.2 Field work began in September 2003 and initially a 6 month survey was commissioned until early March 2004. A further additional 3 months of survey were conducted from March to May 2004. The scheduled field works carried out during this reporting period are presented in *Appendix A*. Surveys carried out during the whole reporting period have included the following key faunal and floral groups and accordingly, the report is broken down into the following sections for discussion purposes:

- freshwater and estuarine fish;
- freshwater macroinvertebrate;
- marine benthic macrofauna;
- intertidal flora and fauna (hard and soft shores);
- coral;
- horseshoe crab;
- cetaceans;
- avifauna;
- terrestrial mammal;
- insect;
- herpetofauna; and
- habitats and vegetation including seagrass and mangroves.

2.3 Details of the marine fisheries in the Northwestern waters of Lantau are provided in Volume 2.

3. LITERATURE REVIEW

3.1 Background

3.1.1 The purpose of the literature review is to identify existing information on the habitats and species present within the study area. Various reports and studies were consulted to extract relevant data on the flora and fauna present in the study area. Relevant books and scientific papers were also consulted and these have been cited where appropriate although the most recent reports were generally relied upon to provide contemporary information of the ecological characteristics of the study area.

3.1.2 Relevant scientific publications and EIA reports have been reviewed. The EIA and EM&A studies reviewed include:

- *New Airport Master Plan* (Greiner-Maunsell ,1991);
- *Remaining Development in Tung Chung and Tai Ho Comprehensive Feasibility Study* (Mott, 1998);
- *Environmental Impact Assessment Report for Lantau North-South Road Link between Tai Ho and Mui Wo* (Mouchel, 2000);
- *EIA Construction of an International Theme Park in Penny's Bay of North Lantau and its Essential Associated Infrastructure* (Scott, 2000)
- *Hong Kong-Pearl River West Link Preliminary Environmental Review* (Scott, 2002)
- *Final EIA for Permanent Aviation Fuel Facility* (Mouchel, 2002b);
- *Environmental Monitoring and Audit for Contaminated Mud Pit IV at East of Sha Chau* (Mouchel, 2002c, 2003a, 2004a, b, ongoing);
- *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha EIA* (Mouchel, 2002a); and
- *Tung Chung Cable Car Project EIA* (Mott, 2003).

3.1.3 The aforementioned EIAs and EM&A provide a wealth of relevant information on the ecology of the study area. The ongoing EM&A at the East of Sha Chau mud pits (ESC) also collects benthic macrofauna samples to the west of the airport and fisheries are trawled just off San Shek Wan and approximately 4km North of Tai Ho Wan in both the wet and dry seasons each year (Mouchel, 2003a). Such recent data are invaluable to the benthic fauna and marine fisheries baseline and have been reviewed for this study.

3.1.4 The existing literature also provides a good baseline for species assessments. Other relevant literature reviewed included:

- *Porcupine! (Newsletter of the Department of Ecology and Biodiversity, Hong Kong University);*
- *Hong Kong Biodiversity (AFCD Newsletter);*
- *Hong Kong Dragonflies* (Wilson, 1995);
- *Field Guide to the Dragonflies of Hong Kong* (Wilson, 2003);
- *Butterfly Watching in Hong Kong* (Young and Yiu, 2002);
- *A Field Guide to butterfly watching in Hong Kong* (Yiu, 2004);
- *Hong Kong Mangroves* (Tam and Wong, 2000);
- *The Avifauna of Hong Kong* (Carey, *et al.*, 2001);

- *Checklist of Hong Kong Plants* (AFCD, 2001);
- *Rare and Precious Plants of Hong Kong* (AFCD, 2003);
- *Freshwater Fish in Hong Kong (*Lam 2002);
- *The Sea Shore Ecology of Hong Kong* (Morton and Morton, 1983);
- *Port Survey of 1996/97* (AFCD, 1998) *and Port Survey of 2001/02* (AFCD website)*;*
- *Marine Benthic Communities in Hong Kong* (CCPC, 2002);
- *Ecological Status and Revised Species Records of Hong Kong's Scleractinian Corals* (AFCD, 2004); and
- *A Conservation Strategy for Lantau* (Green Lantau Association, 1998).

3.1.5 AFCD's studies on *Marine Benthic Communities in Hong Kong* (CCPC, 2002) provide baseline condition of marine benthic communities in Hong Kong's waters while the *Port Survey*s of 1996/97 and of 2001/02 provided information about fisheries resources of Hong Kong. *The Sea Shore Ecology of Hong Kong* (Morton and Morton, 1983) provides useful information on the coastal ecology of Hong Kong while *Hong Kong Mangroves* (Tam and Wong, 2000) includes relatively recent surveys of the coastal areas of Northwestern Lantau. Jefferson and Leatherwood (1997), Jefferson (2000) and Hung (2003) provided information about cetaceans in Hong Kong waters.

3.1.6 The existing literature provides a good baseline for species assessments of vascular plants (Siu, 2000; Wu and Lee, 2000; Xing et *al*., 2000) and AFCD (2001) presents an updated list of the Hong Kong flora.

3.1.7 Standard references for the groups which were the subject of the present study include Goodyer (1992) and Reels (1996) for mammals; Karsen *et al.* (1998) and Lau and Dudgeon (1999) for herpetofauna; Chong and Dudgeon (1992) and Lam (2002) for freshwater fishes; Wilson (1995, 1997, 2003) and Wilson and Reels (2001) for odonates; Walthew (1997), Reels and Walthew (1998), Young and Yiu (2002) for butterflies; and Carey *et al*. (2001) and Viney *et al*. (1994) for avifauna.

3.1.8 An attempt to provide information on the conservation status of certain local fauna has been made by Fellowes *et al*. (2002). This paper is designed to facilitate ecological evaluations based on faunal species of concervation concern, objectively and can assist in assessments conducted in accordance with the Technical Memorandum (TM) of the Environmental Impact Assessment Ordinance (TMEIAO). The paper examines the local (Hong Kong), regional (southern China) and global restrictedness of native fauna species occurring in a wild state in Hong Kong, combined with an assessment of the vulnerability of populations, using the most reliable and up to date information available, and assigns a rating to each species accordingly. Thus, a species of 'Local Concern' may not be particularly threatened globally or regionally, but is rare or restricted in Hong Kong. A species of 'Regional Concern' may not be particularly threatened globally, but is rare or restricted in the region, while a species of 'Global Concern' is globally restricted to Hong Kong and southern China. Some species are regarded as being of 'Potential Regional Concern' or 'Potential Global Concern'. The paper was adopted in the present study in order to complement the species evaluations derived from other the published literature.

3.2 Freshwater and Estuarine Fish

3.2.1 The freshwater streams present on north Lantau are generally unaffected by pollution and support comparatively diverse aquatic communities (Chong and Dudgeon, 1992; EPD, 2000; Mouchel, 2002a). The lowland freshwater streams and their resident fauna are considered one of the most endangered habitats in Hong Kong and those present within the study area require careful assessment.

3.2.2 Approximately 140 species of freshwater fish have been recorded in Hong Kong (Lam, 2002). Of these 140 species, 63 are obligate freshwater species, 39 marine vagrants, 32 are brackish water fish, 3 are catadromous (i.e., migrate from fresh to marine water for breeding) and 3 are amphidromous (i.e., migrate between fresh and marine water unrelated to breeding; Lam, 2002). A short overview of local freshwater fish ecology is provided in Dudgeon and Corlett (1994). An informative source of species present in Hong Kong is the comprehensive checklist produced by Chong and Dudgeon (1992) which provides details of 96 indigenous fish species, including some information on distribution and conservation status. A recent publication *Freshwater Fish in Hong Kong* (Lam, 2002) provides useful information on species identification (39 commoner species are fully described), distribution and conservation status of the 140 predominantly freshwater fish species recorded locally.

3.2.3 Freshwater fish have been relatively well-studied in the north Lantau area. Chong and Dudgeon (1992) reported that the Tai Ho (46 species recorded between 1980-1991) and Tung Chung (23 species recorded between 1980-1991) streams are the first and second most species-rich streams in Hong Kong, respectively. The locally rare Ayu *Plecoglossus altivilis* was first described in Hong Kong from the Tai Ho stream (Chong and Dudgeon, 1992) and is listed in the China Red Data Book of Endangered Animals. The catadromous Giant Mottled Eel *Anguilla marmorata* has also been recorded in Tai Ho stream (Chong and Dudgeon, 1992) and is also listed in the China Red Data Book of Endangered Animals. Owing to the high diversity of fish, the Tai Ho stream has been designated as a SSSI.

3.2.4 Extensive surveys conducted between June 2001 and January 2002 along the broad corridor between Lantau and Sunset Peaks (encompassing both north and south Lantau) revealed the presence of 18 freshwater fish species (Mouchel, 2002a). Of these, four species were considered to be of conservation interest and three were present in streams and/or tributaries in north Lantau adjacent to the present study area. The three species of conservation interest comprised the Beijiang Thick-lipped Barb *Acrossocheilus beijiangensis*, Philippine Neon Goby *Stiphodon atropurpureus* and Ricefish *Oryzias curvinotus*.

3.2.5 The Beijiang Thick-lipped Barb was abundant in the Tung Chung Stream and tributaries (Mouchel, 2002a) and has also been recorded in the nearby Wong Lung Hang Stream (Chan, 1998). The Beijiang Thick-lipped Barb is restricted locally but distributed throughout Guandong Province (Lam, 2002).

3.2.6 The Philippine Neon Goby was also present in Tung Chung Stream (Mouchel, 2002a). It was only very recently discovered in Hong Kong and was previously known to occur in only one other site locally (Chan, 1999). It has also recently been recorded in Tong Fuk and Pui O (Mouchel, 2002a).

3.2.7 The Ricefish was recorded in the Fong Yuen Marsh (Mouchel, 2002a). This species is globally-restricted and highly endangered locally (and endangered globally; Chong and Dudgeon, 1992). *O. curvinotus* is distributed throughout southeast China and has been recorded locally from Chi Ma Wan on Lantau, Sam A Tsuen in the northeast New Territories (Chong and Dudgeon, 1992), Sai Kung and reservoirs in North District and Tuen Mun (Lam, 2002; Mouchel, 2002a).

3.3 Freshwater Macroinvertebrate

3.3.1 The streams on north Lantau are generally unaffected by pollution inputs and support comparatively diverse aquatic communities (Chong and Dudgeon, 1992; EPD, 2000; Mouchel, 2002a). Wilson (1995) and Mouchel (2002a) also reported the presence of several endemic odonates on Lantau and the larval stages are completed in uncontaminated freshwater. The streams of Hong Kong are known to support a diverse group of freshwater macroinvertebrates some of which are endemics (e.g., certain odonates and water beetles). The recently published China Water Beetle Trilogy (Jach and Ji, 1995, 1998, 2003) reported that some of the water beetles in Hong Kong are probably endemic as they have thus far not been recorded in other parts of Mainland China. These include *Sinonychus lantau* (Elmidae) from Ngau Kwu Long near to Tai Ho.

3.4 Marine Benthic Macrofauna

3.4.1 The macro-fauna consist of the invertebrate organisms larger than 1mm living within the sediment (predominantly in the upper well-oxygenated layers). The major conclusion from the previous work in the Northwestern waters (review mostly based on Greiner-Maunsell, 1991; Mouchel, 2001a; 2002c) as summarised in Mouchel (2002b) was that benthic macrofauna present are impoverished and relatively similar throughout the Northwestern waters and are representative of the general study area.

3.4.2 The monitoring results in the Northwestern waters have tended to indicate that the benthic community recorded over approximately the past ten years has remained of similar composition and as with most benthic communities polychaetes are numerically abundant comprising between 44-71% of individuals present and molluscs, crustaceans and echinoderms are also well represented components of the soft-bottom community (Mouchel, 2002b). Echinoderms are, however, not always recorded in the study area (Greiner-Maunsell, 1991) as the larvae of these organisms are often stenohaline (Nicholson, 2001) and unlikely to tolerate the wide salinity fluctuations associated with freshwater discharges from the Pearl River in the wet season.

3.4.3 Infauna diversity in the study area is relatively low ($H' < 2$) compared to other areas in Hong Kong. The impoverished assemblages present is likely due to the proximity of Pearl River Estuary (estuarine areas are often less diverse owing to their highly dynamic physical and chemical nature) and possibly due to the predominantly silt-clay composition of the seabed that tends not to support high diversity (Shin, 1998; Mouchel, 2002b, 2004a; CCPC, 2002).

3.4.4 There is no known macrofauna species of conservation interest in Hong Kong, other than the cephalochordate *Branchiostoma belcheri*. The species is regarded as a living fossil link in the evolution of marine invertebrates to vertebrates and is, therefore, considered a potentially important species. The species, however, is typically recorded in the eastern waters of Hong Kong (CCPC, 2002) although these were also recently recorded to the south of Cheung Chau (Mouchel, 2003b).

3.5 Intertidal Flora and Fauna (Hard and Soft Shores)

3.5.1 The intertidal ecology of Hong Kong is well studied (Morton and Morton, 1983). There were also recent publications that are particularly relevant to the intertidal fauna and flora within areas covered under this Project and these included Mouchel (2000, 2002a), Tam and Wong (2000), Williams (2003) and Chan and Caley (2003).

3.5.2 Various studies of the coastal areas of Northern Lantau (ERM, 2000; Mouchel, 2000, 2002b; Tam and Wong, 2000; Mott, 2003) have revealed that the intertidal fauna and

flora present are typical of other locations in Hong Kong although important species such as horseshoe crabs and seagrasses are present within certain bays in the study area. A review of these groups is addressed separately in this Report.

3.6 Coral

3.6.1 Hard corals are protected in Hong Kong by the Animals and Plants (Protection of Endangered Species) Ordinance (Cap. 187) which includes the protection of all stony (hard) corals. The distribution of hermatypic corals is largely controlled by the requirements of their photosynthesising zooxanthellae which require strong light and hence shallower water, whereas many of the soft corals that do not possess symbiotic algae can survive at greater depths (Morton and Morton, 1983; Morton, 1994). Corals are usually adversely affected by reduced salinity (hyposalinity) and high levels of suspended solids and significant hermatypic coral communities appear to be absent from the study area.

3.6.2 Hard corals have been recorded in the wider study area. The coral communities are, however, sparse compared to rocky reefs of similar depth in the oceanic eastern and southern waters of Hong Kong. A few solitary hermatypic corals (thought to be *Balanophyllia* or *Phyllangia* sp.) have been recorded in the vicinity of The Brothers and soft corals, sea pens and gorgonian corals (sea fans) are also present throughout the Northwestern waters (Mouchel, 2002b, 2003a). Solitary corals have also been reported from Sham Tseng and Tsing Lung Tau adjacent to Castle Peak Road (Mouchel, 2001a). A number of ahermatypic cup corals, pale-blue gorgonian (*Euplexaura* sp.), occasional *Dendronephthya* sp. colonies, isolated sea pens (*Virgularia* or *Pteroides* sp.) and one hermatypic coral *Oulastrea crispata* were also recently recorded at Sham Tseng and Tsing Lung Tau (Mouchel, 2001b). There are also records of hard corals at Sha Chau. Dive surveys conducted in late 1994 at locations around Sha Chau revealed the presence of protected hard corals (Faviidae) in subtidal areas (ERM, 1995). The hard coral species recorded in the Northwestern waters are generally common in local waters (Scott, 1984) although are more abundant in the eastern waters and the study area (comprising Northwestern waters) may represent their westernmost distribution in Hong Kong.

3.6.3 It is notable that the ahermatypic cup coral (*Balanophyllia* or *Phyllangia* sp.) and the pale-blue gorgonian (*Euplexaura* sp.) have only rarely been recorded in the oceanic eastern and southern waters of Hong Kong and it is likely that these species are adapted to the hyposaline waters of the study area (Mouchel, 2001b). The presence of the hermatypic (containing zooxanthellae) coral *Oulastrea crispata* is unusual owing to the prevailing hydrological conditions although total cover was sparse (<1%) and many individuals were in poor condition (Mouchel, 2001b).

3.7 Horseshoe Crabs

3.7.1 Horseshoe crabs are an ancient and taxonomically isolated group (class Merostomata). Three species have been reported in Hong Kong waters namely *Tachypleus tridentatus*, *T. gigas* and *Carcinoscorpius rotundicauda*. The conservation status of the three Indo-Pacific species is listed as "Data Deficient" by the IUCN, indicating that existing knowledge is insufficient to determine whether they are threatened or endangered. Horseshoe crabs have only recently been identified as a species of potential conservation concern in Hong Kong and are not presently protected under local law. All three species appear to be undergoing rapid population declines and are thought to be under severe pressure in the South China Sea, including Hong Kong waters, due to habitat loss, pollution and over exploitation (Huang, 1997; Chiu and Morton, 1999, 2003; Chiu, 2003; Morton and Lee, 2003).

3.7.2 In an extensive study of the distribution of horseshoe crabs in Hong Kong conducted between March 1995 and June 1998 *Tachypleus gigas* was not recorded and its local status is uncertain. It is likely that only two species of horseshoe crab (*T. tridentatus* and C. *rotundicauda*) are currently widely distributed in Hong Kong as no recent records of *T. gigas* are available (Chiu and Morton, 1999; Mouchel, 2002b). Liao *et al.* (2001) also did not record *T. gigas* in their extensive surveys (September 1994 to June 1998) of the South China Sea (from Hainan to Xiamen).

3.7.3 Within the study area, *T. tridentatus* and *C. rotundicauda* have been recorded at Tai Ho Wan, Tung Chung Wan, San Tau and Sha Lo Wan and Sham Wat (Huang, 1997; Chiu and Morton, 1999; Fong, 1999b; Mouchel, 2000, 2002b; Mott, 2003). Specimens of horseshoe crabs collected in the vicinity of the study area during March to September 1996 (ERM, 1997), records mostly from March 1995 to June 1998 (Chiu and Morton, 1999) and between May and January 2004 (Mouchel, ongoing) are presented below in *Table 5.12*.

3.8 Cetaceans

3.8.1 There are fifteen recorded cetacean species from Hong Kong waters although only two of these species, the Indo-Pacific Humpback dolphin (*Sousa chinensis*) and Finless porpoise (*Neophocaena phocaenoides*) are resident (Parsons *et al*., 1995). Until the early 1990s there were few records of *Sousa chinensis* in Hong Kong waters (Jefferson and Leatherwood, 1997) although construction of the international airport at Chek Lap Kok drew attention to the presence of the Indo-Pacific Humpback dolphin in local waters and intensive research into the distribution and conservation requirements of the species have been ongoing since about the mid 1990s.

3.8.2 Although other cetaceans (Finless porpoise and False killer whale) have been found in the Northwestern waters, these are probably extralimmital records and only the Indo-Pacific Humpback dolphin has so far been consistently reported from the study area where it is widely distributed (Parsons *et al*., 1995; Jefferson and Leatherwood, 1997; Jefferson, 2000). There appears to be only limited overlap in distribution of the Indo-Pacific Humpback dolphin and Finless porpoise in local waters as the dolphin tends to be predominantly distributed in the western waters whereas the porpoise is usually recorded from areas further to the east of Hong Kong (the southern coast of Lantau around Fan Lau and the Soko Islands predominantly marks the western edge for the distribution of *Neophocaena phocaenoides*; Parsons *et al*., 1995; Jefferson, 2000).

3.8.3 Globally, the Indo-Pacific Humpback dolphin is widely distributed throughout shallow (< 20 m) coastal waters of the Indian and Western Pacific Oceans, from South Africa in the west to northern Australia and Southern China in the east (Parsons *et al*., 1995; Jefferson, 2000; Jefferson and Karczmarski, 2001). In Hong Kong, *Sousa chinensis* predominantly frequents the less saline brackish waters around the Pearl River Estuary although loss of habitat to numerous developments, fishing, shipping activity and pollution from various sources have placed increasing pressure on the local Indo-Pacific Humpback dolphin population (Liu and Hills, 1997; Jefferson, 2000). In Hong Kong, the dolphin population is centred in the Northwestern waters. The total size of the Pearl River breeding population is difficult to estimate accurately although has been estimated to comprise at least 1,028 individuals with approximately 100 inhabiting Hong Kong's Northwestern waters (Jefferson, 2000; Hung, 2003).

3.8.4 Groups of Indo-Pacific Humpback dolphin are consistently recorded from waters near Tuen Mun and off Lung Kwu Chau, Sha Chau and around the airport although the distribution in Hong Kong may be presently more restricted than when the

population was assumed to contain more individuals in the past (Parsons *et al*., 1995). It should be noted, however, that no reliable census data are available prior to the construction of the Hong Kong International Airport and the hypothesis that the population was larger in the past is only an assumption. The distribution of the dolphin tends to show a slight seasonal response (possibly related to feeding opportunities, as the species is known to feed predominantly on estuarine fish) as individuals tend to move further to the east of the study area during the summer monsoon when ambient seawater is lower in salinity (Jefferson, 2000). In the dry season (winter and spring) the population tends to be concentrated in the waters around the Sha Chau and Lung Kwu Chau Marine Park and to the north of Chek Lap Kok, although individuals are recorded within the entire study area throughout the year (Jefferson, 2000).

3.9 Avifauna

3.9.1 Hong Kong has over 400 naturally-present bird species, including several that are protected under international legislation (Carey *et al*., 2001). All native bird species are protected in Hong Kong under the Wild Animals Protection Ordinance (Cap. 170).

3.9.2 Surveys at Tai Ho in 1998 revealed the presence of 68 predominantly wetland-dependent bird species (Mouchel, 2000). The major groups present included egrets, herons, eagles, hawks and kingfishers. Notable species recorded included Little Egret, Crested Serpent Eagle, Japanese Sparrowhawk, Crested Goshawk, Bonelli's Eagle, Chestnut-winged Cuckoo, Broad-billed Roller, Chestnut Bulbul, White's Thrush and Pale-legged Leaf Warbler (Mouchel, 2000).

3.9.3 Bird surveys were conducted recently between May 2001 and January 2002 along the broad corridor between Lantau and Sunset Peaks (encompassing both north and south Lantau) and revealed the presence of 46 species (Mouchel, 2002a). Of these species, three were present on north Lantau and considered to be of conservation interest. The three species of conservation interest comprised the Grey Nightjar (*Caprimulgus indicus*), Lesser Coucal (*Centropus bengalensis*) and Greater Coucal (*Centropus sinensis*) (Mouchel, 2002a). The Grey Nightjar is widespread in China although only a scarce passage migrant and summer visitor in Hong Kong (Viney *et al*., 1994; Yen *et al*., 1996; MacKinnon and Phillipps, 2000; Carey *et al*., 2001). In addition, both the Lesser and Greater Coucals, which although common and widespread in Hong Kong where they frequent degraded habitats, are considered to be threatened in China (Wang *et al*., 1998).

3.9.4 Several species of coastal birds notably ardeids have been recorded on the intertidal mudflats along the north Lantau coast. Over 40 Little Egret (*Egretta garzetta*) were recorded between October and December 2002 in Tung Chung Bay (Mott, 2003). Egrets are widespread and abundant in Hong Kong although increasingly threatened throughout their global range due to development pressures and loss of habitat. Several Little Egret's have been previously recorded from Tung Chung Bay (Carey *et al*., 2001) and it appears that this location represents an important habitat for this species.

3.9.5 Other notable bird species that have been comparatively recently recorded in the wider study area include Eurasian Eagle Owl *Bubo bubo*, Bonelli's Eagle *Hieraaetus fasciatus*, White-bellied Sea Eagle *Haliaeetus leucogaster* and Dusky Warbler *Phylloscopus fuscatus* (Mouchel, 2002a; Mott, 2003). Although many of the avifauna species recorded are highly mobile, many have highly specific habitat requirements and/or form dense flocks and the assessment of impacts associated with the project will require to consider such factors.

3.10 Terrestrial Mammals

3.10.1 Studies on the distribution of Hong Kong's large mammal fauna have been conducted by Hills and Phillipps (1981), Goodyer (1992) and Reels (1996). Sightings of large mammal species, such as Barking Deer, Wild Boar, Chinese Porcupine, Chinese Leopard Cat, Seven-banded Civet, Masked Palm Civet, Ferret Badger and Chinese Otter were made across the territory but records of larger mammals are scarce for Lantau (Hills and Phillipps, 1981; Goodyer, 1992; Reels, 1996; Mouchel, 2000, 2002a; Mott, 2003).

3.10.2 A recent study for the EIA for Tung Chung Cable Car reported two visual/aural observations of the Barking Deer *Muntiacus reevsii* in Hau Hok Wan and San Tau Valley (Mott, 2003). Another recent EIA of the Tung Chung Road between Lung Tseng Tau and Cheung Sha (Mouchel, 2002a), recorded a dead Ferret Badger (*Melogale moschata*) and signs of civet activity. In addition, surveys undertaken for the Lantau North-South Road Link EIA (Mouchel, 2000) recorded one civet dropping in the upland area near Wong Kung Tin. All these recent mammal surveys together with other previous studies carried out on Lantau (Goodyer, 1992; Reels, 1996) support the conclusion that large mammals are scarce across Lantau Island.

3.11 Insects (Dragonflies and Butterflies)

3.11.1 The odonate fauna of Hong Kong extends to over 100 species, including several that are endemic. Information on species identification, distribution and conservation status have been described by Wilson (1995, 1997, 2003). Wilson (1997) identified a forested area at 600m altitude on the northern slope of Sunset Peak as one of 23 key dragonfly sites in Hong Kong (two other key dragonfly sites were also located on Lantau, around Keung Shan). Streams on Sunset Peak are known to support populations of the endemic *Rhipidolestes janetae* (for which Sunset Peak is presently the only known site used by this species of damselfly in the world) and the near-endemics *Sinosticta ogatai* and *Drepanosticta hongkongensis*. *S. ogatai* and *D. hongkongensis* were previously considered Hong Kong endemics, but were recently discovered on one mountain in Shenzhen, adjacent to the Hong Kong border (Reels, 2001). Another species known to be present in the wider study area, the damselfly *Agriomorpha fusca*, was previously considered restricted to Hong Kong and Guangdong, but has recently also been recorded from Hainan (Wilson and Reels, 2001). The locally uncommon Marsh Dancer *Onychargia atrocyana* has been recorded in Sha Lo Wan (Wilson, 2003).

3.11.2 Some relevant EIA studies (Mouchel, 2000; 2002a) reported a number of dragonfly species of conservation interest in the vicinity of the study area. These include *Agriomorpha fisca*, *Drepanosticta hongkongensis*, *Leptogomphus elegans hongkongensis*, *Meligomphus moluami*, *Protosticta beaumonti*, *Sinosticta ogatai*, *Stylogomphus chunliuae, Zygonyx iris insignis, Macromia* sp and *Pseudagrion microcephalum*. Another recent study carried out by Chan and Lau (2001) also revealed the presence of a locally rare dragonfly *Diplacodes nebulosa* along the Sham Wat Stream.

3.11.3 Over 200 species of butterfly have been recorded from Hong Kong (Bascombe, 1995; Bascombe *et al.*, 1999). A useful account of the local status of butterfly species in Hong Kong was provided by Walthew (1997) later updated by Reels and Walthew (1998). There are no endemic species and, although data on regional rarity are scant, the majority of local species, including most of those that are considered rare in Hong Kong, appear to be widely distributed within southern China and the Asian tropics (Chou, 1994; Bascombe, 1995; Bascombe *et al.*, 1999). The Birdwing Butterfly *Troides helena* and *Trioides aeacus* are the only species of insect currently protected in Hong Kong. The species is well-established between Po Lin and Tung

Chung (Young and Reels, 1998). San Tau is also considered to be an important site for this protected butterfly species (Yiu, 2004).

3.11.4 Some studies documented a number of notable butterfly species of conservation interest in the proximity of the study area. Surveys conducted for the Tung Chung Road EIA (Mouchel, 2002a) revealed the presence of eight butterfly species of conservation interest. These include Large Branded Swift *Pelopidas subochracea*, Palepalm Dart *Telicota colon*, Common Rose *Pachliopta aristolochiae*, Small Grass Yellow *Eurema brigitta*, Pale Cerulean *Jamides celeno*, Black-veined Sergeant *Athyma ranga*, Gaudy Baron *Euthalia lubentina* and Commander *Moduza procris*. The Lantau North-South Link EIA (Mouchel, 2000) reported two species of conservation interest namely Striped Blue Crow *Delias hyparet and* Chestnut Tiger *Parantica sita.* Records from a more recent study (Mott, 2003) include the rare Dragontail *Lamproptera curius* near San Tau Stream together with the protected Birdwing Butterfly *Troides helena* in the vicinity of Tung Chung.

3.11.5 Yiu (2004) also indicated that San Tau is an important location for rare/uncommon butterfly species such as White Dragontail, Red Lacewing, White-edged Blue Baron, Plains Cupid, Falcate Oak Blue and the protected Golden Birdwing. In addition, Sha Lo Wan is also known to support rare/uncommon species namely Swallowtail, Yellow Orange Tip, Dark Blue Tiger, Red Lacewing, Cornelian and Silver Streak Blue (Yiu, 2004).

3.12 Herpetofauna (Reptiles and Amphibians)

3.12.1 Previous studies on Lantau (Lau and Dudgeon, 1999; Mouchel, 2000; Mouchel, 2002a; Mott, 2003) have revealed the presence of a number of herpetofauna species within or adjacent to the study area, including the endemic Romer's Tree Frog *Philautus romeri* which has a restricted local distribution (Karsen *et al*., 1998). Romer's Tree Frog was previously considered to be restricted to only a few locations in Hong Kong and was threatened by the airport development at Chek Lap Kok encompassing Scenic Hill (Karsen *et al*., 1998). Romer's Tree Frog from Chek Lap Kok were, however, bred in captivity and released at selected sites in the New Territories in the early 1990s. Recent records of Romer's Tree Frog in areas adjacent to the study area include Lau and Dudgeon (1999) and Mouchel (2002a). An individual Romer's Tree Frog was previously recorded on Scenic Hill at Chek Lap Kok (Mouchel, 2002a) and previous study (Mouchel, 2002a) has indicated the high ecological value of Scenic Hill as both habitat (secondary woodland) and species (Romer's Tree Frog) present are of high value and/or conservation interest. In addition, an adult Romer's Tree Frog and seven tadpoles were recorded on the northern side of Scenic Hill during a survey conducted by the Agriculture, Fisheries and Conservation Department and an another recent survey (July 2004) also revealed the presence of one adult from the same location (AFCD, pers. comm.). These observations indicate that a remnant population of Romer's Tree Frog is extant on Scenic Hill.

3.12.2 Other less common herpetofauna recorded in the broader Tung Chung area included Large-spotted Cat Snake *Boiga multimaculata* and King Cobra *Ophiophagus hannah* (Chan and Lau, 2001). Chan and Lau (2001) also observed the locally uncommon Three-striped Grass Frog *Rana macrodactyla* in the vicinity of Sham Wat Stream while Mouchel (2002a) recorded the globally restricted Short-Legged Toad *Megophrys brachykolos* at the Tung Chung stream and Chinese Cobra *Naja atra* at Shek Mun Kap. The Chinese Cobra is globally restricted to southern China (Karsen *et al*., 1998) and is a CITES Appendix II species. It is also listed as vulnerable in the China Red Data Book. A list of herpetofauna previously reported in areas adjacent to the study area is included in *Table 3.1*.

Table 3.1 Historical Records of Herpetofauna from the wider Study Area

Common Name	**Scientific Name**	**Area**	Remark
Buff-striped Keelback	*Amphiesma stolatum*	Tung Chung	
Large-spotted Cat Snake	*Boiga multimaculata*	Tung Chung	
Copperhead Racer	*Elaphe radiata*	San Tau	
Chinese Cobra	*Naja atra*	Shek Mun Kap stream	Potential Regional Concern (Fellowes *et al*., 2002). CITES II
King Cobra	*Ophiophagus hannah*	Tung Chung	
Rat Snake	*Pytas* sp.	Sha Lo Wan	
Asian Common Toad	*Bufo melanostictus*	San Tau, Tung Chung	
Short-legged Toad	*Megophrys brachykolos*	Tung Chung Stream	Potential Global Concern (Fellowes *et al*., 2002)
Ornate Pigmy Frog	*Mirohyla ornata*	Tung Chung	
Marbled Pigmy Frog	*Mirohyla pulchra*	Tung Chung	
Romer's Tree Frog	*Philautus romeri*	Tung Chung, Tung Chung Stream, Shek Mun Kap stream, Scenic Hill	Considered an endemic. Protected in Hong Kong. Potential Global Concern (Fellowes *et al*., 2002)
Brown Tree Frog	*Polypedates megacephalus*	Tung Chung	
Three-striped Grass Frog	*Rana macrodactyla*	Sham Wat Wan, Tung Chung	
Chinese Bullfrog	*Rana rugiosa*	Tung Chung	Potential Regional Concern (Fellowes *et al*., 2002).
Gunther's Frog	*Rana guentheri*	Tung Chung	
Paddy Frog	*Rana limnocharis*	Tung Chung	
Tokay Gecko	*Gekko gekko*	Tung Chung	Regional Concern (Fellowes *et al*., 2002)
Long-tailed Skink	*Mabuya longicaudata*	Chek Lap Kok, San Tau	

Source: Chan and Lau (2001); Mouchel (2002a); Mott (2003); AFCD (pers. comm.)

3.13 Habitats and Vegetation

3.13.1 A recent checklist of the Hong Kong Vascular Plant was published by AFCD (2001) and provides comprehensive information on species locally found. The conservation status of each plant species recorded was derived primarily from the comprehensive studies by Siu (2000), Wu and Lee (2000), Xing *et al*. (2000) and the AFCD (2003).

3.13.2 Previous studies in the area have revealed that naturally developed woodland was present in the ravines along Tung Chung Road and these wooded areas represented old stands (Mouchel, 1998, Mouchel, 2002a). Rare/protected species recorded during the Lantau North-South Link EIA floral surveys (Mouchel, 2000), included the Pitcher Plant *Nepenthes mirabilis,* the seagrass *Halophila beccarii* and some orchids. Floral surveys conducted between June 2001 and January 2002 along the broad corridor between Lantau and Sunset Peaks (encompassing both north and south Lantau) revealed the presence of 319 plant species (Mouchel, 2002a). Of these, four species of conservation interest, *Liparis viridiflora, Acampe rigida, Pavetta hongkongensis* and *Artocarpus hypargyreus* were identified. A recent floral survey conducted for the Tung Chung Road Cable Car EIA (Mott, 2003) also reported several rare/protected plant species including the shrub *Enkianthus quinqueflorus*, *Camellia euryoides* and two orchids, *Pholidota chinensis* and *Spathoglottis pubescens*. In the EIA study Brief for this project, the rare sedge *Carex leucochlora* was highlighted while the Biodiversity Survey recorded a very rare sedge *Carex tristachya* in Hau Hok Wan (Xing, 2000; Scott, 2002).

3.13.3 Some fung shui woods are present within the study area and these woods are located behind Pak Mong, San Tau and Sha Lo Wan Village. Floral survey (Mott,

1998) recorded the presence of a locally restricted tree species *Ormosia semicastrata* in Pak Mong fung shui woods (Xing *et al.*, 2000).

Seagrass and Mangroves

3.13.4 Seagrass beds and mangroves are recognised in the TM (Annex 16, Note 2) as important coastal communities as they provide habitat for several species including fish and spawning and nursery grounds for horseshoe crabs. The San Tau SSSI was established in 1994 (AFCD, 2003) due to the important mangrove, eelgrass and seagrass community present. There is a large amount of existing data on the mangal and seagrass habitats present in the study area (e.g., Fong, 1998, 1999a, 1999c; Tam and Wong, 2000; Mouchel 2002a). Previous studies (Tam and Wong, 2000, Mouchel, 2000, 2002a) revealed the presence of some notable species of conservation interest within the study area. These included the important seagrass species *Halophila beccarii, H. ovata, Zostera japonica*, and restricted species such as *Bruguiera gymnorrhiza*, *Lumnitzera racemosa* and *Thespesia populnea*.

4. Field Survey Methodology

4.1 Background

4.1.1 Field work focussed on habitats and species identified in the literature review where adequate data were not available. Other habitats and species groups were also surveyed to characterise the ecology of the study area and prepare an ecological profile. The surveys comprised both wet and dry seasons between September 2003 and March 2004.

4.1.2 The purpose of the ecological surveys was to focus on the optimal census technique and survey period when each animal group was likely to be encountered. The overall quality of the Study is dependent on selecting the correct survey period and survey technique. The survey effort also focussed on those areas mostly likely to be impacted by the Project such as landing points and tunnel portals.

4.2 Freshwater and Estuarine Fish

4.2.1 Streams distributed in the study area and notably from Sham Wat to Sha Lo Wan, Tung Chung Bay and Tai Ho Wan were surveyed and the fish present identified by direct observation and active sampling. Both methods were used as active sampling was not effective for sensitive species whereas direct observation (with or without a diving mask) was not effective or possible at locations subject to high turbidity. As much of the Study Area is coastal, many of the aquatic habitats present are subject to marine water influence and both the habitat and fish assemblages present are characteristic of estuarine conditions.

4.2.2 Fish surveys were carried out on the 25, 27 September, 22, 23 October, 15, 16 December 2003, 17 and 18 February, 12 and 13 April an 12 May 2004. In order to facilitate the description of species-habitat quality on a stream by stream basis, individual stream courses were numbered for reference (*Figures 2.1 – 2.4*). All fish were identified to species level and abundance recorded.

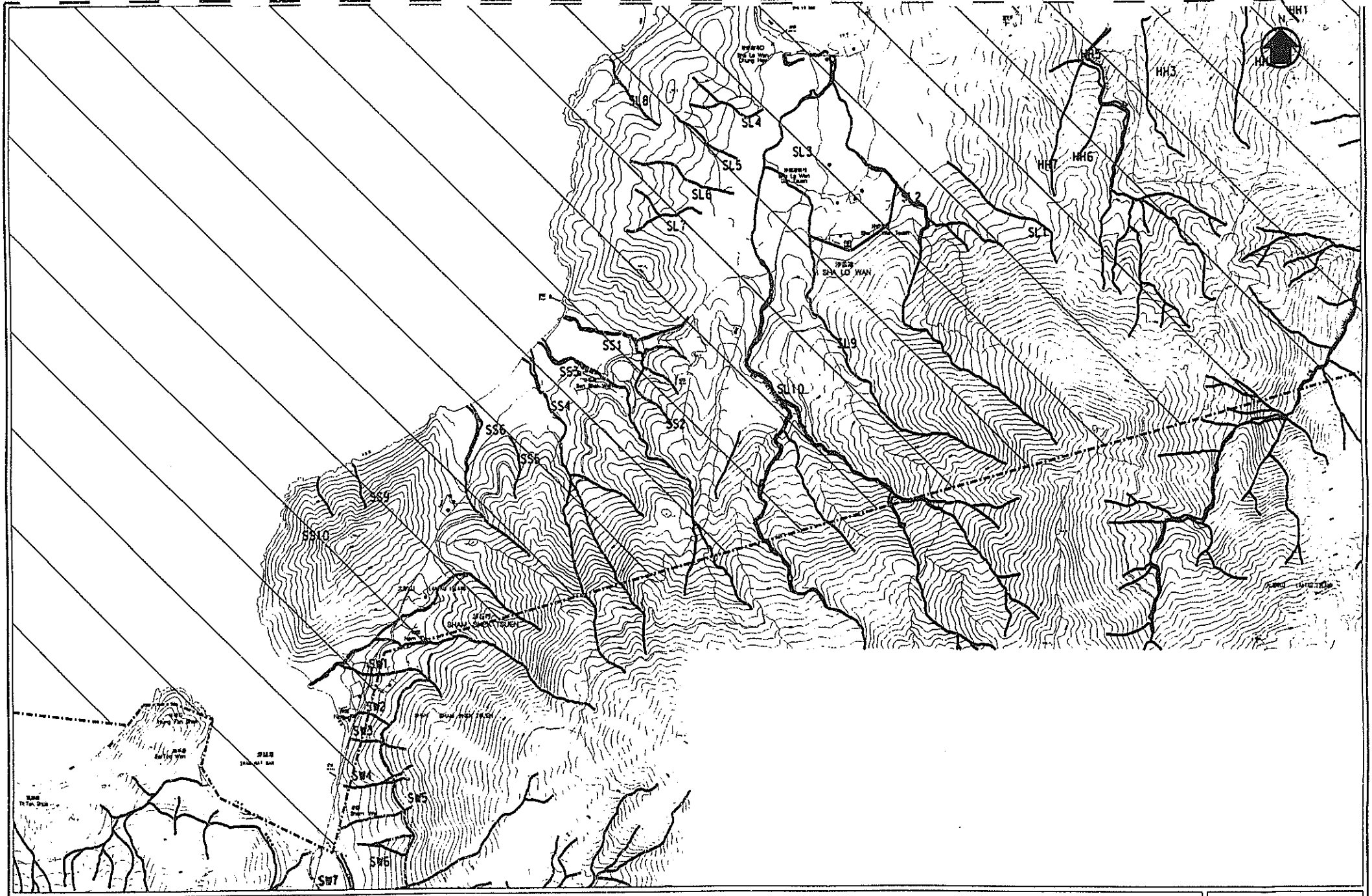
4.3 Freshwater Macroinvertebrate

4.3.1 Freshwater macroinvertebrates were sampled at representative sites (riffle, pool) along each major stream course. Five, 3-minute standardized kick samples were collected at each sampling location. Macroinvertebrates were identified to suitable taxonomic resolution (e.g., Dudgeon, 1999) and habitat quality established through the use of biotic indices (e.g., Abel, 1996).

Biotic Index

4.3.2 Stream water quality was calculated using the Biological Monitoring Working Party (BMWP) biotic index. This index is easily calculated and only requires the fauna present to be identified to the family level. Each family present is assigned a score (based on their relative tolerances to pollution) and the BMWP score is the sum of the individual scores for the families recorded at each sampling location (Abel, 1996). The score does not take into account abundance or the presence of several species from the same family in the sample during the BMWP calculation and the index can, therefore, be rapidly calculated using relatively simple taxonomic resolution.

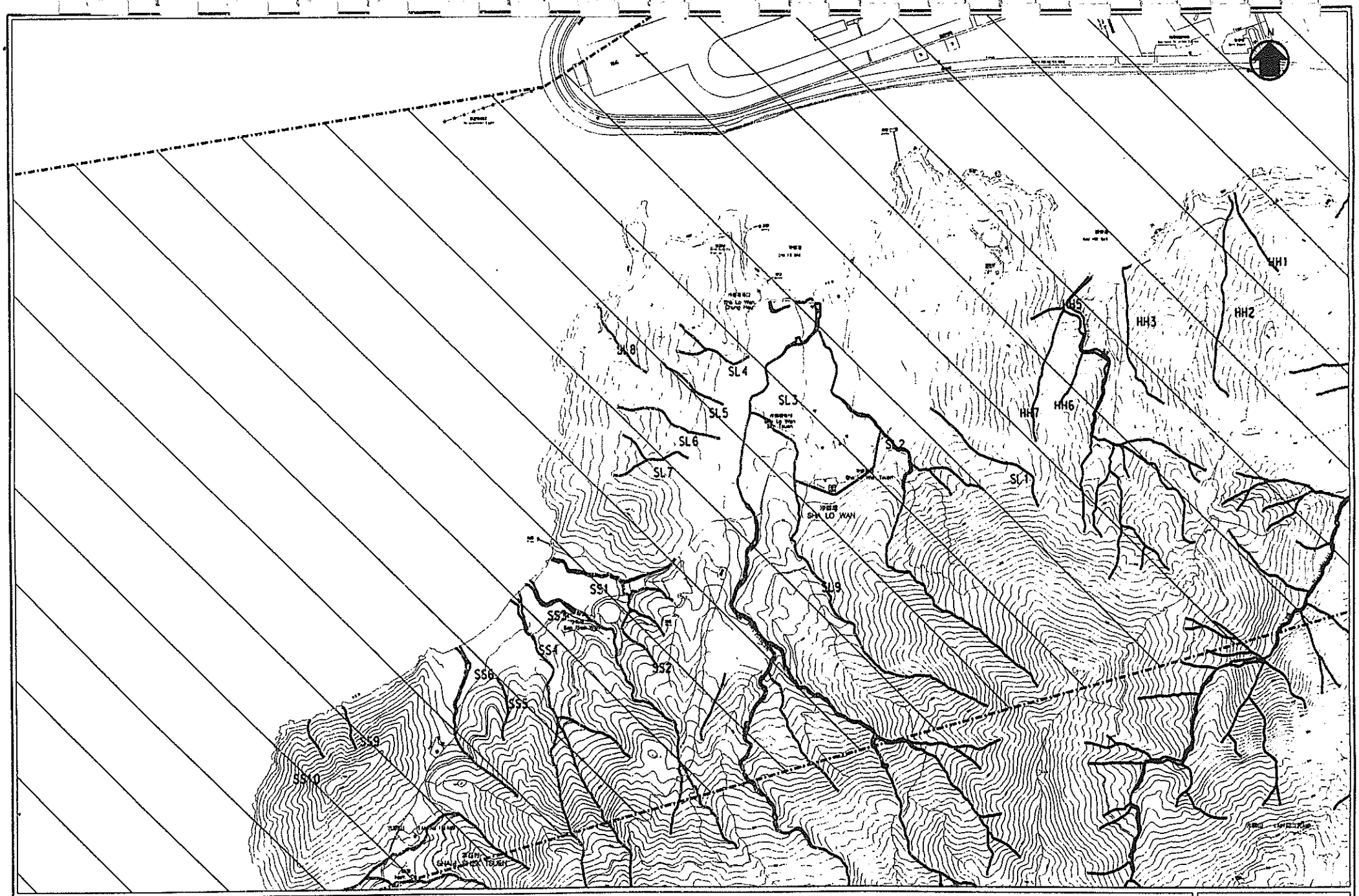
4.3.3 The BMWP score provides a classification (based on pollution tolerance/intolerance) of each sampling location which represents the current ecological condition (health)



Streams and Tributaries Surveyed between September 2003 and May 2004

Meinhardt Mouchel

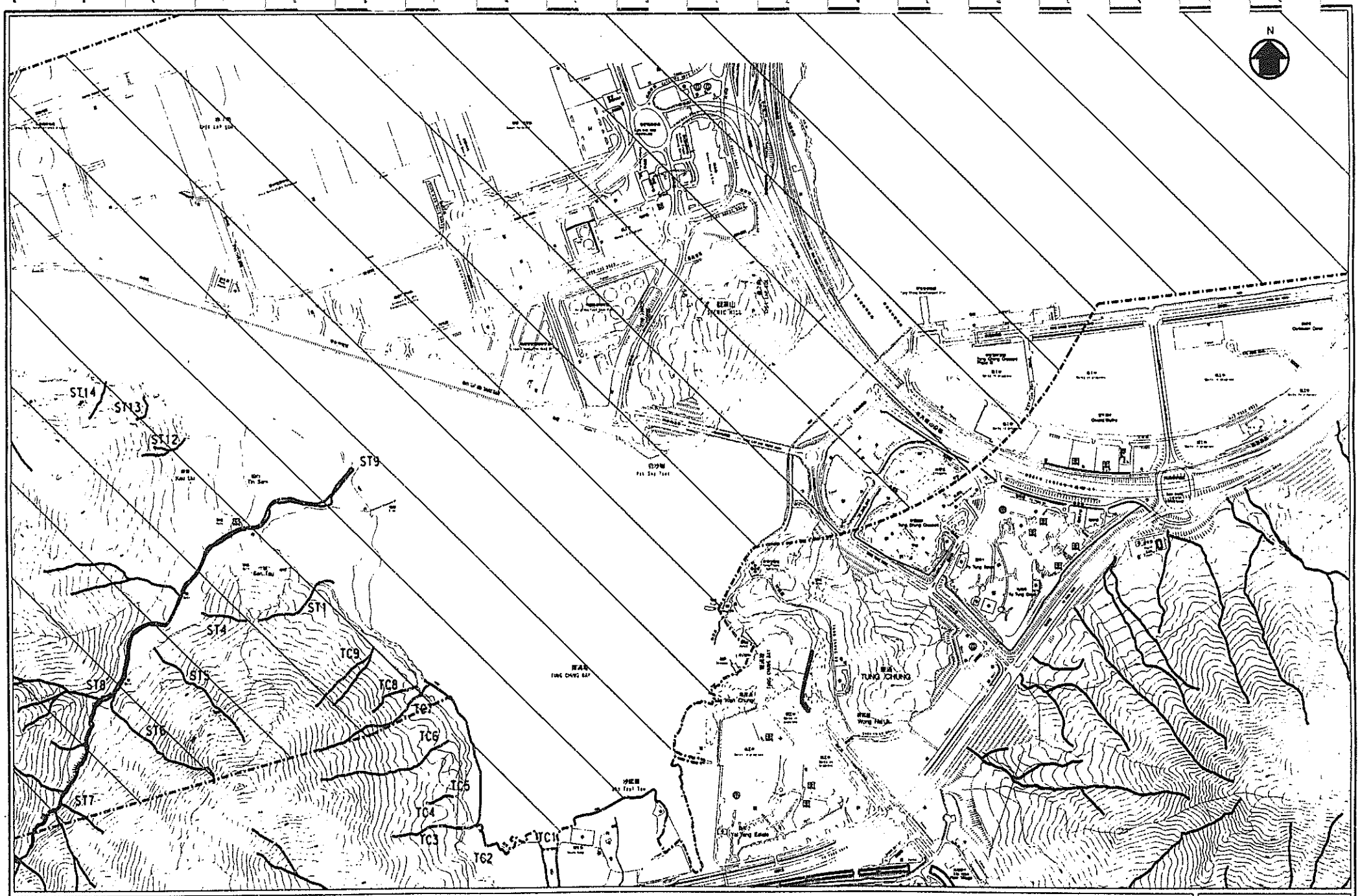
Figure No. 2.1



Streams and Tributaries Surveyed between September 2003 and May 2004

Meinhardt Mouchel

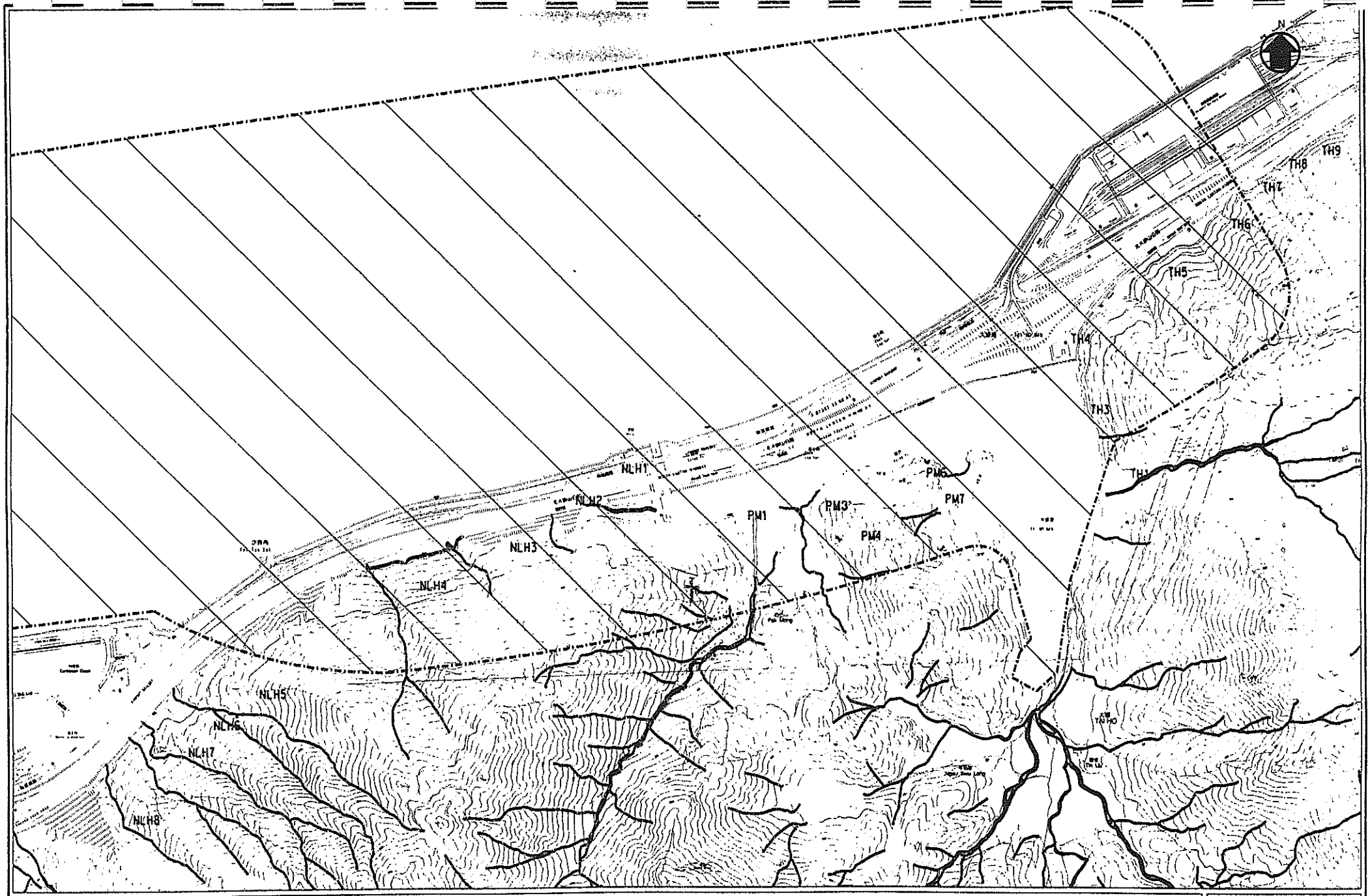
Figure No. 2.2



Streams and Tributaries Surveyed between September 2003 and May 2004

Meinhardt Mouchel

Figure No. 2.3



Streams and Tributaries Surveyed between September 2003 and May 2004

Meinhardt Mouchel

Figure No. 2.4

and also helps to summarise a large amount of ecological information into a single representative value. The BMWP scores are presented in *Table 4.1* below.

Table 4.1 The BMWP Scores used to Calculate the Biotic Index for Freshwater Macrofauna

Family	Score
Siphlonuridae, Heptageniidae, Leptophlebiidae, Ephemerellidae, Potamanthidae, Ephemeridae, Taeniopterygidae, Leuctridae, Capniidae, Perlodidae, Perlidae, Chloroperlidae, Aphelocheiridae, Phryganeidae, Molannidae, Beraeidae, Odontoceridae, Leptoceridae, Goeridae, Lepidostomatidae, Brachycentridae, Sericostomatidae	10
Astacidae, Lestidae, Agriidae, Gomphidae, Cordulegasteridae, Aeshnidae, Corduliidae, Libellulidae, Psychomyiidae, Philopotamidae	8
Caenidae, Nemouridae, Phyacophilidae, Polycentropidae, Limnephilidae	7
Neritidae, Viviparidae, Ancylidae, Hydroptilidae, Unionidae, Corophiidae, Gammaridae, Platycnemididae, Coenagriidae	6
Mesovelidae, Hydrometridae, Gerridae, Nepidae, Naucoridae, Notonectidae, Pleidae, Corixidae, Haliplidae, Hygrobiidae, Dytiscidae, Gyrinidae, Hydrophilidae, Clambidae, Helodidae, Dryopidae, Elminthidae, Chrysomelidae, Curculionidae, Hydropsychidae, Tipulidae, Simuliidae, Planariidae, Dendrocoelidae	5
Baetidae, Sialidae, Piscicolidae	4
Valvatidae, Hydrobidiae, Lymnaeidae, Physidae, Planorbidae, Sphaeriidae, Glossiphoniidae, Hirudidae, Erpobdellidae, Asellidae	3
Chironomidae	2
Oligochaeta (whole class)	1

4.3.4 A total of six macroinvertebrate stream surveys were carried out between September 2003 and January 2004. The sampling locations are presented on *Figure 3*.

4.4 Marine Benthic Macrofauna

4.4.1 Marine benthic sampling was carried out in both the wet (2 October 2003) and dry season (7 January 2004) using a modified van veen grab (capacity of ~11.3 litres; top surface area ~30 x 32 cm^2). Five grab samples were collected in each of three areas namely the Hong Kong Section (HKS1-HKS5), Tung Chung Channel (NLHC1-NLHC5) and Tai Ho Wan (THW1- THW5). The locations of the benthic macro-fauna sampling stations are presented in *Figure 4*. The stations are delineated into three areas, comprising the following:

- Hong Kong Section (HKS1 – HKS5);
- Tung Chung Channel (NLHC1 – NLHC5); and
- Tai Ho Wan (THW1 – THW5).

4.4.2 Sampling methodology, design and analysis are discussed in the following sections. During this reporting period, a suite of biological-based assessments were carried out to determine the macrofaunal community structure of the study area. The sampling stations were located in areas likely to be disturbed by the project and were mostly located directly under the alignment.

Sampling Design and Analysis

N

LEGEND:

INTERTIDAL SURVEY (QUANTITATIVE)

HORSESHOE CRAB AND INTERTIDAL SURVEYS

STREAM INFAUNA SURVEY (QUANTITATIVE)

Hong Kong International Airport

TUNG CHUNG BAY

LANTAU NORTH COUNTRY PARK

SCALE 1:30000

Location of Intensive Intertidal, Horseshoe Crab and Stream Macrofauna Survey Sites

Meinhardt Mouchel

Figure No. 3

K:\F90929\REPORT\SUPPLE FINAL BASELINE\FIG_3.DGN

E 800000
E 805000
E 810000
E 815000
E 820000
N 820000
N 815000
Sha Chau
The Brothers
Hong Kong International Airport
Lantau Island
AREA 3
AREA 7
AREA 5
AREA 21
AREA 1
THW1
THW2
THW3
THW4
THW5
NLHC1
NLHC2
NLHC3
NLHC4
NLHC5
HKS1
HKS2
HKS3
HKS4
HKS5
Location of Benthic Sample
Figure 4
Scale : 1:50,000
Job No. HK182103

4.4.3 The benthic macrofauna samples were analysed for a suite of biological characteristics including composition and number of individuals present. The community diversity of benthic assemblages was also calculated. The distribution of biomass amongst the benthic macrofauna present were also plotted because ecological theory suggests that the distribution of numbers of individuals among species in macrobenthic communities are unbalanced through pollution and disturbance (Warwick, 1986). By plotting the abundance and biomass of the macrofaunal organisms present (abundance biomass comparisons referred to as ABC plots), it is possible to determine the prevailing level of disturbance at each location. The ABC plots were constructed using PRIMER (version 4.0) software. The macrofauna present were also used to derive a biological index (biotic index) of sediment quality in the three areas. The following major biological parameters were determined from the benthic macro-fauna samples:

- Faunal abundance;
- Faunal biomass;
- Faunal diversity;
- Species composition; and
- Trophic structure.

Field Sampling Procedures

4.4.4 Following accurate positioning of the survey vessel (using the dGPS navigation system), a modified van Veen grab sampler was deployed at each of the sampling locations. A replicate grab sample was obtained at each station (5 Hong Kong Section; 5 Tung Chung Channel; 5 off Tai Ho Wan; $\sum n = 15$). Any grab sample showing uneven penetration into the seabed or only partially filled with sediment was rejected. Sediment subsamples (approximately 1 kg) were also collected for particle size and total organic carbon analysis (only samples from selected stations HKS1, HKS5, NLHC1, NLHC5, THW1 and THW5 were analysed) and the remaining sediment was processed for benthic macrofauna.

4.4.5 For preliminary sediment processing on the survey vessel, each sample was gently sieved through a 1.0 mm and 0.5 mm mesh sieve and carefully worked through the sieves using seawater. The material retained on each of the sieves was then washed gently into labelled, double-bagged plastic Ziploc bags and the contents fixed in 5% buffered formaldehyde in seawater containing Rose Bengal (the Rose Bengal vital stain assisted the differentiation of organisms from non-living material when processed in the laboratory because biota stains pink).

Laboratory Procedures

4.4.6 Adequate fixation of the benthic organisms was achieved through holding samples for a minimum of 24 hours in formaldehyde. Following fixation, the samples were gently rinsed with freshwater to remove excess formaldehyde into a 250 μm sieve. All faunal material retained in the sieve was then preserved in a 70% ethanol solution and placed in Petri dishes labelled with the original label from the time of collection. The organisms were then sorted from the sediments by twice scanning the samples held in the Petri dish under a dissecting microscope. The benthic organisms were identified in the laboratory to the lowest possible taxonomic level (usually genus although dominant macrofauna were identified wherever possible to species) and identification of smaller organisms was conducted using a high power compound microscope. Following sorting and identification, organisms were retained in labelled vials and preserved in 70% ethanol. Biomass was determined by taking the blotted wet mass of each taxon.

Statistical Techniques and Pattern Searching Tools

4.4.7 A suite of univariate statistical techniques were used to determine any statistically significant differences in community attributes such as abundance, biomass and species diversity present in the benthic faunal assemblages between areas. These techniques are discussed further below.

Analysis of Variance (ANOVA)

4.4.8 Analysis of variance (ANOVA) was adopted to compare the univariate benthic parameters of the three areas. Where statistically significant differences were detected between areas, multiple comparison procedures (Student-Newman-Keuls) were employed to determine which areas support significantly different community attributes. For the purposes of this Investigation, a significant difference was considered apparent at a significance level of 0.05 (i.e., $\alpha \leq 0.05$).

Diversity Index

4.4.9 Diversity indices are reasonably useful in determining the benthos condition (health) and provide a numerical value that is derived from both the number of species present in the community and also from the distribution of individuals between those species. Generally, the more stable the environment the higher the community diversity although note that there are exceptions. Diversity was assessed at the species/genus level and analysed using the Shannon-Wiener index ($\log_{10}$).

ABC Plots and *W* Statistic

4.4.10 The Abundance-Biomass Comparison (ABC) curve is a technique that plots abundance and biomass data for each station on the same graph and provides useful information on the prevailing ecological condition. When conditions are stable, interspecific competition results in a community composed of *k*-dominated species (i.e., those species that are typically of a larger size, long-lived and have a population that is reasonably constant in time). When the prevailing conditions are unstable such as due to pollution, *r*-selected (opportunist) species dominate and these organisms tend to be of a smaller size, have shorter life-spans and undergo wide fluctuations in their population size. By plotting the abundance and biomass of the macrofaunal organisms along the x-axis of the graph and cumulative percentage dominance on the y-axis, it is possible to determine the pollution status of each area.

4.4.11 The *W* statistic is calculated from the ABC procedures and can also serve as a useful measure of disturbance and/or pollution. The *W* statistic also reduces each plot to a single summary statistic that is helpful for interpretation of impacts in marine benthic communities by non-specialists. The *W* statistic has a range of –1 to 1 with the former value representing transposition of the abundance and biomass curve (i.e., the abundance curve overlies the biomass curve) representative of gross pollution whereas the latter value represents even abundance and biomass dominated by a single species although it is unlikely that either limit is reached in practice (Clarke and Warwick, 1994).

Multivariate Techniques

4.4.12 Multivariate statistical techniques analyse numerous variables simultaneously and are important tools in assessing environmental disturbances and pollution. These pattern searching techniques are useful in assessing impacts as they measure and compare biological and environmental variance in the large and complex data sets generated by the monitoring programme and plot the similarity (and dissimilarity) of

monitoring station attributes into easily understood diagrams (maps). The non-metric form of MDS has been used extensively in marine benthic ecological studies and is useful because it maximises the agreement between ranks of pairwise dissimilarities and the ranks of the distances in the ordination plot rather than actual distance and dissimilarity values. An advantage of the non-metric MDS is that because ranks rather than actual distances are used, outliers (that are frequently observed in macrofaunal assemblages) are not allowed to dominate the ordination.

Biotic Index

4.4.13 Biotic indices are useful in determining sediment quality because they rely on the individual tolerances of the benthic macrofauna present to both natural stressors such as wide salinity fluctuations and anthropogenic pressure including pollution. The biological index used in this study is based on the model proposed by Borja *et al*. (2000, 2003). The biological indicator model is based on the sensitivity of ecological groups and the index is easily calculated based on the percentage of each group collected in each sampling location. The results obtained provide a classification (based on pollution tolerance/intolerance) of each area which represents the current ecological condition (health) and also helps to summarise a large amount of ecological information into a single representative value.

4.4.14 The calculated index is used to derive a series of single values from 0 to 7 with 0 representing a healthy benthic community while 7 represents an azoic situation (no macrofauna present possibly due to highly polluted nature of the sediment). Where species are not assigned to an ecological group, they are omitted from the model calculation. The interpretation of the measured biotic index is based on the groupings presented below in *Table 4.2.*

Table 4.2 Biotic Index for Soft-bottom Marine Macrofauna

Pollution Classification	Calculated Range of Biotic Indices (BI)	Biotic Index	Dominant Ecological Group	Benthic Community Condition (Health)
Unpolluted	$0.0 < BI \leq 0.2$	0	I	Normal
Unpolluted	$0.2 < BI \leq 1.2$	1		Impoverished
Slight pollution	$1.2 < BI \leq 3.3$	2	III	Unbalanced
Mean pollution	$3.3 < BI \leq 4.3$	3		Transitional to polluted
Mean pollution	$4.3 < BI \leq 5.0$	4	IV-V	Polluted
Heavy pollution	$5.0 < BI \leq 5.5$	5		Transitional to heavily polluted
Heavy pollution	$5.5 < BI \leq 6.0$	6	V	Highly polluted
Extreme pollution	Azoic	7	Azoic	Azoic

Adapted from Borja *et al*. (2000, 2003).

4.5 Intertidal Flora and Fauna (Hard and Soft Shores)

4.5.1 Marine intertidal biota show distinct patterns of zonation on the shore. The species present on the lower shore are typically marine-dependent whereas those species found higher up the shore are better adapted to a terrestrial habitat and this results in distinct patterns of distribution on intertidal shores. In addition to showing zonation patterns, intertidal shore flora and fauna are also typically patchily distributed. In order to survey the shoreline accurately, belt transects were placed at different vertical heights up the shore and quadrats randomly placed along the transects in order to ensure that an accurate (non-biased) assessment was made of the species present.

4.5.2 Two 10m belt transects were laid (perpendicular to the shoreline) at approximate 1mCD intervals up the shore being surveyed. Ten 0.25m^2 quadrats were placed randomly along each transect. Substrate type, faunal species abundance and percentage cover of macroalgae was recorded within each quadrat. A total of ten intertidal surveys were conducted on 18, 25, 26 September, 21, 22 October and 18, 19 November 2003, and 7, 15, 16 January 2004 together with an additional half-day survey conducted on 2 October 2003. The locations of intertidal survey sites are presented in *Figure 3*.

4.6 Coral

4.6.1 A qualitative dive survey (October 2003) was used to determine the presence of corals. The survey technique used a tiered methodology to assess sub-littoral benthic communities, in particular, corals, in the proposed landing areas. The survey design consisted of a suite of three standardised 'nested' survey methods: spot-check dives, Rapid Ecological Assessment (REA) and video transects. In an effort to increase survey efficiency the spot-check dives was used to determine if more detailed quantitative surveys, i.e., REA and video assessments, are necessary.

Spot-check reconnaissance dives

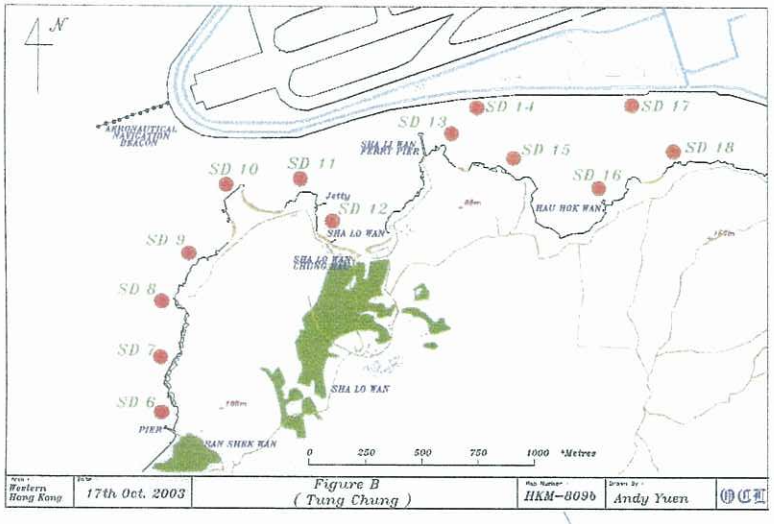
4.6.2 A SCUBA diver assessed the substrate and other marine benthos for the presence of coral communities. These 'spot-check' dives were distributed in and around each survey area at a density that was sufficient to locate any major coral areas and to reliably assess the type of benthos existing in each survey area. The starting location and direction were chosen to ensure most of the area within the specified depth zone (to the end of the hard substrate) was examined. For each dive the following information was recorded:

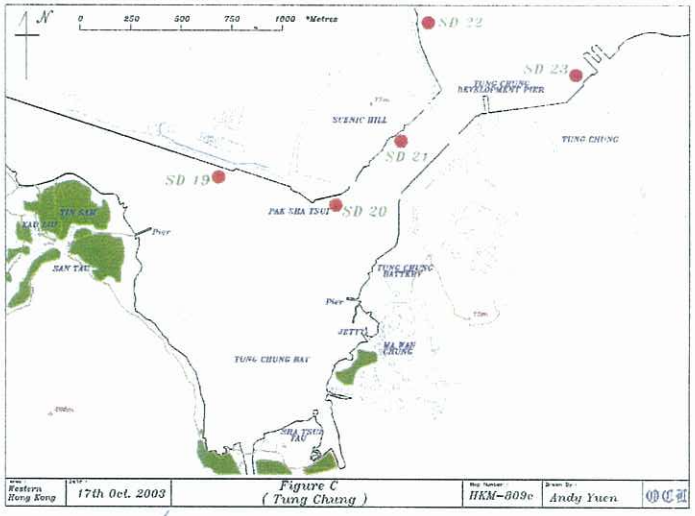
- location (GPS);
- depth range;
- visibility;
- estimate of % hard coral and soft coral cover;
- substrate type;
- distance surveyed;
- coral species and other invertebrates present.
- health of any corals located.

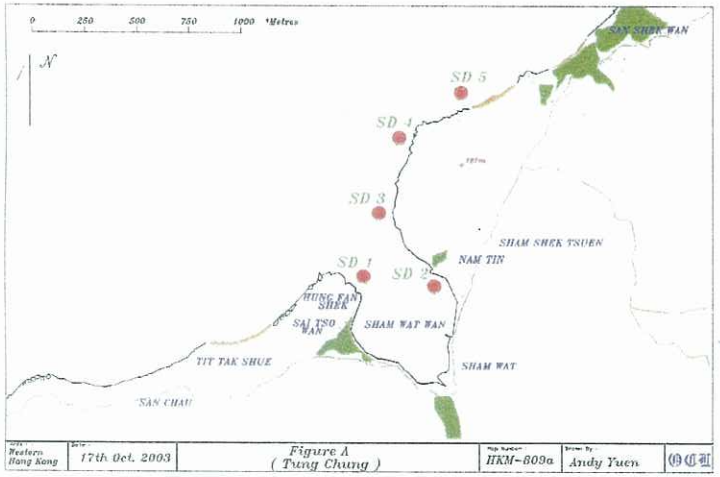
4.6.3 In this way, areas with significant quantities of corals were located and suitable locations to carry out further surveys determined. In order to decide upon areas where REA and video surveys were necessary, the estimate of hard and soft coral was classified into one of four levels: no coral cover, less than 5% cover, between 5% and 10% cover and over 10% cover. At the start of the project, a coral survey was conducted on 15 October 2003. A total of twenty-seven spot dives were conducted along the coastline of the study area as shown in *Figure 5.* As only a few corals were recorded in the study area and they were of low ecological value, no further surveys using REA and video transects were suggested.

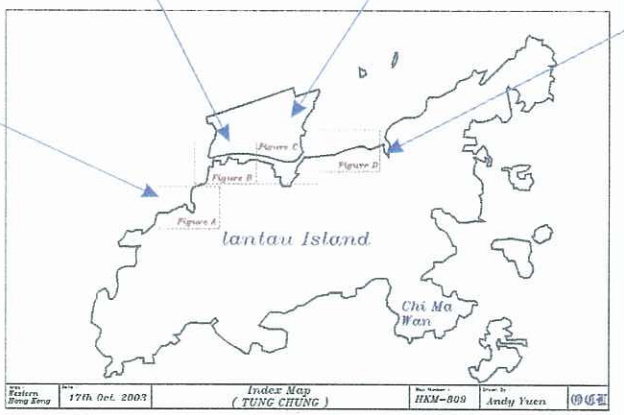
4.7 Horseshoe Crabs

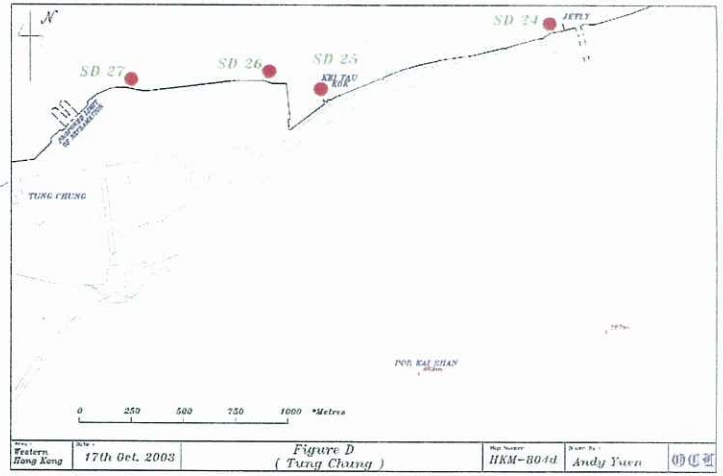
4.7.1 Walk over surveys concurrent with the intertidal surveys were conducted to assess the presence of horseshoe crabs notably in Sham Wat, San Shek Wan, Sha Lo Wan, Hau Hok Wan, San Tau, Tung Chung Bay and Tai Ho Wan. Approximately 1-2 hours of survey effort was allocated at each bay during every survey. Survey effort was, however, later (April and May 2004 surveys) increased to approximately six hours per survey to focus on localities considered to be nursery grounds including











Locations of Coral Surveys

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Figure No.
5

Sham Wat, Tung Chung Bay and Tai Ho Wan. These areas are known nursery grounds or that appeared to provide suitable habitat (typically well-aerated sediment substrates near to seagrass beds; substratum adjacent to streams).

4.7.2 Horseshoe crab surveys were conducted on 18, 25, 26 September, 21, 22 October, 18, 19 November 2003, 7, 15, 16, January, 11, 23 March, 23 April and 5, 6 May 2004. Additional surveys, with a duration of approximately 30 minutes to 5 hours, were undertaken on 2 and 25 October 2003, 25 January and 17 February 2004. The location of the horseshoe crab sites surveyed between September 2003 and May 2004 is presented in *Figure 3.*

4.8 Avifauna

4.8.1 The majority of avifauna surveys were conducted in the early-morning onwards as bird activity is generally higher during this period and both activity and singing decrease later in the day, particularly during hotter periods (Gibbons *et al*., 1996). Standardised line transects were used to accurately and rapidly survey the avifauna present in the study area. In addition, night surveys were conducted in order to assess the activity of nocturnal species. It should be noted, however, that most bird species are active during the day and only a limited number of nocturnal species such as owls, nightjars and species that frequently call at night were likely to be encountered.

4.8.2 As the study area was comparatively large, standardised line transects were used to assess the bird species present. Point counts (Bibby *et al*., 1992) were not considered to be the optimal census technique owing to the wide spatial range of the study area. Standardised line transects are preferred for rapid ecological assessment and were undertaken in habitats representative of the whole study area such as coastal areas, mudflats, woodland, plantation woodland and shrubland. Location of these line transects are presented in *Figure 6a*.

4.8.3 The rationale for conducting the avifaunal surveys during the wet and dry seasons was to ensure that resident species, autumn migrants and winter visitors were detected (note that these seasonal terms are used for reference only and although they follow the terminology used in the majority of local bird studies, they are not strictly correct in Hong Kong where the terms wet or dry season are applicable). The periods of the year that are notable for avifauna activity and/or migration patterns in Hong Kong are detailed below (adapted from Viney *et al*., 1994) and adjusted to reflect patterns in shrubland and forest from observations by Kwok (1996), Leven (2001) and previous surveys on Lantau Island (Mouchel 2000, 2002a):

- January-March: wintering species are present and cold weather can lead to the migration of birds from Mainland China. Both numbers and diversity of bird species in shrubland and forest declines progressively.
- April- May: spring passage of many migrant bird species. By mid-April the breeding season of resident species and newly-arrived summer visitors is underway.
- June-July: hot and humid period; numbers of local breeding birds are highest but overall species diversity is at its annual low point.
- August-October: autumn passage of birds starts in mid-August and continues until early November. Arriving winter visitors are present from mid-October.
- November-December: resident and wintering species are present and species diversity in shrubland and forest is highest.

4.8.4 Daytime surveys of the study area were conducted on 24 and 30 September, 20, 21, 24 and 29 October, 5, 19 and 28 November, 19 and 22 December 2003, 26, 27 January, 18, 23 February, 17, 31 March, 15, 30 April and 11, 12, 27 May 2004 together with an additional half-day survey on 2 October 2003. In order to accurately

N

Cheung Tung Road Hill

Tai Ho Bay

Pak Mong

Chek Lap Kok

Ferry Pier

Hau Hok Wan

Sha Lo Wan/
San Shek Wan Tunnel Option

Tin Sam

Tung Chung Battery

Tung Chung Bay

Sham Skek Tsuen

Sham Wat Wan

Legend:

- Fixed Survey Route for Bird Surveys
- Transect Boundary
- Secondary Woodland
- Cultivated Field/Orchard
- Developed Area
- Tall Shrubland
- Mangrove
- Wasteland
- Shrubby Grassland
- Seagrass
- Stream
- Plantation Woodland
- Salt Marsh
- Fung Shui Woods

Scale: 1 to 30,000

500 0 500 Meters

Location of Line Transects for Avifauna Survey

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Figure 6a

assess the presence of nocturnal species, night surveys were conducted on 23, 28 and 30 October, 5 and 27 November 2003, 17 and 19 February 2004, 19 and 27 April and 27 May 2004 with binoculars and a powerful search light. A map showing the area surveyed for birds over the period of September 2003 until May 2004 is presented in *Figure 6b*.

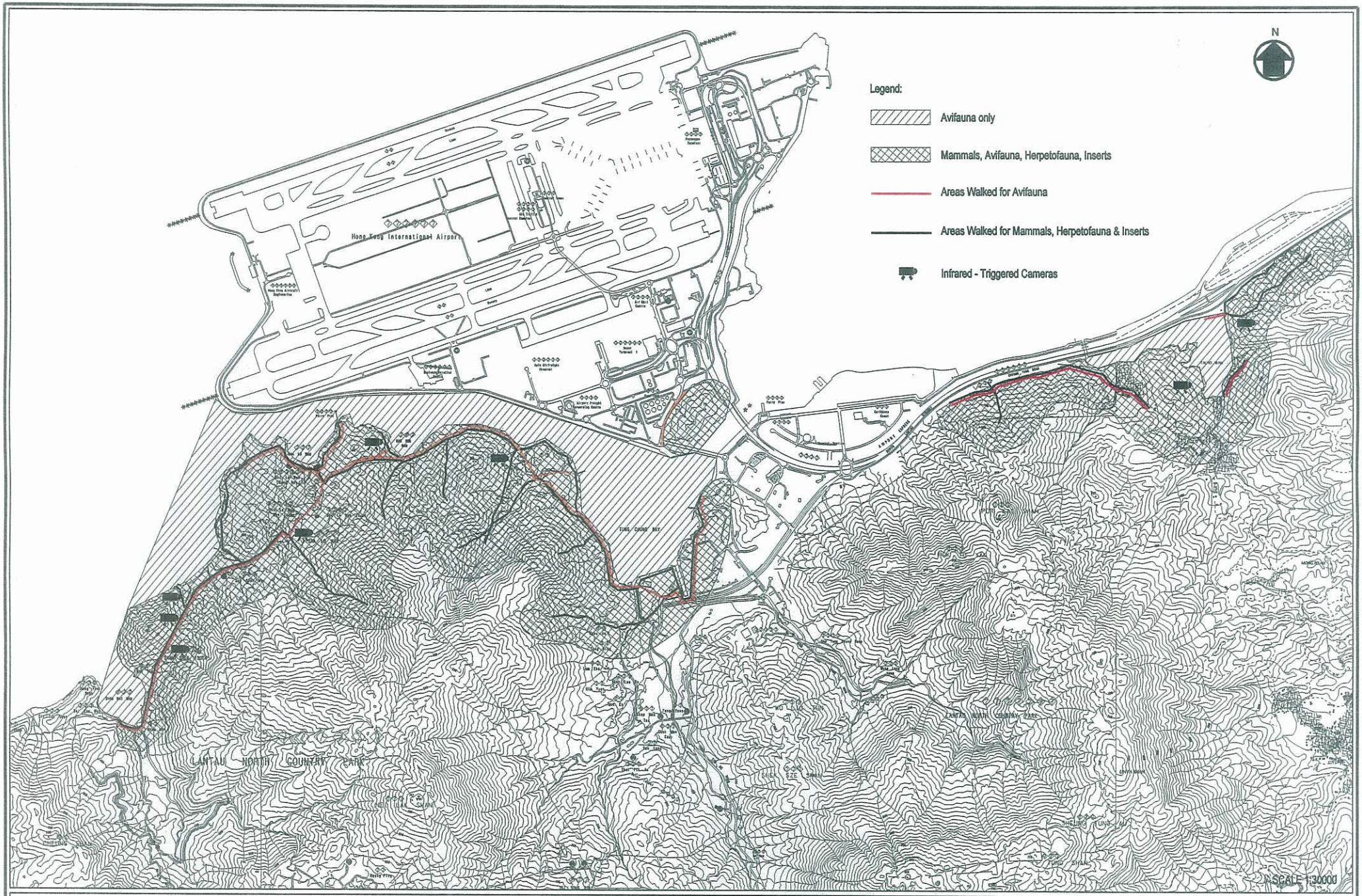
4.8.5 The following literature were consulted to provide information on the status of existing avifauna present in the study area and provide an indication of the rarity of species present both in Hong Kong and Southern China.

- Birds of Hong Kong and South China (Viney *et al*., 1994);
- A Field Guide to the Birds of China (Yen *et al*., 1996);
- A Field Guide to Birds of China (MacKinnon and Phillipps, 2000); and
- The Avifauna of Hong Kong (Carey *et al*., 2001).

4.9 Terrestrial Mammals

4.9.1 Mammal surveys did not include any element of trapping, since this is an intrusive and potentially harmful technique, and the main conservation interest lies in larger mammals, that appear to be scarce on Lantau (Goodyer, 1992; Reels, 1996; Mouchel, 2002a). Day-time searches for mammal activity (prints, burrows and scats) were used and night-time spot-lighting or auditory detection of larger mammals (most of which are primarily nocturnal) were adopted. In addition, passive surveys by the use of a Trailmaster combined camera and infra-red monitoring apparatus was set up in appropriate habitat locations within the study area. The camera was operated for 5-day periods and mammal species photographed were identified.

4.9.2 There were fourteen active day-time surveys, covering the wet and dry seasons, and were undertaken on 20 and 25 September, 2, 8, 24, 27 and 28 October, 5, 25 and 26 November 2003, 22 and 27 January, 16 and 17 March, 9, 12 and 18 May 2004. Night surveys were undertaken on 22 and 25 September, 5, 8, 23 and 27 October, 5 November and 10, 15 December 2003, 17 and 19 February, 20, 27 April and 9, 18 May 2004. Passive surveys were also carried out by setting up infra-red triggered camera sets and four surveys were undertaken between 20 and 25 September, 8 and 13 October, 10 and 15 December 2003 and 22 and 27 January 2004. A map showing the area surveyed for mammals from September 2003 to May 2004 is presented in *Figure 6b*.



Areas Surveyed for Avifauna, Mammals, Herpetofauna and Insects (September 2003 to May 2004)

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Figure No. 6b

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4.10 Insects (Butterflies and Dragonflies)

4.10.1 The focus of the insect surveys was on dragonfly, damselfly and butterfly groups. These insect groups are generally known to be indicators of a high quality habitat and the dragonflies and damselflies require clean freshwater for the successful completion of the larval stages of their lifecycle (Mouchel, 2002a). Special attention was given to habitat often frequented by dragonflies such as streams and riparian shrubland/woodland. Within these broad habitats, various micro-habitats (riffles, pools, small cut-off ponds, mossy banks, seepages, and overhanging vegetation) support different dragonfly species and all these micro-habitats were investigated. Dragonflies were identified with the aid of binoculars, and a telescopic hand net was also used to capture specimens for identification in the hand (when necessary).

4.10.2 Butterfly surveys were conducted in tandem with the dragonfly surveys, using similar methodology. Although most butterflies are readily observed, some species are cryptic and stay close to the ground in shady wooded areas. Others tend to stay on top of the canopy, making only short rapid flights before settling out of view. Accordingly, both of these microhabitats were investigated, by ground searching and by sweeps with a long-handled (5m) butterfly net.

4.10.3 The qualitative insect surveys were spread throughout the 6 month survey period covering both the wet and dry seasons. Late wet season data were collected on 20 and 25 September and 2, 8, 23, 24, 27 and 28 October 2003. Dry season data were collected on 5, 25 and 26 November 2003, 10 and 15 December, 22 and 27 January, 17 and 19 February 2004. Additional early wet season surveys were conducted on 16 and 17 March, 9 and 12 May 2004 during the day-time and 20, 27 April, 9, 13, 18 May 2004. A map showing the area surveyed for insects from September 2003 to May 2004 is presented in *Figure 6b*

4.11 Herpetofauna

4.11.1 Reptiles and amphibians surveys were conducted by active searching in all habitats, with particular attention given to potential shelters sites and hiding places such as streams and watercourses. Frogs and toads were surveyed by auditory as well as visual detection. As most of the amphibian species are more active during night time, surveys were also conducted at night.

4.11.2 The herpetofauna surveys were spread throughout the 9 month survey period covering both the wet and dry seasons. Late wet season data were collected on 20 and 25 September and 2, 8, 24, 27 and 28 October 2003 during the day-time and 22, 25 September, 5, 8, 23, 27 October 2003 during the night-time. Dry season data were collected on 5, 25 and 26 November 2003, 22, 27 January and 17, 19 February during day-time and 5 November and 10, 15 December during night-time. Additional early wet season surveys were carried out on 16, 17 March and 9, 12, 18 May 2004 during the day-time and 20, 27 April and 9, 18 May during the night-time.

4.12 Habitats and Vegetation

4.12.1 A habitat survey was conducted to identify and delineate the distribution of different ecological habitats found within the study area, making use of the latest available aerial photographs from the Lands Department and supplemented by a reconnaissance field survey. Reconnaissance field surveys were undertaken to field check and verify the information with focus on those areas to be directly affected by the HZMB. General habitat attributes such as vegetation type, structural complexity, or degree of disturbance will be noted and photographs taken during the field study. A habitat map of the study area was prepared at a scale of 1:15000.

4.12.2 A floral survey was conducted to identify the presence within the study area of any plant species of conservation interest. Surveys were conducted by using a stratified sampling technique and covering all representative habitat types found during the habitat mapping. Stratified sampling involved dividing the study area into sub-areas (strata) that differ in vegetation density and then these sub-areas are randomly surveyed. The sub-area is selected prior to the field investigation through preliminary data and aerial photographs. This method is an efficient means of sampling habitat types present and provides better results than by simple random sampling.

4.12.3 During the floral surveys, the location of rare or protected plant species were noted, and the number of individuals present counted. Floral characteristics including species list and relative abundance were provided. To date, seventeen field surveys have been conducted on 25 September and 16, 26, 28 October and 2, 4, 15, 29, 30 November and 2 December 2003, 26, 28 January and 22, 25, 26 March and 6, 7 May 2004.

5. Baseline Ecological Conditions

5.1 Freshwater and Estuarine Fish

5.1.1 The surveyed streams supported native upstream species (primary freshwater fish), migratory species (diadromous fish that migrate between freshwater and saltwater systems) as well as coastal species (brackish water fish). During field surveys, it was noted that many of stream courses within the study area were found to be seasonal (such as TH3-4, TH6-9, PM4, PM6-7) and these streams are, therefore, expected to have limited fish fauna due to insufficient discharge to support fish life on an annual basis. These surveyed streams pass through various vegetated habitats such as woodlands, shrubby grasslands and cultivated fields. In order to facilitate the description of species-habitat quality on a stream by stream basis, individual streams were numbered for reference (*Figures 2.1-2.4*).

5.1.2 During the course of the surveys, 67 fish species were recorded and these are presented below in *Table 5.1*. Survey results confirmed that the Tai Ho, Tung Chung and Sham Wat streams in particular, support high fish diversity and species of conservation interest. Details of the survey results are presented in *Appendix B*.

Table 5.1 Freshwater and Estuarine Fish Species Recorded in the Study Area between September 2003 and May 2004

Species name	Occurence[1]	Location[2]					
		Sep 03	Oct 03	Dec 03	Feb 04	Apr 04	May-04
Acanthopagrus berda (Forsskål, 1775)	8			SW7, SL3, PM1	SW7, TC2, PM1, PM3	SL3, TC2, PM1	SW7, SL3, ST9, TC1, TC2, PM1, TH1
Acanthopagrus latus (Houttuyn, 1782)	6			PM1	PM1, PM3	SL3, PM1	SW7, SL3, TC1, PM1, PM3, TH1
Acentrogobius caninus (Valenciennes, 1837)	6	ST9		ST9	ST9		SL3, ST9, TC1, PM1, PM3, TH1
Acentrogobius viridipunctatus (Valenciennes, 1837)	5	ST9		SW1	SW1		ST9, TC1, PM1, TH1
Acrossocheilus beijiangensis (Wu & Lin, 1977)	1			TC1			
Ambassys gymnocephalus (Lacepède, 1802)	7	SW7, SL3, TC1	SW1, SL3, TC1, PM1, TH1	SW1, SW7, SL3, TC1, TH1	SW1, SW7, SL3, TC1, PM1, TH1	SW7, SL3, TC1, TH1	SW1, SW7, SL3, ST9, TC1, PM1, TH1
Anguilla japonica (Temminck & Schlegel, 1846)	9	SW1, ST9	SW1, SL3, ST9, TC1, PM1, TH1	SW1, SS4, SL3, ST9, TC1, PM1, TH1	SW1, ST9, TC1, PM1, TH1	ST9, TC1, TH1	SW1, SW7, SL3, ST9, TC1, PM1, TH1
Anguilla marmorata (Quoy & Gaimard, 1842)	2			SW7			TH1
Bathygobius meggetti (Hora & Mukerji, 1936)	13	SW1, SL3, ST9, TC1	SW1, SW7, SS1, SS3, SS4, SS6, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS1, SS3, SS4, SS6, SL3, ST9, TC1, PM1	SW1, SW7, SS1, SS3, SS4, SS6, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS1, SS4, SS6, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS1, SS4, SS6, SL3, HH5, ST9, TC1, PM1, PM3, TH1
Butis butis (Hamilton, 1822)	7	SL3	SL3, PM1, PM3, TH1	SW1, SW7, SL3, TC1, TH1	SW1, SW7, SL3, PM1, PM3, TH1	SW1, SW7, SL3, PM1, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Butis koilomatodon (Bleeker, 1849)	4	ST9		SW1, SW7, SL3	SL3		ST9
Capoeta semifasciolata (Günther, 1868)	6	SL3, TC1		SW1, SW7, TC1, PM1	SW1, SW7, TC1, PM1	SW1, SW7, SL3, TC1, PM1	SW1, SW7, SL3, TC1, PM1, TH1
Channa asiatica (Linnaeus, 1758)	5			SW7	SW7, TC1		SL3, TC1, PM1, TH1
Chelon subviridis (Valenciennes, 1836)	8		SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Cirrhinus molitorella (Valenciennes, 1844)	1	TC1		TC1			
Clarias fuscus (Lacepède, 1803)	7			SW1, SL3, TC1, TC3, PM1	SW1, TC1	SW1, SL3	SW7, SL3, TC1, PM1, TH1
Eleotris acantopoma acanthopoma (Bleeker, 1853)	8	SW1, SW7, SL3, ST9	SW1, SW7, SL3, ST9, PM1, PM3, TH1	SW1, SW7, SL3, ST9, PM1, TH1	SW1, SW7, SL3, ST9, PM1, PM3, TH1	SW1, SW7, SL3, ST9, PM1, PM3, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Eleotris melanosoma (Bleeker, 1852)	3	SL3, TC1		SL3, TC1	SL3, TC1	TC1	TC1, TH1

Species name	Occurence[1]	Location[2]					
		Sep 03	Oct 03	Dec 03	Feb 04	Apr 04	May-04
Eleotris oxycephala (Temminck & Schlegel, 1845)	5	SL3	PM1	SW7, SL3, PM1	SW7, SL3, PM1	SL3, PM1	SL3, ST9, PM1, TH1
Gambusia affinis affinis (Baird & Girard, 1853)	6	SL3, TC1, TC2, TC3	SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1
Gerres filamentosus (Cuvier, 1829)	6			SW7, SL3, TC1, TH1	SW7, SL3, TC1, PM1, PM3, TH1	SW7, SL3, PM1, PM3, TH1	SW7, SL3, TC1, PM1, PM3, TH1
Gerres poeti (Cuvier, 1829)	8			SW1, SW7, SL3, TC1, PM1, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Glossogobius giuris (Hamilton, 1822)	9	SW1, SW7, SL3, ST9, TC1	SW1, SW7, SL3, ST9, TC1, PM1, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1
Glossogobius olivaceus (Temminck & Schlegel, 1845)	9			SW1, SW7, SS1, SL3, HH5, TC1, PM1, TH1	SW1, SW7, SS1, SL3, TC1	SW1, SL3, TC1	SW1, SL3, ST9, TC1, TH1
Lateolabrax japonicus (Temminck & Schlegel, 1843)	2			SW7			SW7, TC1, TH1
Lates calcarifer (Bloch, 1790)	2			SW7		SL3	SL3, TH1
Liniparhomaloptera disparis disparis (Lin, 1934)	9	SL3, ST6, ST7, ST8		SW7, SL3, ST6, ST7, ST8, ST9, PM1	SL3, SL10, ST8, PM1	SL3, ST6, ST7, ST8, ST9, PM1	SL3, ST6, ST7, ST8, ST9, PM1, TH1
Luciogobius guttatus (Gill, 1859)	14	SW1, TC1	SW1, SS1, SS6, SL3, ST9, TC1, PM1	SW1, SW7, SS1, SS3, SS4, SS6, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SS1, SS6, SL3, ST9, TC1, PM1, PM3	SS1, SL3, ST9, TC1, PM1	SW1, SW7, SS1, ST9, TC1, PM1, PM3, TH1
Lutjanus argentimaculatus (Forsskål, 1775)	8	SW1, SW7, SL3, TC1	SW1, SW7, SL3, TC1, PM1, PM3	SW1, SW7, SL3, TC1, PM1, PM3	SW1, SW7, SL3, TC1, PM1, PM3	SW7, SL3, TC1, PM1, TH1	SW1, SW7, SL3, ST9, TC1, PM1, TH1
Lutjanus russellii (Bleeker, 1849)	3			SW7		SL3	SL3, TH1
Macropodus opercularis (Linnaeus, 1758)	1			TC1	TC1		
Misgurnus anguillicaudatus (Cantor, 1842)	8			SW7, ST6, ST7, ST8, TC1, PM1			SW7, SL3, TH1
Momopterus albus (Zuiew, 1793)	2			SL3			PM1
Mugil cephalus (Linneaus, 1758)	7	SW1, SW7, SL3, TC1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Mugilogobius abei (Jordan & Snyder, 1901)	11	SW1, SW7, SL3, ST9, TC1	SW1, SW7, SS6, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS3, SS4, SS6, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS6, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS6, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SS6, SL3, HH5, ST9, TC1, PM1, PM3, TH1
Mugilogobius chulae (Smith, 1932)	8	SW1, SL3, TC1	SW7, SL3, ST9, TC1, PM1, PM3, TH1	SW7, SL3, ST9, TC1, PM1, PM3	SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1
Mugilogobius obliquifasciatus (Wu & Ni, 1985)	2	TC1, TC2		TC1, TC2	TC1, TC2	TC1, TC2	TC1, TC2
Nicholsicypris normalis (Nichols & Pope, 1927)	2		SW1	SW1, SW7	SW1	SW1	SW1
Oreochromis mossambicus (Peters, 1852)	7	TC1, TC2, TC3	SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1	SW7, SL3, TC1, TC2, TC3, PM1, TH1	SW7, SL3, TC1, TC2, TC3, PM1, TH1
Oreonectes platycephalus (Günther, 1868)	8	SL3		SW1, SW7, SL3, ST6, ST7, ST8, PM1	SW1, ST8	SW1, ST6, ST7, ST8, PM1, PM3	SW1, SW7, SL3, ST6, ST7, ST8, PM1
Orizias curvinotus (Nichols & Pope, 1927)	1	TC1		TC1	TC1		
Paralichthys olivaceus (Temminck & Schlegel, 1846)	2			SW7, TC1	SW7, TC1		
Parazacco spilurus (Günther, 1868)	9	SL3, ST6, ST7, ST8, TC1	SL3, ST6, ST7, ST8, TC1, PM1	SW7, SL3, ST6, ST7, ST8, TC1, PM1	SW7, SL3, ST8, TC1, PM1	SW7, SL3, ST6, ST7, ST8, TC1, PM1	SW7, SL3, ST6, ST7, ST8, TC1, PM1, TH1
Pisodonophis boro (Hamilton, 1822)	2						TC1, PM1
Pisodonophis cancrivorus (Richardson, 1848)	5	SW7, SL3, TC1		TC1, PM1	TC1, TH1		
Plecoglossus altivelis (Temminck et Schlegel, 1846)	1						TH1

Species name	Occurence[1]	Location[2]					
		Sep 03	Oct 03	Dec 03	Feb 04	Apr 04	May-04
Plotosus anguillaris (Bloch, 1794)	5			SL3, TC2			SW7, SL3, TC1, TH1
Pseudogastromyzon myersi (Herre, 1932)	7	SL3, ST6, ST7, ST8		SW7, SL3, ST6, ST7, ST8, PM1	SL3, ST8, PM1	SL3, ST6, ST7, ST8, PM1	SL3, ST6, ST7, ST8, PM1, TH1
Pseudogobius javanicus (Bleeker, 1856)	9	SW1, SW7, SL3, ST9, TC1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1
Rhinogobius duospilus (Herre, 1935)	17	SL3, ST9	SL3, NLH4, NLH5, NLH6, NLH7, NLH8, PM1, TH1, TH5	SW7, SS2, SS3, SS4, SS6, SL3, HH5, NLH4, NLH5, NLH6, NLH7, NLH8, PM1, PM3, TH1, TH5	SW7, SS2, SS3, SS4, SS6, SL3, HH5, NLH4, NLH5, NLH6, NLH7, NLH8, PM1, PM3, TH1, TH5	SW7, SS2, SS3, SS4, SS6, SL3, ST9, NLH4, NLH5, NLH6, NLH7, NLH8, PM1, PM3, TH1, TH5	SW7, SS2, SS3, SS4, SS6, SL3, ST9, NLH4, NLH5, NLH6, NLH7, NLH8, PM1, PM3, TH1, TH5
Rhinogobius giurinus (Rutter, 1897)	7	ST9		SW7, PM1, TH1	SW7, PM1, TH1	SW7, PM1, TH1	SW7, SL3, ST9, TC1, PM1, PM3, TH1
Rhynchorhamphus georgii (Valenciennes, 1847)	7		SL3, TC1, PM1, PM3, TH1	SW7, SL3, TC1	SW7, SL3, TC1, PM1		SW1, SW7, SL3, TC1, PM1, TH1
Scatophagus argus (Linnaeus, 1766)	6	SW1, SW7, SL3	SW1, SW7	SW1, SW7, SL3, TC1, PM1, TH1	SW1, SW7	SL3	SL3
Schistura fasciolata (Nichols & Pope, 1927)	10	SL3, ST6, ST7, ST8		SW1, SW7, SL3, ST6, ST7, ST8, ST9, PM1	SW1, SL3, SL10, ST8, PM1	SW1, SL3, ST6, ST7, ST8, PM1	SW1, SW7, SL3, ST6, ST7, ST8, PM1, TH1
Siganus fuscescens (Houttuyn, 1782)	9			SW1, SW7, SL3	SW1, SW7, SL3, HH5		SL3, ST9, TC1, PM1, PM3, TH1
Sillago japonica (Temminck & Schlegel, 1843)	7			SW1, SW7, SL3	SW1, SW7		SW1, SW7, ST9, TC1, PM1, PM3
Sillago shihama (Forsskål, 1775)	5			SW1, SW7, SL3	SW1, SW7, SL3, PM1, TH1	SL3, TH1	SW1, SW7, SL3, PM1, TH1
Silurus cochinchinensis (Valenciennes, 1840)	6	SL3	SW1, SL3, TC1, PM1	SW1, SL3, TC1, PM1	SW1, SL3, TC1, PM1	SW1, SL3, PM1	SW1, SW7, SL3, PM1, TH1
Takifugu niphobles (Jordan & Snyder, 1901)	8	SL3, TC1		SW7, TC1, TH1	SW7, TC1, PM1, PM3, TH1	SW1, SW7, TC1, PM1, PM3, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Takifugu obscurus (Abe, 1949)	6			SW7, TC1, TH1		SW7, SL3, ST9, PM1, TH1	SW1, SW7, SL3, ST9, TC1, PM1, TH1
Takifugu ocellatus (Linnaeus, 1758)	5			SW7, ST9, TC1, PM3, TH1	ST9	ST9	
Terapon jarbua (Forsskål, 1775)	8	SW1, SW7, SL3, TC1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, TC1, PM1, PM3, TH1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1
Tridentiger bifasciatus (Steindachner, 1881)	9	SW1, SW7, SL3, ST9, TC1	SW1, SW7, SL3, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1
Tridentiger trigonocephalus (Gill, 1859)	9			SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW1, SW7, SL3, HH5, ST9, TC1, PM1, PM3, TH1	SW7, ST9, TC1, PM1	SW7, ST9, TC1, PM1
Tylosurus strongylurus (Van Hasselt, 1823)	3			SW7, TC1	TH1		SW7, TH1
Xiphophorus hellerii (Heckel, 1848)	2			SW7, TC1			
Xiphophorus variatus (Meek, 1904)	2	TC1		SW7, TC1			

[1]This refers to the total number of stream courses (as listed in the location columns) where the species was recorded; [2]HH = Hau Hok Wan; PM = Pak Mong; SL = Sha Lo Wan; SS = San Shek / Sham Shek Tsuen; ST = San Tau; SW = Sham Wat; TC = Tung Chung; TH = Tai Ho.

5.1.3 Notable fish species of conservation interest recorded in the streams include the *Acrossocheilus beijiangensis*, (Tung Chung Stream), *Anguilia marmorata* (Sham Wat Stream and Tai Ho Stream), *Channa asiatica* (Pak Mong Stream, Sha Lo Stream, Sham Wat Stream, Tai Ho Stream and Tung Chung Stream), *Oryzias curvinotus* (Tung Chung Stream), *Plecoglossus altivelis* (Tai Ho Stream), *Takifugu ocellatus* (Pak Mong Stream, San Tau Stream, Sham Wat Stream, Tai Ho Stream and Tung Chung Stream). Among these, *Acrossocheilus beijiangensis*, *Anguilia marmorata* and *Oryzias curvinotus* are of global concern and the remaining two species are considered locally/regionally restricted. The locations where these fish were recorded are shown in *Figures 2.1-2.4.*

5.1.4 Beijiang Thick-lipped Barb *Acrossocheilus beijiangensis* was recorded in Tung Chung Stream (TC1) during the survey in December 2003. This species was first

reported in Hong Kong by Chong and Dudgeon (1992) and was until recently known only from Tung Chung Stream within the Territory (Mouchel, 2002a). However, this fish has also recently been recorded in the Wong Lung Hang Stream (Chan, 1998) and is considered to be of conservation interest (global concern; Fellowes *et al*., 2002).

5.1.5 The locally common Predaceous Chub *Parazacco spilurus* was recorded in a number of streams including Sha Lo Wan (SL3), Sham Wat (SW7), Pak Mong (PM1), Tung Chung (TC1), Tai Ho (TH1) and San Tau (ST6, ST7 and ST8) and this species was recorded during all fish surveys. This species is listed as "Vulnerable" in the China Red Data Book. However, this is more a reflection of lack of fish research in the region than of the real vulnerability of the species (Mouchel, 2002a).

5.1.6 The Giant Mottled eel *Anguilla marmorata* was recorded in Sham Wat (SW7) and Tai Ho (TH1) during the surveys conducted in December 2003 and May 2004. The population of *Anguilla marmorata* was reported to be in marked decline locally and considered a species threatened globally (Fellowes *et al*., 2002). This species is also listed in the China Red Data Book.

5.1.7 The Chinese Moon Snakehead *Channa asiatica* were recorded in Sham Wat Stream (SW7), Tung Chung Stream(TC1), Sha Lo Stream (SL3), Pak Mong Stream (PM1) and Tai Ho Stream (TH1) during December, February and May 2004 surveys. The overall population of this species has been in marked decline and this species is considered to be of local concern (Fellowes *et al*., 2002). The species is, however, distributed in several streams in Hong Kong and also cultured for food (Lam, 2002).

5.1.8 The Ricefish *Oryzias curvinotus* was recorded in Tung Chung Stream (TC1) during the fish surveys in September, December 2003 and February 2004. This species was recorded in a few locations in Lantau including the Fong Yuen Marsh (Mouchel, 2002a) and Mong Tung Hang Stream (Scott, 2000). This species is threatened globally (Fellowes *et al*., 2002) and highly endangered locally (Chong and Dudgeon, 1992).

5.1.9 During the May 2004 survey, the Ayu *Plecoglossus altivelis* was recorded in the Tai Ho Stream (TH1). Declining population of this species were reported locally, regionally and globally. This species is ideintifed as of immediate regional concern (Fellowes *et al*., 2002) and only recorded once during the course of the surveys.

5.1.10 The Archpatch Puffer *Takifugu ocellatus* is rated of local concern and thought to be in population decline (Fellowes *et al*., 2002). During the December 2003, February and April 2004 surveys, this species was recorded in Sham Wat Stream (SW7), San Tau Stream (ST9), Tung Chung Stream (TC1), PaK Mong Stream (PM3) and Tai Ho Stream (TH1).

5.2 Freshwater Macroinvertebrate

5.2.1 Six macroinvertebrate stream surveys were conducted between September 2003 and January 2004 and the fauna recorded are presented in *Appendix C*. The sampling locations are presented on *Figure 3*. A total of twelve freshwater macroinvertebrate families/suborders consisting of 83 individuals were recorded during the surveys.

5.2.2 The number of macrofauna recorded in each stream was generally low (except the stream at San Shek Wan) although this is likely to be due to lower water flow during the dry season. During the January 2004 survey, many of the water courses with low flows during the wet season were completely dried out. The water levels at courses with significant flows during the wet season were found to be lowered substantially, including sections of the Hau Hok Wan and San Tau streams. This seasonal variation, however, is typical of streams in Hong Kong (Dudgeon and Corlett, 1994).

The lower section of the San Tau Stream was recently realigned and the sampling site was highly disturbed and quantitative kick sampling was not conducted.

5.2.3 In order to determine the relative quality of each water course, a biotic index was calculated for each stream. It should be noted that the BMWP index was developed for northern European rivers and not all subtropical macroinvertebrate representatives have been ascribed a score and as such some caution is required when applying the index to Hong Kong datasets.

5.2.4 The BMWP scores were calculated for each stream and the derived biotic index for Pak Mong, Hau Hok Wan, Sha Lo Wan and San Shek Wan are 8, 0, 2 and 34, respectively. The biotic index indicated that there were large variations in the habitat quality of the streams within the study area. This, however, could be a reflection of stream flow variability and the percentage of taxa that does not have a score rather than pollution/disturbance. The macroinvertebrates and calculated biotic index are summarised in *Table 5.2* below.

Table 5.2 The Number of Macroinvertebrate Individuals of each Family Recorded and BMWP Scores

Family	Common Name	Pak Mong	Hau Hok Wan	Sha Lo Wan	San Shek Wan
Gammaridae[1]	Amphipod	1 (6)			
Hydropsychidae	Caddisflies				1 (5)
Euphaeidae	Damselflies				1 (0)
Libellulidae	Dragonflies				10 (8)
Corydalidae	Fishflies				1 (0)
Baetidae	Mayflies				9 (4)
Euphemeridae	Mayflies				1 (0)
Leptophlebiidae	Mayflies				24 (10)
Chironomidae	Trueflies (Non-biting midge)	14 (2)		7 (2)	4 (2)
Nematocera[1]	Trueflies		1 (0)		
Gyrinidae	Water Beetle				3 (5)
Psephenidae	Water Beetle				6 (0)
Grapsidae	Small Shore Crab[2]	1 (0)			
Total Abundance (BMWP Index)		**16 (8)**	**1 (0)**	**7 (2)**	**60 (34)**

Note: The BMWP scores are presented in brackets. A value of zero was assigned to families that do not have a BMWP score; [1]Suborder; [2] Estuarine fauna.

5.3 Marine Benthic Macrofauna

Results - Faunal Characteristics

5.3.1 The benthic sampling event in October 2003 (late wet season) resulted in the collection of 15 sediment samples containing 362 macro-faunal specimens belonging to 31 families comprising 5 different phyla. The total recorded biomass was 11.5 g although this was largely due to the high mass of crustaceans (arthropods), echinoderms and molluscs collected (*Table 5.3*). The dry season survey in January 2004 resulted in the collection of 459 macrofaunal specimens belonging to 56 families comprising 8 different phyla. The total recorded biomass was 31.07 g although this was largely due to the high mass of molluscs, crustaceans (arthropods) and polychaetes (annelids) collected.

5.3.2 As noted in *Table 5.3* below, higher number, biomass and fauna diversity of macro-faunal were recorded during the dry season survey. The macrofauna data obtained together with the ANOVA tables are appended in *Appendices D1* and D*2* of this Report.

Table 5.3 Summary of the Macrofauna Collected in October 2003 and January 2004

Phylum	Wet Season (October 2003)			Dry Season (January 2004)		
	Number of Identified Families	Total Number of Individuals	Total Biomass (g)	Number of Identified Families	Total Number of Individuals	Total Biomass (g)
Annelida	16	288	1.20	32	340	2.62
Arthropoda	7	54	5.31	10	85	9.55
Coelenterata	0	0	0	2	3	0.08
Echinodermata	2	5	2.60	2	14	0.43
Echiura	0	0	0	1	1	0.60
Mollusca	5	14	2.40	7	13	17.77
Plathyelminthes	0	0	0	1	1	0.01
Sipuncula	1	1	0.0003	1	2	0.01
Grand Total	**31**	**362**	**11.5**	**56**	**459**	**31.07**

5.3.3 An exploratory analysis of the dataset was conducted to ascertain further information on the biological attributes in each area. An assessment of the data by area revealed large differences in terms of both the number of individuals and biomass present. During the wet season survey, the macrofaunal density recorded from the areas off Tai Ho Wan (32.6 individuals grab^{-1}) and the Hong Kong Section (30.6 individuals grab^{-1}) were fairly similar while the Tung Chung Channel contained the lowest faunal density (9.2 individuals grab^{-1}). The average biomass ranged from 1.49 g grab^{-1} in the Hong Kong Section (HKS) to 0.05 g grab^{-1} in the Tung Chung Channel (NLHC).

5.3.4 During the dry season survey, the macrofaunal density recorded from the areas off Tai Ho Wan (23.0 individuals grab^{-1}) and the Hong Kong Section (22.6 individuals grab^{-1}) were similar while the Tung Chung Channel contained the highest faunal density (46.2 individuals grab^{-1}). The average biomass ranged from 4.10 g grab^{-1} in the Hong Kong Section (HKS) to 0.54 g grab^{-1} in the Tai Ho Wan (THW). The macrofauna characteristics recorded from each area during both the wet (October 2003) and dry season (January 2004) surveys are presented below in *Table 5.4*.

Table 5.4 Summary of the Macrofauna Collected from Each Area

Area (*n*=5)	Total Number of Taxa[1]	Total Number of Individuals	Total Biomass (g)	Number of Taxa[1] Grab^{-1}	Number of Individuals Grab^{-1}	Biomass (g) Grab^{-1}
Wet Season (October 2003)						
HKS	19	153	7.47	3.8	30.6	1.49
NLHC	12	46	0.23	2.4	9.2	0.05
THW	23	163	3.80	4.6	32.6	0.76
Total	**36**	**362**	**11.5**	**7.2**	**72.4**	**2.3**
Dry Season (January 2004)						
HKS	28	113	20.50	5.6	22.6	4.10
NLHC	49	231	7.87	9.8	46.2	1.57
THW	28	115	2.70	5.6	23.0	0.54
Total	**69**	**459**	**31.07**	**13.8**	**91.8**	**6.21**

Notes: Hong Kong Section (HKS); Tung Chung Channel (NLHC); Tai Ho Wan (THW). [1]Taxa refers to the lowest taxonomic level identified (i.e., either species or genus).

5.3.5 Six species were considered dominant in terms of abundance in the grab samples (dominance is defined as greater than 10 individuals of the same species in each grab). The dominant species recorded in October 2003 and January 2004 and the corresponding stations are presented below in *Table 5.5*. Of the dominant species recorded, almost all were annelids (worms). The capitellid *Mediomastus californiensis* and spionids *Prionospio* spp. and crustacen decapod *Neoxenophthalmus obscurus* were the most dominant species and more than 10 individuals of these species were recorded in both the wet and dry seasons.

Table 5.5 Summary of the Dominant (> 10 Individuals in Each Grab) Macrofauna Species Collected (October 2003 and January 2004)

Phylum	Class	Order	Family	Species	Wet Season	Dry Season
Annelida	Polychaeta	Capitellida	Capitellidae	*Mediomastus californiensis*	HKS-5; TWH-4	NLHC3
Annelida	Polychaeta	Spionida	Spionidae	*Prionospio queenslandica*	THW-1	NLHC-2; NLHC-3; THW-5
Arthropoda	Crustacea	Decapoda	Pinnotheridae	*Neoxenophthalmus obscurus*	HKS-4	HKS2
Annelida	Polychaeta	Eunicida	Eunicidae	*Eunice indica*	-	NLHC-2; LHC-3
Annelida	Polychaeta	Spionida	Poecilochaetidae	*Poecilochaetus serpens*	THW-1	-
Annelida	Polychaeta	Spionida	Spionidae	*Prionospio cirrifera*	HKS-3; HKS-4	-

5.3.6 Further biological information on the taxa present at each station is also useful in addition to reporting the dominant species above in *Table 5.5*. The datasets for the wet (October 2003) and dry (January 2004) benthic macro-fauna have also been presented in order to complement the information presented above for the dominant species. Summaries of the benthic macro-fauna families present during the wet and dry season surveys in each area are presented below in *Tables 5.6* and *5.7*, respectively. During the wet season, the most abundant number of individuals recorded in each family present were the spionidae (85 individuals), pilargiidae (63 individuals) and capitellid (57 individuals) annelids. During the dry season, the most abundant number of individuals recorded in each family present were the spionidae (79 individuals), capitellidae (71 individuals) and eunicidae (55 individuals) annelids.

Table 5.6 Summary of the Macrofauna Families (number of individuals) Collected in each area in October 2003

Phylum	Family	HKS	NLHC	THW	Total
Annelida	Capitellidae	26	12	19	57
	Cirratulidae	1	2	7	10
	Cossuridae	3	6		9
	Glyceridae			6	6
	Hesionidae	4			4
	Lumbrineridae			5	5
	Magelonidae			1	1
	Nephtyidae	5	4	4	13
	Nereidae			4	4
	Phyllodocidae			3	3
	Pilargiidae	21	12	30	63
	Poecilochaetidae			23	23
	Polynoidae	1		2	3
	Spionidae	40	6	39	85
	Syllidae	1			1
	Trichobranchidae			1	1
Arthropoda	Callianassidae	1			1
	Corophiidae	4	1	10	15
	Gonedacidae	2		2	4
	Goneplacidae			1	1
	Penaeidae			1	1
	Pinnotheridae	28	1	1	30
	Processidae	1		1	2
Echinodermata	Amphiuridae	3		1	4
	Synaptidae			1	1
Mollusca	Lasaeidae	1			1
	Nassariidae	9			9
	Semelidae	1	1		2
	Solenidae			1	1
	Tellinidae	1			1
Sipuncula	Phascolosomatidae		1		1
Grand Total		**153**	**46**	**163**	**362**

Table 5.7 Summary of the Macro-fauna Families (number of individuals) Collected at each area in January 2004

Phylum	Family	HKS	NLHC	THW	Total
Annelida	Ampharetidae			1	1
	Amphinomidae	1			1
	Capitellidae	34	23	14	71
	Chrysopetalidae		1		1
	Cirratulidae		2	1	3
	Dorvilleidae			1	1
	Eunicidae	1	53	1	55
	Glyceridae		12	7	19
	Goniadidae	1	2		3
	Hesionidae	2	7	2	11
	Heterospionidae		2		2
	Lacydoniidae		1		1
	Lumbrineridae	2	1	9	12
	Magelonidae		1	2	3
	Maldanidae		1		1
	Nephtyidae	6	6	7	19
	Nereidae		1		1
	Onuphidae		1		1
	Opheliidae	1			1
	Orbiniidae	1	3	1	5
	Paraonidae		1		1
	Phyllodocidae		4		4
	Pilargiidae	10	10	9	29
	Poecilochaetidae		2	1	3
	Polynoidae	1	4		5
	Sabellariidae		1		1
	Sabellidae		1		1
	Sigalionidae		1		1
	Spionidae	7	42	30	79
	Sternaspidae	1			1
	Syllidae		2		2
	Terebellidae			1	1
Arthropoda	Alpheidae		8	2	10
	Bodotriidae	1			1
	Corophiidae		12	13	25
	Goneplacidae	2	2		4
	Leucosiidae		1		1
	Luciferidae	1			1
	Pilumnidae		1	3	4
	Pinnotheridae	29	4		33
	Porcellanidae		3		3
	Portunidae		1	2	3
Coelenterata	Actiniidae		1	1	2
	Virgulariidae	1			1
Echinodermata	Amphiuridae	4	2	4	10
	Temnopleuridae	2	2		4
Echiura	Echiuridae		1		1
Mollusca	Calyptraeidae		3		3
	Muricidae	1			1
	Semelidae	1			1
	Tellinidae			1	1
	Thraciidae			1	1
	Ungulinidae		1		1
	Veneridae	2	2	1	5
Plathyelminthes	Stylochidae	1			1
Sipuncula	Phascolosomatidae		2		2
Grand Total		**113**	**231**	**115**	**459**

Statistical Analysis

Univariate Statistical Results of Benthic Macro-fauna

5.3.7 The wet season results of the statistical analyses of the biological parameters (number of species, faunal abundance, faunal biomass and diversity) measured in the different areas are summarised in *Figures 7.1 – 7.4* and in *Table 5.8* below. In general, more species, individuals, biomass and higher species diversity were recorded from the Hong Kong Section (HKS) and Tai Ho Wan (THW) areas while the lowest values were recorded in the sheltered Tung Chung Channel (NLHC).

5.3.8 The dry season results of the statistical analyses of the biological parameters (number of species, faunal abundance, faunal biomass and diversity) measured in the different areas are summarised in *Figures 7.5 – 7.8* and in *Table 5.8* below. In general, the univariate benthic community characteristics recorded in the Hong Kong Section (HKS), Tung Chung Channel (NLHC) and Tai Ho Wan (THW) were similar.

Table 5.8 Summary of the Macrofauna Statistical Analyses

Biological Parameter	Area[2]	Comments
Wet Season		
Number of Species	* THW=HKS>NLHC	There were significant differences in the number of species present. The mean number of species recorded in the Tai Ho Wan and Hong Kong Section were significantly higher than the Tung Chung Channel (*Figure 7.1)*.
Number of Individuals	NS	There were no significant differences between the number of individuals present in each area (*Figure 7.2*).
Biomass	NS	There were no significant differences in biomass between areas (*Figure 7.3*).
Diversity[1]	** THW HKS NLHC	There were significant differences in diversity present between areas. The mean diversity recorded at Tai Ho Wan (THW) was significantly higher than the Tung Chung Channel (NLHC) (*Figure 7.4*).
Dry Season		
Number of Species	NS	There were no significant differences in number of species between areas (*Figure 7.5*).
Number of Individuals	NS	There were no significant differences between the number of individuals present in each area (*Figure 7.6*).
Biomass	NS	There were no significant differences in biomass between areas (*Figure 7.7*).
Diversity[1]	NS	There were no significant differences in diversity between areas (*Figure 7.8*).

Notes: NS = Non significant; *=P<0.05; **= P<0.01; NLHC = Tung Chung Channel; HKS = Hong Kong Section; THW = Tai Ho Wan. ANOVA was used to test the spatial differences between areas; [1]Diversity is at the species/genus level and analysed using the Shannon-Wiener index (log_{10}); [2]Where ANOVA revealed significant differences between the areas, the pattern of significant spatial differences are presented in the second row. Areas that are underlined are not significantly different.

Abundance Biomass Plots and *W* Statistic

5.3.9 The ABC plots for each area showed that the curves were indicative of stable communities in both the wet and dry seasons. When the biomass curve is above the abundance curve for its entire length (thereby indicating higher numbers of organism diversity than biomass diversity) it indicates that a stable community is present that is considered to be unaffected by disturbance or pollution (Warwick, 1986). The *W* statistic reduces each ABC plot to a single summary statistic that is helpful for interpretation of benthic communities by non-specialists. A negative *W* statistic indicates gross disturbance or pollution.

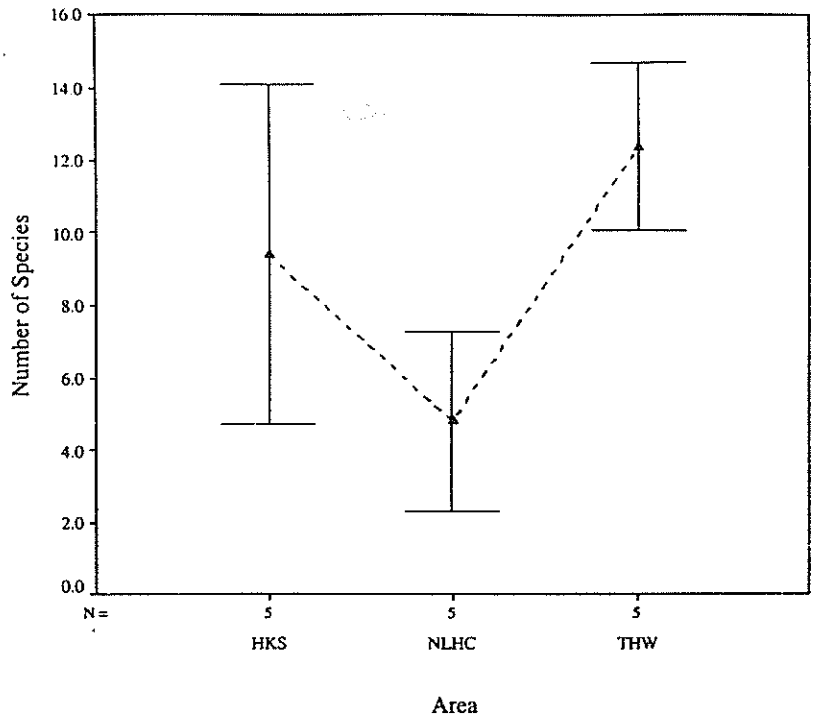


Figure 7.1 ***Mean (± SD; per grab) number of macro-faunal species present in each area during the October 2003 wet season survey.***

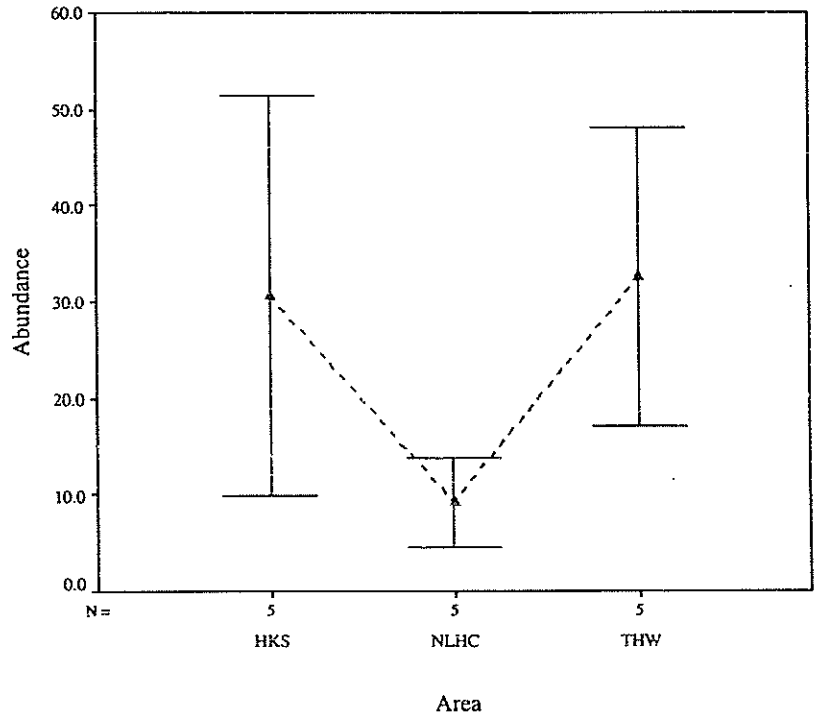


Figure 7.2 ***Mean (± SD; per grab) number of macro-faunal individuals in each area during the October 2003 wet season survey.***

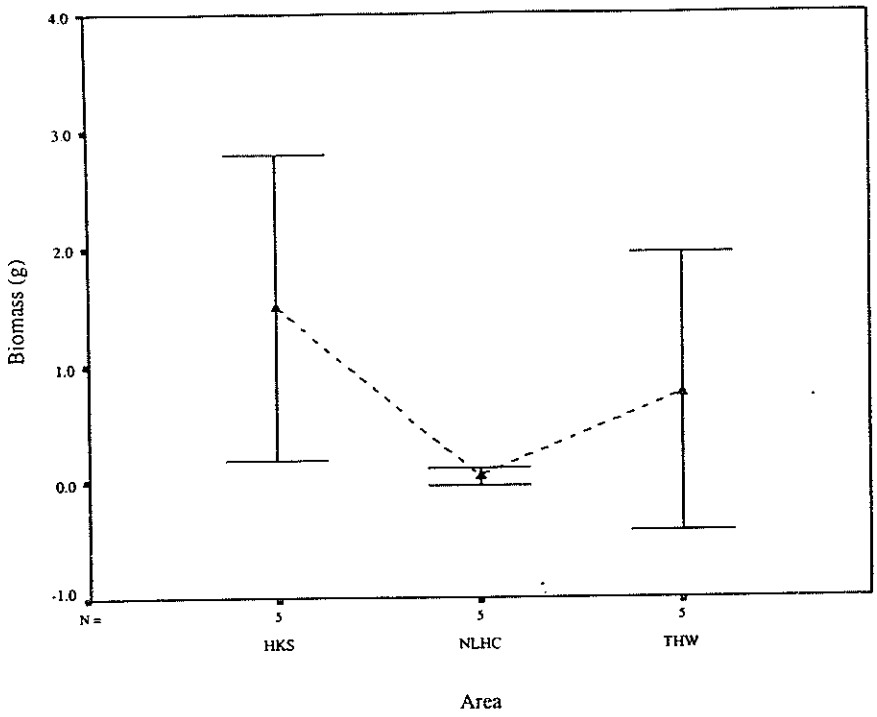


Figure 7.3 ***Mean (± SD; per grab) biomass of macro-faunal individuals in each area during the October 2003 wet season survey.***

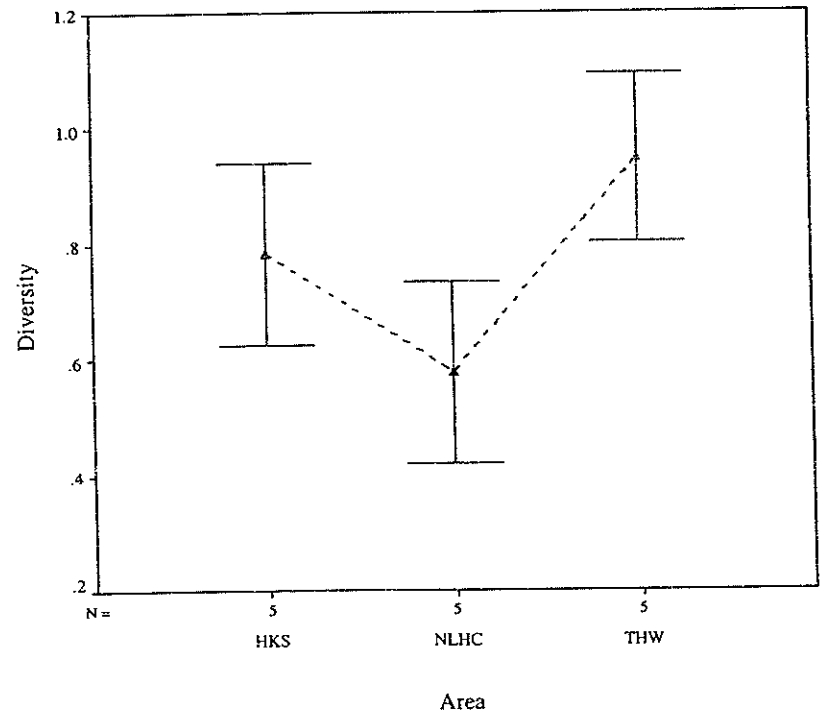


Figure 7.4 ***Mean (± SD; per grab) diversity of macro-faunal in each area during the October 2003 wet season survey.***

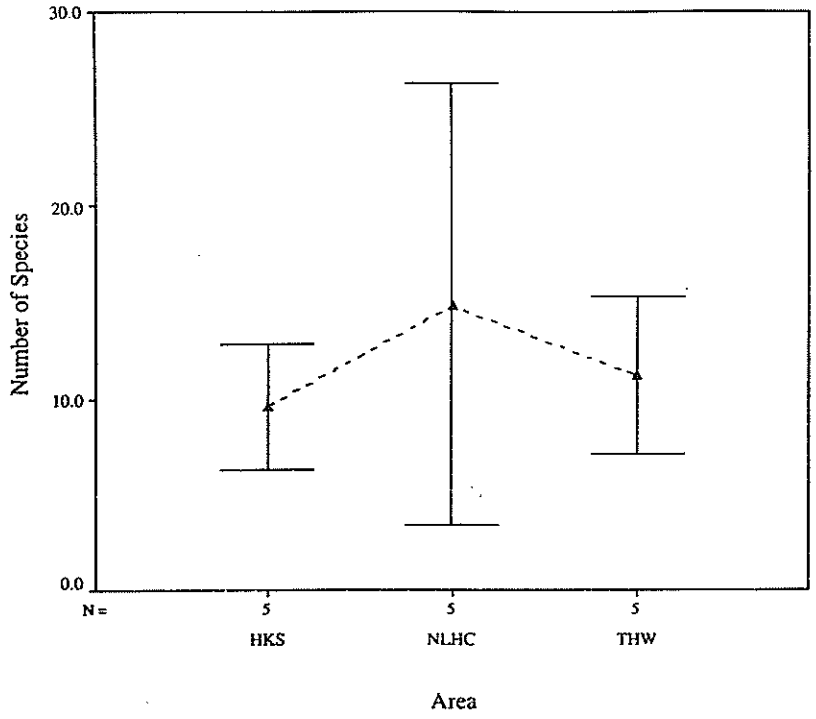


Figure 7.5 ***Mean (± SD; per grab) number of macro-faunal species present in each area during the January 2004 dry season survey.***

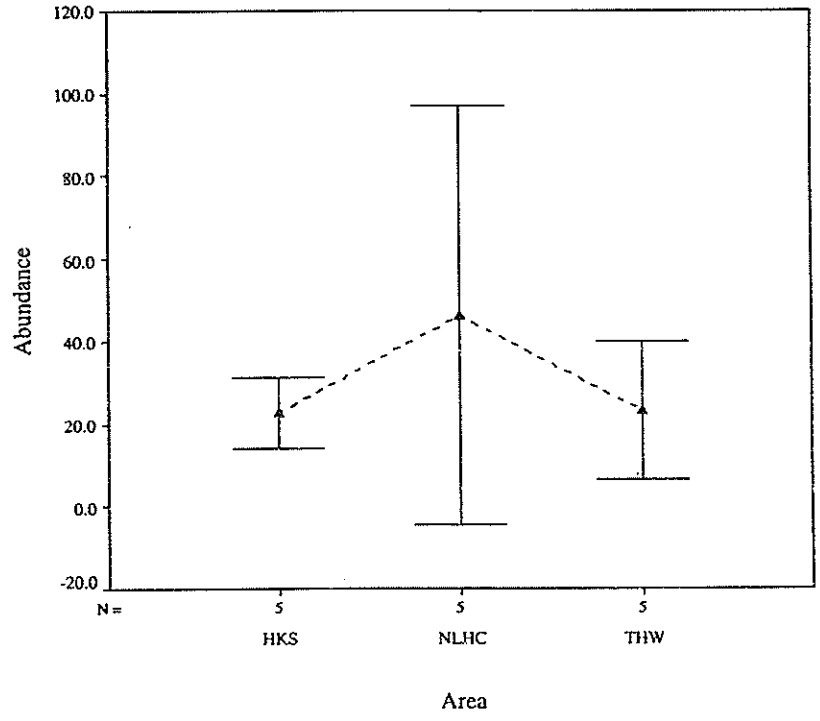


Figure 7.6 ***Mean (± SD; per grab) number of macro-faunal individuals in each area during the January 2004 dry season survey***

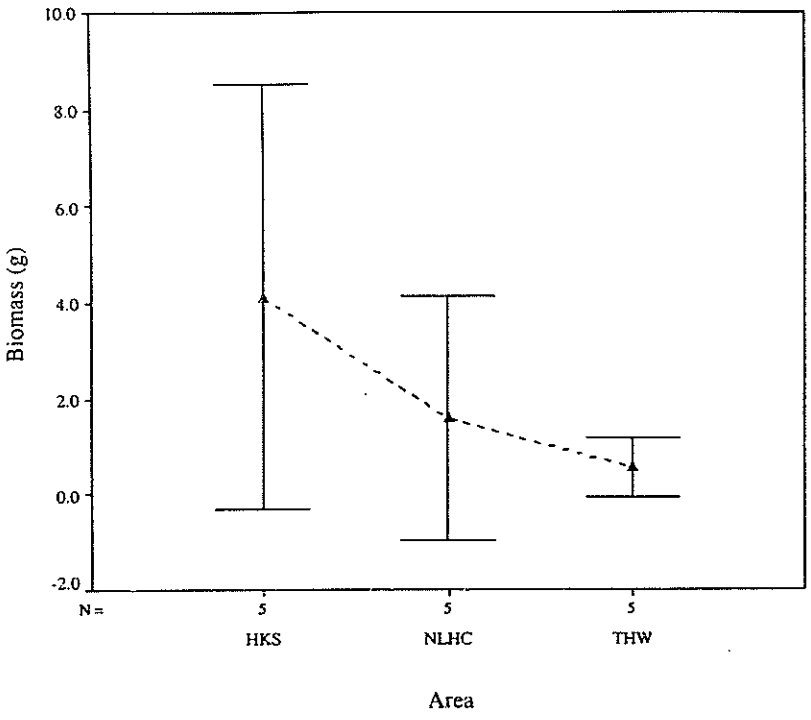


Figure 7.7 ***Mean (± SD; per grab) biomass of macro-faunal individuals in each area during the January 2004 dry season survey.***

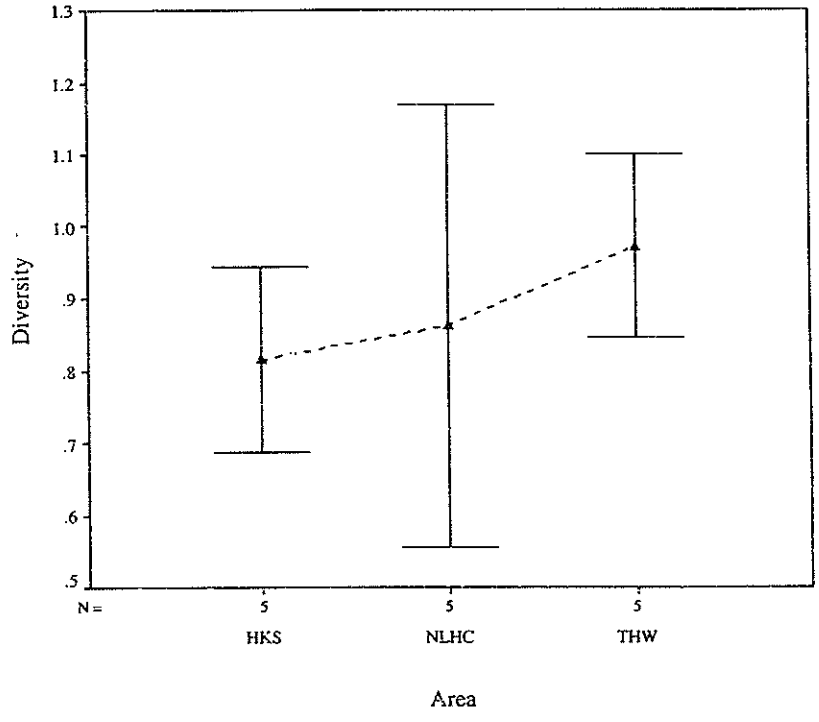


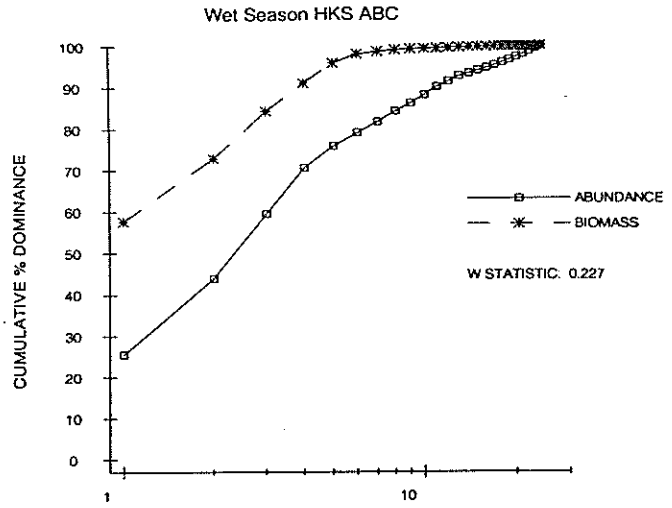
Figure 7.8 ***Mean (± SD; per grab) diversity of macro-faunal in each area during the January 2004 dry season survey.***

5.3.10 The *W* statistics for the three areas during the wet season were all positive and reasonably similar (HKS: 0.227; NLHC: 0.315; THW: 0.293). The *W* statistics for the three areas during the dry season were also positive and reasonably similar (HKS: 0.268; NLHC: 0.197; THW: 0.299). The ABC plots for each area during the wet and dry season are presented in *Figures 7.9* and *7.10,* respectively.

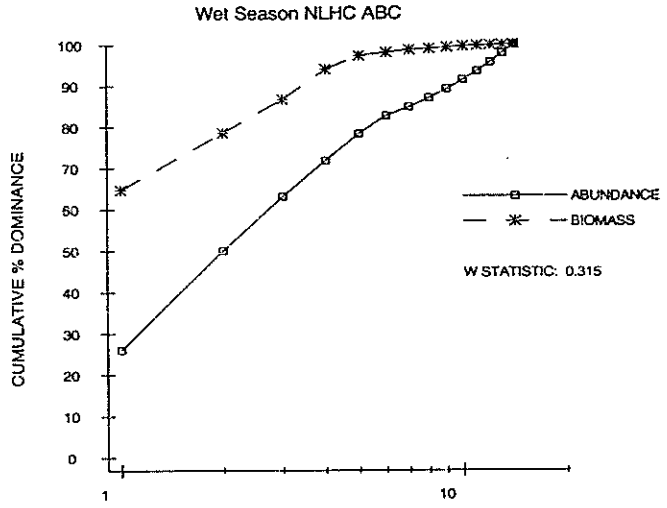
Biotic Indices

5.3.11 The biotic indices calculated for macrofauna collected during the surveys are presented in *Table 5.9* below. Results indicated that the biotic indices for the three areas were similar. Although the Tung Chung Channel (biotic index of 3) was slightly higher (i.e., indicative of higher levels of pollution and/or disturbance) than the Hong Kong Section and Tai Ho Wan (biotic index of 2) during the wet season, the difference was not observed in the dry season.

a.



b.



c.

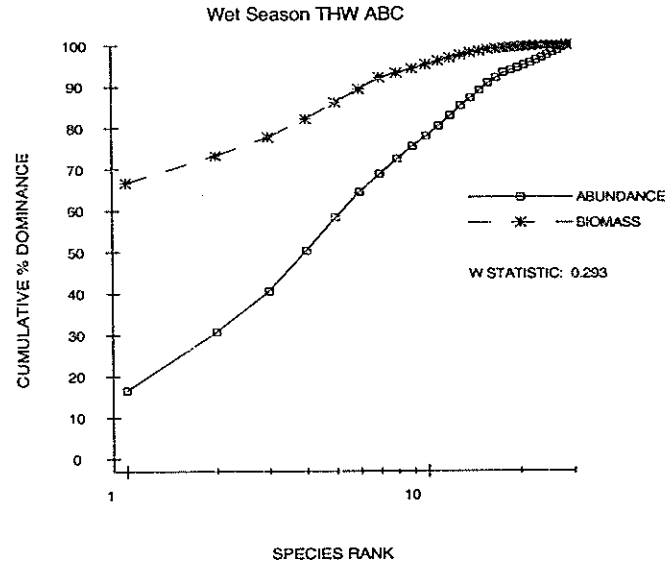
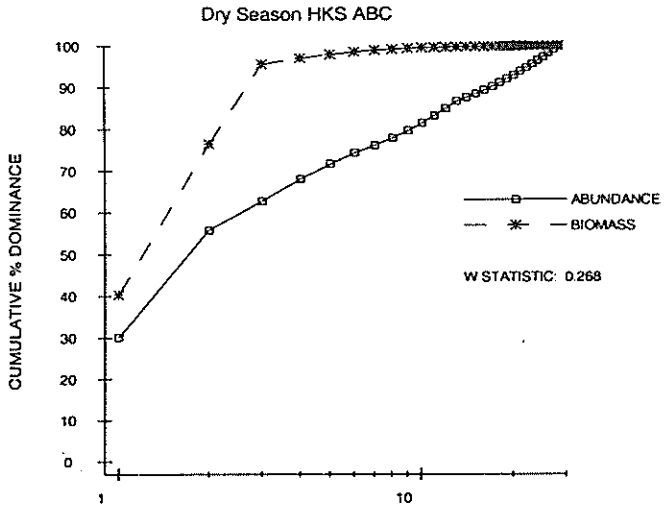
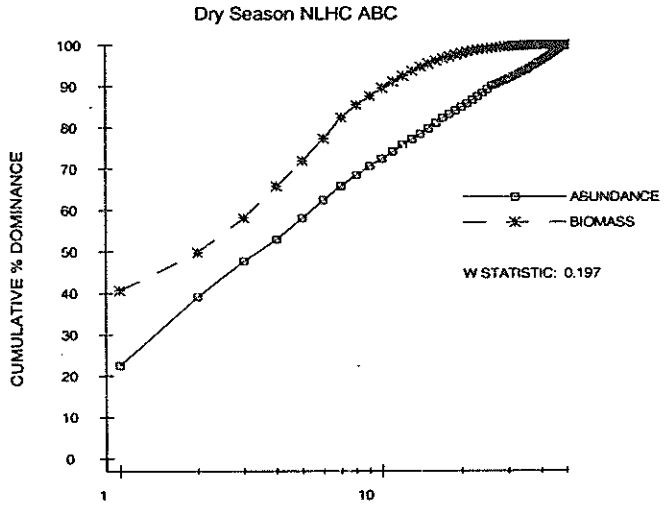


Figure 7.9 ***ABC plots of the benthic macro-fauna from grab samples collected in October 2003 (genus/species level)***

a.



b.



c.

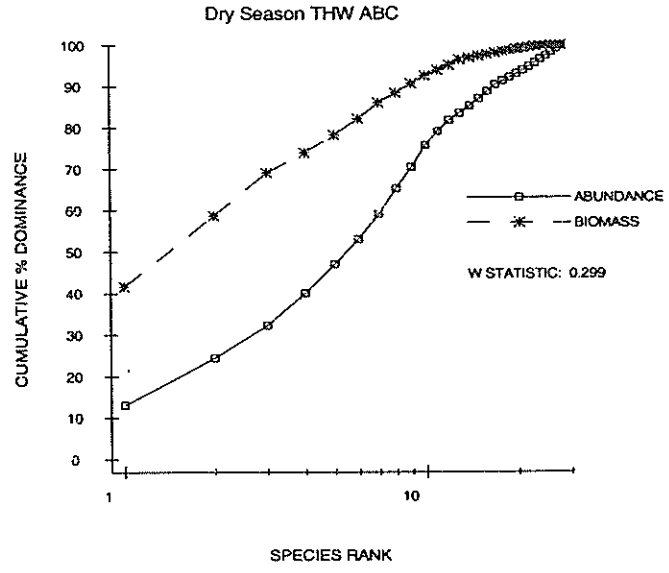


Figure 7.10 ***ABC plots of the benthic macro-fauna from grab samples collected in January 2004 dry season survey (genus/species level).***

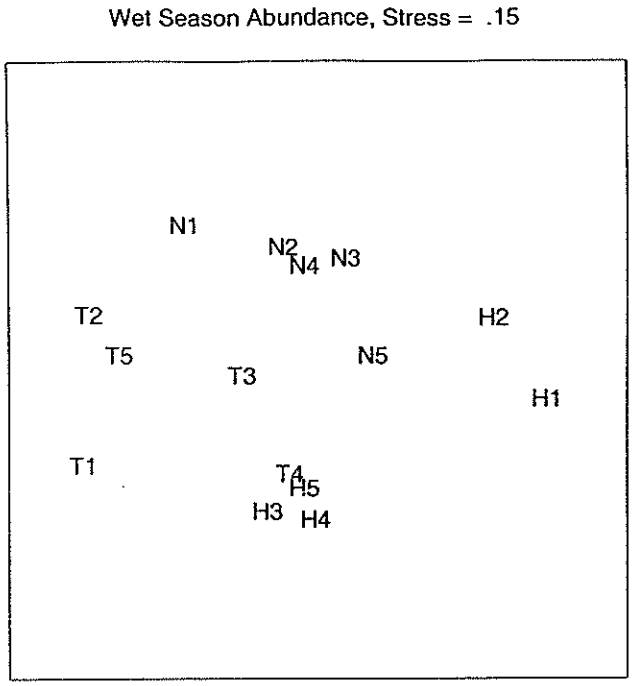


Figure 7.11 ***MDS plot of dissimilarities between the benthic sediment macro-fauna from grab samples collected in October 2003. (H= Hong Kong Section; N= Tung Chung Channel; T= Tai Ho Wan)***

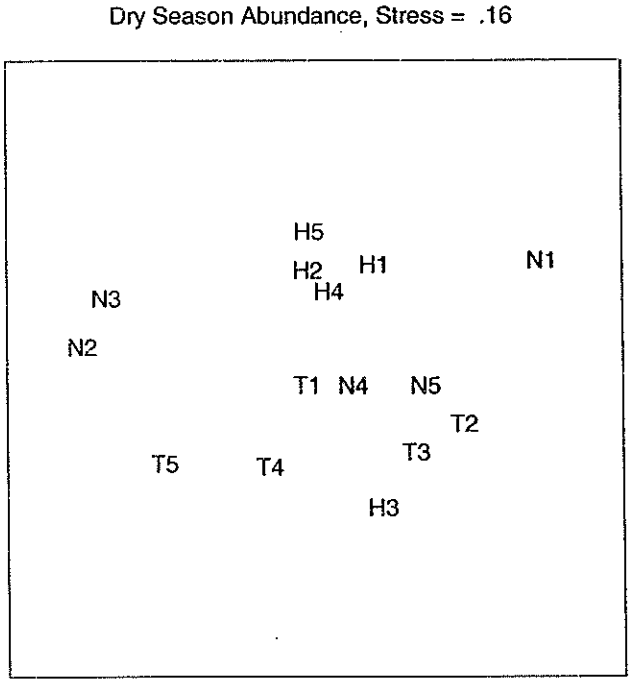


Figure 7.12 ***MDS plot of dissimilarities between the benthic sediment macro-fauna from grab samples collected in January 2004 (H=Hong Kong Section; N=Tung Chung Channel; T=Tai Ho Wan).***

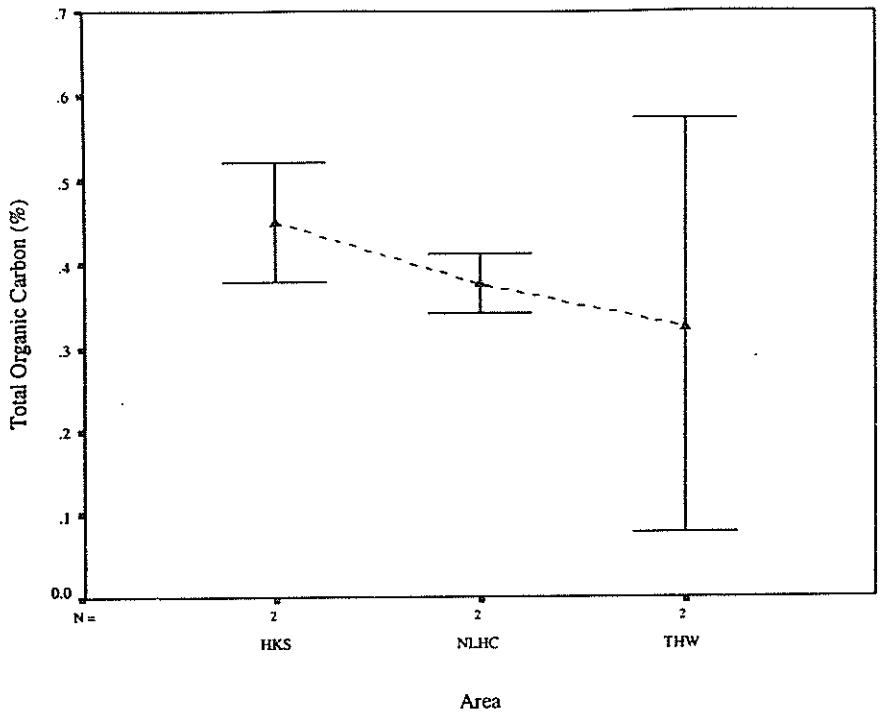


Figure 7.13 Mean percentage of total organic carbon (%; ± SD) in each area during the October 2003 wet season survey.

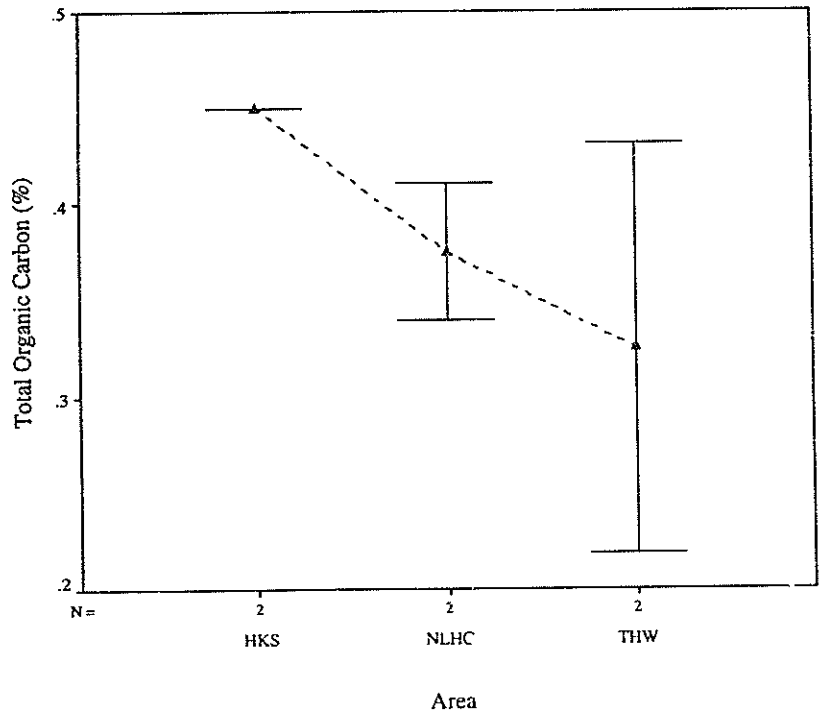


Figure 7.14 Mean percentage of total organic carbon (%; ± SD) in each area during the January 2004 dry season survey.

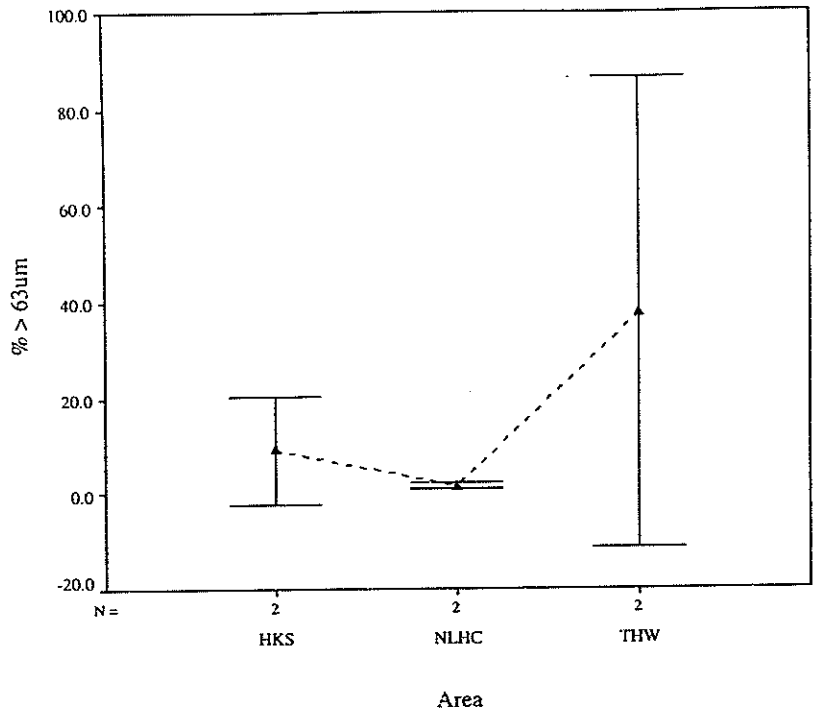


Figure 7.15 ***Mean percentage of coarse grained sediment (> 63 μm; ± SD) in each area during the October 2003 wet season survey.***

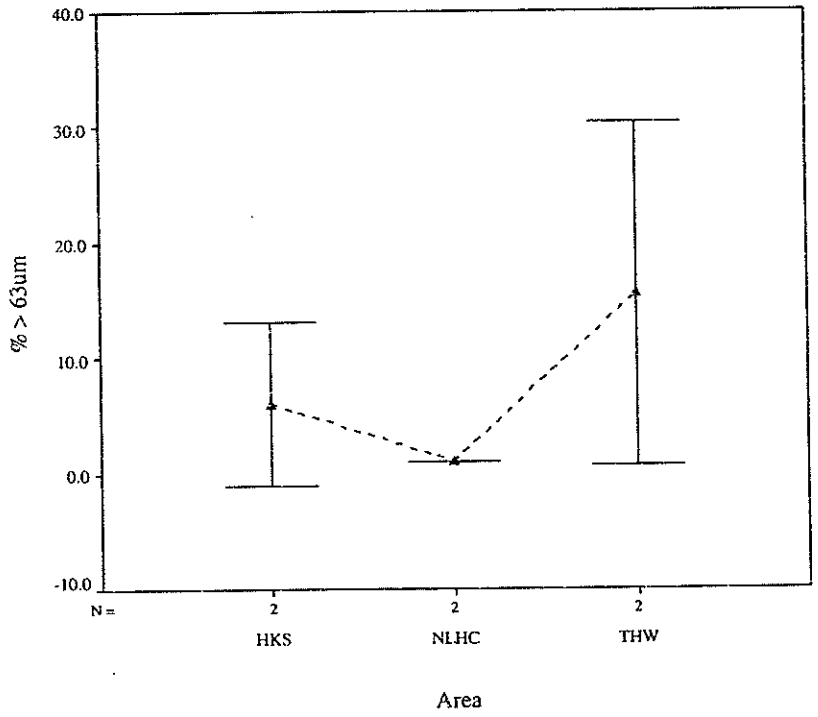


Figure 7.16 ***Mean percentage of coarse grained sediment (> 63 μm; ± SD) in each area during the January 2004 dry season survey.***

Table 5.9 Biotic Indices for the Macro-fauna at each of the Surveyed Areas

Area	Measured Biotic Coefficient	Biotic Index	Pollution Classification	Dominant Ecological Group	% Groups Assigned	Benthic Community Condition (Health)
Wet Season						
HKS	3.24	2	Slight pollution	IV (*Prionospio*)	60.1	Based on the BI, this area has slight pollution or disturbance. The dominant ecological group present, however, indicates that the area is characteristic of a polluted or heavily disturbed benthic community.
NLHC	3.55	3	Mean pollution	III (*Mediomastus*)	47.8	Based on the BI, this area has mean pollution or disturbance. The dominant ecological group is characteristic of an unbalanced benthic community. Only 47.8% of the fauna present were ascribed an ecological group and the BI should be treated with caution.
THW	2.68	2	Slight pollution	I (*Peocilochaetus*)	75.5	Based on the BI, this area has slight pollution or disturbance. The dominant ecological group present indicated that the area is characteristic of a normal benthic community.
Dry Season						
HKS	2.48	2	Slight pollution	III (*Mediomastus*)	51.3	Based on the BI, this area has slight pollution or disturbance. The dominant ecological group is characteristic of an unbalanced benthic community. Only 51.3% of the fauna present were ascribed an ecological group and the BI should be treated with caution
NLHC	2.40	2	Slight pollution	II (*Eunice*)	77.9	Based on the BI, this area has slight pollution or disturbance. The dominant ecological group is characteristic of only slightly stressed benthic community.
THW	2.65	2	Slight pollution	IV (*Prionospio*)	78.3	Based on the BI, this area has slight pollution or disturbance. The dominant ecological group present, however, indicates that the area is characteristic of a polluted or heavily disturbed benthic community.

5.3.12 In summary, the biological indices calculated showed little difference between the three areas although the indices suggested that the Tung Chung Channel (NLHC) was slightly more disturbed during the wet season. During the wet season, the dominant ecological groups present in the Hong Kong Section (HKS) and Tung Chung Channel were mostly second-order opportunists characteristics of an unbalanced environment whereas those from Tai Ho Wan were indicative of an undisturbed benthic community. During the dry season, the dominant ecological groups present in the Hong Kong Section and Tai Ho Wan were mostly second-order opportunists characteristics of an unbalanced environment whereas those from Tung Chung Channel (NLHC) were indicative of only slightly disturbed benthic community. Based on the overall biotic indices there would not appear to be major differences in the benthic communities present in the three areas.

Multivariate Statistical Results of Benthic Macro-fauna

5.3.13 The MDS analysis was based on the number of individuals of all species/genera present at each station. Station groups that are plotted far apart are dissimilar, whereas stations in close proximity are similar.

5.3.14 The MDS plot for the wet season data (*Figure 7.11*) had a relatively high stress value (0.15) and the data points on the plot should be treated with caution. There is no obvious aggregation of stations in the MDS plot, apart from two small clusters, indicating that the monitoring stations were reasonably (dis)similar. The two small clusters (N2, N3 and N4; H3, H4 H5 and T4) in the middle of the plot, however, did suggest some dissimilarity of the stations between areas.

5.3.15 The MDS plot for the dry season data (*Figure 7.12*) also had a relatively high stress value (0.16) and the data points on the plot should be treated with caution. There is no obvious aggregation of stations in the MDS plot, apart from a small cluster, indicating that the monitoring stations were reasonably (dis)similar. The small cluster of Hong Kong Section stations (H1, H2, H4 and H5) in the middle of the plot suggested the benthic communities of the Hong Kong Section (HKS) stations were more similar to each other than stations of the Tung Chung Channel (NLHC) and Tai Ho Wan (THW).

Sediment Characteristics (Grain-Size and TOC)

5.3.16 Selected benthic sediment samples from each area were also analysed to determine their grain size composition and total organic carbon (TOC) content. Sediment grain size characteristics and TOC are important variables in determining the benthic communities capable of inhabiting sediments and organic carbon content also provides a useful indication of potential food resources. The results are summarised below in *Table 5.10* and *Figures 7.13-7.16*.

Table 5.10 Summary of Sediment Characteristics (Grain-size and TOC)

Area (*n*=2)	**TOC** (%)	**Coarse Fraction** (% > 63 µm)
Wet Season		
HKS	0.45	9.0
NLHC	0.37	1.5
THW	0.32	37.5
Dry Season		
HKS	0.45	6.0
NLHC	0.38	1.0
THW	0.33	15.5

Notes: Hong Kong Section (HKS); Tung Chung Channel (NLHC); Tai Ho Wan (THW).

5.3.17 As indicated in *Table 5.10* and *Figures 7.13 – 7.16*, there were little seasonal variation in the level of TOC and percentage of fine-grained particles recorded. The spatial distributions of TOC and sediment grain-size, however, were different. The sediments at Tai Ho Wan contained a large percentage (15.5% - 37.5%) of coarse grained particles while the Hong Kong Section has a higher percentage of TOC (0.45%). As TOC and granulometry are know to affect the macro benthic fauna distribution, these two parameters may have influenced benthic community characteristics recorded in the study area (*Figures 7.1 – 7.8*).

Summary of Marine Benthic Community Results

5.3.18 A suite of biological-based statistical tests and pattern searching tools were conducted to assess the benthic macro-fauna community structure of the study area and these are summarised below in *Table 5.11*. The univariate analyses (number of species, number of individuals, biomass and diversity index), biotic index, ABC plots, *W* statistic and multivariate multidimensional scaling (MDS) all suggested that the communities present in the three areas (Hong Kong Section, Tai Ho Wan and Tung Chung Channel) were similar although the assemblages at Tung Chung Channel were slightly different than the other two areas during the wet season. In terms of disturbance status, both the biotic index and dominant species indicated the whole study area is slightly disturbed.

Table 5.11 Summary of Wet Season Benthic Macrofauna Surveys

Parameter	Hong Kong Section (HKS)	Tung Chung Channel (NLHC)	Tai Ho Wan (THW)
Wet Season (October 2003)			
Number of Species (Number of Taxa grab^{-1}) Statistical Test[1]	3.8	2.4 THW=HKS>NLHC	4.6
Abundance (individuals grab^{-1}) Statistical Test[1]	30.6	9.2 NS	32.6
Biomass (wet weight, g grab^{-1}) Statistical Test[1]	1.49	0.05 NS	0.76
Diversity (H')[2] Statistical Test[1]	0.78	0.58 THW HKS NLHC	0.95
ABC Plot	U	U	U
***W* Statistic**	0.227	0.315	0.293
BI[3] (Dominant Ecological Group)	2 (IV)	3 (III)	2 (I)
MDS Analysis	Some stations similar	Some stations similar	Stations dissimilar
Dry Season (January 2004)			
Number of Species (Number of Taxa grab^{-1}) Statistical Test[1]	5.6	9.8 NS	5.6
Abundance (individuals grab^{-1}) Statistical Test[1]	22.6	46.2 NS	23.0
Biomass (wet weight, g grab^{-1}) Statistical Test[1]	4.10	1.57 NS	0.54
Diversity (H')[2] Statistical Test[1]	0.81	0.86 NS	0.97
ABC Plot	U	U	U
***W* Statistic**	0.268	0.197	0.299
BI[3] (Dominant Ecological Group)	2 (III)	2 (II)	2 (IV)
MDS Analysis	Most stations similar	Some stations similar	Stations dissimilar

Notes: U= undisturbed; NS= Non-significant (P>0.05); [1]ANOVA followed by SNK when significant differences were detected between areas; [2]Diversity is at the species level and analysed using the Shannon-Wiener index ($\log_{10}$); [3]Calculated using the index of Borja *et al*. (2000, 2003).

5.4 Intertidal (Hard and Soft Shores)

5.4.1 The first wet season intertidal transect surveys focussed on potential landing points and areas potentially affected and were undertaken at San Tau, Sha Lo Wan, San Shek Wan, Tung Chung Bay, Tai Ho Wan and Sham Wat on 18, 25 and 26 September, 21 and 22 October 2003. Dry season transect surveys were undertaken at Kau Liu, Sha Lo Wan, Sham Wat and Tai Ho Wan on 18 and 19 November 2003 and at at Hau Hok Wan, Kau Liu, Sha Lo Wan, San Shek Wan and Tai Ho Wan on 7, 15 and 16 January 2004. A list of species recorded is provided in *Appendix E* and the location of intertidal survey transects are presented in *Figure 3*.

Soft Shore Intertidal

5.4.2 All of the species recorded were typical soft shore intertidal fauna and can be found in similar habitats throughout Hong Kong. Mud snails (*Cerithidea diadjariensis*) were common representatives on the sand-flats of Tung Chung Bay. Survey results obtained at Tai Ho Wan also revealed that the mud snail (*C. diadjariensis*) was dominant. Common species including acorn barnacle (*Balanus* sp.), small shore crab (*Hemigrapsus sanguineus*) and the nerite (*Nerita polita*) were abundant on hard surfaces such as rocks and boulders present on the soft shores of the entire coastal study area. Species abundance during the wet and dry seasons was similar.

Hard Shore Intertidal

5.4.3 Survey results revealed that common gastropods such as freshwater nerite (*Clithon cf. faba*) and top shell (*Monodonta labio*) were dominant on the hard shore of San Tau. While at the hard shore of Kau Liu, common species such as the nerite (*Nerite* spp.) and rock oyster (*Saccostrea cucullata*) were dominant at the lower levels. The littorinid gastropod (*Littoraria articulata*) was also common on the rocky shore. In addition, a few small shore crabs (*Hemigrapsus sanguineus*) and one hermit crab were noted on pebbles or rocky bottom.

5.4.4 At Hau Hok Wan, the rock oyster (*Saccostrea cucullata*) was abundant both on the higher and lower levels of the hard shore together with the gastropods *Nerita polita* and *Clithon* sp. At Sha Lo Wan and San Shek Wan, common hard shore substrate fauna present included nerite (*Nerita polita*), rock oyster (*Saccostrea cucullata*), common whelk (*Thais clavigera*), littorinids including *Nodilittorina radiata* and *Littoraria articulata* and small shore crab (*Hemigrapsus sanguineus*).

5.4.5 The littorinid gastropod (*Littoraria articulata*) was abundant on the hard shore of Sham Wat while the nerite (*Nerita polita*), rock oyster (*Saccostrea cucullata*) and fresh water nerites (*Clithon* sp.) were occasionally seen.

5.4.6 At Tai Ho Wan the hard shore substrate fauna present included acorn barnacle (*Balanus* sp.), *Hemigrapsus sanguineus*, *Nerita polita* and the bivalve *Striarca symrnentrica*.

5.4.7 All soft-bottom and hard-bottom intertidal species recorded are common and characteristics of intertidal habitats throughout Hong Kong.

5.5 Coral

5.5.1 A coral survey was conducted at locations likely to be impacted by the Project on 15 October 2003. Twenty-seven spot dives were conducted along the coastline of the study area as shown in *Figure 5.* For the purpose of the surveys, the study area was subdivided into four areas namely, Sham Wat/San Shek Wan, West Chek Lap Kok Channel, East Chek Lap Kok Channel and East Tung Chung. Results of each spot dive are presented in *Table A2.2* of the Coral Survey Report. The Coral Survey Report is presented in *Appendix F* and a summary is presented below.

5.5.2 In Sham Wat/San Shek Wan, ten spot dives (S1-10) were conducted within this area. Only one hard ahermatypic coral, *Balanophyllia* spp. and one soft coral *Echinomuricea* spp. were found on hard substrate to the east of Chek Lap Kok. However, the abundance and overall percentage cover of the coral were low (i.e., <5%).

5.5.3 In the West of Chek Lap Kok, eight dives were conducted (S11-18). However, no hard or soft coral was found.

5.5.4 In the East of Chek Lap Kok, four dives were conducted (S19-22). Four spot dives (S23-27) were conducted within this area. Only one soft coral *Echinomuricea* spp. was recorded. The soft coral was patchily distributed and the overall percentage cover of the coral was low (i.e., <5%).

5.5.5 At the East of Tung Chung, the soft coral *Echinomuricea* spp, was recorded although overall percentage cover was <5%.

5.5.6 Despite the presence of the ahermatypic cup coral, *Balanophyllia* sp. and the gorgonian soft coral, *Echinomuricea* sp. in certain areas, abundance of these corals was low (cover <5%) and in particular *Echinomuricea* sp. had suffered high levels of partial mortality. Results of the coral survey indicated that the few corals present were of low abundance and poor condition and, therefore, of low ecological importance (which is typical of the northwestern waters). As such, neither higher tier assessments nor further coral surveys were considered necessary.

5.6 Horseshoe Crabs

5.6.1 Horseshoe crabs are known to be sparsely distributed along the coast of Lantau Island and most survey effort was expended at bays within the study area where suitable microhabitats were present (typically well-aerated sediment substrates near to seagrass beds; substratum adjacent to streams). These areas included Hau Hok Wan, Pak Mong, San Shek Wan, San Tau, Sha Lo Wan, Sham Wat, Tai Ho Wan and Tung Chung Bay.

5.6.2 Unidentified juvenile horseshoe crabs (at least ten individuals) were recorded at Sham Wat Wan in October 2003 while the Agriculture, Fisheries and Conservation Department recorded 20 *C. rotundicauda* individuals at Tai Ho Wan during their on-going surveys in December 2003 (AFCD pers. comm.). Apart from Tai Ho Wan, some *C. rotundicauda* have been reported from Tung Chung Bay and Sham Wat (AFCD pers. comm.). The ongoing demersal trawl surveys of the East of Sha Chau contaminated mud pits (Mouchel, 2004b) also recorded a juvenile *T. tridentatus* in the waters north of the Hong Kong International Airport in January 2004. Interviews with the fisherman at Pak Mong in September 2003 indicated juvenile horseshoe crabs were still occasionally netted in the water channel between Pak Mong and the North-Lantau Express Highway; and residents at Sham Wat Wan also reported recent sightings of adult horseshoe crabs. The results of the present surveys together with historical records of the horseshoe crabs in the vicinity of the study area are summarised below in *Table 5.12*.

5.6.3 Ten *Tachypleus tridentatus* and one *Carcinoscorpius rotundicauda* were recorded at San Tau in November 2003. Two *T. tridentatus* and one *C. rotundicauda* were recorded at Hau Hok Wan in the November 2003 survey. In April 2004, one live and three molts of *Tachypleus tridentatus* were recorded at Sham Wat Wan and in May 2004, twenty-six individuals of this species were also recorded between Tung Chung and San Tau. In addition, during a survey in May 2004, fourteen live and three molts of *Carcinoscorpius rotundicauda* were recorded at Tai Ho Wan and Pak Mong. Survey results showed that areas of importance for the horseshoe crab include San Tau, Hau Hok Wan, Sham Wat Wan, Tung Chung Bay, Tai Ho Wan and Pak Mong (*Figures 13a-b*). The raw data from these surveys are presented in *Appendix G*.

Table 5.12 Horseshoe Crab Sightings and Landings in the vicinity of the Study Area

Location	Species and Lifestage	Date	Number of Individuals	Remark
Hau Hok Wan	*Carcinoscorpius rotundicauda* Juvenile	November 2003	1	This Study
	Tachypleus tridentatus juveniles	November 2003	2	
San Tau	Unknown	May 1995	~ 13	Mouchel[1]
	Tachypleus tridentatus and *Carcinoscorpius rotundicauda* juveniles	October 1997-June 1998	~ 15	
	Tachypleus tridentatus 5 males, 6 females	April 1997	11	
	Tachypleus tridentatus juveniles	June 2002	57	Mott[2]
	Carcinoscorpius rotundicauda juvenile	November 2003	1	This Study
	Tachypleus tridentatus juveniles	November 2003	10	
	Tachypleus tridentatus	May 2004	11	
Sha Lo Wan	Unknown juvenile	April 1995	1	Mouchel[1]
Sham Wat	Unknown juvenile	October 2003	> 10	This Study
	Tachypleus tridentatus	April 2004	1 and 3 molts	This Study
Tai Ho Wan	Unknown juvenile	September 1998	1	Mouchel[3]
	Carcinoscorpius rotundicauda juvenile	1999	8	Fong[4]
	Carcinoscorpius rotundicauda mating pair	1999	2	
	Tachypleus tridentatus juveniles	1999	2	
	Carcinoscorpius rotundicauda juveniles	December 2003	20	AFCD[5]
	Carcinoscorpius rotundicauda	May 2004	14 and 3 molts	This Study
Tung Chung Bay	*Tachypleus tridentatus* 18 males, 14 females	April – October 1997	32	Mouchel[1]
	Carcinoscorpius rotundicauda	April 1997	1	Huang[6]
	Carcinoscorpius rotundicauda juveniles	June 2002	2	Mott[2]
	Tachypleus tridentatus	May 2004	15	This Study
East of Sha Chau	*Carcinoscorpius rotundicauda* adult	July 1995	1	Mouchel[1]
	Tachypleus tridentatus juvenile	January 2004	1	Mouchel[7]
The Brothers	Unknown juvenile	April 1995	1	Mouchel[1]
	Tachypleus gigas	June 1996	5	
Northwest Lantau Island (Tai O, Yi O, Sham Wat Wan, Sha Lo Wan)	*Tachypleus tridentatus* 7 males, 12 females	July – August 1997	19	Chiu and Morton (1999)
	Carcinoscorpius rotundicauda 22 males, 31 females	July – August 1997	65	Chiu and Morton (1999)

Note: Although *Tachypleus gigas* has been reported in the wider study area, it may have been misidentified as Chiu and Morton (1999) only recorded the similar *Tachypleus tridentatus* during extensive surveys of the Northwestern waters. [1]Adapted from Mouchel (2002a); [2]Mott (2003); [3]Mouchel (2000); [4]Fong (1999b); [5]AFCD (pers. comm.); [6]Huang (1997); [7]Mouchel (2004b).

5.7 Cetaceans

5.7.1 The cetacean species of primary concern in the study area is the Indo-Pacific humpback dolphin *Sousa chinensis* (Chinese White Dolphin), which occurs in the waters of North Lantau. It is also known to appear seasonally in outer Deep Bay, South and East Lantau and Lamma.

5.7.2 *Sousa chinensis* is listed in the UN Biodiversity Treaty as a protected species and is classified in Appendix I of the Convention on the International Trade in Endangered Species of Flora and Fauna (CITES). In Hong Kong, this species is protected under the Wild Animals Protection Ordinance (Cap. 170) 1980 and the Animals and Plants (Protection of Endangered Species) Ordinance (Cap. 187) 1988.

5.7.3 The dolphins have been the subject of several intensive studies for approximately the past eight years. Thus, there is a great deal of data available from which to make an assessment of the potential impacts of the bridge and to propose mitigation measures for reducing such impacts. In this baseline ecological assessment, a method of assessing the impacts of the bridge construction and operation on the dolphin population has also been developed and this will be invaluable to the EIA.

5.7.4 To estimate the potential impact of the bridge on the dolphin population, an approach based on estimating impacts in 1km^2 grids has been developed using the same methodology adopted for the Permanent Aviation Fuel Facility (PAFF) Environmental Impact Assessment Report (Mouchel, 2002b). To derive the density of dolphins, in each 1km^2 grid, existing data have been used and this has also formed the basis for the assessment of potential impacts. The alignment within the Hong Kong SAR waters has been divided into three sections:

a. Hong Kong Section (HKS) – from the Hong Kong SAR boundary to the bridge's landfall on Lantau at Sha Lo Wan;
b. North Lantau Highway Connection (NLHC) – from the landfall at Sha Lo Wan to the bridge's exit from the eastern side of the airport platform; and
c. Northeast Lantau Section (NELS) – from the eastern edge of the airport platform to its connection to the North Lantau Highway.

5.7.5 An Impact Index (I) for each of these three sections of the proposed bridge has been calculated as follows:

$$I = \sum_{i=1}^{n} (D\ l)$$

where n = number of 1 km^2 grids the bridge alignment passes through;
D = dolphin density in grid I (based on number of on-effort sightings); and
l = length of bridge route in grid *i*.

The higher the Impact Index, the higher the predicted impact on the dolphin population, based on the assumption that human activity in a higher density area for dolphins would have a greater impact than the same activity in a lower density area. The dolphin density in each 1 km^2 grid was calculated by evaluating the number of on-effort (i.e., collected during strict line transect sighting effort surveys) dolphin sightings in that grid. Dolphin sightings were based on the Hong Kong Cetacean Research Project (HKCRP) humpback dolphin sighting database, which covers

vessel surveys conducted by the HKCRP (and its predecessor at the Ocean Park Conservation Foundation) since November 1995 (Jefferson and Leatherwood, 1997; Jefferson, 2000). The length of bridge section in each grid was calculated by overlaying a map showing the proposed bridge alignment over a 1km^2 grid of the study area.

5.7.6 Results revealed that the current proposed bridge alignment (*Figure 8)* passes through sixteen 1km^2 grids, although five of these are along the southern edge of the airport platform and do not occur over water. Predicted impacts based on the distribution of dolphins in each 1km^2 grids for each section and alignment are discussed below.

Proposed Alignment

5.7.7 The Hong Kong Section of the bridge passes through seven grids and occurs in a known area of high dolphin density along the northwest coast of Lantau Island. The Impact Index is 24.4 for this approximately 4.8km long section of bridge. The North Lantau Highway Connection section of the bridge runs along the southern edge of the airport platform, and there have been no dolphin sightings in the adjacent channel between the airport and Lantau Island. The Impact Index for the NLHC is therefore, zero. The Northeast Lantau Section of the bridge, approximately 4.1km long, passes through four grids in an area of low dolphin density (the lowest in North Lantau) and the Impact Index is zero. The total Impact Index for the main alignment is, therefore, 24.4.

Alternative Alignment

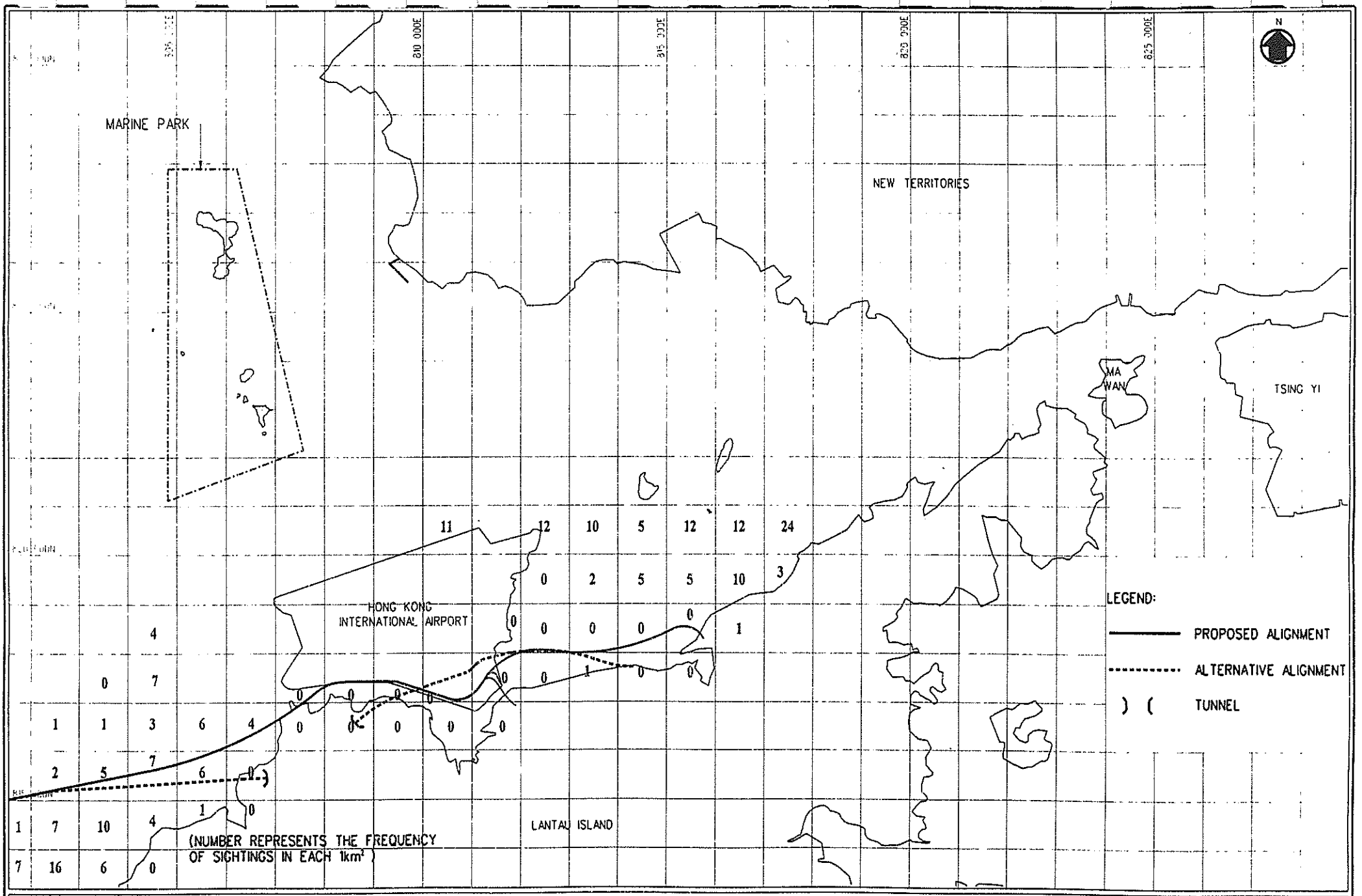
5.7.8 The alternate alignment (as shown in *Figure 8*) runs south of the main alignment and passes through a tunnel on Lantau Island, crosses the airport channel and across the airport platform, exiting east of the airport, and then joins the North Lantau coastline further west than the main alignment. The total Impact Index for the alternative alignment is 20.0. This is largely due to the minimisation of dolphin impacts caused by the larger proportion of the route on land.

Summary/Discussion

5.7.9 The Impact Index analysis described above provides a quantitative indication that the HKS section of the bridge passes through an important area of dolphin habitat. Both the NLHS and NELS sections pass through areas of very low dolphin density. Thus, within Hong Kong waters, the HKS section is likely to have the most significant impact on dolphins.

5.7.10 It should be noted that the entire section of the bridge to be built in Mainland Chinese waters (Zhujiang Section – ZS) passes through a known high-density area for dolphins (see Jefferson, 2000) and it is imperative that potential cumulative impacts along the whole alignment are thoroughly assessed.

5.7.11 Finally, it should also be noted that the Impact Index described above was originally designed to evaluate alternative alignments at the same point in time. As such, it does not take into account changes in dolphin sighting effort and resulting effects on the Impact Index. Although it is possible to scale each Impact Index calculation to the overall current level of sighting effort, and thereby standardise for survey effort, this is not the best way to evaluate before and after changes in dolphin density distribution.



Distribution of Indo-Pacific Humpback Dolphin Sightings in Each 1 km²

Meinhardt Mouchel

Figure No. 8

5.8 Avifauna

5.8.1 A total of 118 species of birds were recorded within the study area during the scheduled surveys. A summary of the species recorded within the study area is given in *Table 5.13* below and details are presented in *Appendix H*. The surveyed areas are presented in *Figure 6*.

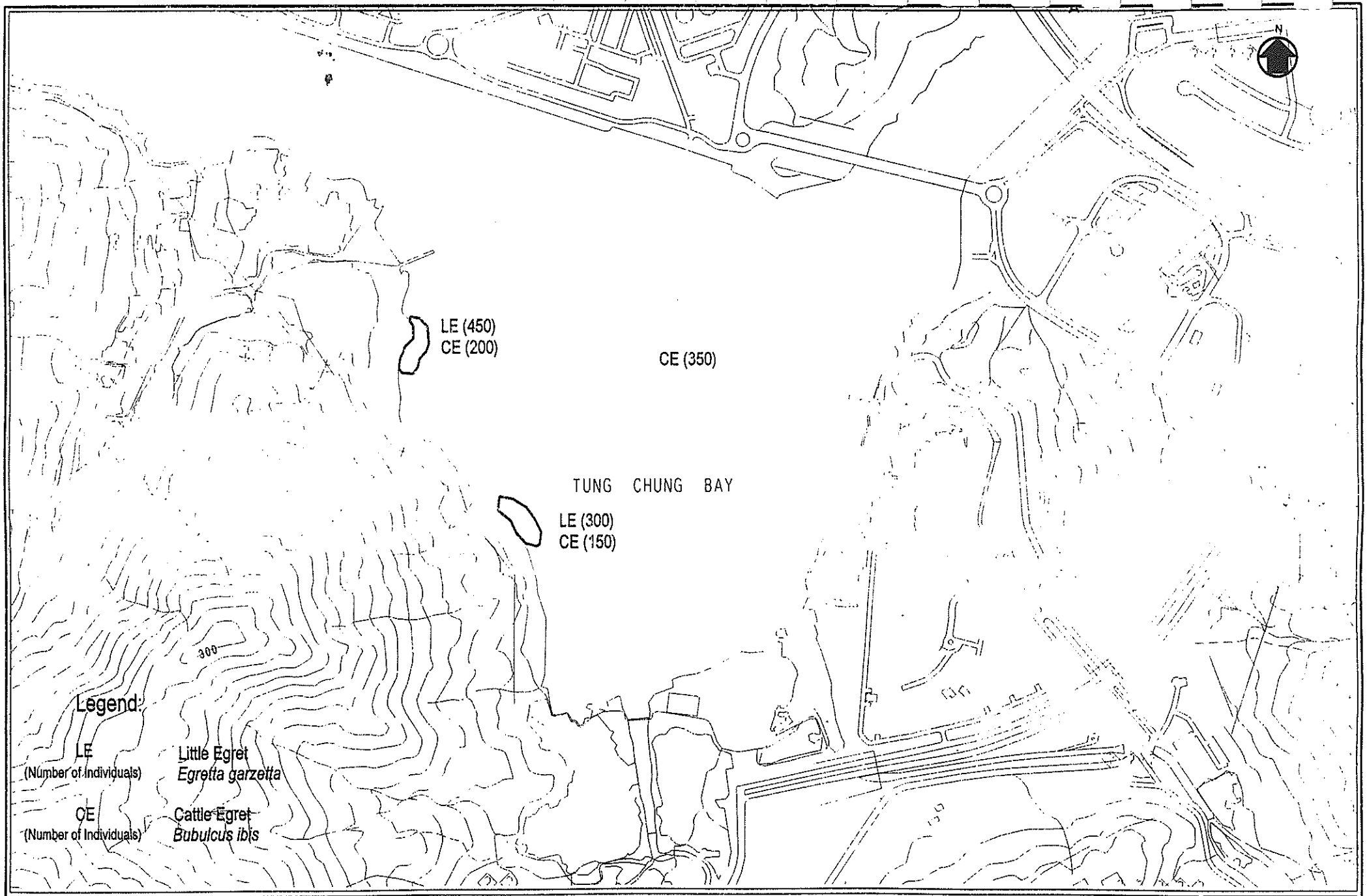
5.8.2 The majority of the bird species recorded are common and widespread and found in similar habitats throughout Hong Kong (Carey *et al*., 2001). There were 32 species that are considered to be of conservation interest (Fellowes *et al*., 2002) including the Black-browed Reed Warbler *Acrocephalus bistrigiceps*, Pacific Swift *Apus pacificus*, Grey Heron *Ardea cinerea*, Chinese Pond Heron *Ardeola bacchus*, Eurasian Eagle Owl *Bubo Bubo*, Cattle Egret *Bubulcus ibis*, Striated Heron *Butorides striatus*, Zitting Cisticola *Cisticola juncidis*, Grey Treepie *Dendrocitta formosae*, Great Egret *Egretta alba*, Swinhoe's Egret *Egretta eulophotes*, Little Egret *Egretta garzetta*, Intermediate Egret *Egretta intermedia*, Pacific Reef Egret *Egretta sacra*, Yellow-breasted Bunting *Emberiza aueola*, Chestnut-eared Bunting *Emberiza fucata*, Peregrine Falcon *Falco peregrinus*, Black-capped Kingfisher *Halcyon pileata*, White-throated Kingfisher *Halcyon smyrnensis*, White-bellied Sea Eagle *Haliaeetus leucogaster*, Grey-tailed Tattler *Heteroscelus brevipes*, Bonelli's Eagle *Hieraaetus fasciatus*, Black-winged Stilt *Himantopus himantopus*, Brown Fish Owl *Ketupa zeylonensis*, Black Kite *Milvus migrans*, Black-crowned Night Heron *Nycticorax nycticorax*, Eurasian Woodcock *Scolopax rusticola*, Crested Serpent Eagle *Spilomis cheela*, Red-Billed Starling *Sturnus sericeus*, White-shouldered Starling *Sturnus sinensis*, Little Grebe *Tachybaptus ruficollis* and Wood Sandpiper *Tringa glareola*.

5.8.3 Of the species of conservation interest recorded, 19 were identified by Fellowes et al. (2002) as local concern while 10 species were of immediate (potential) regional concern. It should be noted that Swinhoe's Egret *Egretta eulophotes* is listed as globally vulnerable by the IUCN and the majority of records in Hong Kong have been from the intertidal mudflats of Deep Bay (Carey *et al*., 2001). Three Swinhoe's Egrets were recorded in Tung Chung Bay during the survey conducted in April 2004. Another noteworthy bird is the Red-billed Starling *Sturnus sericeus* which is also considered a globally threatened species (Fellowes *et al*., 2002). *S. sericeus* was recorded at Tin Sam and Tung Chung Bay during the December 2003 and January 2004 surveys.

5.8.4 Some avifauna species were also listed under CITES Appendices. Seventeen species namely Japanese Sparrowhawk, Crested Goshawk, Besra, Eurasian Eagle Owl, Cattle Egret, Grey-faced Buzzard, Common Buzzard, Liitle Egret, Peregrine Falcon, Common Kestrel, Hwamei, White-bellied Sea Eagle, Bonelli's Eagle, Brown Fish Owl, Black Kite, Collared Scops Owl and Crested Serpent Eagle are classified as threatened species in CITES. Of these avifauna species, all are protected in China except Cattle Egret, Little Egret and Hwamei. In addition, *Centropus bengalensis* and *Centropus sinensis* are also protected species in China. It should, however, be noted that such listings are based mainly on the level of exploitation.

5.8.5 Avifauna surveys conducted at Tai Ho Wan in October 2003 revealed the presence of a pair of Brown Fish Owls which is a species of very high conservation interest and has only been recorded previously in Hong Kong from four other locations mostly in Sai Kung (Carey *et al*., 2001). It is notable that this owl species was also previously recorded at Discovery Bay, Lantau but abandoned the area following habitat loss as a consequence of construction activity. The ecological impact assessment will, therefore, carefully need to determine the potential indirect impacts (notably noise disturbance) associated with any construction near to Tai Ho. Additional night surveys on 28 October and 5, 27 November 2003 at Tai Ho Wan confirmed the presence of the Brown Fish Owls suggesting that they are resident and likely to breed in Tai Ho Wan.

5.8.6 During a survey on 24 September 2003, a high number of Cattle Egret (~700 individuals) and Little Egret (~773 individuals) were recorded in Tung Chung Bay (*Figure 9*). For both species, records are mainly from the northwest and northeast New Territories and there has never been such a high number recorded in Lantau Island (Carey *et al*., 2001) and Little Egret are known to form colonies that are highly concentrated (Fellowes *et al*., 2002). For the Cattle Egret, this is the second highest count in Hong Kong. Results suggested that Tung Chung Bay is likely an important foraging site for the Cattle and Little Egrets. As many feeding habitats for Egrets have been lost in Hong Kong (Carey *et al*., 2001), conservation priority should be given to the Tung Chung Bay during the impact assessment.



Records of Cattle Egret and Little Egret from Tung Chung Bay on 24 September 2003

Meinhardt Mouchel

Figure No. 9

Table 5.13 A Summary of the Avifauna Species Recorded during the Reporting Period

Species name	Common name	Local Abundance	Status	Global Red List category (IUCN)	Global rating	Regional rating	Local rating	Level of concern	Sep - Oct 2003	Nov - Dec 2003	Jan - Feb 2004	Mar-May 2004	Habitat Present
Accipiter gularis (CITES II)	Japanese Sparrowhawk	U	M							+			WL
Accipiter trivirgatus ~ (CITES II)	Crested Goshawk	U	R						+			+	WL
Accipiter virgatus ~ (CITES II)	Besra	S	R									+	WL
Acridotheres cristatellus ~	Crested Myna	A	R						+	+	+	+	C,DA
Acrocephalus bistrigiceps	Black-browed Reed Warbler	C	M			?		LC	+				SHG
Actitis hypoleucos	Common Sandpiper	C/S	WV						+	+	+	+	CT
Aethopyga christinae	Fork-tailed Sunbird	C	R							+		+	WL
Alcedo atthis	Common Kingfisher	C	AM, W, R						+	+	+	+	S, CT
Amaurornis phoenicurus ~	White-breasted Waterhen	C	R						+		+	+	S, CT, C
Anthus hodgsoni	Olive-backed Pipit	C	WV						+	+	+	+	C, SHG, DA, TS, PW
Anthus richardi	Richard's Pipit	C	R M WV						+				W,C
Apus affinis	Little Swift	A-C	R,SpM									+	WL, SHG, TS
Apus pacificus	Pacific Swift	C	SpM,Su					(LC)				+	WL, SHG, TS
Ardea cinerea	Grey Heron	A	W			@		PRC	+	+	+		CT
Ardeola bacchus	Chinese Pond Heron	C	R			@		PRC (RC)	+	+	+	+	CT
Bambusicola thoracica	Chinese Bamboo Partridge	Cat E	Cat E									+	TS
Bubo bubo (CITES II)	Eurasian Eagle Owl	S	R			* #		RC				+	SHG
Bubulcus ibis (CITES III)	Cattle Egret	U-C	R, Su			#		(LC)	+				CT
Butastur indicus (CITES II)	Grey-faced Buzzard	U	SpM									+	TS
Buteo buteo (CITES II)	Common Buzzard	C	WV						+	+	+	+	WL, SHG, TS
Butorides striatus ~	Striated Heron	U- S	Su					LC	+	+		+	S
Caprimulgus affinis ~	Savanna Nightjar	U	Su, ?WV									+	SHG,TS
Centropus bengalensis ~	Lesser Coucal	C	R								+	+	WL, SHG
Centropus sinensis ~	Greater Coucal	C	R						+		+	+	WL, SHG, TS
Cettia diphone	Japanese Bush Warbler	U-C	WV							+	+		DA, SHG
Cettia fortipes	Brownish-flanked Bush Warbler	S	WV								+		SHG
Chalcophaps indica ~	Emerald Dove	S	R									+	WL
Cisticola juncidis	Zitting Cisticola	C	R WV				#	LC	+				SHG
Clamator coromandus ~	Chestnut-winged Cuckoo	U	Su									+	WL
Copsychus saularis ~	Oriental Magpie Robin	A	R						+	+	+	+	CT
Corvus macrorhynchus ~	Large-billed Crow	C	R*						+	+	+	+	WL, CT
Cuculus micropterus ~	Indian Cuckoo	C	Su									+	WL, TS
Cyanoptila cyanomelana	Blue-and-white Flycatcher	S	SpM							+			WL
Delichon dasypus	Asian House Martin	U	M									+	WL,TS

Species name	Common name	Local Abundance	Status	Global Red List category (IUCN)	Global rating	Regional rating	Local rating	Level of concern	Sep - Oct 2003	Nov - Dec 2003	Jan - Feb 2004	Mar- May 2004	Habitat Present
Dendrocitta formosae	Grey Treepie	S-U	R, WV, M					LC	+				WL
Dicaeum cruentatum	Scarlet-backed Flowerpecker	C	R							+			WL, TS
Dicrurus hottentotus ~	Hair-crested Drongo	C	SV*						+			+	WL
Dicrurus macrocercus	Black Drongo	C	M,Su						+			+	CT, WL, SHG, TS
Egretta alba	Great Egret	C- A	R			@		LC	+		+	+	CT
Egretta eulophotes	Swinhoe's Egret	S	SpM	VU	#	# @		GC				+	CT
Egretta garzetta (CITES III)	Little Egret	A	R			@		PRC (RC)	+	+	+	+	CT
Egretta intermedia	Intermediate Egret	C	AM, W			* #		RC	+				CT
Egretta sacra	Pacific Reef Egret	U	R			? $		LC	+	+		+	CT
Emberiza aureola	Yellow-breasted Bunting	U-C	M			? #	#	RC	+				SHG
Emberiza fucata	Chestnut-eared Bunting	S	M				#	LC				+	CT
Emberiza pusilla	Little Bunting	VC -C	WV									+	TS
Emberiza rutila	Chestnut Bunting	C-S	M						+	+		+	SHG
Emberiza spodocephala	Black-faced Bunting	C	WV, M							+	+	+	WL, C, SHG
Eudynamys scolopacea ~	Common Koel	A	Su, R							+	+	+	CT, WL, DA, TS, C
Eurystomus orientalis	Dollarbird	U	M									+	WL
Falco peregrinus (CITES I)	Peregrine Falcon	S	R, WV					LC	+				SHG
Falco tinnunculus (CITES II)	Common Kestrel	C	WV, AM							+	+		SHG
Ficedula mugimaki	Mugimaki Flycatcher	U	M, WV							+			WL
Ficedula parva	Red-breasted Flycatcher	N/A	WV						+				WL
Francolinus pintadeanus ~	Chinese Francolin	C	R									+	TS, SHG
Garrulax canorus ~ (CITES II)	Hwamei	C	R							+	+	+	SHG, WL
Garrulax perspicillatus ~	Masked Laughingthrush	A	R						+	+	+	+	SHG, , DA, TS
Halcyon pileata	Black-capped Kingfisher	C	AM, WV				#	LC	+	+	+	+	CT
Halcyon smyrnensis ~	White-throated Kingfisher	C	AM, WV, R					(LC)	+	+	+	+	CT, S
Haliaeetus leucogaster (CITES II)	White-bellied Sea Eagle	U	R*			*		RC	+	+	+	+	WL
Heteroscelus brevipes	Grey-tailed Tattler	C	M			*	*	LC				+	CT
Hieraaetus fasciatus (CITES II)	Bonelli's Eagle	S	R					RC		+			SHG
Hierococcyx sparveroides ~	Large Hawk Cuckoo	N/A	N/A									+	WL
Himantopus himantopus	Black-winged Stilt	C-U	WV			* @		RC	+				CT
Hirundapus cochinchinensis	White-vented Needletail	U	SpM									+	TS
Hirundo rustica ~	Barn Swallow	A	SpM,Su									+	DA,C
Hypsipetes castanonotus	Chestnut Bulbul	C	R, WV							+	+		WL
Ketupa zeylonensis ~ (CITES II)	Brown Fish Owl*	S	R			* #		RC	+	+			S, CT, WL
Lanius cristatus	Brown Shrike	C	SpM								+	+	TS
Lanius schach ~	Long-tailed	C	R						+	+	+	+	WL, W, C,

Species name	Common name	Local Abundance	Status	Global Red List category (IUCN)	Global rating	Regional rating	Local rating	Level of concern	Sep - Oct 2003	Nov - Dec 2003	Jan - Feb 2004	Mar- May 2004	Habitat Present
	Shrike												SHG
Lonchura punctulata	Scaly-breasted Munia	C	R						+	+	+	+	W, C, SHG, DA
Luscinia calliope	Siberian Rubythroat	C	WV						+	+	+	+	CT, WL, SHG, TS
Luscinia sibilans	Rufous-tailed Robin	U	WV, M							+	+		WL, TS, SHG
Milvus migrans (CITES II)	Black Kite	A	R, WV			@ #		PRC (RC)	+	+	+	+	WL, TS, SHG, CT
Monticola solitarius	Blue Rock Thrush	U	WV, M								+		CT
Motacilla alba ~	White Wagtail	C	WV, M R						+	+	+	+	C, DA, S, CT
Motacilla cinerea	Grey Wagtail	C	WV						+	+	+	+	C, S
Motacilla flava	Yellow Wagtail	C	M,W									+	CT
Muscicapa dauurica	Asian Brown Flycatcher	C-U	M, WV						+				WL, TS
Myophonus caeruleus ~	Blue Whistling Thrush	C	R						+	+	+	+	WL, S, CT
Nycticorax nycticorax	Black-crowned Night Heron	C-A	R					(LC)	+	+	+		S, CT
Orthotomus sutorius ~	Common Tailorbird	A	R						+	+	+	+	W, C, SHG, DA, TS
Otus bakkamoena ~ (CITES II)	Collared Scops Owl	C	R						+		+	+	WL
Parus major ~	Great Tit	A	R						+	+	+	+	CT, WL, C, DA, TS
Passer montanus ~	Eurasian Tree Sparrow	A	R						+	+		+	W, C, DA, S
Phoenicurus auroreus	Daurian Redstart	C	WV							+	+		WL, C, DA, TS
Phylloscopus borealis	Arctic Warbler	C	AM						+				WL, TS, CT
Phylloscopus fuscatus	Dusky Warbler	C	WV						+	+	+	+	CT, WL, C, SHG, DA, TS
Phylloscopus inornatus	Yellow-browed Warbler	C	WV						+	+	+	+	CT, WL, TS, C
Phylloscopus proregulus	Pallas's Leaf Warbler	U-C	WV							+	+		WL, TS, C
Phylloscopus tenellipes	Pale-legged Leaf Warbler	S	AM, WV						+				WL, TS
Pica pica ~	Common Magpie	C	R						+	+	+	+	CT, WL, DA, TS
Prinia flaviventris ~	Yellow-bellied Prinia	A	R								+		SHG
Prinia inornata ~	Plain Prinia	C	R									+	C
Pycnonotus aurigaster ~	Sooty-headed Bulbul	C	R									+	C
Pycnonotus jocosus ~	Red-whiskered Bulbul	A	R						+	+	+	+	CT, WL, W, C, SHG, TS, S
Pycnonotus sinensis ~	Chinese Bulbul	A	R						+	+	+	+	CT, WL, W, C, SHG, TS, S
Rallina eurizonoides ~	Slaty-legged Crake	Un	Un (Su, M, MV)									+	TS
Saxicola torquata	Common Stonechat	C	WV						+	+		+	C, SHG, WL
Scolopax rusticola	Eurasian Woodcock	S	WV, M					LC	+	+	+		WL
Serinus mozambiqus	Yellow-fronted Canary	N/A	N/A									+	DA
Spilornis cheela (CITES II)	Crested Serpent Eagle	N/A	M,R					LC				+	WL
Steptopelia chinensis ~	Spotted Dove	A	R						+	+	+	+	CT, WL, W, C, SHG, TS, S
Streptopelia orientalis	Oriental Turtle Dove	C	M WV							+	+		SHG, TS, C

Species name	Common name	Local Abundance	Status	Global Red List category (IUCN)	Global rating	Regional rating	Local rating	Level of concern	Sep - Oct 2003	Nov - Dec 2003	Jan - Feb 2004	Mar- May 2004	Habitat Present
Sturnus nigricollis ~	Black-collared Starling	A	R						+	+	+	+	CT, WL, W, C, SHG, TS, S
Sturnus sericeus	Red-billed Starling	A	WV			? @	@ #	GC		+	+		CT, WL
Sturnus sinensis	White-shouldered Starling	C	M,WV, Su			?	#	LC			+	+	WL
Tachybaptus ruficollis	Little Grebe	C	R					LC	+				CT
Tarsiger cyanurus	Red-flanked Bluetail	C	WV							+	+		WL, TS, C
Tringa glareola	Wood Sandpiper	A-C	WV			?		LC				+	CT
Turdus cardis	Japanese Thrush	U	M WV							+	+		WL, TS, C
Turdus hortulorum	Grey-backed Thrush	C	WV							+	+	+	WL, TS, C
Turdus merula	Common Blackbird	C	WV, M						+	+	+		TS, C
Turdus pallidus	Pale Thrush	S-U	WV								+		C, WL
Urocissa erythrorhyncha	Blue Magpie	C	R						+	+	+	+	WL, TS
Urosphena squameiceps	Asian Stubtail Warbler	C-S	WV							+	+		WL, TS
Zoothera dauma	Scaly Thrush	U	WV							+	+	+	WL, DA, TS, C
Zosterops japonicus ~	Japanese White-eye	A	R*						+	+	+	+	CT, WL, W, C, SHG, DA, TS, S

Note: Local abundance and status based on Carey *et al.* (2001), Viney et al., (1994) and conservation rating based on Fellowes *et al.* (2002).

Local Abundance:
A- Abundant
C- Common
U- Uncommon
S- Scarce
N/A – Not listed in Carey et al., 2001
Un- Uncertain

Species Name:
CITES (Appendix I, II or III)

Status:
SpM- Spring Migrant
M- Passage Migrant
R- Resident
WV- Winter Visitor
Su- Summer Visitor
AM- Autumn Migrant

? Inadequate Information

Cat E – Species for which all published Hong Kong records are considered likely to relate to birds that have escaped or have been released from captivity (Carey *et al.*, 2001).

$: scarce visitor in Hong Kong
? : inadequate information on restrictedness
* : probably under-recorded
@: population highly concentrated
: in marked decline
+ : Recorded during reporting period
~ Signs of Breeding (Carey *et al.*, 2001) - Breeding was recorded if one or more of the following were observed:
- Bird apparently holding territory;
- Courtship, display or anxiety call and agitated behavior of adult indicating presence of young or nest;
- Brood- patch on trapped bird;
- Adult visiting probably nest-site;
- Nest-building (including excavating nest hole);
- Distraction display or injury-feigning;
- Used nest found;
- Recently fledged young;
- Adult carrying faecal sac or food;
- Adult entering or leaving nest-site in circumstances indicating occupied nest (including colonies);
- Nest with eggs found, or bird sitting but not disturbed, or eggshells found near nest;
- nest with young or downy young of ducks, gamebirds, waders or other nidifugous species.

RC: Regional Concern
LC: Local Concern
PRC: Potential Regional Concern
( ) : Based on restricted nesting or roosting site

Habitat Type
C- Cultivated Field
CT- Coastal
DA – Developed Area
S –Stream
SHG- Shrubby Grassland
TS- Tall Shrubland
W – Wasteland
WL- Woodland

5.9 Terrestrial Mammals

5.9.1 Mammal surveys were carried out and a summary of the species recorded between September 2003 and May 2004 is presented below in *Table 5.14.* Full details of the survey results are presented in *Appendix I*. A map showing the area surveyed for mammals is presented in *Figure 6b.*

Table 5.14 A Summary of the Mammal Species Recorded

Species / Group	Protection Status	Locations Recorded	Local Abundance and Level of Conservation Interest
Muntiacus muntjac (Indian Muntjac)	WAPO	Tall shrubland at Sha Lo Wan and Sham Shek Tsuen.	Probably common (Reels, 1996) Considered as Potential Regional Concern (Fellowes *et al.*,2002).
Suncus murinus (Brown Musk Shrew)	WAPO	Village in Sham Wat.	Common (Reels, 1996)

5.9.2 Indian Muntjac *Muntiacus muntjac* were recorded in the tall shrubland of Sha Lo Wan in September 2003 and also in April 2004. Another sighting of the Indian Muntijac was made in the tall shrubland at Sham Shek Tsuen in April 2004. Calling of this species was also heard from almost the same location in March 2004. All Muntjac species are known to be in drastic decline in the region and considered to be of potential regional concern by Fellowes *et al.* (2002). In addition, one Brown Musk Shrew *Suncus murinus* was recorded in the village of Sham Wat in October 2003.

5.9.3 Both terrestrial mammal species recorded are locally common and Goodyer (1992) recorded them in many parts of the Territory and the Indian Muntijac has scattered records in Lantau (Reels, 1996). Only limited recent information is available for the Brown Musk Shrew (Goodyer, 1992). No other large mammal species was recorded during the course of the surveys and this supports the conclusion that large mammals are scarce across Lantau Island.

5.9.4 It should be noted that some unidentified insectivorous bats were observed during the February, April and May 2004 night surveys flying across Tai Ho Wan, Sham Wat and San Shek Wan. All bat species are protected in Hong Kong under the Wild Animals Protection Ordinance. Bat species have been reported previously from Lantau such as Least's Horseshoe bat *Rhinolophus pusillus* in Tai Ho (Ades, 1999; Mouchel, 2000), the Long-fingered Bat in Mui Wo (Green Lantau Association, 1998) and Greater Short-nosed Fruit Bat *Cynopterus sphinx* in north Lantau (Ades, 1999). Although many bats are common and widespread in Hong Kong, some are rare including the Least's Horseshoe Bat in Tai Ho (Mouchel, 2000).

5.10 Insects (Butterflies and Dragonflies)

5.10.1 The insect surveys were conducted over the 9-month period between September 2003 and May 2004 covering both the wet and dry seasons. The dragonfly and butterfly species recorded during the surveys are summarised in *Tables 5.15* and *5.16*, respectively. Details including the locations and period recorded are presented in *Appendices J* and *K* for dragonflies and butterflies, respectively.

Dragonflies

5.10.2 Twenty-four species of dragonfly were recorded in different habitats including stream, shrubland, coastal, grassland, wasteland and secondary woodland. The dragonflies recorded during the surveys were all common and abundant in Hong Kong although

a number of the species are considered uncommon (Wilson, 1997, 2003) and of conservation interest (Fellowes *et al.*, 2002). The majority of the species were sighted near streams or ponds while a few were recorded in secondary woodland or shrubby grassland.

5.10.3 Dragonfly species of local concern included the Elegant Clubtail *Leptogomphus elegans* recorded near Tai Ho Wan and the Sapphire Flutterer *Rhyothemis triangularis* observed near a pond in Tung Chung Bay. Both species were recorded in May 2004. One globally threatened (Fellowes *et al.*, 2002) dragonfly species Small Hooktail *Melligomphus moluamis* was recorded near a stream at San Tau. Note that Elegant Clubtail and Small Hooktail have been previously recorded in the vicinity of the study area (Mouchel, 2002a). Apart from the aforesaid three species, all other species recorded during the course of the surveys are considered common and abundant in Hong Kong (Wilson, 1997, 2003).

5.10.4 The abundance of dragonfly species showed significant seasonal variation. The abundance was apparently higher in March to May 2004 surveys when compared with those conducted between September and November 2003. During the January and February 2004 surveys, no species of dragonfly was recorded. The dragonfly species recorded during the surveys are summarised in *Table 5.15* below and further details are presented in *Appendix J*.

Table 5.15 Dragonflies Recorded in the Study Area, September 2003 to May 2004

Species name	Common name	Status	Locations Recorded	Remarks
Brachydiplax chalybea	Blue Dasher	Common	Tung Chung Bay	
Acisoma panorpoides	Asian Pintail	Common	Tai Ho Wan	
Anax immaculifrons	Fiery Emperor	Common	Hau Hok Wan, Tai Ho Wan	
Coeliccia cyanomelas	Blue Forest Damsel	Common	San Tau	
Copera marginipes	Yellow Featherlegs	Abundant	Pak Mong to Ngau Kwu Long, Pak Mong to Tai Ho Wan	
Crocothemis servilia	Crimson Darter	Abundant	Pak Mong to Tai Ho Wan	
Diplacodes trivialis	Blue Percher	Abundant	Tai Ho Wan	
Euphaea decorata	Black-banded Gossamerwing	Abundant	Sha Lo Wan, San Tau, Pak Mong to Tai Ho Wan	
Leptogomphus elegans	Elegant Clubtail	Common	Pak Mong to Tai Ho Wan	Local Concern (Fellowes *et al.*, 2002)
Lyriothemis elegantissima	Forest Chaser	Common	Pak Mong to Tai Ho Wan	
Melligomphus moluamis	Small Hooktail	Uncommon	San Tau	Global Concern (Fellowes *et al.*, 2002)
Neurothemis tullia	Pied Percher	Common	Tung Chung Bay	
Orthetrum chrysis	Red-faced Skimmer	Common	Pak Mong to Tai Ho Wan	
Orthetrum glaucum	Common Blue Skimmer	Abundant	Sham Wat Wan, San Shek Wan, Sha Lo Wan, Hau Hok Wan, San Tau, Pak Mong to Ngau Kwu Long, Pak Mong to Tai Ho Wan, Ngau Au	
Orthetrum luzonicum	Marsh Skimmer	Abundant	Sha Lo Wan	
Orthetrum pruinosum	Common Red Skimmer	Abundant	Sham Wat Bay, Kau Liu, Hau Wong Temple, Tai Ho Wan	

Species name	Common name	Status	Locations Recorded	Remarks
Orthetrum sabina	Green Skimmer	Abundant, common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Kau Liu, Tin Sam, San Tau, Tai Ho Wan	
Pantala flavescens	Wandering Glider	Abundant	Sham Wat Bay, Sham Shek Tsuen, San Shek Wan, Sha Lo Wan, Hau Hok Wan, Chek Lap Kok, Kau Liu, Hau Wong Temple, Ma Wan Chung, Tung Chung Battery, Pak Mong to Tai Ho Wan, Pak Mong to Ngau Kwu Long, Kau Liu to Hau Hok Wan, Ngau Au	
Prodasineura autumnails	Black Threadtail	Abundant	Sha Lo Wan, San Tau, Pak Mong to Tai Ho Wan	
Rhinocypha perforata	Common Blue Jewel	Abundant	Sha Lo Wan, San Tau, Pak Mong to Tai Ho Wan	
Rhyothemis triangularis	Sapphire Flutterer	Uncommon	Tung Chung Bay	Local Concern (Fellowes *et al*., 2002)
Tramea virginia	Saddlebag Glider	Common	Chek Lap Kok	
Trithemis aurora	Crimson Dropwing	Abundant	Sha Lo Wan, Hau Hok Wan, Tung Chung Bay, Pak Mong to Tai Ho Wan	
Trithemis festiva	Indigo Dropwing	Abundant	Sham Wat Bay, Hau Hok Wan, San Tau, Pak Mong to Ngau Kwu Long, Pak Mong to Tai Ho Wan	

Note: After Wilson (1997, 2003).

Butterflies

5.10.5 Ninety species of butterfly were recorded in different habitats including edge of woodland, tall shrubland, riparian, cultivated field, coastal grassland and shrubby grassland. During the course of surveys, the butterfly species encountered were mostly common and abundant in Hong Kong except six species of conservation interest (Fellowes *et al*., 2002; Young and Yiu, 2002). These included Common Albatross *Appias albina*, Burmese Bush Blue *Arhopala bimana*, Small Grass Yellow *Eurema brigitta*, Danaid Eggfly *Hypolimnas misippus*, Dragontail *Lamproptera curius* and Falcate Oak Blue *Mahathala ameria*. All of these are of local conservation concern (Fellowes *et al*., 2002). The three rare species (Common Albatross, Burmese Bush Blue and Dragontail) were only recorded in San Tau. This supports the conclusion that San Tau is an important habitat for butterfly species.

5.10.6 The butterfly species recorded during the surveys are presented in *Table 5.16* below. Details including the locations and period recorded are presented in *Appendix K*.

Table 5.16 Butterflies Recorded in the Study Area, September 2003 to May 2004

Species name	Common name	Status*	Locations Recorded	Remarks
Abisara echerius	Plum Judy	Very common	Sham Wat Bay, San Shek Wan, Sha Lo Wan, Hau Hok Wan, Kau Liu, Tin Sam, San Tau, Tai Ho Bay, Pak Mong to Ngau Kwu Long, Sham Shek Tsuen headland, Ngau Au	
Acytolepis puspa	Common Hedge Blue	Common	Sham Wat Bay, San Shek Wan, Chek Lap Kok, San Tau, Tung Chung Bay, Pak Mong to Ngau Kwu Long, Ngau Au	
Ampittia dioscorides	Bush Hopper	Uncommon	Sha Lo Wan, Tai Ho Bay	
Appias albina	Common Albatross	Rare	San Tau	Local Concern (Fellowes *et al.*, 2002)
Arhopala birmana	Burmese Bush Blue	Rare	San Tau	Local Concern (Fellowes *et al.*, 2002)
Artipe eryx	Green Flash	Uncommon	Kau Liu to Hau Hok Wan	
Astictopterus jama	Forest Hopper	Common	San Tau, Pak Mong to Ngau Kwu Long, Sham Shek Tsuen headland	
Athyma nefte	Colour Sergeant	Common	San Tau, Tung Chung Bay	
Athyma perius	Common Sergeant	Common	Tai Ho Bay	
Athyma selenophora	Staff Sergeant	Common	San Tau, Pak Mong to Tai Ho Wan	
Bibasis gotama	Pale Awlet	Uncommon	San Tau	
Catopsilia pomona	Lemon Emigrant	Common	Sham Wat Bay, San Shek Wan, Chek Lap Kok, Tung Chung Bay, Hau Wong Temple, Ma Wan Chung, Pak Mong to Ngau Kwu Long, Kau Liu to Hau Hok Wan	
Catopsilia pyranthe	Mottled Emigrant	Common	San Tau, Hau Wong Temple, Pak Mong to Ngau Kwu Long	
Cepora nerissa	Common Gull	Common	Sha Lo Wan, San Tau, Pak Mong to Tai Ho Wan, Kau Liu to Sha Lo Wan	
Cethosia biblis	Hong Kong Lacewing	Rare	San Tau, Tung Chung Bay, Pak Mong to Ngau Kwu Long	
Charaxes bernardus	Tawny Rajah	Common	Tin Sam, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan	
Chilades lajus	Lime Blue	Very common	Sham Wat Bay, Pak Mong to Ngau Kwu Long	
Cupha erymanthis	Rustic	Very common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Chek Lap Kok, Kau Liu, San Tau, Tung Chung Bay, Tung Chung Battery, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland, Ngau Au, Kau Liu to Hau Hok Wan	
Cyrestis thyodamas	Mapwing	Common	Sha Lo Wan, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan, Hok Hok Wan to Sha Lo Wan	
Danaus chrysippus	Plain Tiger	Uncommon	Sham Wat Bay	
Danaus genutia	Common Tiger	Very common	Sham Wat Bay, Chek Lap Kok, Tin Sam, Pak Mong, Tai Ho Bay	

Species name	Common name	Status*	Locations Recorded	Remarks
Delias pasithoe	Red-base Jezebel	Very common	Sham Wat Bay, Chek Lap Kok, Kau Liu, Tin Sam, San Tau, Hau Wong Temple, Ma Wan Chung, Tung Chung Battery, Pak Mong to Ngau Kwu Long, Ngau Au, Kau Liu to Hau Hok Wan	
Erionota torus	Banana Skipper	Common	Sham Wat Bay	
Euchrysops cnejus	Gram Blue Cupid	Common	Tai Ho Bay	
Euploea core	Common Indian Crow	Very common	Sha Lo Wan, Chek Lap Kok, San Tau, Hau Wong Temple, Tung Chung Battery	
Euploea midamus	Blue-spotted Crow	Very common	Sham Wat Bay, Hau Hok Wan, Kau Liu, San Tau, Hau Wong Temple, Pak Mong to Tai Ho Wan	
Eurema blanda	Three-spot Grass Yellow	Uncommon	Pak Mong to Tai Ho Wan	
Eurema brigitta	Small Grass Yellow	Uncommon	Kau Liu	Population in marked decline and of local concern (Fellowes *et al.*, 2002).
Eurema hecabe	Common Grass Yellow	Very common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Chek Lap Kok, Kau Liu, San Tau, Tung Chung Bay, Hau Wong Temple, Ma Wan Chung, Tung Chung Battery, Pak Mong to Ngau Kwu Long, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland, Ngau Au, Kau Liu to Sha Lo Wan	
Eurema laeta	Spotless Grass Yellow	Uncommon	Sha Lo Wan, Tung Chung Bay, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland	
Euthalia phemius	White-edged Blue Baron	Common	San Tau	
Everes lacturnus	Tailed Cupid	Common	Tai Ho Bay, Pak Mong to Ngau Kwu Long	
Faunis eumeus	Common Faun	Common	San Tau, Tai Ho Bay, Pak Mong to Ngau Kwu Long, Sham Shek Tsuen headland	
Graphium agamemnon	Tailed Jay	Very common	Kau Liu, San Tau, Tung Chung Bay, Hau Wong Temple, Tai Ho Bay, Pak Mong to Ngau Kwu Long, Kau Liu to Hau Hok Wan	
Graphium doson	Common Jay	Uncommon	Sha Lo Wan, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan, Kau Liu to Hau Hok Wan	
Graphium sarpedon	Common Bluebottle	Very common	Sham Wat Bay, Sha Lo Wan, Chek Lap Kok, Kau Liu, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland, Kau Liu to Hau Hok Wan	
Hebomoia glaucippe	Great Orangetip	Common	Sha Lo Wan, San Tau, Tung Chung Bay, Ngau Au, Hau Hok Wan to Sha Lo Wan	
Heliophorus epicles	Purple Sapphire	Common	Tin Sam, Pak Mong to Tai Ho Wan	
Hestina asslimilis	Red Ring-skirt	Common	Pak Mong to Tai Ho Wan	
Hypolimnas bolina	Great Eggfly	Very common	Chek Lap Kok, San Tau, Tai Ho Bay, Pak Mong to Ngau Kwu Long	
Hypolimnas misippus	Danaid Eggfly	Uncommon	Chek Lap Kok	Local concern (Fellowes *et al.*, 2002)

Species name	Common name	Status*	Locations Recorded	Remarks
Iambrix salsala	Chestnut Bob	Uncommon	Kau Liu to Hau Hok Wan	
Ideopsis similis	Ceylon Blue Glassy Tiger	Very common	Sham Wat Bay, Sha Lo Wan, Kau Liu, San Tau, Hau Wong Temple, Tung Chung Battery, Tai Ho Bay, Pak Mong to Ngau Kwu Long	
Iraota timoleon	Silver Streak Blue	Uncommon	Kau Liu	
Ixias pyrene	Yellow Orange Tip	Uncommon	Sha Lo Wan, Hau Hok Wan, Hau Hok Wan to Sha Lo Wan	
Jamides bochus	Dark Cerulean	Common	Sham Wat Bay, Kau Liu	
Junonia almana	Peacock Pansy	Common	Tung Chung Battery, Tai Ho Bay, Pak Mong to Tai Ho Wan, Pak Mong to Ngau Kwu Long	
Junonia atlites	Grey Pansy	Common	Pak Mong to Tai Ho Wan, Pak Mong to Ngau Kwu Long	
Junonia hierta	Yellow Pansy	Uncommon	San Tau	
Junonia iphita	Chocolate Pansy	Uncommon	San Tau	
Junonia lemonias	Lemon Pansy	Uncommon	Pak Mong to Ngau Kwu Long	
Kaniska canace	Blue Admiral	Common	Hau Hok Wan, Kau Liu, Tin Sam, San Tau	
Lampides boeticus	Long-tailed Blue	Common	Sham Wat Bay, Pak Mong to Ngau Kwu Long	
Lamproptera curius	Dragontail	Rare	San Tau,	Local Concern (Fellowes *et al*., 2002)
Lethe confusa	Common White-banded Brown	Very common	Kau Liu, San Tau, Sham Shek Tsuen headland, Kau Liu to Hau Hok Wan	
Mahathala ameria	Falcate Oak Blue	Uncommon	Kau Liu to Hau Hok Wan	Local Concern (Fellowes *et al*., 2002)
Melanitis leda	Common Evening Brown	Very common	Sham Wat Bay, Kau Liu, San Tau, Tai Ho Bay, Sham Shek Tsuen headland	
Mycalesis mineus	Dark Brand Bush Brown	Very common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Kau Liu, San Tau, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland	
Mycalesis zonata	South China Bush Brown	Common	Sham Wat Bay, Kau Liu, San Tau, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland	
Nacaduba kurava	Rounded Six-line Blue	Very common	Pak Mong to Tai Ho Wan	
Neopithecops zalmora	Quaker	Uncommon	Sha Lo Wan, Tung Chung Bay	
Neptis hylas	Common Sailer	Very common	Sha Lo Wan, Hau Hok Wan, Kau Liu, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland, Ngau Au, Kau Liu to Hau Hok Wan	
Odontoptilum angulatum	Chestnut Angle	Common	Sham Wat Bay, San Tau, Pak Mong to Ngau Kwu Long	
Papilio bianor	Chinese Peacock	Common	San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan	
Papilio clytia	Common Mime	Common	Sham Wat Bay, Sha Lo Wan, Chek Lap Kok, Kau Liu, Tin Sam, San Tau, Tung Chung Battery, Pak Mong to Tai Ho Wan, Kau Liu to Hau Hok Wan	
Papilio demoleus	Lime Butterfly	Common	Sha Lo Wan, Hau Hok Wan, Chek Lap Kok, Kau Liu, San Tau, Tung Chung Bay, Pak Mong to Ngau Kwu Long	
Papilio helenus	Red Helen	Very common	Sham Wat Bay, Kau Liu, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan, Kau Liu to Sha Lo Wan	

Species name	Common name	Status*	Locations Recorded	Remarks
Papilio memnon	Great Mormon	Very common	Sha Lo Wan, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan	
Papilio paris	Paris Peacock	Very common	Sha Lo Wan, Hau Hok Wan, Kau Liu, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan, Kau Liu to Hau Hok Wan	
Papilio polytes	Common Mormon	Very common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Kau Liu, San Tau, Tung Chung Bay, Hau Wong Temple, Pak Mong to Tai Ho Wan, Sham Shek Tsuen headland, Kau Liu to Sha Lo Wan	
Papilio protenor	Spangle	Very common	Hau Hok Wan, San Tau, Hau Wong Temple, Tung Chung Battery, Pak Mong to Tai Ho Wan, Hau Hok Wan to Sha Lo Wan	
Papilio xuthus	Swallowtail	Rare	San Shek Wan, San Tau, Sham Shek Tsuen headland	
Parasarpa dudu	Commodore	Uncommon	Tung Chung Bay	
Parathyma sulpitia	Five-dot Sergeant	Common	San Tau, Kau Liu to Hau Hok Wan	
Parnara guttata	Common Straight Swift	Common	Sha Lo Wan, Tin Sam, Tai Ho Bay	
Pathysa antiphates	Five-bar Swordtail	Common	Sha Lo Wan, Kau Liu, San Tau, Tung Chung Bay, Pak Mong to Tai Ho Wan	
Phaedyma columella	Short-banded Sailer	Uncommon	Sha Lo Wan, Pak Mong to Tai Ho Wan	
Pieris canidia	Indian Cabbage White	Very common	Sham Wat Bay, Sha Lo Wan, San Tau, Chek Lap Kok, Kau Liu, Tin Sam, Tung Chung Bay, Hau Wong Temple, Pak Mong to Tai Ho Wan	
Polyura nepenthes	Shan Nawab	Uncommon	San Tau, Tung Chung Battery, Tai Ho Bay, Pak Mong to Ngau Kwu Long, Hau Hok Wan to Sha Lo Wan	
Rapala manea	Slate Flash	Uncommon	Pak Mong to Tai Ho Wan	
Rohana parisatis	Black Prince	Uncommon	Sha Lo Wan, San Tau, Pak Mong to Ngau Kwu Long, Kau Liu to Sha Lo Wan	
Spindasis lohita	Long-banded Silverline	Uncommon	Tai Ho Bay	
Suastus gremius	Indian Palm Bob	Common	Pak Mong to Ngau Kwu Long,	
Symbrenthia lilaea	Jester	Common	Sha Lo Wan, Pak Mong to Tai Ho Wan	
Vanessa indica	Indian Red Admiral	Common	Pak Mong to Ngau Kwu Long,	
Ypthima baldus	Common Five-ring	Very common	Sha Lo Wan, Hau Hok Wan, Tai Ho Bay, Pak Mong to Ngau Kwu Long, Hau Hok Wan to Sha Lo Wan	
Ypthima lisandra	Straight Five-ring	Common	Tai Ho Bay,	
Zemeros flegyas	Punchinello	Common	Sham Wat Bay, San Tau, Tung Chung Bay,	
Zizeeria maha	Pale Grass Blue	Very common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Chek Lap Kok, Kau Liu, San Tau, Tung Chung Bay, Hau Wong Temple, Ma Wan Chung, Pak Mong to Tai Ho Wan, Ngau Au	
Zizina otis	Lesser Grass Blue	Common	Tai Ho Wan	

Note: After Young and Yiu (2002).

5.11 Herpetofauna (Reptiles and Amphibians)

5.11.1 The herpetofauna were surveyed during both the day and night by active searching in appropriate microhabitats, combined with auditory detection and chance encounters, in areas traversed or potentially impacted by the proposed road alignment. The herpetofauna surveys were conducted over a 9-month period between September 2003 and May 2004 covering both the wet and dry seasons. Twenty-one species of herpetofauna were recorded in the study area during the course of the surveys, including five species of conservation interest. A summary of the species recorded is provided in *Table 5.17* below and details including locations and period recorded are presented in *Appendix L*.

Amphibians

5.11.2 Of the seven amphibian species recorded in the study area, the Lesser Spiny Frog (*Rana exilispinosa*) is of conservation concern. The Lesser Spiny Frog was recorded in Tai Ho Wan, San Tau, Kau Liu, Hau Hok Wan, Sha Lo Wan and Sham Wat Bay. Although this species is widespread in hill and mountain streams in Hong Kong (Karsen *et al*., 1998), this frog is considered threatened in China due to a decline in populations throughout its range (Hunan, Fujian and Guangdong). This species is, therefore, considered to be of conservation concern (Fellowes *et al*., 2002). The other amphibian species are common and widespread in Hong Kong (Karsen *et al*., 1998).

5.11.3 Although several populations of Romer's Tree Frog (*Philautus romeri*) have been recorded on Lantau Island (Lau and Dudgeon, 1999; Mouchel, 2002a; AFCD, pers. comm.), no signs of Romer's Tree Frog (including tadpoles and audible frog calls) were found during the present surveys. Romer's Tree Frog are widespread on north Lantau (Mouchel, 2002a) and of very high conservation interest. Recent records have indicated that a remnant population of Romer's Tree Frog is extant on Scenic Hill where 2.86 ha of secondary woodland is present. Careful assessment of the Scenic Hill secondary woodland and aquatic habitats potentially utilised by the frog (well-wooded areas near to streams; Karsen *et al*., 1998) that may be impacted by the project is, therefore, required.

Reptiles

5.11.4 Of the fourteen reptile species recorded in the study area, all are common in Hong Kong except the Blue-tailed skink (*Eumeces quadrilineatus*), Four-clawed Gecko (*Gehyra mutilata*), Tokay Gecko (*Gekko gecko*), Chinese Cobra (*Naja atra*) and Taiwan Kukri snake (*Oligodon formosanus*). The Chinese Cobra and Tokay Gecko are of conservation interest. The Common Rat Snake is common in Hong Kong but of conservation interest in the wider region (Fellowes *et al*., 2002)

5.11.5 Chinese Cobra in southern China is believed to be in population decline (Mouchel, 2002a) and this species is of conservation interest in the wider region (Fellowes *et al*., 2002). This species is considered globally restricted to southern China (Karsen *et al*., 1998), and is a CITES Appendix II species. It is also listed as vulnerable in the China Red Data Book of Endangered Animals (Zhao, 1998). This species was recorded at Sham Shek Tsuen headland in October 2003.

5.11.6 Tokay Gecko is considered locally rare (Karsen *et al*., 1998) and was recorded at San Tau, San Shek Wan and Sham Wat Bay during the night survey in April 2004. This species is threatened regionally and the global population is in marked decline (Fellowes *et al*., 2002).

5.11.7 Common Rat Snake is common throughout Hong Kong (Karsen *et al.*, 1998) and was recorded in Tung Chung Bay during two day-time surveys in May 2004. This species is of conservation interest at the regional scale (Fellowes et al., 2002).

Table 5.17 Herpetofauna Recorded in the study area, September 2003 to May 2004

Species name	Common name	Status*	Location Recorded	Remarks
Kaloula pulchra	Asiatic Painted Frog	Common	San Shek Wan, Sha Lo Wan, Kau Liu, San Tau, Hau Wong Temple and Pak Mong.	
Microhyla pulchra	Marbled Pigmy Frog	Common	San Shek Wan	
Polypedates megacephalus	Brown Tree Frog	Common/ Abundant	Sham Wat Bay, San Shek Wan, Sha Lo Wan, Pak Mong and Tai Ho Wan.	
Rana exilispinosa	Lesser Spiny Frog	Common	Sham Wat Bay, Sha Lo Wan, Hau Hok Wan, Kau Liu, San Tau and Tai Ho Wan.	Wide spread and common in local streams and hills (Karsen *et al*., 1998) Global population in marked decline and considered of Potential Global Concern (Fellowes *et al.,* 2002)
Rana guentheri	Günther's Frog	Very common	Sham Wat Bay, San Shek Wan, Sha Lo Wan, San Tau, Pak Mong and Hok Tau Wan.	
Rana limnocharis	Paddy Frog	Very common	San Shek Wan, Sha Lo Wan, San Tau, Pak Mong and Tai Ho Wan.	
Naja atra	Chinese Cobra	Common	Sham Shek Tsuen headland	Common in Hong Kong (Karsen *et al*., 1998) CITES Appendix II Global population in marked decline and population in drastic decline regionally (Fellowes *et al*., 2002) Considered of Potential Regional Concern (Fellowes *et al*., 2002)
Oligodon formosanus	Taiwan Kukri Snake	Not generally common	Pak Mong to Ngau Kwu Long	
Ptyas mucosus	Common Rat Snake	Common	Tung Chung Bay	Common in Hong Kong (Karsen *et al*., 1998) Potential Regional Concern (Fellowes *et al*., 2002)
Trimeresurus albolabris	Bamboo Snake	Common	Pak Mong	
Ateuchosaurus chinensis	Chinese Forest Skink	Common on Lantau	San Tau	
Calotes versicolor	Changeable Lizard	Common	Sha Lo Wan, Hau Hok Wan, San Tau, Tung Chung Bay, Hau Wong Temple, Pak Mong, Tai Ho Wan	
Eumeces chinensis	Chinese Skink	Very common	Tung Chung Bay and Tai Ho Wan	
Eumeces quadrilineatus	Blue-tailed Skink	Uncommon to abundant	San Shek Wan,Sha Lo Wan, Hau Hok Wan and Kau Liu	
Gehyra mutilata	Four-clawed Gecko	Uncommon	San Tau	

Species name	Common name	Status*	Location Recorded	Remarks
Gekko chinensis	Chinese Gecko	Very common	San Shek Wan, Sha Lo Wan, Hau Hok Wan, Kau Liu, San Tau, Pak Mong and Tai Ho Wan.	
Gekko gecko	Tokay Gecko	Rare	Sham Wat Bay, San Shek Wan and San Tau	Locally rare (Karsen *et al*., 1998) Global and regional population in marked decline (Fellowes *et al*., 2002) Regional Concern (Fellowes *et al*., 2002)
Hemidactylus bowringii	Bowring's Gecko	Very common	Sham Wat Bay, San Shek Wan,Sha Lo Wan,Hau Hok Wan, Chek Lap Kok, Kau Liu, San Tau, Pak Mong and Tai Ho Wan.	
Mabuya longicaudata	Long-tailed Skink	Fairly common and widespread	San Tau and Tai Ho Wan.	
Scincella reevesii	Reeves' Smooth Skink	Very common	San Shek Wan and San Tau.	
Bufo melanostictus	Asian Common Toad	Very abundant, common	Sham Wat Bay, Sha, Lo Wan, Hau Hok Wan, Chek Lap Kok, San Tau, Hau Wong Temple, Pak Mong and Tai Ho Wan.	

Note: After Karsen *et al*. (1998).

5.12 Habitats and Vegetation

5.12.1 Macro-habitats have been mapped on 1:50,000 and 1:15,000 map based on Government base maps. Over the 9-month survey period, seventeen field surveys were conducted. A list of recorded plant species together with estimates of relative abundance is presented in *Appendix M*. The conservation status of each plant species recorded was derived primarily from the comprehensive studies by Siu (2000), Wu and Lee (2000), Xing *et al*. (2000) and the AFCD (2001; 2003).

5.12.2 The habitat map covering the entire terrestrial and coastal study area is shown in *Figures 10a-c*. The habitats recorded within the study area were dominated by developed area, secondary woodland and shrubby grassland, with isolated patches of tall shrubland. Numerous streams, many of them pristine, traverse these habitats. A summary of the overall coverage of habitat types in the study area is shown in *Table 5.18* below and representative photographs of major habitat types present are provided in *Figures 11a-c*. Based upon the information obtained during the survey period, a summary of each habitat type is detailed in the following sections.

Table 5.18 Coverage of the Different Habitat Types Within the study area

Habitat Type	Area (ha)	No. of plant species recorded
Secondary Woodland	302.54	217
Plantation Woodland	6.57	125
Tall Shrubland	22.17	185
Shrubby Grassland	191.8	153
Mangrove and Seagrass	10.57	85
Salt Marsh	1.63	74
Cultivated Land/Orchard	59.9	126
Developed Area	483.9	129
Wasteland	2.64	159
Stream/Riparian/Pond	5.36	N/A

Note: N/A not applicable

5.12.3 A total of 475 plant species were recorded within the study area including restricted tree species *Actinidia latifolia*, *Canarium album*, *Celtis biondii*, *Celtis timorensis*, *Dimocarpus longan*, *Ehretia longiflora*, *Lasianthus wallichii*, *Litchi chinensis*, *Thespesia populnea* and *Vitex negunda var cannabifolia*. *D. longan* and *L. chinensis* are orchard trees widely cultivated but restricted to fung shui woods. In addition, some restricted shrub species were recorded including *Abelmoschus moschatus*, *Boehmeria nivea*, *Bruguiera gymnorrhiza* and *Ricinus communis*. Some locally restricted herb species were recorded including *Acrostichum arureum*, *Asplenium neolaserpitiifoloium, Crinum asiaticum, Cyanotis vaga, Diplacrum caricinum, Indigofera spicata, Limnophila aromatica* together with eight restricted climbers, *Abrus mollis*, *Caesaplinia bondou*, *Cansjera rheedii*, *Impomea imperati*, *Merremia hederacea*, *Toddalia asiatica*, *Uvaria grandiflora* and *Vitis balansana* together one rare sedge *Carex tristachya.* Notable species of conservation interest included four orchid species *Cleisostoma simondii*, *Acampe rigida*, *Arundina chinensis*, *Eulophia graminea*, the insectivorous herb *Drosera indica* and the tree *Dodonaea viscosa,* the shrub, *Pavetta hongkongensis*, the sedge *Carex tristachya and* three rare seagrass *Halophila ovata*, *Halophila beccarii* and *Zostera japonica*. The *Aquilaria sinensis* is listed under State Protection (Category II) and classified as “Near Threatened” in China Red Data Book (AFCD, 2003). Despite its nationally protected status, this species is considered common (Xing *et al*., 2000) in Hong Kong. Floral survey

N

Legend:

- Study Area
- Secondary Woodland
- Cultivated Field/Orchard
- Developed Area
- Tall Shrubland
- Mangrove
- Wasteland
- Shrubby Grassland
- Seagrass
- Stream
- Plantation Woodland
- Salt Marsh
- Fung Shui Woods

Scale: 1 to 50,000

1000 0 1000 Meters

Habitat Map

Meinhardt Mouchel
Figure 10a

N

Legend:

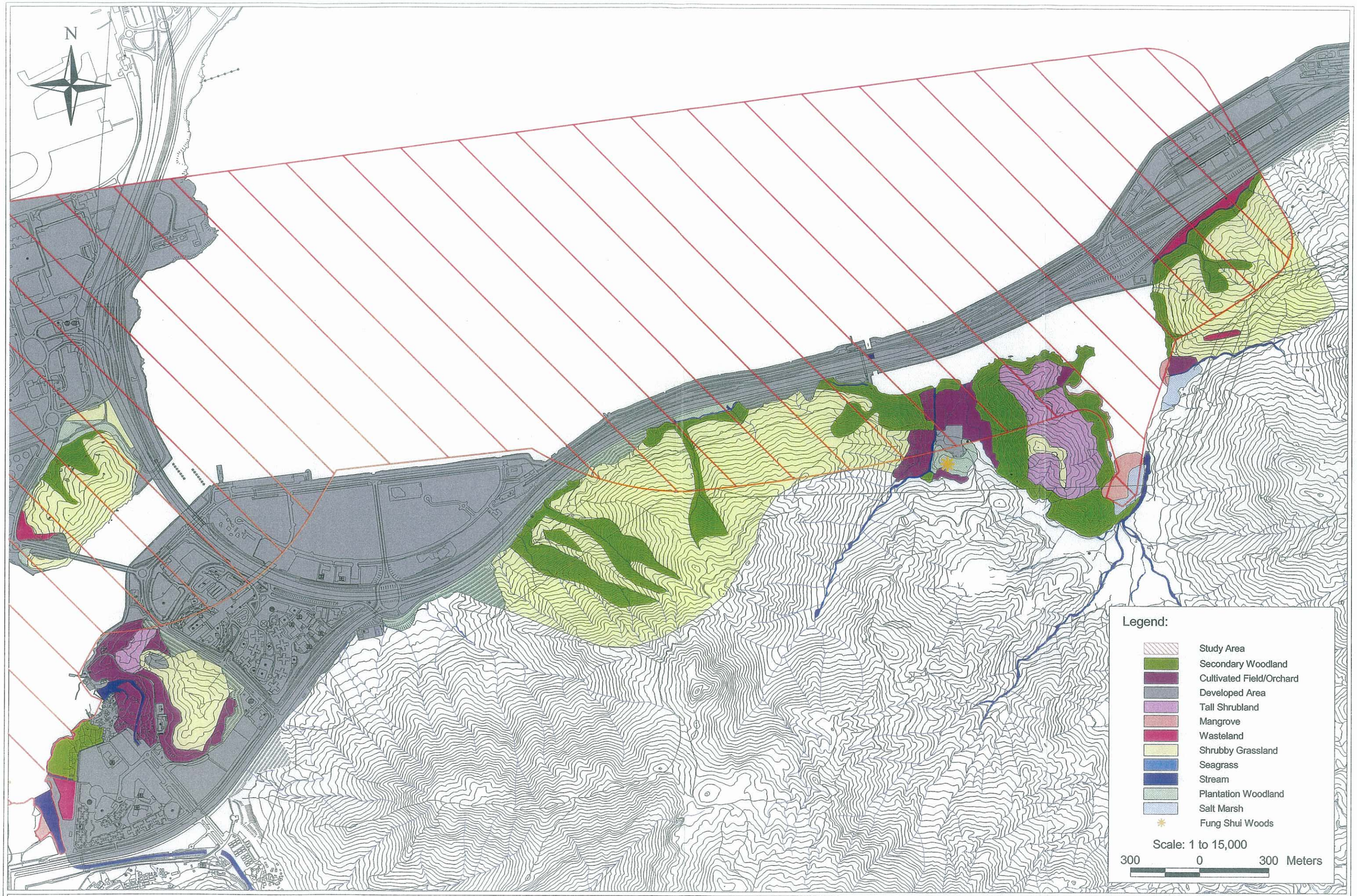
- Study Area
- Secondary Woodland
- Cultivated Field/Orchard
- Developed Area
- Tall Shrubland
- Mangrove
- Wasteland
- Shrubby Grassland
- Seagrass
- Stream
- Plantation Woodland
- Salt Marsh
- Fung Shui Woods

Scale: 1 to 15,000

300 0 300 Meters

Habitat Map

Meinhardt Mouchel
Figure 10b



Habitat Map

Meinhardt Mouchel
Figure 10c

An example of tall shrubland habitat

Fruit trees cultivated in an orchard

Salt Marsh habitat

Village dwellings classified as "Developed Area"

Photographs of Habitats Present within the Study Area

Meinhardt Mouchel

Figure No.: 11a

Mangrove habitats are of conservation importance

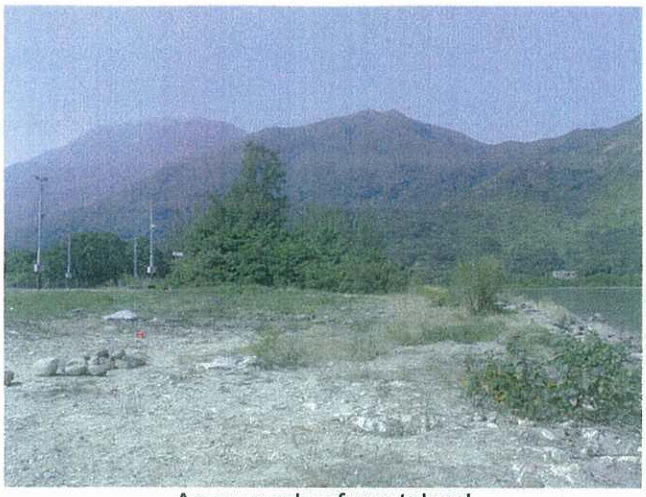
Plantation woodland habitats are mostly found on hill slopes

The seagrass habitat present in San Tau

Photographs of Habitats Present within the Study Area

Meinhardt Mouchel

Figure No.: **11b**



An example of wasteland

Shrubby grassland habitats are common within the study area

Some woodland habitats in North Lantau are well established

Photographs of Habitats Present within the Study Area

Meinhardt Mouchel

Figure No.: 11c

revealed the presence of this species in a number of locations including plantation woodland, secondary woodland and developed area.

5.12.4 A total of five locally protected species were found within the study area. Two orchid species, *Cleisostoma simondii* and the Bamboo orchid *Arundina chinensis* were recorded near Hau Hok Wan (*Figure 12*). Another patch (more than 10 individuals) of orchid, *Arundina chinensis* was also found (*Figure 12*) in the west-facing slope (~ 12m above sea level) of the headland of Tai Ho Wan while the orchid, *Acampe rigida* was also noted along the shoreline from Hau Hok Wan to Kau Liu. Another orchid, the Pale Purple Eulophia *Eulophia graminea*, was found within the tall shrubland near Hau Hok Wan and a patch was found in tall shrubland at Sha Lo Wan during the supplementary surveys. Pale Purple Eulophia is listed as restricted in Hong Kong (Siu, 2000). Apart from the *Eulophia graminea*, all of the aforementioned orchid species are very common in Hong Kong (Siu, 2000). Note that all members of the orchid family (Orchidaceae) are protected under the Forestry Regulations and the Animals and Plants (Protection of Endangered Species) Ordinance Cap. 187(AP Ordinance). In addition to the four orchids, patches of the locally protected *Pavetta hongkongensis* were also observed in a group of 4-6 individuals in secondary woodland and tall shrubland habitats. Although protected under the Forestry Regulation, this species is considered common (Xing *et al*., 2000).

5.12.5 About 20 individuals of an insectivorous herb, the sundew, *Drosera indica*, were found on a rock face along the shoreline from Hau Hok Wan to Kau Liu. This species is very rare and only previously recorded in Tung Chung and Cape d'Aguilar (AFCD, 2003). In addition, a single stand of Clammy Hop Seed *Dodonaea viscosa* was recorded along the back of the beach near Sha Lo Wan. *D. viscosa*, is considered a rare shrub/tree but has been recorded in Ham Tin and Tung Chung. These two species are rare (Xing *et al*., 2000) but they are not protected under any Hong Kong Ordinance.

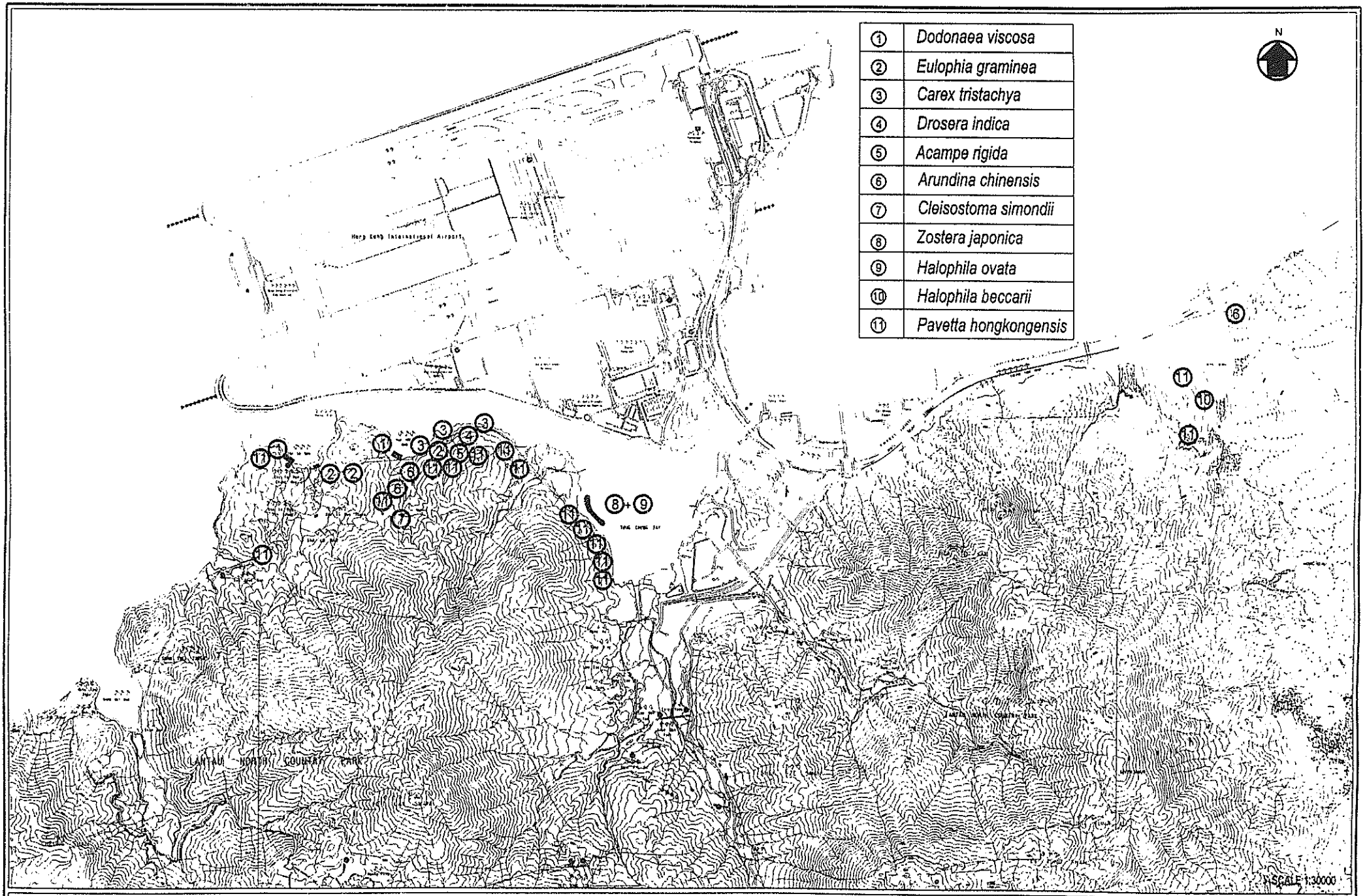
5.12.6 In addition to the orchid, the seagrass, *Halophila beccarii* was also found at Tai Ho Wan during low tide in the supplementary survey and this have been previously recorded by a number of studies (Mott, 1998; Mouchel, 2000). This area supports more than 20 colonies with size of about 30cm X 30cm. Together with the two seagrass species (*Halophila ovata* and *Zostera japonica*) found in preceding surveys, a total of three seagrass species were recorded in this study.

5.12.7 Apart from the orchid and seagrass, a rare sedge species *Carex tristachya* was recorded near Hau Hok Wan. The only known occurrence of this sedge in Hong Kong was at Hau Hok Wan (Xing *et al*., 2000) and approximately 6 patches of this species (approximately 70 individuals) were found spreading along both sides of the footpath near a tall shrubland near Hau Hok Wan.

5.12.8 The location of the locally rare and protected floral species recorded during the course of the surveys are presented in *Figure 12*.

Secondary Woodland

5.12.9 Notable woodland patches can be found at Tai Ho Wan headland and adjacent to Sha Lo Wan San Tsuen. The woods behind San Tau, Pak Mong and Sha Lo Wan Tsuen are known to have fung shui significance. However, recent surveys revealed that the woodland behind Pak Mong has been heavily modified and dominated by planted species *Acacia confusa.* This woodland, therefore, is now marked under the habitat type of plantation woodland. Secondary woodland habitat is extensive and relatively rich in flora with a total of 217 species recorded within this habitat type. Major/dominant plant species included trees *Aporosa dioica*, *Bridelia tomentosa*, *Litsea glutinosa*, *Mallotus paniculata*, *Schefflera octophylla* and *Sterculia lanceolata.* Dominant shrub species included *Litsea rotundiafolia*, *Ilex asprella* and *Psychotria rubra*. Species known to have local restricted distributions that were present



Location of Locally Rare / Protected Floral Species Recorded between September 2003 and May 2004

Meinhardt Mouchel

Figure No. 12

included *Canarium album, Celtis biodii, Dimocarpus longan, Ehretia longiflora, Lasianthus wallichii, Litchi chinensis, Vitex negundo var cannabifolia, Asplenium neolaserpitiifoloim, Pericampylus glaucus, Teuricum quadrifarium, Abrus mollis, Caesalpinia bonduc, Cansjera rheedii, Toddalia asiatica* and *Uvaria grandiflora.* Seven out of eight restricted trees were recorded within this habitat type. Of the species recorded, only the shrub *Pavetta hongkongensis* was protected under the law but this species is considered common (Xing *et al*., 2000).

Plantation Woodland

5.12.10 Plantation woodland habitats are mainly either located on the hill slopes or near developed areas. This habitat type is dominated by species with either high amenity value or pioneer species comprised of *Acacia confusa*, *Dimocarpus longan, Ficus hirta, Mallotus paniculata, Microcos paniculata* and *Pinus massoniana.* The understorey shrub consisted of *Ilex asprella*, *Litsea rotundifolia* and *Vitex negundo var negundo*, the climbers, *Lydgodium japonicum* and *Embelia laeta*. The understorey shrub communities present were not particularly diverse. A total of 125 plant species were present in the plantation woodland habitats. Of these, *Dimocarpus longan*, *Lasianthus wallichii*, *Vitex negundo var cannabifolia* and *Abrus mollis* are restricted locally. The *Aquilaria sinensis* is listed under State Protection (Category II) and is considered “Near Threatened” in the China Plant Red Data Book. However, this species is common in Hong Kong (Xing *et al*., 2000).

Tall Shrubland

5.12.11 Tall shrubland within the study area is patchily located along the coast of Tung Chung to Sham Wat and is dominant on the hill-slope of the Tai Ho Wan headland. This habitat type is densely populated with a mix of native tree and shrubby plant species. Species found commonly in this habitat type included tree species such as *Aconychia pedunculata*, *Cratoxylum cochinchinense*, *Schefflera octophylla*, *Rhus succedanea* and *Mallotus paniculatus*; the shrub *Litsea rotundifolia, Melastoma sanguineum* and *Rhaplolepis indica,* the climbers *Alyxia sinensis* and *Embelia ribes;* as well as the herbs *Dianella ensifolia* and *Dicranopteris pedata.*

5.12.12 A total of 185 species were recorded in this habitat and species commonly found in this habitat type included some pioneer tree species such as *Mallotus paniculata, Sapium discolor*, the shrubs*, Eurya japonica, Litsea rotundifolia, Melastoma sanguineum, Rhaphiolepis indica,* together with the climbers*, Alyxia sinensis, Lygodium japonicum, Cassytha filiformis* and *Tetracera asiatica. Carex tristachya* is a rare sedge (Xing *et al*., 2000) recorded within this habitat in Hau Hok Wan and patches of the orchid *Eulophia graminea* were found near tall shrubland habitats at Hau Hok Wan and Sha Lo Wan. Apart from woodland habitat, the locally protected *Pavetta hongkongensis* was also observed within this habitat.

Shrubby Grassland Mosaic

5.12.13 The shrubby grassland is composed of a range of plant species showing various growth forms (from herbaceous ferns to woody tree species) that are patchily distributed on the hill-slopes within the study area and mostly located at higher elevations along the hill slopes. Generally, this habitat type is open in structure and has a height of less than 2m. Moreover, it is believed that part of this mosaic may be disturbed frequently by hill-fire as evidenced by the presence of patches of the fire-resistant fern *Dicranopteris pedata*, especially in the areas behind the burial grounds. There were 153 floral species recorded within this habitat. Tree species recorded were not particularly diverse and major species included *Ficus variolosa*, *Aporosa dioica* and *Cratoxylum cochinchinense.* However, a range of shrubs

species were recorded including *Baeckea frutescens*, *Aster baccharoides*, *Breynia fruticosa*, *Melastoa sanguineum* and *Helicteres angustifolia* as well as the herbs*, Arundinella setosa*, *Eremochloa ciliaris*, *Eulalia* spp., *Grewia biloba*, *Innula cappa*, *Ischaemum rugosum* together with climbers, *Alyxia sinensis*, *Cassytha filiformis*, *Lygodium japonicum*, *Millettia nitida* and *Morinda umbellata.* Species present were similar to those present in the tall shrubland although fewer tree species were recorded. Three protected orchids *Acampe rigida, Arundina chinensis* and *Cleisostoma simondii* were recorded within this habitat. Although all three species are common in Hong Kong (Siu, 2000), all members of the orchid family (Orchidaceae) are protected under the AP Ordinance in Hong Kong.

Coastal Habitat and Salt Marsh

5.12.14 Since mangroves, seagrass and salt marsh are closely associated, these habitats are collectively classified and described as coastal habitat in the species list. Major mangrove stands, seagrass beds and salt marsh, however, have been shown separately on the habitat map. Mouchel (2000 and 2002a) and Tam and Wong (2002) have previously undertaken detailed studies of the distribution and composition of mangroves on North Lantau including those at Tai Ho Wan and San Tau.

5.12.15 Despite the comparatively small habitat size, the coastal habitats are rich in species. Four noteworthy species included the rare tree, *Dodonaea viscosa* at the back of the Sha Lo Wan Beach, the insectivorous herb, *Drosera indica* found near Hau Hok Wan, as well as three seagrass species, *Zostera japonica, Halophila beccarii* and *Halophila ovata*. Apart from these, some species recorded that have restricted distribution included the herbs, *Stenoloma biflorum* and *Cyanotis vaga* and the climber, *Ipomoea imperati* that were observed along the coastal area from Tung Chung to Sham Wat. The woody climber *Caesaplinia bonduc* was present within the coastal fringe at Tai Ho Wan. Apart from the rare species and six true mangroves, some wetland species including *Ischaemum* sp*., Eriocaulon* sp*., Xyris indica, Scleria levis, Limnophila aromatica* and *Leersia hexandra* were also recorded. The aforesaid rare and protected species are presented in *Figure 12*.

Seagrass

5.12.16 Field surveys for seagrass beds covered the whole coastal study area and surveys were undertaken on 2, 4, 29, 30 November and 2 December 2003 and 26, 28 January and 22, 25, 26 March and 6, 7 May 2004. Field survey results confirmed that two seagrass beds were present. The seagrass bed at Tung Chung Bay where the San Tau SSSI is located support two seagrass species, *Halophila ovata* and *Zostera japonica* which are of ecological importance. During the April 2004 survey, the seagrass *Halophila beccarii* habitat was found during the low tide at Tai Ho Wan supporting more than 20 colonies with size of about 30cm X 30 cm.

5.12.17 It should be noted that the seagrass bed at San Tau has been subject to impacts associated with the reclamation works for the airport at Chek Lap Kok. The seagrass has, however, successfully recovered since the works were completed.

5.12.18 The seagrass species, *Zostera japonica* and *Halophila ovata* are considered rare locally (Xing *et al.*, 2000). *Zostera japonica* has been recorded in three localities namely Sheung Sze Wan, Tung Chung (San Tau) and Lai Chi Wo (AFCD, 2003). Another locally restricted seagrass species, *Halophila ovata*, is considered to be of special scientific interest because it is one of the few marine flowering plants in Hong Kong (AFCD, 2003). Apart from San Tau, *Haplophila ovata* has been previously recorded in Tai Tam Bay, Ho Chung, Hoi Ha Wan, Wu Shek Kok and Lai

Chi Wo (AFCD, 2003). *Zostera japonica* and *Halophila ovata* are usually found co-habiting the seaward margins of mangrove stands (AFCD, 2003).

5.12.19 The seagrass, *Halophila beccarii* is also locally rare (Xing *et al*., 2000) and was previously found at Tai Ho Wan (Mott, 1998; Mouchel, 2000). This species have been recorded in two other localities including Starling Inlet and Black Point (Xing *et al*., 2000) with the largest *H. beccarii* bed in Ha Pak Nai (Fong, 1999c).

Mangrove

5.12.20 Mangrove communities are under threat from urbanisation and reclamation and as many stands have been destroyed in Hong Kong they are considered to be a conservation priority (Tam and Wong, 2000). The mangrove habitat at San Tau is regarded as an important stand in Hong Kong. Mangroves are also present in Tai Ho Wan. There is a large amount of existing data on the mangal and seagrass habitats present in the study area (e.g., Mouchel, 2000; Tam and Wong, 2000; Mouchel, 2002a) but up to date surveys were also conducted between September 2003 and May 2004. A habitat map has been prepared (see *Figures 10a-c*) based upon the survey results.

5.12.21 During the initial surveys, intertidal mangrove habitats were recorded at a few locations and major stands included Sham Wat, Tai Ho Wan and San Tau to Tung Chung Bay (*Figures 10a–c*). The mangrove species recorded in the larger stands are discussed further below.

Tai Ho Mangrove Habitats

5.12.22 The number of floral species recorded in Tai Ho was fairly high. There were six true mangrove species including *Lumnitzera racemosa*, *Kandelia candel*, *Bruguiera gymnorrhiza*, *Avicennia marina*, *Aegiceras corniculatum* and *Acanthus ilicifolius.* In addition to these true mangrove species, a number of mangal associated flora, such as *Limonium sinense*, *Clerodendrum inerme* and *Acrostichum aureum* were also recorded within the mangrove habitat. During the field surveys, other common species recorded within the coastal or mangrove communities included *Zoysia sinica*, *Suaeda maritime* and *Vitex rotundifolia*.

5.12.23 Among the true mangrove species recorded, *Bruguiera gymnorrhiza* is considered to have a restricted distribution in Hong Kong (Xing *et al*., 2000). This species has established a relatively large population in Tai Ho and it is known to adapt to hardened and stiff mud.

Tung Chung and San Tau Mangrove Habitats

5.12.24 The Tung Chung and San Tau mangrove habitats have also been well studied in recent years (Tam and Wong, 2000; Mott, 2003). The mangrove habitat at San Tau is considered to be of particular ecological importance. This habitat is dominated by the mangroves *Aeigceras corniculatum*, *Kandelia candel* and the restricted *Bruguiera gymnorrhiza*. Other mangroves *Avicennia marina* and *Acanthus ilicifolius* are also well represented. Apart from the restricted mangrove species *Bruguiera gymnorrhiza*, some locally restricted species were also recorded in the vicinity of the habitats and these include *Thespesia populnea, Stenoloma biflorum* and *Ipomoea imperati.*

Cultivated Field/Orchard

5.12.25 Cultivated field includes both active, inactive cultivation fields and orchards. Cultivated fields are mainly scattered among the village areas and mostly

distributed along the coast of the study area. These are planted with fruit trees and ornamental plants such as *Litchi chinensis*, *Dimocarpus longan*, *Clausena lansium*, *Citrus* sp., and some widespread herbs including *Lantana camara*, *Solanum torvum* and *Lygodium japonicum*. A number of restricted species including *Celtis timorensis*, *Dimocarpus longan*, *Litchi chinensis*, *Abelmoschus moschatus*, *Ipomoea purpurea*, *Plumbago zeylanica*, *Merremia hederacea*, and *Toddalia asiatica* were recorded. A total of 126 species were present in this habitat although no rare or protected species was recorded.

Developed Area

5.12.26 The developed area refers to urbanised areas including roads, buildings and villages that can be found in Chek Lap Kok, Tung Chung and some scattered in the western part of the study area. This habitat is artificial and predominantly composed of herbs and climbers and occasionally with some planted or orchard trees such as *Casuarina equisetifolia*, *Bambusa* sp., *Clausena lansium* and *Averrhoa carambola*. Despite some observations of restricted species, including the trees *Celtis timorensis*, *Vitex negundo var cannabifolia* and the herb, *Plumbago zeylanica*, the 129 species recorded in the developed areas are common and widespread in Hong Kong. No locally rare or protected species was recorded. However, the tree *Aquilaria sinensis* is protected in China and individuals of this species were recorded in the developed area near Tai Ho and San Tau. It should be noted that this species is common in Hong Kong.

Wasteland

5.12.27 Wasteland is dominated by mainly weedy herbaceous ruderal vegetation, and is mostly to be found in heavily disturbed or previously developed areas. Within the study area this habitat type is poorly represented. In general, the species diversity of this habitat is poor and its structural complexity is simple. Dominant species are mainly herbaceous; such as the common herbs, *Cynodon dactylon*, *Panicum maximum*, *Lygodium japonicum* and the climbers *Mikania micrantha* and *Pueraria lobaba.* However, it should be noted that several restricted species were also recorded in wasteland including *Plumbago zeylanica, Teucrium quadrifarium* and *Merremia hederacea.*

6. Species of Conservation Interest Present and Faunal Diversity

Species of Conservation Interest

6.1 Annex 8 of the TMEIAO specifies three criteria by which a species' conservation significance may be measured: protection status (local, Chinese or international), with legally protected species afforded higher conservation value; geographical distribution, with higher conservation value afforded to species with more restricted geographical ranges; and rarity, with higher conservation value afforded to species which are internationally rare than to species which are only regionally or locally rare.

6.2 As mentioned above, the published literature on Hong Kong fauna does not always provide a clearly-defined objective basis for conservation assessment of species, and for this reason the assessments below is complemented by reference to Fellowes *et al.* (2002). This paper examines the local (Hong Kong), regional (southern China) and global restrictedness of native fauna species occurring in a wild state in Hong Kong, combined with an assessment of the vulnerability of populations, using the most reliable and up to date information available, and assigns a rating to each species accordingly. Thus, a species of 'Local Concern' may not be particularly threatened globally or regionally, but is rare or restricted in Hong Kong. A species of 'Regional Concern' may not be particularly threatened globally, but is rare or restricted in the region. For a species of 'Global Concern', a given Hong Kong locality is considered to be of global importance. Some species are regarded as being of 'Potential Regional Concern' or 'Potential Global Concern' and these species are considered to be relatively secure in Hong Kong but all Hong Kong localities are of potential regional and global importance, respectively. Based on the criteria mentioned above, species of conservation interest recorded within the study area during our field surveys (September 2003 ~ May 2004) are listed in *Table 6.1* below.

Table 6.1 Faunal and Floral Species of Conservation Interest Recorded within the Study Area during the Course of Our Surveys (September 2003 ~ May 2004)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Avifauna				
Acrocephalus bistrigiceps (Black-browed Reed Warbler)	WAPO	Breeds in southeast Siberia, Mongolia, northeast China, Indochina, Thailand, northern India and Bangladesh (Carey *et al*., 2001) Recorded in Deep Bay, Lantau, and Hong Kong Island (Carey *et al*., 2001)	Shrubland in Sham Wat Bay and Tung Chung Bay	Common migrant (Carey *et al*., 2001) Local Concern (Fellowes *et al*., 2002)
Apus pacificus (Pacific Swift)	WAPO	Breeds from Siberia east to Japan, Vietnam, Thailand and Burma, and winters through southeast Asia to Australia. Records in China include Tibet, Shandong, Henan, Jiangsu (Carey *et al*., 2001)	Woodland, shrubby grassland and tall shrubland at Sham Shek Tsuen, San Shek Wan, Sha Lo Wan, ferry pier between Sha Lo Wan and Hau Hok Wan, Hau Hok Wan, Chek Lap Kok, Tin Sam and Tung Chung Battery	Common spring migrant and localised summer visitor (Carey *et al*., 2001) Local Concern based on restricted breeding and/or roosting sites (Fellowes *et al*., 2002)
Ardea cinerea (Grey Heron)	WAPO	In most of the Palearctic, sub-Saharan Africa, much of the oriental region and Indonesia (Carey *et al*., 2001) Starling Inlet, Shuen Wan, Lantau and Deep Bay (Carey *et al*., 2001)	Coastal habitat Tung Chung Bay, San Tau and Tai Ho Wan	Abundant winter visitor (Carey *et al*., 2001) Potential Regional Concern (Fellowes *et al*., 2002)
Ardeola bacchus (Chinese Pond Heron)	WAPO	Breeds in Burma, China, Japan; winters in Malay peninsula, Indochina, Borneo and Sumatra (Carey *et al*., 2001) Mainly New Territories including Mai Po, Lok Ma Chau and also Hong Kong Island and Lantau (Carey *et al*., 2001)	Coastal habitat Sham Wat Bay, Sham Shek Tsuen, Sha Lo Wan, Hau Hok Wan, Tin Sam, San Tau, Tung Chung Bay, Tai Ho Wan	Common resident (Carey *et al*., 2001) Potential Regional Concern/ Regional Concern based on restricted breeding and/or roosting sites (Fellowes *et al*., 2002)
Bubo bubo (Eurasian Eagle Owl)	WAPO	Norway to Sahara and east to Sakhalin and southern China (Carey *et al*., 2001) Fairly widespread in Hong Kong (Carey *et al*., 2001)	Shrubby grassland at Pak Mong	Scarce but widespread resident (Carey *et al*., 2001) Regional population in marked decline but possibly under-recorded (Fellowes *et al*., 2002) Regional Concern (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Bulbulcus ibis (Cattle Egret)	WAPO	Southern Europe, Africa, Indian Subcontinent, Southeast and Eastern Asia, Australia, America (Carey *et al*., 2001) Deep Bay, Kai Tak, Yuen Long, Lantau and mainly breeds in New Territories (Carey *et al*., 2001)	Coastal habitat at Tung Chung Bay	Uncommon to common summer visitor (Carey *et al*., 2001) Regional population in marked decline Local Concern, restricted breeding and/or roosting sites (Fellowes *et al*., 2002)
Butorides striatus (Striated Heron)	WAPO	America, Africa and Asia (Carey *et al*., 2001) Deep Bay, Lai Chi Wo, Shuen Wan, Hebe Haven and some other localities in Hong Kong (Carey *et al*., 2001)	Sea off Tai Ho Wan	Uncommon to scarce summer visitor (Carey *et al*., 2001) Local Concern (Fellowes *et al*., 2002)
Cisticola juncidis (Zitting Cisticola)	WAPO	Europe, Middle East Africa, India, Asia, Indonesia, New Guinea, Australia and China (Carey *et al*., 2001) Breeding confined to Northern New Territories and Deep Bay and also records from Shing Mun River, Lok Ma Chau and Long Valley (Carey *et al*., 2001)	Shrubby grassland at Sham Wat Bay	Common winter visitor (Carey *et al*., 2001) Local population in marked decline (Fellowes *et al*., 2002) Local Concern (Fellowes *et al*., 2002)
Dendrocitta formosae (Grey Treepie)	WAPO	Himalayas, Burma, Thailand, Indochina to China. (Carey *et al*., 2001) Primarily on western Hong Kong Island and central New Territories (Carey *et al*., 2001)	Secondary woodland at Cheung Tung Road Hill	Scarce to uncommon migrant and winter visitor (Carey *et al*., 2001) Local Concern (Fellowes *et al*., 2002)
Egretta alba (Great Egret)	WAPO	Eurasia, Indian sub-continent to southern China, Indonesia, Australia (Carey *et al*., 2001) Records are mainly from wetlands such as Mai Po, Inner Deep Bay, Starling Inlet, Shuen Wan and also Hebe Haven, Cape D'Aguilar, Lantau and Lamma (Carey *et al*., 2001)	Coastal habitat, secondary woodland at Sham Wat Wan, Sha Lo Wan, ferry pier between Sha Lo Wan and Hau Hok Wan, Chek Lap Kok and Tung Chung Bay	Common to abundant resident (Carey *et al*., 2001) Regional population in marked decline (Fellowes *et. al*., 2002) Potential Regional Concern based on restricted breeding or roosting sites (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Egretta eulophotes (Swinhoe's Egret)	WAPO	West coast of Korea, coast of Easten China and the Sea of Japan, Philippines, Vietnam, Thailand, Malaysia, Singapore, Indonesia and Brunei (Carey *et al*., 2001) Breeding record in Yim Tso Ha egretry, records from A Chau, Mai Po, Lok Ma Chau, Deep Bay and Tsing Yi (Carey *et al*., 2001)	Coastal habitat at Tung Chung Bay	Records from Yuen Long, Deep Bay, Starling Inlet, A Chau, Mai Po, Lok Ma Chau and Tsing Yi (Carey *et al*., 2001). Listed as globally Vulnerable by IUCN (Fellowes *et al*., 2002)
Egretta garzetta (Little Egret)	WAPO	Eastern Europe, Central and Southern Asia, Austalia and South Africa (Carey *et al*., 2001) Breeding records in Yuen Long, Nam Sang Wai, Lok Ma Chau, Tsim Bei Tsui, Mai Po, Shuen Wan (Carey *et al*., 2001)	Coastal habitat, secondary woodland at Sham Wat Wan, Sha Lo Wan, ferry pier between Sha Lo Wan and Hau Hok Wan, Hau Hok Wan, Chek Lap Kok, Tin Sam and Tung Chung Bay	Abundant resident (Carey *et al*., 2001) Regional population in marked decline (Fellowes *et. al*., 2002) Potential Regional Concern based on restricted breeding and/or roosting sites (Fellowes *et. al*., 2002)
Egretta intermedia (Intermediate Egret)	WAPO	Africa, Japan, Malaysia, Indonesia and Australia (Carey *et al*., 2001) Most records from Deep Bay, Shuen Wan and Starling Inlet (Carey *et al*., 2001)	Coastal habitat at Tung Chung Bay	Common autumn migrant and winter visitor (Carey *et al*., 2001) Regional population in marked decline (Fellowes *et al*., 2002) Regional Concern (Fellowes *et al*., 2002)
Egretta sacra (Pacific Reef Egret)	WAPO	Eastern and southeast Asia, Japan, Australia, New Zealand (Carey *et al*., 2001) Mostly found along rocky coastline in southern areas of Hong Kong Island, and coast of outlying islands such as Sokos, Lamma, Po Toi, Waglan Island (Carey *et al*., 2001)	Coastal habitat at Sha Lo Wan, ferry pier between Sha Lo Wan and Hau Hok Wan, Chek Lap Kok and Tung Chung Bay.	Uncommon Resident (Carey *et al*., 2001) Scarce visitor in Hong Kong and inadequate information on restrictedness (Fellowes *et al*., 2002) Local Concern (Fellowes *et al*., 2002)
Emberiza aureola (Yellow-breasted Bunting)	WAPO	Breeds across Eurasia, winters in southeast Asia, Thailand and Indochina (Carey *et al*., 2001) Mai Po, Long Valley, Mong Tseng and Kai Tak Airport (Carey *et al*., 2001)	Shrubby grassland at Tin Sam and Tung Chung Bay	Uncommon to common migrant (Carey *et al*., 2001) Local population in marked decline and Regional Concern (Fellowes *et al*., 2002) Inadequate information on regional restrictedness and regional population in marked decline (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Emberiza fucata (Chestnut-eared Bunting)	WAPO	From western Himalayas to Japan (Carey *et al*., 2001) Most records in Deep Bay, Sha Lo Tung, Ho Chung, Long Valley, Tai Mong Tsai, Lantau and Luk Keng (Carey *et al*., 2001)	Woodland at Tai Ho Wan	Scarce migrant and rare in winter (Carey *et al*., 2001) Local population in marked decline and Local Concern (Fellowes *et al*., 2002)
Falco peregrinus (Peregrine Falcon)	WAPO	Worldwide distribution including China (Carey *et al*., 2001) Widespread localities and reported throughout New Territories, Kowloon, Hong Kong Island, Lantau and outlying island (Carey *et al*., 2001)	Shrubby grassland at Sha Lo Wan	Scarce resident and winter visitor (Carey *et al.,* 2001) Local Concern (Fellowes *et al*., 2002)
Halcyon pileata (Black-capped Kingfisher)	WAPO	Breeding records in India, Indochina, China, Korea and winters south to Sri Lanka Malaysia and Indonesia (Carey *et al*., 2001) In suitable habitats throughout New Territories and Lantau, occasionally seen in Kowloon, Hong Kong Island and offshore islands (Carey *et al*., 2001)	Coastal habitat at Sham Wat Bay, San Shek Wan tunnel option , Sha Lo Wan, Tung Chung Bay and Tai Ho Wan	Common autumn migrant and winter visitor (Carey *et al.,* 2001) Local population in marked decline (Fellowes *et al*., 2002) Local Concern (Fellowes *et al*., 2002)
Halcyon smyrnensis (White-throated Kingfisher)	WAPO	Turkey, India, Indochina, China, Sri Lanka, Malaysia, Sumatra and the Philippines (Carey *et al*., 2001) Widespread in winter and autumn and nesting sites were found in Lung Tsai Ng Yuen, Shuen Wan, Chi Ma Wan, Luk Keng and Tung Chung (Carey *et al*., 2001)	Coastal habitat at Sham Wat Bay, Hau Hok Wan, Chek Lap Kok, Tin Sam, Tung Chung Bay, Tai Ho Wan and Tung Chung Battery	Common autumn migrant, winter visitor and resident (Carey *et al.,* 2001) Local Concern based on restricted breeding and/or roosting sites (Fellowes *et al*., 2002)
Haliaeetus leucogaster (White-bellied Sea Eagle)	WAPO	India, Sri Lanka, southern China, southeast Asia, the Philippines and Australia (Carey *et al.,* 2001*)* Found in coastal areas and offshore islands in Hong Kong (Carey *et al.,* 2001)	Secondary woodland at Sham Shek Tsuen and Sha Lo Wan	Uncommon resident in coastal areas and offshore islands (Carey *et al*., 2001, Tsim *et al*., 2003) Regional population under-recorded and regional concern (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Heteroscelus brevipes (Grey-tailed Tattler)	WAPO	Breeds in Siberia, Kamchatka and the Kuril and winters in Taiwan, the Malay Peninsula, the Philippines, through Indonesia and New Guinea (Carey *et al*., 2001) Highest number found in Deep Bay and also widespread in coastal areas throughout Hong Kong (Carey *et al*., 2001)	Coastal habitat at Tung Chung Bay and Tai Ho Wan	Local and Regional population in marked decline (Fellowes *et al*., 2002) Local Concern (Fellowes *et al*., 2002)
Hieraaetus fasciatus (Bonelli's Eagle)	WAPO	Southern Europe through Central Asia to India and southern China (Carey *et al*., 2001) Records are mainly from New Territories and also urban Kowloon, Hong Kong Island and outlying islands (Carey *et al*., 2001)	Shrubby grassland at San Shek Wan (Tunnel Option)	Scarce resident (Carey *et al.,* 2001) Regional Concern (Fellowes *et al*., 2002)
Himantopus himantopus (Black-winged Stilt)	WAPO	Resident in southern hemisphere, central America and Africa, summer visitor to US, Europe, Asia and China and winter visitor to southeast Asia (Carey *et al*., 2001) Most records are from Deep Bay, Long Valley and Kam Tin (Carey *et al*., 2001)	Intertidal mudflat at Tin Sam	Common to uncommon winter visitor (Carey *et al.,* 2001) Population under-recorded and highly concentrated (Fellowes *et al*., 2002) Regional Concern (Fellowes *et al*., 2002)
Ketupa zeylonensis (Brown Fish Owl)	WAPO	Middle East to southern China (Carey *et al*., 2001) Restricted in Hong Kong (Carey *et al*., 2001)	Tai Ho Wan	Scarce resident in Hong Kong (Carey *et al*., 2001) Regional Concern (Fellowes *et al*., 2002)
Milvus migrans (Black Kite)	WAPO	Africa, Europe, Asia and Australasia. considered the commonest bird of prey in China (Carey *et al*., 2001) Widespread in Hong Kong and found in a wide variety of coastal and inland habitats such as small islands, sea-coast, intertidal mudflat, landfills, grassy hillsides (Carey *et al*., 2001)	Secondary woodland, tall shrubland, shrubby grassland, coastal habitat at Sham Wat Bay, San Shek Wan, San Shek Wan (Tunnel Option), Sha Lo Wan, ferry pier between Sha Lo Wan and Hau Hok Wan, Hau Hok Wan, Tin Sam, Tung Chung Bay, Pak Mong and Tai Ho Wan	Abundant winter visitor and Resident (Carey *et al.,* 2001) Regional population in marked decline and highly concentrated (Fellowes *et al*., 2002) Potential Regional Concern based on restricted breeding and/or roosting sites (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Nycticorax nycticorax (Black-crowned Night Heron)	WAPO	Worldwide distribution (Carey *et al*., 2001) Breeds in Yim Tso Ha, Mai Po, Hebe Haven, Ho Chung and Shuen Wan (Carey *et al*., 2001)	Coastal habitat at Tai Ho Wan	Common to abundant Resident (Carey *et al.,* 2001) Local Concern based on restricted breeding and/or roosting sites (Fellowes *et al*., 2002)
Scolopax rusticola (Eurasian Woodcock)	WAPO	Breeds from Europe through Central Asia to Sakhalin and Japan, winters in Europe, North Africa, southeast Asia and southern China (Carey *et al*., 2001) Throughout Hong Kong but mostly recorded in Tai Po Kau, Shek Kong and Hong Kong Island (Carey *et al*., 2001)	Secondary woodland at Hau Hok Wan and Tai Ho Wan	Scarce winter visitor (Carey *et al.,* 2001) Local Concern (Fellowes *et al*., 2002)
Spilornis cheela (Crested Serpent Eagle)	WAPO	Occurs throughout Oriental region from India to China (Carey *et al*., 2001) Tsim Bei Tsui and mostly recorded in New Territories such as Lam Tsuen, Tai Po Kau and occasionally recorded from Kowloon Hills, Hong Kong Island, Lantau and Kat O (Carey *et al*., 2001)	Woodland at Sham Shek Tsuen	Uncommon resident (Carey *et al*., 2001) Local Concern (Fellowes *et al*., 2002)
Sturnus sericeus (Red-billed Starling)	WAPO	Breeds only in China and winter visitor in northern Indochina (Carey *et al*., 2001) Mainly recorded in Deep Bay area with other favored localities being Long Valley, Kam Tin, Starling Inlets and Shuen Wan (Carey *et al*., 2001)	Coastal habitat and secondary woodland at Tin Sam and Tai Ho Wan	Abundant but localised winter visitor (Carey *et al*., 2001) Global Concern (Fellowes *et al*., 2002) Local population in marked decline and population highly concentrated (Fellowes *et al*., 2002) Inadequate information on regional restrictedness (Fellowes *et al*., 2002)
Sturnus sinensis (White-shouldered Starling)	WAPO	Breeding restricted to southern China and northern Indochina (Carey *et al*., 2001) Occurs in urban area, Hog Kong Island, Deep Bay and Long Valley (Carey *et al*., 2001)	Secondary woodland at ferry pier between Sha Lo Wan and Hau Hok Wan	Common passage migrant and localised breeding summer visitor and winter visitor (Fellowes *et al*., 2002) Local Concern (Fellowes *et al*., 2002) Local population in marked decline (Fellowes et al., 2002) Inadequate information on regional restrictedness (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Tachybaptus ruficolis (Little Grebe)	WAPO	Widespread in Europe, sub-Saharan Africa, Middle East, Central Asia and the Indian subcontinent, southeast Asia and Japan (Carey *et al*., 2001) Locally common in Deep Bay and other sites included Nam Sang Wai, Tsim Bei Tsui, northeast and eastern New Territories (Carey *et al*., 2001)	Coastal habitat at Sha Lo Wan	Common resident (Carey *et al.,* 2001) Local Concern (Fellowes *et al*., 2002)
Tringa glareola (Wood Sandpiper)	WAPO	Breeds from northern Europe through central Siberia to Kamchatka and winters from tropical and subtropical Africa across southern Asia to China, the Philippines, Indonesia and Australia (Carey *et al*., 2001) Throughout New Territories, Long Valley, Shuen Wan, Kam Tin, Ha Tsuen, San Tin, Lok Ma Chau and Lantau (Carey *et al*., 2001)	Coastal habitat at Sham Wat Bay	Common to abundant passage migrant and winter visitor (Carey *et al*., 2001) Local Concern (Fellowes *et al*., 2002)
Herpetofauna				
Gecko gecko (Tokay Gecko)	None	Bangladesh east to southern China and south to the Philippines and Indonesia (Karsen *et al*., 1998)	Developed Area and rocky outcrop at Sham Wat Wan, San Shek Wan and San Tau	Rare in Hong Kong (Karsen *et al*., 1998) Regional Concern and marked decline in regional population (Fellowes *et al*., 2002)
Naja atra (Chinese Cobra)	None	Restricted to southern China, Taiwan, northern Vietnam Widespread in Hong Kong (Karsen *et al*., 1998)	A freshly sloughed skin was found at a stream (SS6) near Sham Shek Tsuen headland	Listed as Vulnerable in China Red Data Book Global population in marked decline and regional population in drastic decline (Fellowes *et al*., 2002) Potential Regional Concern (Fellowes *et al*., 2002)
Ptyas mucosus (Common Rat Snake)	None	Central and southern China including Taiwan, south and southeast Asia (Karsen *et al*., 1998)	Coastal, shrubby grassland and secondary woodland at Tung Chung Bay	Common in Hong Kong (Karsen *et al*., 1998) Potential Regional Concern, marked decline in regional and global population (Fellowes *et al*., 2002)
Rana exillispinosa (Lesser Spiny Frog)	None	Common in Hong Kong hill streams. Also known from Hunan, Fujian and Guangdong provinces (Karsen *et al*., 1998)	Streams at Sha Lo Wan, San Shek Wan, Hau Hok Wan, San Tau, Tai Ho Wan and a stream near Pak Mong (SL9, SS6, HH2, HH3, HH5, ST8, TH4, TH1, NLH4)	Potential Global Concern (Fellowes *et al.,* 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Butterfly				
Appias albinia (Common Albatross)	None	Recorded in S. India, Sri Lanka, Nepal, northeast India, Yunnan, Guangxi, Guangdong, Hainan, Taiwan, Ryu Kyus, Philippines, New Guinea and Australia (Bascombe, 1995)	Cultivated field at San Tau	Rare in Hong Kong (Walthew, 1997; Reels and Walthew, 1998; Young and Yiu, 2002) Local Concern (Fellowes *et al*., 2002)
Arhopala birmana (Burmese Bush Blue)	None	Nepal, northeast India, Burma, Thailand, Guangdong, Taiwan (Bascombe, 1995)	Developed area and woodland at San Tau	Rare in Hong Kong (Walthew, 1997; Reels and Walthew, 1998; Young and Yiu, 2002) Local Concern (Fellowes *et al*., 2002)
Eurema brigitta (Small Grass Yellow)	None	Ethiopian, Oriental regions (Bascombe, 1995)	Tall shrubland at Kau Liu to Hau Hok Wan.	Inadequate global and regional data Rare to uncommon in Hong Kong (Walthew, 1997; Reels and Walthew, 1998; Young and Yiu, 2002) Population in marked decline and of local concern (Fellowes *et al*., 2002).
Hypolimnas misippus (Danaid Egg-fly)	None	Florida, Antilles, South America, Africa, Arabian peninsula, Sri Lanka, India, China, Taiwan, Philippines, Malay Peninsula, Lesser Sundas, New Guinea, Bismarcks, Solomon Islands and Australia (Bascombe, 1995)	Shrubby grassland at Chek Lap Kok	Local Concern (Fellowes *et al*., 2002) Uncommon in Hong Kong (Walthew, 1997; Reels and Walthew, 1998; Young and Yiu, 2002)
Lamproptera curius (Dragontail)	None	India, Sichuan, Hubei Yunnan, Guangxi, Guangdong, Hainan, Indo-China, Malay Peninsula, Java, Borneo and Palawan (Bascombe, 1995)	A stream at San Tau	Locally rare (Walthew, 1997; Reels and Walthew, 1998; Young and Yiu, 2002) Local Concern (Fellowes *et al*., 2002)
Mahathala ameria (Falcate Oak Blue)	None	Nepal, India, Guangxi, Hainan, Guangdong, Jiangxi, Fujian, Zhejiang, Taiwan, Burma, Thailand and Indo-China (Bascombe, 1995)	Tall shrubland at Kau Liu to Hau Hok Wan	Uncommon in Hong Kong (Walthew, 1997; Reels and Walthew, 1998; Young and Yiu, 2002) Local Concern (Fellowes *et al*., 2002)
Dragonfly				
Leptogomphus elegans (Elegant Clubtail)	None	Fujian, Guangdong and Guangxi (Wilson, 2003)	Secondary woodland at Pak Mong to Tai Ho Wan	Common and widespread in Hong Kong (Wilson, 1997; 2003) Local Concern (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Melligomphus moluamis (Small Hooktail)	None	No further range Endemic to Hong Kong (Wilson, 1997; 2003) Keung Shan, Mount Butler, Tai Po Kau and Yuen Tun Ha (Wilson, 2003)	Stream at San Tau	Uncommon in Hong Kong (Wilson, 2003) Global Concern (Fellowes *et al*., 2002)
Rhyothemis triangularis (Sapphire Flutterer)	None	Borneo, Burma, China, Indonesia, India, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Thailand and Vietnam (Wilson,2003) Cheung Sheung, Double Island, Kang Mun Tsui, Kau Sai Chau, Luk Keng, Lamma Island, Tai Tam Country Park, Tai Po Kau and Sha Lo Tung (Wilson,2003)	Pond at Tung Chung Bay	Uncommon in Hong Kong (Wilson, 1997; 2003) Local Concern (Fellowes *et al*., 2002)
Mammal				
Muntiacus muntjac (Indian Muntjac)	WAPO	Widespread from India to Southern China and Southeast Asia (Francis, 2001) Probably common in Hong Kong (Reels, 1996)	Tall shrubland at Sha Lo Wan and Sham Shek Tsuen	Probably common (Reels, 1996) Potential Regional Concern (Fellowes *et al*., 2002)
Freshwater Fish				
Acrossocheilus beijiangensis (Beijiang Thick Lipped Barb)	None	Restricted to Guangdong Province. Highly restricted in Hong Kong (Chong and Dudgeon, 1999)	Tung Chung (TC1)	Global Concern (Fellowes *et al*., 2002)
Anguilia marmorata (Giant Mottled Eel)	None in Hong Kong Class II protected species in Mainland China.	Distributed from South Africa, Mauritius, China, Taiwan, Japan	Sham Wat (SW7) and Tai Ho (TH1)	Global Concern (Fellowes *et al*., 2002). Listed in the China Red Data Book of Endangered Animals
Channa asiatica (Chinese Moon Snakehead)	None	Widespread in south-east China, Taiwan, Japan and Sri Lanka	Sham Wat (SW7), Tung Chung (TC1), Sha Lo Wan (SL3), Pak Mong (PM1) and Tai Ho (TH1)	Local Concern (Fellowes *et al*., 2002)
Oryzias curvinotus (Rice Fish)	None	Restricted to Hainan, Guangdong and north Vietnam (Chong and Dudgeon, 1999)	Tung Chung (TC1)	Global Concern (Fellowes *et al*., 2002)

Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Plecoglossus altivelis (Ayu)	None	Widely distributed in rivers along the coasts of Korea, China, Taiwan, Japan and Vietnam (Chong and Dudgeon, 1999)	Tai Ho (TH1)	Regional Concern (Fellowes *et al*., 2002) Listed in the China Red Data Book of Endangered Animals
Takifugu ocellatus (Archpatch Puffer)	None		Sham Wat (SW7), San Tau (ST9), Tung Chung (TC1), Pak Mong (PM3), Tai Ho (TH1)	Local Concern (Fellowes *et al*., 2002)
Flora				
Acampe rigida (Banana Orchid)	AP, FR	Hainan, Guangdong, Guangxi, Yunnan, Guizhou, Tropical Asia and Africa (AFCD, 2001) Shek O, Tung Chung, Lantau Island (AFCD, 2001)	Shrubby grassland near Hau Hok Wan	Classified as common (Siu *et al*., 2000)
Arundina chinensis (Bamboo Orchid)	AP, FR	Central, east, south, southwest China and Tropical Asia (AFCD, 2001)	Shrubby grassland near Hau Hok Wan and Tai Ho Wan	Classified as very common (Siu *et al*., 2000) Common in Hong Kong (AFCD, 2001)
Carex tristachya	None	Hau Hok Wan (Xing *et al*., 2000)	Tall shrubland near Hau Hok Wan	Classified as very rare (Xing *et al*., 2000)
Cleisostoma simondii (Bee Orchid)	AP, FR	Guangdong, Hainan and Fujian (AFCD, 2001)	Shrubby grassland near Hau Hok Wan	Classified as very common (Siu, 2000) and common (AFCD, 2001)
Drosera indica (Indian Sundew)	None	Taiwan, Fujian, Hainan, Guangdong, Guangxi, Tropical and subtropical regions of Asia, Africa and Australia (AFCD, 2003) Tung Chung and Cape D'Augilar (Xing *et al,* 2000; AFCD, 2003)	Coastal habitat along Hau Hok Wan to Kau Liu	Classified as very rare (Xing *et al*., 2000) Classified as Least Concern in IUCN Red List (AFCD, 2003)
Dodonaea viscosa	*None*	Ham Tin and Tung Chung (Xing *et al,* 2000)	Coastal habitat at Sha Lo Wan	Classified as rare (Xing *et al*, 2000)
Eulophia graminea (Pale Purple Eulophia)	AP, FR	Hainan, Guangdong, Guangxi, Guizhou, Yunnan, Anhui, Taiwan and Tropical Asia (AFCD, 2001) Lam Tsuen and Ho Chung (AFCD, 2001)	Tall shrubland near Hau Hok Wan and Sha Lo Wan	Classified as restricted (Siu, 2000)
Halophila beccarii (Becar's Halophila)	None	Hainan, Guangdong, Taiwan and Tropical Asia (AFCD, 2001) Tai Tam Bay, Sheung Pak Nai, Ha Pak Nai, Starling Inlet, Black Point and Tai Ho (Xing *et al*., 2000; AFCD, 2001)	Coastal habitat at Tai Ho Bay	Classified as rare (Xing *et al*., 2000)

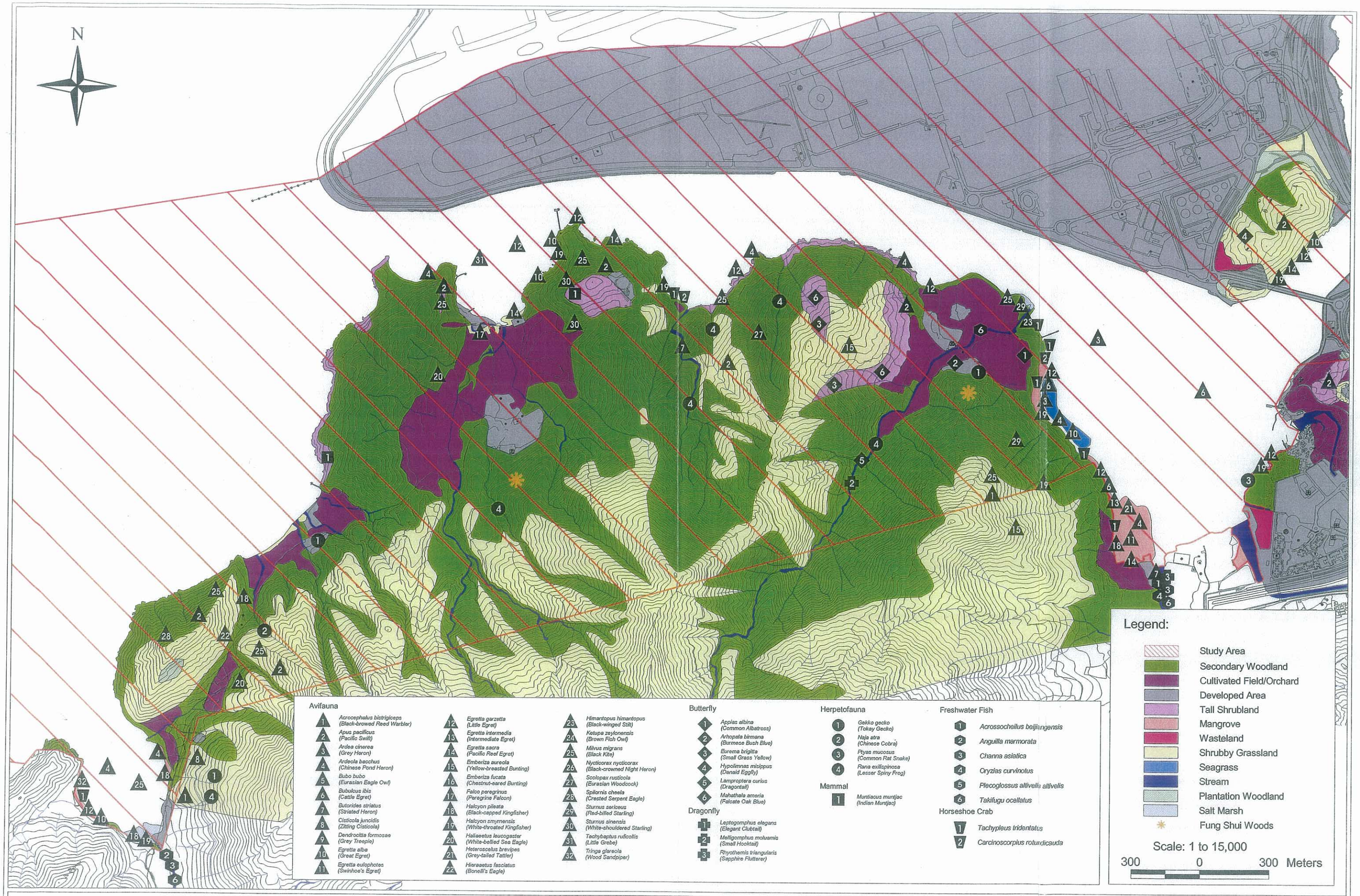
Species / Group	Protection Status	Distribution	Locations Recorded in this study	Rarity
Halophila ovata (Oval Halophila)	None	Hainan, Guangdong, Taiwan, Red Sea, India Ocean, West Pacific Ocean (AFCD, 2001; 2003) Tung Chung and Lai Chi Wo, Tai Tam Bay, Ho Chung, Hoi Ha Wan, Wu Shek Kok and San Tau (Xing *et al*., 2000; AFCD, 2003)	Coastal habitat at Tung Chung (San Tau)	Classified as rare (Xing *et al*, 2000) Classified as Least Concern in IUCN Red List (AFCD, 2003)
Pavetta hongkongensis (Hong Kong Pavetta)	FR	Guangdong, Guangxi, Yunnan, Philippines (AFCD, 2001)	Secondary woodland and tall shrubland at a number of location such as Hau Hok Wan	Classified as common (Xing *et al*., 2000 and AFCD, 2001)
Zostera japonica (Dwarf Eel Grass)	None	Shandong Hebei, Liaoning, Japan, Russia (AFCD, 2001) Sheung Sze Wan, Tung Chung Pier, Lai Chi Wo and San Tau (Xing, 2000; AFCD, 2001)	Coastal habitat at Tung Chung (San Tau)	Classified as rare (Xing *et al*., 2000) Classified as Least Concern in IUCN Red List (AFCD, 2003)
Corals				
Balanophyllia sp.	AP	Typically found in temperate seas (Scott, 1984) In Hong Kong, mostly restricted to the western waters (AFCD, 2004)	Sham Wat to San Shek Wan (S01-S05; S07-S09), East of Chek Lap Kok (S22)	Common in Hong Kong waters (Scott, 1984; AFCD, 2004)
Marine Mammals				
Sousa chinensis (Indo-Pacific humpback dolphin)	WAPO AP UN Biodiver-sity Treaty	Typically distributed in estuaries and shallow coastal waters. Indian and Western Pacific. South Africa in the west to Northern Australia and Southern China including Xiamen and Taiwan One population predominantly distributed in the Pearl River Estuary and western waters of Hong Kong	Mostly in waters north and west of Lantau Seasonally in waters south and east of Lantau	Approximately 1,028 individuals identified in breeding population in the Pearl River Estuary with about 100 inhabiting the Northwestern waters of Hong Kong (Jefferson, 2000)
Horseshoe crabs				
Tachypleus tridentatus	None	Indo-west Pacific (Morton and Lee, 2003)	Sham Wat, Hau Hok Wan, San Tau, Tung Chung Bay	Probably declining and extirpated throughout much of its range due to water pollution and loss of nursery grounds (Morton and Lee, 2003)
Carcinoscorpius rotundicauda	None	Indo-west Pacific (Morton and Lee, 2003)	Hau Hok Wan, San Tau, Tai Ho Wan	Probably declining and extirpated throughout much of its range due to water pollution and loss of nursery grounds (Morton and Lee, 2003)

Notes: WAPO = Wild Animals Protection Ordinance; AP = Animals and Plants (Protection of Endangered Species) Ordinance; FR = Forestry Regulations; UN= United Nations.

6.3 A total of fifty-two terrestrial and freshwater fauna species of conservation interest were recorded from various habitats within the study area. The localities where these faunal species of conservation interest were recorded are presented in *Figure 13*. Many of these species, in particular birds and mammals, have high mobility and are not always restricted to a single habitat. Conversely, fauna such as freshwater fish are restricted to the streams and impact avoidance is more difficult. Similarly, certain bird species form highly concentrated flocks and in this regard the ardeids are of greater conservation concern than more mobile generalists. The faunal species occurrence within the different habitats present in the study area are presented below in *Table 6.2* and mapped on *Figure 13a-b*.

6.4 Ten floral species of conservation interest have been identified in the study area through field surveys. These included four orchids *Acampe rigida*, *Arundina chinensis*, *Cleisostoma simondii*, *Eulophia graminea*, one sedge, *Carex tristachya,* one shrub/tree *Dodonaea viscosa,* one herb*, Drosera indica* and three seagrass species *Halophila beccarii*, *Halophila ovata* and Zostera japonica.

6.5 There were four marine species of conservation interest recorded in the study area. These included the hard coral *Balanophyllia* sp., the Indo-Pacific humpback dolphin and two species of horseshoe crab (*Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*).



Location of Faunal Species of Conservation Interest

Meinhardt Mouchel
Figure 13a

N

Avifauna

1 *Acrocephalus bistrigiceps* (Black-browed Reed Warbler)
2 *Apus pacificus* (Pacific Swift)
3 *Ardea cinerea* (Grey Heron)
4 *Ardeola bacchus* (Chinese Pond Heron)
5 *Bubo bubo* (Eurasian Eagle Owl)
6 *Bubulcus ibis* (Cattle Egret)
7 *Butorides striatus* (Striated Heron)
8 *Cisticola juncidis* (Zitting Cisticola)
9 *Dendrocitta formosae* (Grey Treepie)
10 *Egretta alba* (Great Egret)
11 *Egretta eulophotes* (Swinhoe's Egret)
12 *Egretta garzetta* (Little Egret)
13 *Egretta intermedia* (Intermediate Egret)
14 *Egretta sacra* (Pacific Reef Egret)
15 *Emberiza aureola* (Yellow-breasted Bunting)
16 *Emberiza fucata* (Chestnut-eared Bunting)
17 *Falco peregrinus* (Peregrine Falcon)
18 *Halcyon pileata* (Black-capped Kingfisher)
19 *Halcyon smyrnensis* (White-throated Kingfisher)
20 *Haliaeetus leucogaster* (White-bellied Sea Eagle)
21 *Heterosceles brevipes* (Grey-tailed Tattler)
22 *Hieraaetus fasciatus* (Bonelli's Eagle)
23 *Himantopus himantopus* (Black-winged Stilt)
24 *Ketupa zeylonensis* (Brown Fish Owl)
25 *Milvus migrans* (Black Kite)
26 *Nycticorax nycticorax* (Black-crowned Night Heron)
27 *Scolopax rusticola* (Eurasian Woodcock)
28 *Spilornis cheela* (Crested Serpent Eagle)
29 *Sturnus sericeus* (Red-billed Starling)
30 *Sturnus sinensis* (White-shouldered Starling)
31 *Tachybaptus ruficollis* (Little Grebe)
32 *Tringa glareola* (Wood Sandpiper)

Butterfly

1 *Appias albina* (Common Albatross)
2 *Arhopala birmana* (Burmese Bush Blue)
3 *Eurema brigitta* (Small Grass Yellow)
4 *Hypolimnas mizippus* (Danaid Eggfly)
5 *Lamproptera curius* (Dragontail)
6 *Mahathala amoria* (Falcate Oak Blue)

Dragonfly

1 *Leptogomphus elegans* (Elegant Clubtail)
2 *Melligomphus moluamis* (Small Hooktail)
3 *Rhyothemis triangularis* (Sapphire Flutterer)

Herpetofauna

1 *Gekko gecko* (Tokay Gecko)
2 *Naja atra* (Chinese Cobra)
3 *Ptyas mucosus* (Common Rat Snake)
4 *Rana exilispinosa* (Lesser Spiny Frog)

Mammal

1 *Muntiacus muntjac* (Indian Muntjac)

Freshwater Fish

1 *Acrossocheilus beijiangensis*
2 *Anguilla marmorata*
3 *Channa asiatica*
4 *Oryzias curvinotus*
5 *Plecoglossus altivelis altivelis*
6 *Takifugu ocellatus*

Horseshoe Crab

1 *Tachypleus tridentatus*
2 *Carcinoscorpius rotundicauda*

Legend:

- Study Area
- Secondary Woodland
- Cultivated Field/Orchard
- Developed Area
- Tall Shrubland
- Mangrove
- Wasteland
- Shrubby Grassland
- Seagrass
- Stream
- Plantation Woodland
- Salt Marsh
- Fung Shui Woods

Scale: 1 to 15,000

300 0 300 Meters

Location of Faunal Species of Conservation Interest

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Figure 13b

Table 6.2 Number of Terrestrial Faunal Species Present in Different Habitat Types Within the Study Area

	Secondary Woodland	Plantation Woodland	Tall Shrubland	Shrubby Grassland	Stream/ Riparian/Pond	Coastal	Developed Area	Wasteland	Cultivated Field/Orchard
Butterfly	62	0	45(2)	67(1)	20 (1)	11	43(1)	13	41(2)
Dragonfly	9(1)	0	3	13	17(2)	2	2	2	1
Herpetofauna	12(1)	0	7	12(2)	6(2)	1(1)	10(1)	4	5
Avifauna	61(9)	1	44 (2)	37(8)	16 (4)	42(18)	18	11	34
Freshwater fish	0	0	0	0	67 (6)	0	0	0	0
Mammal	0	0	2 (1)	0	0	0	1	0	0
Flora	217(1)	125(0)	185(3)	153(2)	N/A	141(5)	129(0)	159(0)	126(0)
Total No. of Faunal Species	144	1	101	129	126	56	74	30	81
Faunal Species of Conservation Interest	11	0	5	11	15	19	2	0	2
Floral Species of Conservation Interest	1	0	3	2	0	5	0	0	0

Note: ( ) = Species of conservation interest , N/A = not applicable

Secondary Woodland

6.6 A total of 144 faunal species were recorded in the secondary and plantation woodland habitats across the study area. This habitat was rich in butterflies and avifauna, with 62 and 61 species recorded respectively, of which nine bird species (Pacific Swift, Grey Treepie, White-bellied Sea Eagle, Brown Fish Owl, Black Kite, Eurasian Woodcock, Crested Serpent Eagle, Red-Billed Starling and White-shouldered Starling) are of conservation interest. This was the only habitat in which Grey Treepie, Chest-eared Bunting, Crested Serpent Eagle, White-bellied Sea Eagle, White-shouldered Starling and Eurasian Woodcock were observed. Despite the high number recorded, no butterfly species is of conservation interest.

6.7 Nine species of odonates were also recorded within this habitat type and the Elegant Clubtail is of conservation interest. This was the only habitat in which Elegant Clubtail was recorded.

6.8 Twelve species of herpetofauna were recorded within this habitat type and only the Common Rat Snake is of conservation concern.

6.9 This habitat supports the highest number of floral species. Of these, one protected shrub species was recorded. Patches of the protected shrub *Pavetta hongkongensis* were recorded in a group of 4-6 individuals in a number of locations.

Plantation Woodland

6.10 Given the limited area within the study area, only one avifauna species was recorded in this habitat type and no floral and fauna species of conservation interest present.

Tall Shrubland

6.11 This habitat contained 101 species of fauna, including 44 species of avifauna, two of which, namely the Pacific Swift and Black Kite are considered to be of some conservation interest.

6.12 Other non-avian fauna include 45 species of butterfly, 3 species of dragonfly, 7 species of herpetofauna and 2 species of mammal. Among the butterfly species, Small Grass Yellow and Falcate Oak Blue are of conservation interest. This was the only habitat in which these two species were recorded.

6.13 Apart from the abovementioned species, the protected mammal, Indian Muntjac was recorded in the tall shrubland at Sha Lo Wan and San Shek Wan. This mammal species is considered to be of potential regional concern (Fellowes *et al*., 2002). No herpetofauna and dragonfly species of conservation concern was recorded.

6.14 A total of 185 floral species were recorded within this habitat. There were three species of conservation interest including one protected shrub Pavetta hongkongensis, one restricted orchid Eulophia graminea and one very rare sedge *Carex tristachya*.

Shrubby Grassland Mosaic

6.15 This extensive habitat contained 129 species, including 67 species of butterfly, 13 species of dragonfly and 12 species of herpetofauna.

6.16 Thirty-seven species of avifauna were recorded within this habitat of which eight are of conservation interest, namely Black-browed Reed Warbler, Pacific Swift, Eurasian Eagle Owl, Zitting Cisticola, Yellow-breasted Bunting, Peregrine Falcon, Bonelli's Eagle and Black Kite. This was the only habitat in which Bonelli's Eagle, Peregrine Falcon, Yellow-breasted Bunting, Zitting Cisticola and Black-browed Reed Warbler were recorded.

6.17 Apart from the avifauna, one butterfly (Danaid Eggfly) and two reptile species (Common Rat Snake and Tokay Gecko) are of conservation interest.

6.18 Three protected orchids *Acampe rigida*, *Arundina chinensis* and *Cleisostoma simondii* were recorded within this habitat. All these flora species are common in Hong Kong (Xing et al., 2000).

Stream/Riparian/Pond

6.19 This habitat was rich in faunal species with 126 species of fauna recorded, of which fourteen are of conservation interest. Streams are numbered as presented in *Figures 2.1-2.4* in the following discussions.

6.20 Freshwater fish made up the majority of species, with 67 species recorded at streams within the study area. Of these, six species are considered to be of conservation interest. These were comprised of Beijiang Thick Lipped Barb (TC1), Giant Mottled Eel (SW7, TH1), Rice Fish (TC1), Chinese Moon Snakehead (PM1, SL3, SW7, TH1 and TC1), Ayu (TH1) and Archpatch Puffer (PM3, ST9, SW7, TH1 and TC1). The survey provided further data on the importance of stream systems throughout the study area and ecologically important streams included Tung Chung Stream (TC1), Tai Ho Stream (TH1) and Sham Wat Stream (SW7).

6.21 Among seventeen Odonates species recorded within this habitat, two are of conservation interest. The Small Hooktail is of global concern (Fellowes *et al*., 2002) and Sapphire Flutterer is of local concern. Local population of the latter is in decline.

6.22 Twenty butterfly species were recorded of which one, the Dragontail, is of conservation. This was the only habitat in which Dragontail was recorded.

6.23 A total of sixteen avifauna species were recorded within this habitat, of which the Striated Heron, White-throated Kingfisher, Brown Fish Owl and Black-crowned Night Heron are of conservation interest. This was the only habitat in which the Straited Heron was recorded.

6.24 In addition to the above, herpetofauna were limited at stream habitats with only six species recorded. Of these, two were considered to be of conservation interest, one species of reptile, the CITES II listed Chinese Cobra, and one species of amphibian of conservation concern, the locally common but globally restricted Lesser Spiny Frog were recorded.

Coastal

6.25 Coastal habitat comprised seagrass habitat, salt marsh, rocky shoreline and mangrove habitats. A total of 56 species was recorded. This habitat is rich in avifauna with 42 bird species observed. Eighteen of them are of conservation interest namely, Grey Heron, Chinese Pond Heron, Cattle Egret, Great Egret, Swinhoe's Egret, Little Egret, Intermediate Egret, Pacific Reef Egret, Black-capped Kingfisher, White-throated Kingfisher, Grey-tailed Tattler, Black-winged Stilt, Brown Fish Owl, Black Kite, Black-crowned Night Heron, Red-billed Starling, Little Grebe and Wood Sandpiper. Apart from the Brown Fish Owl, Black Kite, Black-crowned Night Heron and Red-billed Starling, the other fourteen species were only recorded in coastal habitat.

6.26 In addition to the avifauna, eleven butterflies and two dragonflies were recorded in this habitat type but all of these are common and widespread in Hong Kong.

6.27 One reptile species, the Common Rat Snake, was recorded within this habitat in Tung Chung Bay. This species is threatened regionally (Fellowes *et al*., 2002).

6.28 141 floral species have been identified within this habitat of which five are of conservation interest. These included the tree *Dodonaea viscosa*, herb *Drosera indica* and three seagrass species *Halophila beccarii*, *Halophila ovata* and *Zostera japonica*. All these are rare in Hong Kong (Xing et al., 2000).

6.29 In addition to the above, two species of horseshoe crabs *Tachypleus tridentatus* and *Carcinoscorpius rotundicauda* were recorded within the intertidal mudflat and seagrass habitats. The coastal habitats present in the study area are, therefore, considered to be ecologically important to horseshoe crabs.

Developed Area

6.30 A total of 74 faunal species were recorded within this habitat and two of these are of conservation interest.

6.31 This habitat was rich in butterfly species with forty-three species recorded. However, only Burmese Bush Blue is rated of local concern (Fellowes *et al*., 2002). Two species of dragonfly, eighteen bird species, one mammal and ten herpetofauna species were recorded, of which Tokay Gecko is globally restricted (Fellowes *et al*., 2002).

6.32 A total of 129 floral species were present in the developed area habitat. Of these, none were rare or protected.

Wasteland

6.33 Wasteland was depauperate in fauna and supported the lowest number of faunal species. Only thirteen butterfly, eleven avifauna, four herpetofauna, and two dragonfly species were recorded in this habitat. All these were common and widespread and no species of conservation concern was recorded.

6.34 There were 159 flora species present in this habitat although no rare or protected species was recorded.

Cultivated Field/Orchard

6.35 Cultivated Land supported eighty-four faunal species, including forty-one species of butterfly, one species of dragonfly, five species of herpetofauna and thirty-four species of bird. The locally restricted butterfly Common Albatross and Burmese Bush Blue were recorded in the cultivated fields at San Tau. Butterfly species was the only species of conservation interest recorded in this habitat.

6.36 126 floral species were recorded within this habitat and no species of conservation interest present.

Subtidal Habitat

6.37 There were four marine species recorded of conservation interest. The hard coral *Balanophyllia* sp. is protected in Hong Kong although it should be noted that the species is common and the few individuals present within the study area were in poor condition and of low ecological importance. The Indo-Pacific humpback dolphin was also present and this species is considered threatened throughout much of its range due to various pressures including loss of habitat, fishing activity and pollution (Liu and Hills, 1997; Jefferson, 2000). Two horseshoe crabs were recorded in the study area (*Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*). Horseshoe crabs have undergone population declines throughout much of their range and extirpated from certain locations in Hong Kong such as Tolo Harbour (Morton and Lee, 2003).

7. Habitat Quality

7.1 Background

7.1.1 In this section, the ecological importance of the habitats identified within the study area have been evaluated in accordance with criteria stipulated in Annex 8 of the EIAO TM.

7.2 Secondary Woodland

7.2.1 As discussed earlier in *Section 5.12.6*, secondary woodland patches are distributed throughout the study area. Although there are differences in many ecological aspects of these patches, the ecological value of secondary woodland as a whole is considered high. An assessment of the secondary woodland in accordance with the criteria stated in Annex 8 of the TMEIA is provided below in *Table 7.1*.

Table 7.1 Ecological Evaluation of Secondary Woodland Within the Study Area

Criteria	Secondary Woodland
Naturalness	Secondary woodland dominated by native plant species and suffering only limited human disturbance
Size	Comparatively large in size (>300 ha)
Diversity	Rich in terms of floral diversity (217 species recorded)
Rarity	None of the plant species recorded are rare in Hong Kong. One regionally protected tree *Aquilaria sinensis* and one locally protected shrub *Pavetta hongkongensis* were recorded, which are both common in Hong Kong. Eleven faunal species of conservation interest were recorded
Re-creatability	Possible if adequate resources are available (man-power, land, finance, re-planting material) and in the absence of disturbance, but original habitat characteristics including the community composition and structural complexity may require > 20 years to establish (Mouchel, 2002a)
Fragmentation	Fragmentation of patches is minimal
Ecological linkage	Native secondary woodland may provide a movement corridor for wildlife and it could serve as a seed source to facilitate the succession process in the surrounding area. Functionally linked to streams passing through this habitat
Potential value	High in terms of size and species diversity
Nursery/ breeding ground	No significant nursery or breeding ground recorded
Age	Relatively old (>50 years) with respect to the size of the trees and the structural complexity and community composition
Abundance/ Richness of wildlife	Very high butterfly, high dragonfly, high herpetofauna and very high avifauna abundance. High species richness with 144 species of fauna present; 12 species of conservation interest including nine avifauna, one dragonfly and one reptile.
Ecological value	High

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.3 Plantation Woodland

7.3.1 As discussed earlier in *Section 5.12.7*, patches of plantation woodland are distributed throughout the study area. Although there are differences in many ecological aspects of these patches, the ecological value of plantation woodland as a whole is considered moderate to low. An assessment of the secondary woodland in accordance with the criteria stated in Annex 8 of the TMEIA is provided below in *Table 7.2*.

Table 7.2 Ecological Evaluation of Plantation Woodland Within the Study Area

Criteria	Plantation Woodland
Naturalness	Man-made planted habitat
Size	Relatively small (6.57 ha)
Diversity	Rich floral diversity (125 species)
Rarity	None of the plant species recorded are rare in Hong Kong. One regionally protected but locally common tree was recorded. No faunal species of conservation interest
Re-creatability	Readily re-creatable provided adequate resources are available (man-power, land, finance, re-planting material)
Fragmentation	Moderately fragmented
Ecological linkage	Not functionally linked to any high value habitat
Potential value	Relatively low given small size of the plantation
Nursery/ breeding ground	No significant breeding ground or nursery detected
Age	Young plantation forest
Abundance/ Richness of wildlife	Low avifauna abundance and no other species were noted. Low species richness with only one avifauna species present and no species of conservation interest
Ecological value	Moderate to Low

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.4 Tall Shrubland

7.4.1 The habitat structure and species diversity of tall shrubland within the study area is complex and rich. The species composition is comparable to secondary woodland and the ecological value of this habitat type is considered moderate to high. An assessment of the tall shrubland in accordance with the criteria stated in Annex 8 of the TMEIA is provided below in *Table 7.3*.

Table 7.3 Ecological Evaluation of Tall Shrubland Within the Study Area

Criteria	Tall Shrubland
Naturalness	Natural habitat
Size	Comparatively small area (22.17 ha)
Diversity	Botanically diverse (185 species)
Rarity	Two rare floral species recorded included *Carex tristachya* and *Eulophia graminea*. One locally protected but common shrub was recorded. Six faunal species of conservation interest were present
Re-creatability	Readily re-creatable provided that adequate resources are available (man-power, land, finance, re-planting material) and in the absence of disturbance
Fragmentation	Fragmentation is moderate with respect to the distribution pattern of the habitat within the study area
Ecological linkage	Generally not functionally linked to any high value habitat
Potential value	High given the rich tree flora within the habitat
Nursery/ breeding ground	No significant breeding or nursery ground recorded
Age	Moderate in terms of the succession pathway
Abundance/ Richness of wildlife	Very high butterfly, medium dragonfly, high herpetofauna, very high avifauna and medium mammal abundance. High species richness with 101 species of fauna recorded in this habitat, five species of conservation interest including two butterfly, two avifauna and one mammal species
Ecological value	Moderate to high

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.5 Shrubland-Grassland Mosaic

7.5.1 Shrubland-grassland mosaic is species rich and structurally complex as a whole for the mosaic, and is considered to have a moderate ecological value. An assessment of the shrubland-grassland mosaic in accordance with the criteria stated in Annex 8 of the TMEIA is provided below in *Table 7.4*.

Table 7.4 Ecological Evaluation of Shrubland-Grassland Mosaic Within the Study Area

Criteria	Shrubland-Grassland Mosaic
Naturalness	Natural habitat but may suffer frequent disturbance (hill fire)
Size	Large in size (191.8 ha)
Diversity	Botanically diverse (153 species)
Rarity	Three common and protected orchids although no rare floral species recorded. Species of conservation interest included eight avifauna, one butterfly and two reptile species
Re-creatability	Readily re-creatable provided that adequate resources are available (man-power, land, finance, re-planting material) and in the absence of disturbances such as fire
Fragmentation	Fragmentation is relatively limited with respect to the distribution pattern of the habitat within the study area
Ecological linkage	Functionally linked to streams
Potential value	Moderate as a result of the location and the potential for fire disturbance
Nursery/ breeding ground	No significant breeding ground or nursery detected
Age	Young in terms of the succession pathway
Abundance/ Richness of wildlife	High dragonfly and herpetofauna and very high butterfly and avifauna abundance. High species richness with 129 species of fauna present; 11 species of conservation interest including one butterfly, two herpetofauna and eight avifauna.
Ecological value	Moderate

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.6 Streams and Riparian Habitat

7.6.1 Riparian vegetation in the study area is broadly similar to that of the surrounding habitat, comprising secondary woodland and shrubby grassland. The stream habitats are of particular value notably due to the fish fauna present although several other important species were also present in the riparian zone. Several streams in the study area are seasonal, or of very low base flow, and these are of lower ecological value than the permanent streams with reliable discharge, upon which fully aquatic fauna are dependent. The following evaluation divides streams into two broad categories, those with generally higher base flow supporting species of conservation interest, and those with generally lower base flow supporting less species of conservation interest (*Table 7.5*).

Table 7.5 Ecological Evaluation of Streams and Riparian Habitat Within the Study Area

Criteria	**Streams (relatively higher base flow): SW1, SW7, SS1-SS4, SS6, SL1-SL7, SL9, SL10, HH5, HH7, ST4-ST9, TC1-TC3, NLH4-NLH8, PM1, PM3, TH1, TH5**	**Streams (relatively lower base flow): SW2-SW6, SS5, SS9-SS10, SL8, HH1-HH3, HH6, ST1, ST12-ST14, TC4-TC9, NLH1-NLH3, PM4-PM7, TH3-TH4, TH6-TH9**
Naturalness	Natural habitat, pristine at higher elevations, generally more disturbed at lower elevations	Natural habitat, pristine at higher elevations, generally more disturbed at lower elevations
Size	Small in size as a whole for the study area. Relatively moderate to high base flow	Small in size as a whole for the study area. Relatively low base flow
Diversity	Botanically diverse riparian strip as a whole for the habitat mosaic	Botanically diverse riparian strip as a whole for the habitat mosaic
Rarity	No rare floral species recorded. Numerous rare/endangered species of fauna were present, including fifteen species of conservation interest. *Acrossocheilus beijiangensis* was recorded in TC1, *Anguilla japonica* was recorded in SW7 and TH1, *Channa asiatica* was recorded in SW7, TC1, SL3, PM1 and TH1, *Oryzias curvinotus* was recorded in TC1, *Plecoglossus altivelis* was recorded in TH1 and *Takifugu ocellatus* was recorded in SW7, ST9, TC1, PM3 and TH1. The Lesser Spiny Frog was recorded in SL9, HH5, ST8, NLH4, TH1 and TH5 and Chinese Cobra was recorded in SS6 (although only the freshly sloughed skin of Chinese Cobra was found)	No rare floral species recorded and Lesser Spiny Frog was recorded in HH2, HH3 and SW4
Re-creatability	Re-creatable provided that works conducted in ecologically-sensitive manner and original flow not diverted or polluted, and in the absence of disturbance	Readily re-creatable provided that works conducted in ecologically-sensitive manner and original flow not diverted or polluted, and in the absence of disturbance
Fragmentation	Generally non-fragmented continuous linear habitat	Generally non-fragmented continuous linear habitat
Ecological linkage	Functionally linked to surrounding terrestrial and coastal habitat	Functionally linked to surrounding terrestrial and coastal habitat
Potential value	High as a result of the pristine condition and generally low level of disturbance	Moderate-low as a result of low/seasonal base flow
Nursery/ breeding ground	Significant breeding grounds of numerous species of conservation interest, including *Acrossocheilus beijiangensis*, *Anguilla japonica*, *Channa asiatica*, *Oryzias curvinotus Plecoglossus altivelis* and *Takifugu ocellatus* and potential breeding location for Lesser Spiny frog	No significant breeding ground or nursery detected
Age	Ancient geomorphological drainage features	Ancient geomorphological drainage features
Abundance/ Richness of wildlife	High butterfly, dragonfly, herpetofauna, avifauna and very high freshwater fish abundance. High species richness with 126 faunal species recorded; 15 species of conservation interest including one butterfly, two dragonfly, two herpetofauna, four avifauna and six freshwater fish	Low species richness with only one amphibian, a species of conservation interest, present
Ecological value	High	Moderate-low, given the value of the surrounding habitat (secondary woodland or shrubby grassland)

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.7 Wasteland

7.7.1 Wasteland is found close to the developed areas and comprised mainly of ruderal plants of low ecological value. An assessment of the wasteland habitat in accordance with the criteria stated in Annex 8 of the TMEIA is provided below in *Table 7.6*.

Table 7.6 Ecological Evaluation of Wasteland within the Study Area

Criteria	Wasteland
Naturalness	Semi-natural as the habitat is established on heavily disturbed land predominantly inhabited by ruderal plant species
Size	Relatively small (2.64 ha)
Diversity	Relatively botanically diverse (159 species)
Rarity	None of the floral and faunal species recorded are rare in Hong Kong
Re-creatability	Readily re-creatable
Fragmentation	High
Ecological linkage	Not functionally linked to any high value habitat
Potential value	Low potential value with respect to the planned land-use
Nursery/ breeding ground	No significant nursery or breeding ground recorded
Age	Young in terms of the succession pathway
Abundance/ Richness of wildlife	High butterfly and avifauna, medium dragonfly and herpetofauna abundance. Medium species richness with 30 faunal species present and no species of conservation interest
Ecological value	Low

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.8 Cultivated Field/Orchard

7.8.1 Cultivated field/Orchard within the study area are comparatively small in size and intensively modified and managed by human activities. The ecological value is hence considered low (*Table 7.7*).

Table 7.7 Ecological Evaluation of Cultivated/Agricultural Land within the Study Area

Criteria	Cultivated/Agricultural Land
Naturalness	Man-made habitat
Size	Comparatively small (59.9 ha)
Diversity	Relatively diverse plant community (126 species)
Rarity	Two butterfly species of conservation interest and no rare floral species present
Re-creatability	Readily creatable
Fragmentation	Relatively fragmented given the size of the patches
Ecological linkage	Not functionally linked to any highly valued habitat in close proximity
Potential value	Potentially high depending on the agricultural management practices
Nursery/ breeding ground	No significant nursery or breeding ground recorded
Age	Unknown
Abundance/ Richness of wildlife	Low dragonfly, medium herpetofauna, very high butterfly and avifauna abundance. Medium species richness with 81 fauna species recorded of which two butterfly species are of conservation interest
Ecological value	Low

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.9 Developed Area

7.9.1 The developed areas were often associated with intensive human activities (notably at the airport) and had limited ecological resources, and hence low ecological value. An assessment of the developed area in accordance with the criteria stated in Annex 8 of the TMEIA is provided below in *Table 7.8*.

Table 7.8 Ecological Evaluation of Developed Area Within the Study Area

Criteria	Developed Area
Naturalness	Man-made habitat with intensive human activities
Size	Relatively large (483.9 ha)
Diversity	Relatively diverse plant community (129 species)
Rarity	Two faunal species of conservation interest recorded and no rare floral species present
Re-creatability	Readily re-creatable
Fragmentation	Moderate
Ecological linkage	Not functionally linked to any highly valued habitat in close proximity
Potential value	Low potential value with respect to the planned land-use
Nursery/ breeding ground	No significant nursery or breeding ground recorded
Age	No information (airport construction commenced 1990s)
Abundance/ Richness of wildlife	Medium dragonfly, high herpetofauna, high avifauna and very high butterfly abundance. Medium species richness with 81 faunal species recorded; 2 species of conservation interest including 1 butterfly and 1 herpetofauna
Ecological value	Low

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.10 Mangrove and Seagrass

7.10.1 There are important mangrove stands and seagrass beds within the coastal fringe of the study area. The habitat serves as a nursery, foraging and roosting ground for many faunal species and the ecological value of this habitat type is considered high. Seagrass bed and mangrove habitats are defined as important habitat in Technical Memorandum (TM) of Environmental Impact Assessment Ordinance (EIAO). An assessment of these habitats in accordance with the criteria stated in Annex 8 of the TM is provided below in *Table 7.9*.

Table 7.9 Ecological Evaluation of Mangrove/Seagrass Within the Study Area

Criteria	Mangrove/Seagrass
Naturalness	Natural habitat
Size	Comparatively small area (10.57 ha)
Diversity	Botanically diverse (85 species) with the presence of 6 mangal species
Rarity	Mangrove and seagrass habitats are rare in Hong Kong. Rare plant species recorded included *Dodonaea viscosa* and *Drosera indica* and three seagrass species, *Zostera japonica*, *Halophila beccarii* and *Halophila ovata*. Fifty-six faunal species were recorded, of which 19 species of conservation interest present. One species of horseshoe crab were recorded
Re-creatability	Readily re-creatable provided that adequate resources and suitable substrate are available (man-power, soft intertidal mudflat, finance, re-planting material) and in the absence of disturbance. Soft-substrate intertidal habitat likely difficult to re-create
Fragmentation	Fragmentation is high due to reclamation's along the coastal fringe
Ecological linkage	Functionally linked to streams, mudflat, salt marshland, coastal waters
Potential value	High given the rich seagrass, established mangrove and tree flora and fauna within the habitat
Nursery/ breeding ground	Significant nursery ground for horseshoe crabs and roosting and/breeding location for many avifauna (notably ardeids)
Age	Moderate in terms of the succession pathway
Abundance/ Richness of wildlife	Very high avifauna, high butterfly, medium dragonfly and low herpetofauna abundance. High species richness with 56 faunal species present of which 19 of these are of conservation interest including 18 avifauna and 1 reptile
Ecological value	High

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.11 Marine Intertidal Shores (Hard and Soft Shores)

7.11.1 The ecological importance of the hard and soft shore intertidal habitats present were evaluated in accordance with the suggested criteria stated in Annex 8 of the EIAO TM. The habitats present were composed of artificial seawall, boulder shores with intermittent sand deposits, sandflats and mudflats. These natural habitats are generally rated higher in the TM. It should, however, be noted that these habitats are reasonably common and present in similar locations elsewhere in Hong Kong.

Hard Intertidal Shores

7.11.2 The faunal diversity of the rocky intertidal shores was generally low and only 34 common marine-dependent species were recorded along the whole coastline and molluscs (predominantly littorinid gastropods, predatory gastropods, bivalves including oysters) were the most abundant group recorded (*Appendix E*). All species present are found on hard (often including artificial substrates such as seawalls) substrates throughout Hong Kong coastal waters.

7.11.3 The shoreline in the western study area is functionally linked to the adjacent marine habitat (particularly the lower shore) although the coastline along the eastern part of the study area (around Tai Ho) has been subject to reclamation and is fragmented and of lower ecological value. The shoreline around the airport platform is artificial and also of low ecological value. The hard shores present are not anticipated to represent significant nursery or breeding areas for species of conservation interest. The natural hard shore intertidal habitats are, therefore, generally of moderate ecological importance.

Soft Intertidal Mudflats

7.11.4 The faunal diversity was generally low and only 22 common coastal species were recorded along the whole coastline and common molluscs such as mud snails (*Cerithidea* sp.) were the most abundant group recorded (*Appendix E*). All species present are found on other soft intertidal substrates throughout Hong Kong. The large venerid bivalve *Meretrix meretrix* are reasonably common on sheltered lower intertidal sand shores on Lantau (Morton and Morton, 1983) and were collected by villagers at Sham Wat during the course of the present surveys.

7.11.5 The soft interidal shores in the west of the study are relatively undisturbed, often functionally linked to the adjacent marine habitat and streams and owing to certain flora and faunal species present, are of high ecological value. The shoreline in the eastern study area is mostly fragmented, predominantly hard or composed of artificial seawall although some soft shores remain in Tung Chung Bay and near to Tai Ho. The aforementioned shores are relatively undisturbed, functionally linked to the adjacent marine and stream habitats and of high ecological value.

7.11.6 Important seagrass beds and mangrove stands have been recorded in the study area. The spoon grass, *Halophila beccarii* has been recorded at Tai Ho whilst *H. ovata* and the eelgrass, *Zostera japonica* have been recorded at San Tau. The latter two species were significantly reduced at San Tau due to the airport construction although they have more recently recovered following completion of the reclamation (Mouchel, 2002a). Mangrove communities are under threat from urbanisation and reclamation and many stands have been destroyed in Hong Kong and they are considered to be a conservation priority (Tam and Wong, 2000). The mangrove habitat at San Tau is regarded as an important stand in Hong Kong (Tam and Wong, 2000). Mangrove stands of conservation interest are also present at Sham Wat, Tung Chung Bay and Tai Ho Wan. Both mangrove and seagrass beds are important habitats for many birds (notably ardeids) and also serve as important nursery areas. The locations containing either seagrass or mangrove are, therefore, considered to be of high ecological value.

7.11.7 Notable mangal-associated fauna included ardeids (notable numbers recorded in Tung Chung Bay) and horseshoe crabs. The horseshoe crabs (*Tachypleus tridentatus* and *Carcinoscorpius rotundicauda*) have been recorded from intertidal mudflats and sandflats at Sham Wat, Sha Lo Wan, Hau Hok Wan, San Tau, Tung Chung Bay and Tai Ho Wan (see *Table 5.12*). These bays are considered to be nursery grounds for juvenile horseshoe crabs and are of high ecological value.

7.12 Marine Habitat Quality

7.12.1 The ecological value of each habitat present in the study area is largely based on the species present. Habitats that contain species of conservation interest or serve as a nursery or breeding grounds are considered to have a higher ecological value. The marine waters present in the study area are used by the species of highest marine ecological importance, the Indo-Pacific humpback dolphin. A species-based impact evaluation for both the construction and operational phases of the project will be required for the dolphin. For the purposes of habitat evaluation, the horseshoe crabs are distributed in the coastal waters of the study area, but they are mostly associated with mangroves and seagrass beds and these habitats are likely the most important as they serve as nursery grounds.

Soft-Bottom Benthos

7.12.2 The marine benthic habitat present in the North-western waters of Hong Kong are generally characterised by soft-bottom material composed of silts and clay as a homogenous layer or in loosely packed mud clasts bound in a puzzle fabric (Mouchel, 200b). In areas subject to the influence of stronger tidal currents, coarser sands are also present (Mouchel, 2002b). The macroinvertebrate species present are characteristic of estuaries and dominant ecological groups present include polychaetes, bivalves, gastropods, crustaceans and echinoderms (e.g., Mouchel, 2002b). An assessment of the soft-bottom habitats in accordance with the criteria stated in Annex 8 of the TM is provided below in *Table 7.10*.

Table 7.10 Ecological Evaluation of Marine Soft-bottom Benthic Habitat Within the Study Area

Criteria	Marine Soft-Bottom Benthic Habitat
Naturalness	Natural habitat (although suffers disturbance both naturally through storm events and due to activities such as demersal trawling)
Size	Relatively large as majority of marine study area composed of soft-bottom silt-clay material
Diversity	Infauna diversity is relatively low ($H' < 2$) compared to other areas in Hong Kong due to the proximity of the prevailing estuarine conditions and possibly due to the predominantly silt-clay composition of the seabed that tends not to support high diversity (Mouchel, 2002b)
Rarity	Horseshoe crabs are rare in Hong Kong and adults have been recorded on this habitat. Horseshoe crabs were recorded within this habitat to the north of the Hong Kong International Airport
Re-creatability	Easily recreated as disturbed soft-bottom sediments are readily recolonized
Fragmentation	Highly connected to adjacent homogeneous habitat although fragmentation due to disturbance possible
Ecological linkage	Functionally linked to overlying water column
Potential value	Low
Nursery/ breeding ground	No species of conservation interest known to use soft-bottom sediments in the study area as a nursery or breeding ground
Age	The majority of deposits are considered to be derived locally although some likely transported by the Pearl River. Local seabed material is considered to be comprised of Holocene post-glacial sediments deposited over the past 12 000 years (Whiteside, 2000)
Abundance/ Richness of wildlife	Forty three species were recorded in the wet season (October 2003) and eighty six in the dry season (January 2004) together with some horseshoe crabs. Highest abundance recorded is similar to the eastern waters where 79 species of macroinvertebrate fauna were recorded in Tolo Harbour and Mirs Bay in 1986 (Shin, 1990)
Overall Ecological value	Low-moderate

Marine Hard-Substrate Intertidal and Subtidal

7.12.3 Natural shorelines over 500m are considered as important habitats in Hong Kong. The littoral communities present on the rocky shores in study area were comprised of common intertidal species that are found on similar habitat types elsewhere in Hong Kong (Morton and Morton, 1983; Williams, 2003). Biological diversity is not, therefore, considered to be high on the hard substrates present within the study area. The subtidal (dive) surveys revealed the presence of some hard corals although these were in poor condition and considered to be of low ecological value. An assessment of the hard-substrate intertidal and subtidal habitats in accordance with the criteria stated in Annex 8 of the TM is provided below in *Table 7.11*.

Table 7.11 Ecological Evaluation of Marine Hard Substrate Intertidal and Subtidal Habitat Within the Study Area

Criteria	Marine Hard Substrate Intertidal and Subtidal
Naturalness	Natural habitat
Size	Natural hard substrate intertidal habitats are mostly present in the eastern side of the study area as the shorelines in the west have been reclaimed. Natural hard substrate shoreline comparatively long (>500 m).
Diversity	Low
Rarity	No rare species recorded although some protected hard corals present subtidally at Sham Wat and East of Chek Lap Kok
Re-creatability	Readily re-creatable
Fragmentation	North Lantau shoreline highly fragmented due to reclamation although shores in the Western side of the study area relatively continuous
Ecological linkage	Connected to adjacent coastal habitats and subtidal to the overlying water column and soft-bottom seabed
Potential value	Moderate given the potential for colonisation of taxa such as corals
Nursery/ breeding ground	No species of conservation interest known to use hard-substrates in the study area as a nursery or breeding ground
Age	Natural hard shoreline largely composed of Jurassic granite and sandstone with siltstone
Abundance/ Richness of wildlife	Thirty-four littoral faunal species present. Number of individuals per unit area generally low (maximum density recorded 331 individuals m^{-2}) The only species of conservation interest present are subtidal isolated hard corals which are in poor condition
Overall Ecological value	Moderate-Low

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

Marine Soft-Substrate Intertidal Mudflat

7.12.4 Intertidal mudflats larger than one hectare and natural coastal shores longer than 500m are considered as important habitats in Hong Kong. The intertidal communities present on the soft shores in the study area were comprised of common species that are found on similar habitat types elsewhere in Hong Kong (Morton and Morton, 1983; Chan and Caley, 2003). Biological diversity is, therefore, considered to be moderate on the soft substrates present within the study area. However, adult horseshoe crabs also migrate to and utilise intertidal habitats to reproduce. The ecological value of intertidal mudflat habitats containing nursery grounds is, therefore, considered to be high. An assessment of the soft-substrate intertidal and subtidal habitats in accordance with the criteria stated in Annex 8 of the TM is provided below in *Table 7.12*.

Table 7.12 Ecological Evaluation of Marine Soft-Substrate Intertidal Mudflat Habitat Within the Study Area

Criteria	Marine Soft-Substrate Intertidal Mudflat
Naturalness	Natural habitat
Size	Natural soft substrate intertidal habitats are mostly present in the western side of the study area as the shorelines in the west have been reclaimed. Natural soft substrate shoreline comparatively long (>500 m).
Diversity	Low
Rarity	Horseshoe crabs are rare in Hong Kong. Two species of horseshoe crabs were recorded within this habitat
Re-creatability	Readily re-creatable provided that suitable hydrodynamic (depositional) regime present
Fragmentation	North Lantau shoreline highly fragmented due to reclamation although shores in the Western side of the study area relatively continuous
Ecological linkage	Connected to adjacent coastal and terrestrial habitats
Potential value	Moderate given the potential for colonisation of taxa such as horseshoe crabs
Nursery/ breeding ground	Potential nursery or breeding ground for horseshoe crabs
Age	Not known
Abundance/ Richness of wildlife	Twenty-two intertidal mudflat faunal species and two species of horseshoe crabs present. Number of individuals per unit area generally low (maximum density recorded 433 individuals m^{-2})
Overall Ecological value	Moderate

Notes: Abundance is defined as low =1 individual, medium =2-5, high = 6-20, very high = >20.

7.13 Overall Evaluation

7.13.1 The habitats present within the study area have been ranked according to their overall ecological value (*Table 7.13*). The intertidal mudflat (including the mangrove and seagrass habitat) is considered to be the most valuable habitat present. The streams and riparian habitats with high base flow were also ecologically valuable habitats, whereas developed areas, agricultural land and wasteland were of lowest ecological value.

Table 7.13 Summary of the Ecological Value of Habitats within the Study Area (ascending order of importance)

Habitat	Ecological Value
Mangrove and Seagrass	High
Streams and Riparian (high base flow)	High
Secondary woodland	High
Tall Shrubland	Moderate-High
Shrubland-Grassland Mosaic	Moderate
Marine Soft-Substrate Interidal Mudflat	Moderate
Plantation woodland	Moderate-Low
Stream and Riparian (low base flows)	Moderate-Low
Marine Hard Substrate Intertidal and Subtidal	Moderate-Low
Marine Soft-bottom Benthic	Moderate-Low
Developed Area	Low
Cultivated Field / Orchard	Low
Wasteland	Low

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Appendix A

Indicative Ecological Baseline Survey Programme

Agreement No MW 01/2003
Hong Kong- Zhuhai - Macao Bridge: Hong Kong Section and the North Lantau Highway Connection
Ecological Baseline Survey

ID	Task Name
1	Instruction to Proceed
2	
3	Issue Preliminary Survey Methodology to AFCD
4	AFCD comments
5	Respond to comments
6	
7	**HKS and NLHC Study Area Including Tung Chung Bay & Sham Wat Bay - Habitat Mapping/Vegetation Survey**
8	Habitat mapping, mangroves and seagrass - HKS/NLHC excluding Tung Chung/Sham Wat Bay
9	Habitat mapping, mangroves and seagrass - Tung Chung Bay & Sham Wat Bay only
10	Mangroves and Seagrass (2nd survey)
11	Mangroves and Seagrass (3rd Survey)
12	Mangroves and Seagrass (4th Survey) - extra 3 month survey period.
13	Mangroves and Seagrass (5th Survey) - extra 3 month survey period.
14	
15	**Long Term NLHC Study Area Including Tai Ho Wan - Habitat Mapping/Vegetation Survey**
16	Habitat mapping, mangroves and seagrass - Long Term NLHC excluding Tai Ho Wan
17	Habitat mapping, mangroves and seagrass - Tai Ho Wan only
18	Mangroves and Seagrass (2nd survey)
19	Mangroves and Seagrass (3rd Survey)
20	Mangroves and Seagrass (4th Survey) - extra 3 month survey period.
21	Mangroves and Seagrass (5th Survey) - extra 3 month survey period.
22	
23	**NLHC Inland San Shek Wan Tunnel Option Study Area - Habitat Mapping/Vegetation Survey**
24	
25	**HKS and NLHC Study Area Including Tung Chung Bay & Sham Wat Bay - Avifauna**
26	1st Avifauna Survey (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay
27	2nd Avifauna Survey (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay
28	3rd Avifauna Survey (Day) - Tung Chung Bay & Sham Wat Bay only
29	4th Avifauna Survey (Day)
30	5th Avifauna Survey (Day)
31	6th Avifauna Survey (Day)

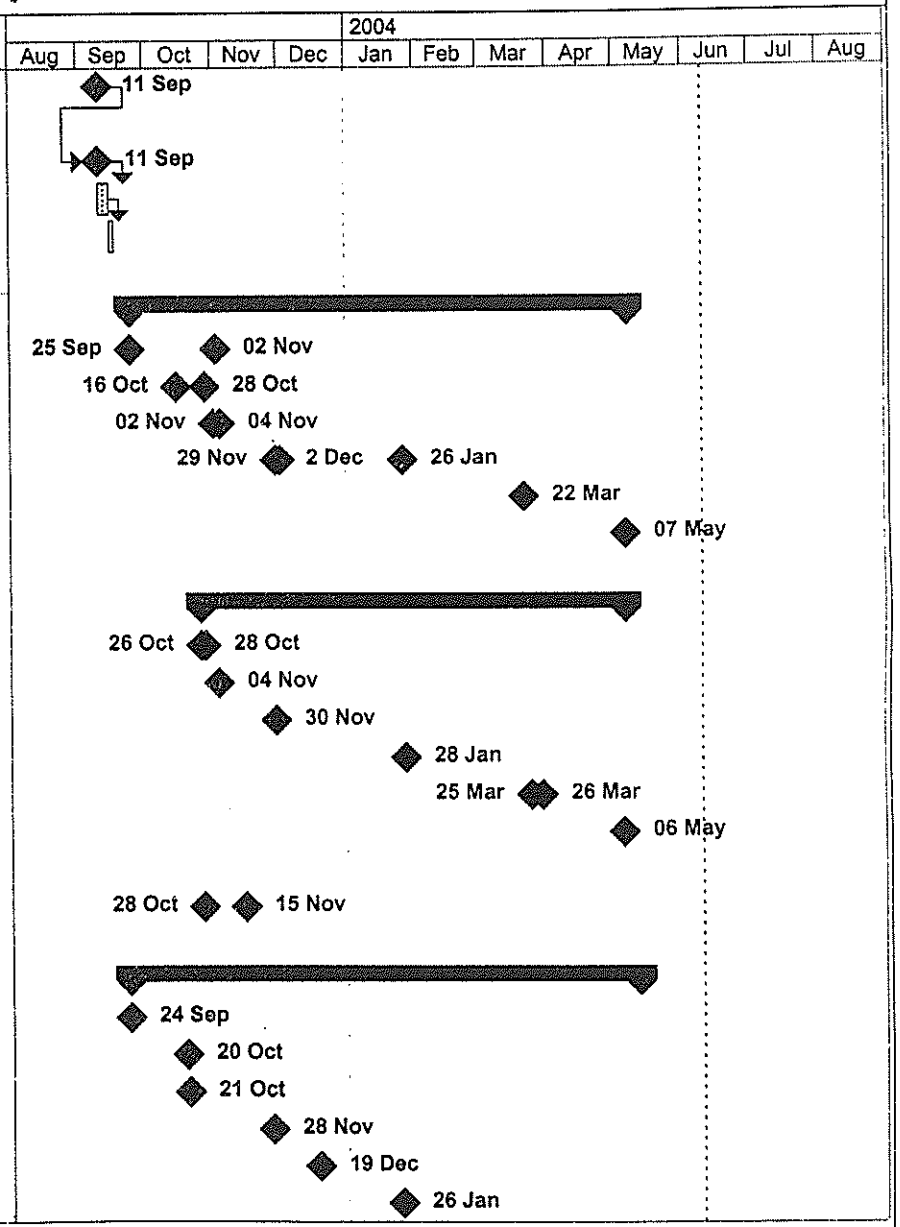

Figure 2: Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

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Hong Kong- Zhuhai - Macao Bridge: Hong Kong Section and the North Lantau Highway Connection
Ecological Baseline Survey

ID	Task Name	Gantt
32	7th Avifauna Survey (Day)	18 Feb
33	1st Additional Nighttime Survey	23 Oct
34	2nd Additional Nighttime Survey	17 Feb
35	8th Avifauna Survey (Day) - extra 3 month survey period.	17 Mar
36	9th Avifauna Survey (Day) - extra 3 month survey period.	15 Apr
37	10th Avifauna Survey (Day) - extra 3 month survey period.	12 May
38	3rd Additional Nighttime Survey - extra 3 month survey period.	19 Apr
39		
40	**Long Term NLHC Study Area Including Tai Ho Wan - Avifauna**	
41	1st Avifauna Survey (Day) - Long Term NLHC excluding Tai Ho Wan	30 Sep
42	2nd Avifauna Survey (Day) - Long Term NLHC excluding Tai Ho Wan	29 Oct
43	3rd Avifauna Survey (Day) - Tai Ho Wan only	24 Oct
44	4th Avifauna Survey (Day)	19 Nov
45	5th Avifauna Survey (Day)	22 Dec
46	6th Avifauna Survey (Day)	27 Jan
47	7th Avifauna Survey (Day)	23 Feb
48	1st Additional Nighttime Survey	28 Oct
49	2nd Additional Nighttime Survey - Tai Ho Wan only	05 Nov
50	3rd Additional Nighttime Survey	27 Nov
51	8th Avifauna Survey (Day) - extra 3 month survey period.	19 Feb
52	9th Avifauna Survey (Day) - extra 3 month survey period.	31 Mar
53	10th Avifauna Survey (Day) - extra 3 month survey period.	30 Apr
54	4th Additional Nighttime Survey - extra 3 month survey period.	11 May 27 Apr
55		
56	**NLHC Inland San Shek Wan Tunnel Option Study Area - Avifauna**	
57	Dry Season (Day/Night)	30 Oct 05 Nov
58	Wet Season (Day/Night)	27 May
59		
60	**HKS and NLHC Study Area Including Tung Chung Bay & Sham Wat Bay - Mammals**	
61	1st Wet Season (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	20 Sep
62	2nd Wet Season (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	25 Sep

Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

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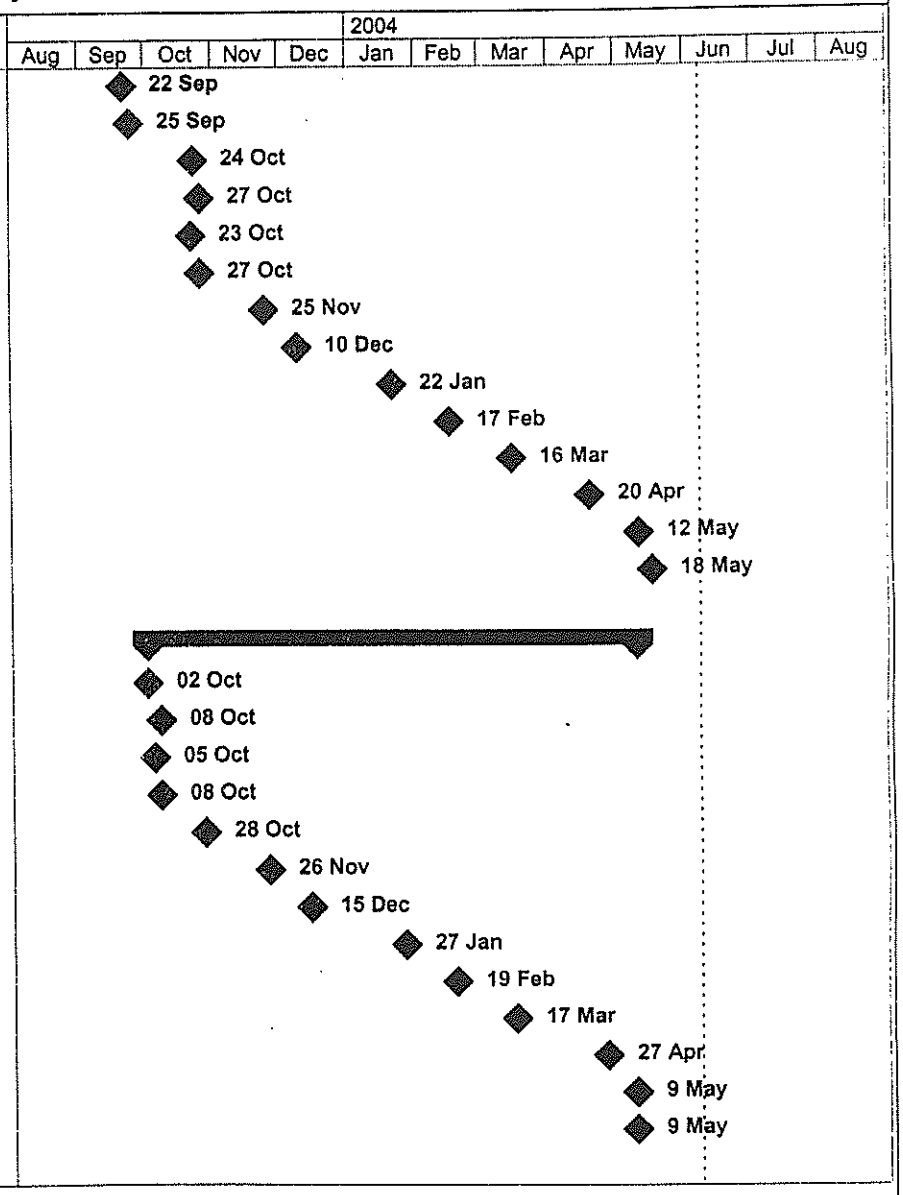
Ecological Baseline Survey

ID	Task Name	
63	3rd Wet Season (Night) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	22 Sep
64	4th Wet Season (Night) -HKS/NLHC excluding Tung Chung/Sham Wat Bay	25 Sep
65	5th Wet Season Survey (Day) - Tung Chung Bay & Sham Wat Bay only	24 Oct
66	6th Wet Season Survey (Day) - Tung Chung Bay & Sham Wat Bay only	27 Oct
67	7th Wet Season Survey (Night) - Tung Chung Bay & Sham Wat Bay only	23 Oct
68	8th Wet Season Survey (Night) - Tung Chung Bay & Sham Wat Bay only	27 Oct
69	1st Dry Season (Day)	25 Nov
70	2nd Dry Season (Night)	10 Dec
71	3rd Dry Season (Day)	22 Jan
72	4th Dry Season (Night)	17 Feb
73	5th Dry Season (Day) - extra 3 month survey period.	16 Mar
74	6th Dry Season (Night) - extra 3 month survey period.	20 Apr
75	9th Wet Season (Day) - extra 3 month survey period.	12 May
76	10th Wet Season (Night) - extra 3 month survey period.	18 May
77		
78	**Long Term NLHC Study Area Including Tai Ho Wan - Mammals**	
79	1st Wet Season (Day) - Long Term NLHC excluding Tai Ho Wan	02 Oct
80	2nd Wet Season (Day) - Long Term NLHC excluding Tai Ho Wan	08 Oct
81	3rd Wet Season (Night) - Long Term NLHC excluding Tai Ho Wan	05 Oct
82	4th Wet Season (Night) - Long Term NLHC excluding Tai Ho Wan	08 Oct
83	5th Wet Season Survey (Day) - Tai Ho Wan only	28 Oct
84	1st Dry Season (Day)	26 Nov
85	2nd Dry Season (Night)	15 Dec
86	3rd Dry Season (Day)	27 Jan
87	4th Dry Season (Night)	19 Feb
88	5th Dry Season (Day) - extra 3 month survey period.	17 Mar
89	6th Dry Season (Night) - extra 3 month survey period.	27 Apr
90	6th Wet Season (Day) - extra 3 month survey period.	9 May
91	7th Wet Season (Night) - extra 3 month survey period.	9 May
92		



Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

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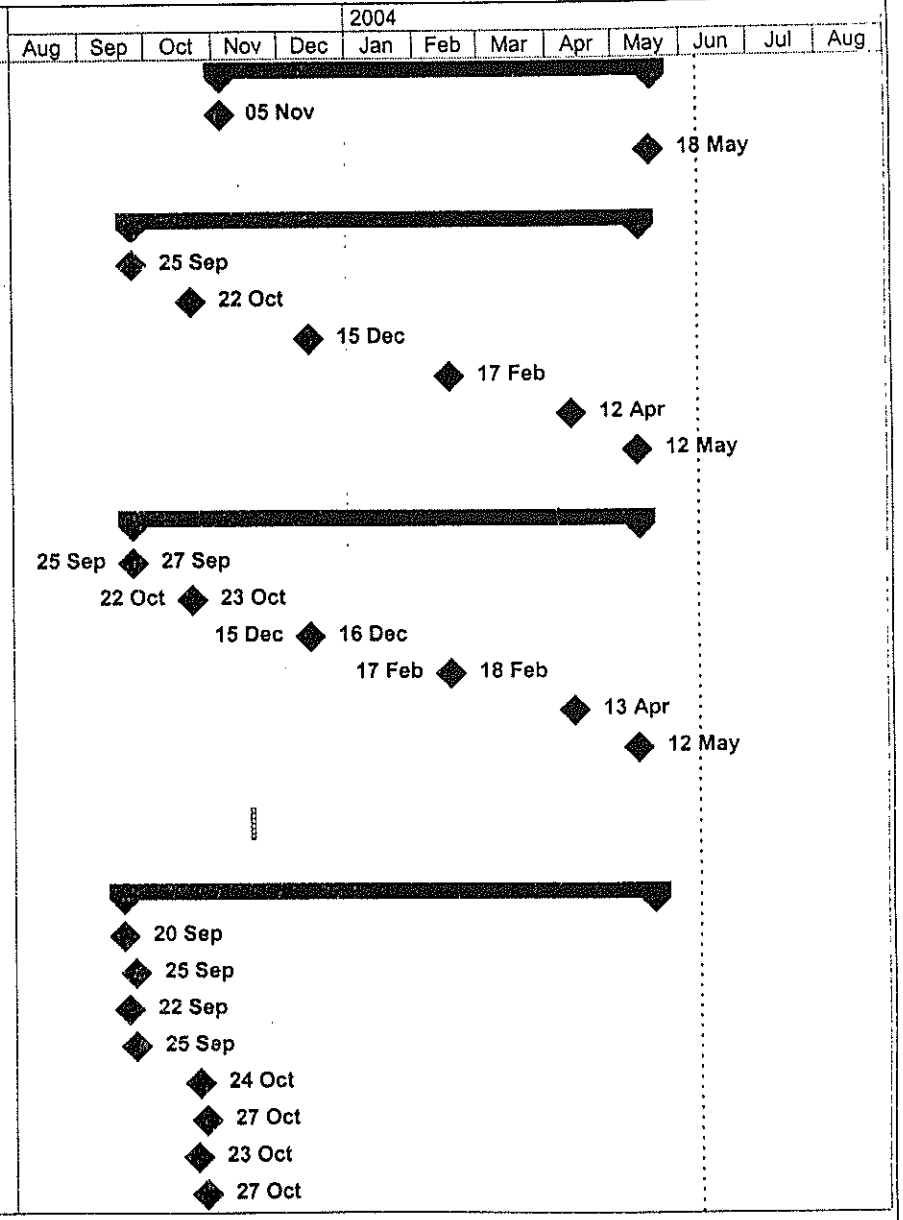
Hong Kong- Zhuhai - Macao Bridge: Hong Kong Section and the North Lantau Highway Connection
Ecological Baseline Survey

ID	Task Name
93	**NLHC Inland San Shek Wan Tunnel Option Study Area - Mammals**
94	Dry Season (Day/Night)
95	Wet Season (Day/Night)
96	
97	**HKS and NLHC Study Area Including Tung Chung Bay & Sham Wat Bay - Freshwater Fish**
98	1st Wet Season Survey - HKS/NLHC excluding Tung Chung/Sham Wat Bay
99	2nd Wet Season Survey - Tung Chung Bay and Sham Wat Bay only
100	1st Dry Season Survey
101	2nd Dry Season Survey
102	3rd Dry Season Survey - extra 3 month survey period.
103	3rd Wet Season survey - extra 3 month survey period.
104	
105	**Long Term NLHC Study Area Including Tai Ho Wan - Freshwater Fish**
106	1st Wet Season Survey - Long Term NLHC excluding Tai Ho Wan
107	2nd Wet Season Survey - Tai Ho Wan only
108	1st Dry Season Survey
109	2nd Dry Season Survey
110	3rd Dry Season Survey - extra 3 month survey period.
111	3rd Wet Season survey - extra 3 month survey period.
112	
113	**NLHC Inland San Shek Wan Tunnel Option Study Area - Freshwater Fish**
114	
115	**HKS and NLHC Study Area Including Tung Chung Bay & Sham Wat Bay - Herpetofauna**
116	1st Wet Season (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay
117	2nd Wet Season (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay
118	3rd Wet Season (Night) - HKS/NLHC excluding Tung Chung/Sham Wat Bay
119	4th Wet Season (Night) - HKS/NLHC excluding Tung Chung/Sham Wat Bay
120	5th Wet Season Survey (Day) - Tung Chung Bay & Sham Wat Bay only
121	6th Wet Season Survey (Day) - Tung Chung Bay & Sham Wat Bay only
122	7th Wet Season Survey (Night) - Tung Chung Bay & Sham Wat Bay only
123	8th Wet Season Survey (Night) - Tung Chung Bay & Sham Wat Bay only



Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

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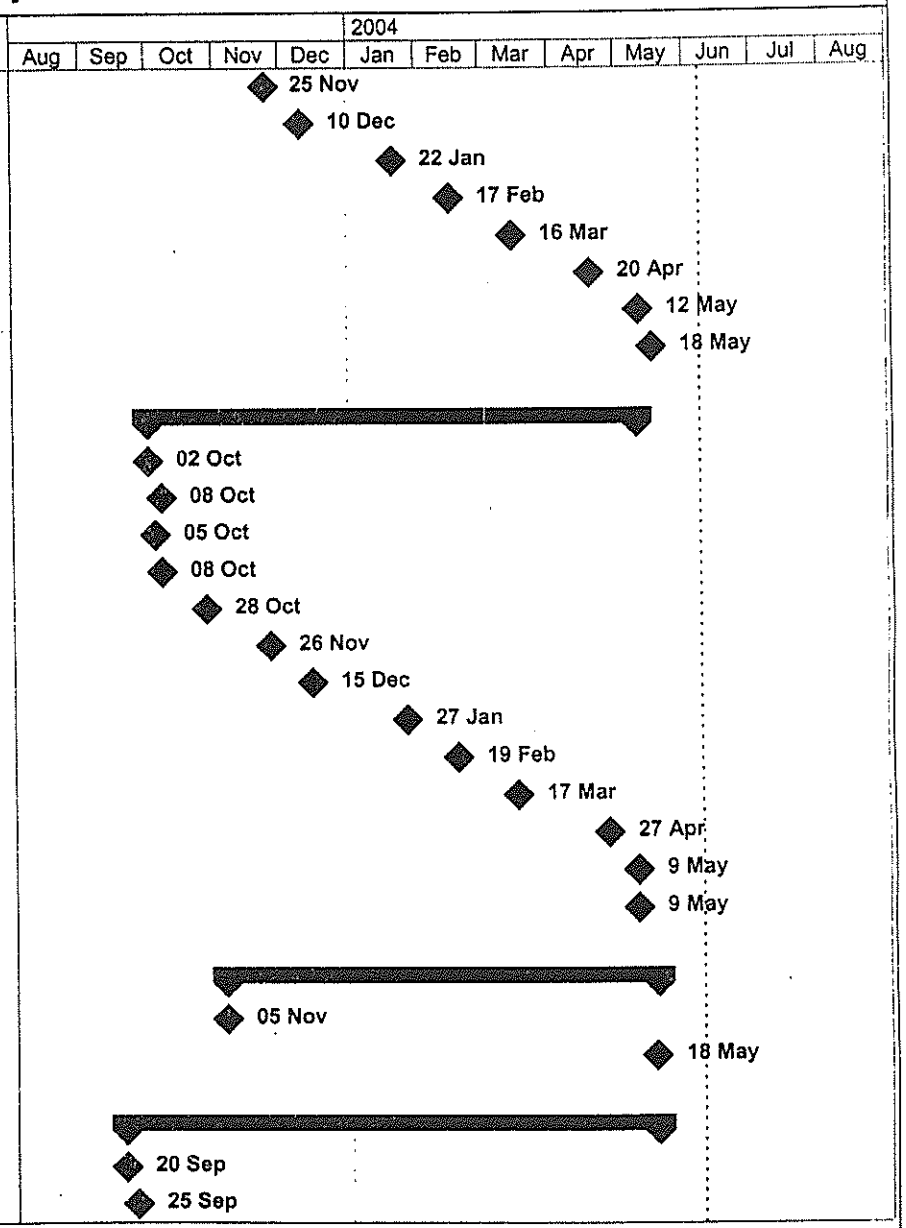
Ecological Baseline Survey



ID	Task Name	
124	1st Dry Season (Day)	25 Nov
125	2nd Dry Season (Night)	10 Dec
126	3rd Dry Season (Day)	22 Jan
127	4th Dry Season (Night)	17 Feb
128	5th Dry Season (Day) - extra 3 month survey period.	16 Mar
129	6th Dry Season (Night) - extra 3 month survey period.	20 Apr
130	9th Wet Season (Day) - extra 3 month survey period.	12 May
131	10th Wet Season (Night) - extra 3 month survey period.	18 May
132		
133	**Long Term NLHC Study Area including Tai Ho Wan - Herpetofauna**	
134	1st Wet Season (Day) - Long Term NLHC excluding Tai Ho Wan	02 Oct
135	2nd Wet Season (Day) - Long Term NLHC excluding Tai Ho Wan	08 Oct
136	3rd Wet Season (Night) - Long Term NLHC excluding Tai Ho Wan	05 Oct
137	4th Wet Season (Night) - Long Term NLHC excluding Tai Ho Wan	08 Oct
138	5th Wet Season Survey (Day) - Tai Ho Wan only	28 Oct
139	1st Dry Season (Day)	26 Nov
140	2nd Dry Season (Night)	15 Dec
141	3rd Dry Season (Day)	27 Jan
142	4th Dry Season (Night)	19 Feb
143	5th Dry Season (Day) - extra 3 month survey period.	17 Mar
144	6th Dry Season (Night) - extra 3 month survey period.	27 Apr
145	6th Wet Season (Day) - extra 3 month survey period.	9 May
146	7th Wet Season (Night) - extra 3 month survey period.	9 May
147		
148	**NLHC Inland San Shek Wan Tunnel Option Study Area - Herpetofauna**	
149	Dry Season (Day/Night)	05 Nov
150	Wet Season (Day/Night)	18 May
151		
152	**HKS and NLHC Study Area including Tung Chung Bay & Sham Wat Bay - Insects**	
153	1st Wet Season (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	20 Sep
154	2nd Wet Season (Day) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	25 Sep

Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

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Ecological Baseline Survey

ID	Task Name	
155	3rd Wet Season (Night) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	20 Sep
156	4th Wet Season (Night) - HKS/NLHC excluding Tung Chung/Sham Wat Bay	25 Sep
157	5th Wet Season Survey (Day) - Tung Chung Bay & Sham Wat Bay only	24 Oct
158	6th Wet Season Survey (Day) - Tung Chung Bay & Sham Wat Bay only	27 Oct
159	7th Wet Season Survey (Night) - Tung Chung Bay & Sham Wat Bay only	23 Oct
160	8th Wet Season Survey (Night) - Tung Chung Bay & Sham Wat Bay only	27 Oct
161	1st Dry Season (Day)	25 Nov
162	2nd Dry Season (Night)	10 Dec
163	3rd Dry Season (Day)	22 Jan
164	4th Dry Season (Night)	17 Feb
165	5th Dry Season (Day) - extra 3 month survey period.)	16 Mar
166	6th Dry Season (Night) - extra 3 month survey period.	20 Apr
167	9th Wet Season (Day) - extra 3 month survey period.	12 May
168	10th Wet Season (Night) - extra 3 month survey period.	18 May
169		
170	**Long Term NLHC Study Area Including Tai Ho Wan - Insects**	
171	1st Wet Season (Day) - Long Term NLHC excluding Tai Ho Wan	20 Sep
172	2nd Wet Season (Day) - Long Term NLHC excluding Tai Ho Wan	25 Sep
173	3rd Wet Season (Night) - Long Term NLHC excluding Tai Ho Wan	02 Oct
174	4th Wet Season (Night) - Long Term NLHC excluding Tai Ho Wan	08 Oct
175	5th Wet Season Survey (Day) - Tai Ho Wan only	28 Oct
176	1st Dry Season (Day)	26 Nov
177	2nd Dry Season (Night)	15 Dec
178	3rd Dry Season (Day)	27 Jan
179	4th Dry Season (Night)	19 Feb
180	5th Dry Season (Day) - extra 3 month survey period.	17 Mar
181	6th Dry Season (Night) - extra 3 month survey period.	27 Apr
182	6th Wet Season (Day) - extra 3 month survey period.	9 May
183	7th Wet Season (Night) - extra 3 month survey period.	9 May
184		

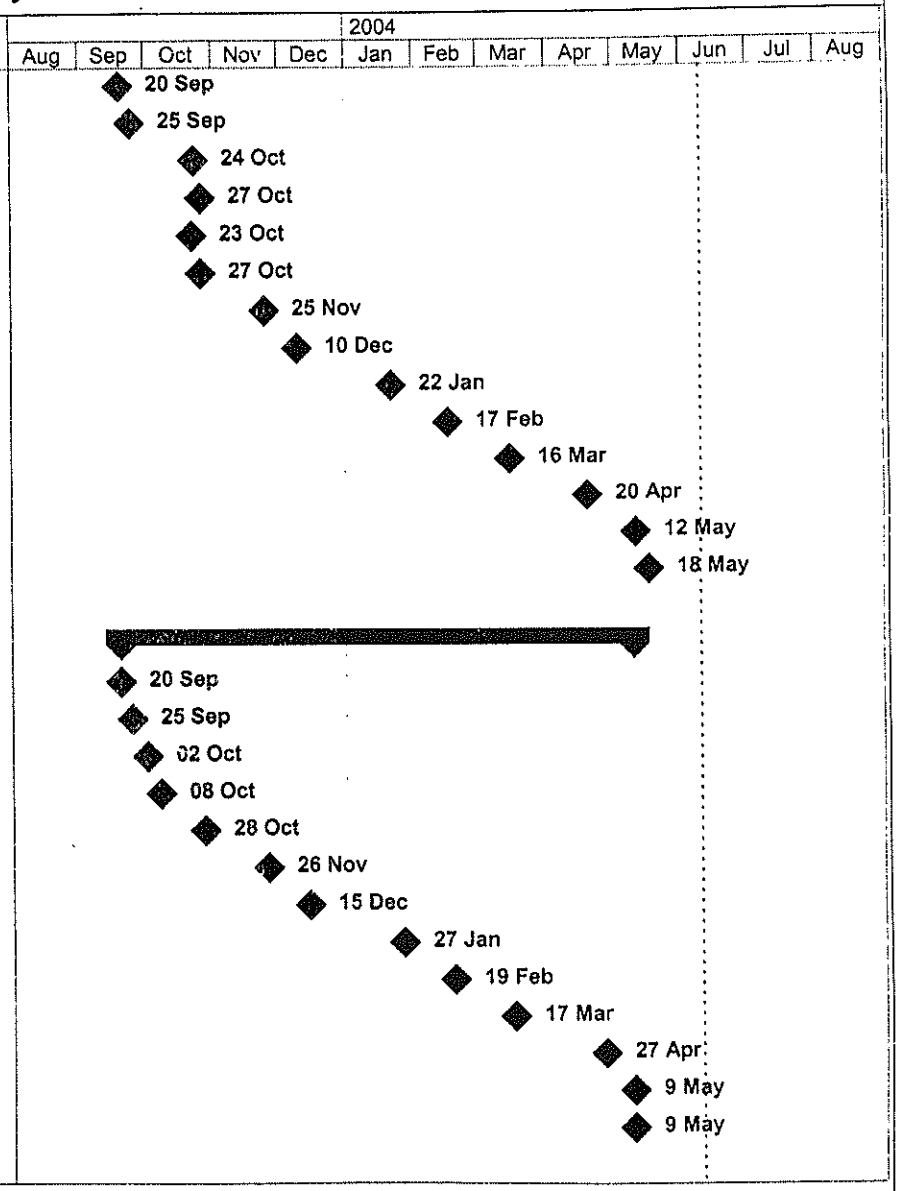
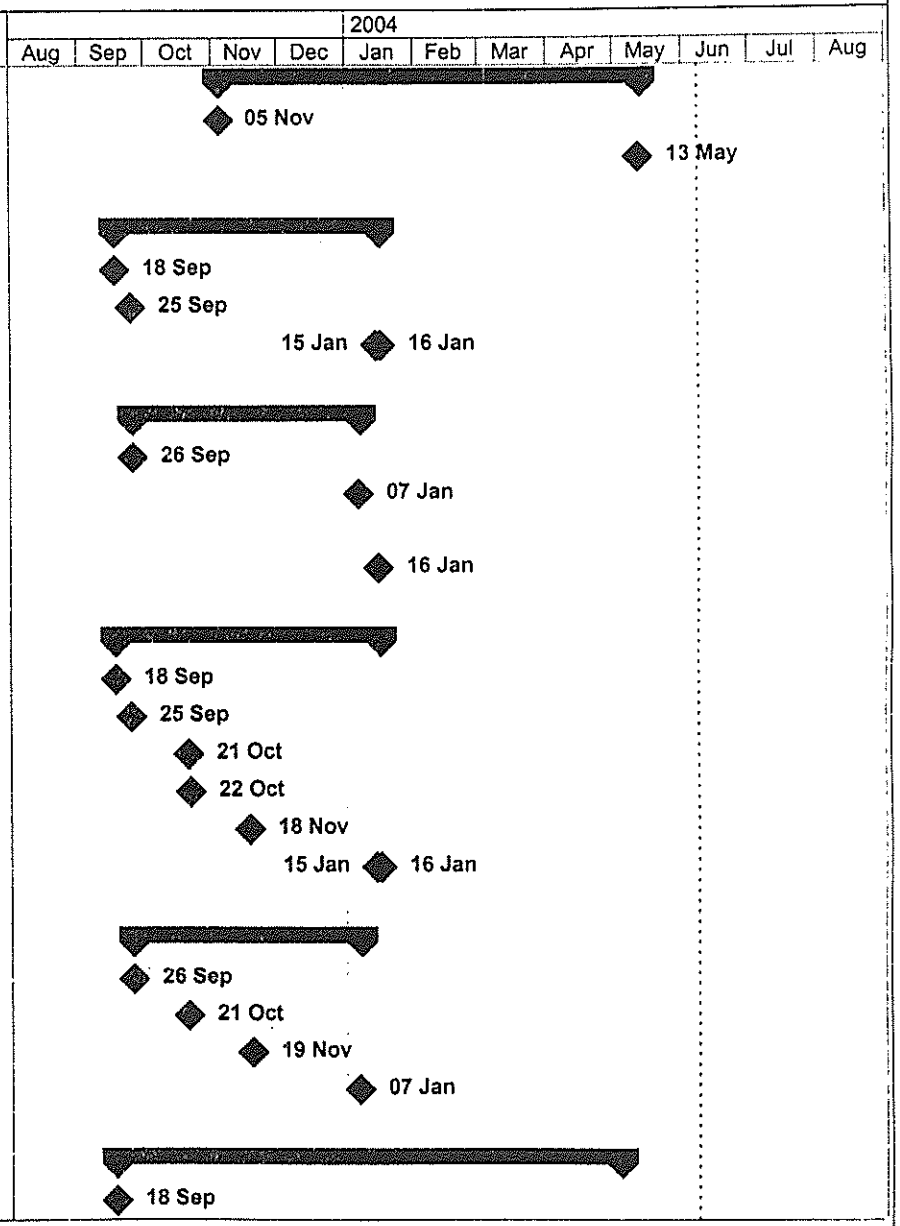


Figure 2: Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

Agreement No MW 01/2003
Hong Kong- Zhuhai - Macao Bridge: Hong Kong Section and the North Lantau Highway Connection
Ecological Baseline Survey



ID	Task Name
185	**NLHC Inland San Shek Wan Tunnel Option Study Area - Insects**
186	Dry Season (Day/Night)
187	Wet Season (Day/Night)
188	
189	**HKS and NLHC Study Area including Tung Chung Bay & Sham Wat Bay - Stream and Intertidal Macroinvertebrates**
190	1st Wet Season Survey
191	2nd Wet Season Survey
192	Dry Season Survey
193	
194	**Long Term NLHC Study Area including Tai Ho Wan - Stream and Intertidal Macroinvertebrates**
195	Wet Season Survey
196	Dry Season Survey
197	
198	**NLHC Inland San Shek Wan Tunnel Option Study Area - Stream Macroinvertebrates**
199	
200	**HKS and NLHC Study Area including Tung Chung Bay & Sham Wat Bay - Intertidal Surveys**
201	1st Wet Season Survey - HKS/NLHC excluding Tung Chung/Sham Wat Bay
202	2nd Wet Season Survey - HKS/NLHC excluding Tung Chung/Sham Wat Bay
203	3rd Wet Season Survey - Tung Chung Bay and Sham Wat Bay only
204	4th Wet Season Survey - Tung Chung Bay and Sham Wat Bay only
205	1st Dry Season Survey - Original Study Area, Tung Chung Bay, Sham Wat Bay
206	2nd Dry Season Survey - Original Study Area, Tung Chung Bay, Sham Wat Bay
207	
208	**Long Term NLHC Study Area including Tai Ho Wan - Intertidal Surveys**
209	1st Wet Season Survey - Long Term NLHC excluding Tai Ho Wan
210	2nd Wet Season Survey - Tai Ho Wan only
211	1st Dry Season Survey
212	2nd Dry Season Survey
213	
214	**HKS and NLHC Study Area including Tung Chung Bay & Sham Wat Bay - Horseshoe Crabs**
215	1st Wet Season Survey - HKS/NLHC excluding Tung Chung/Sham Wat Bay

Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

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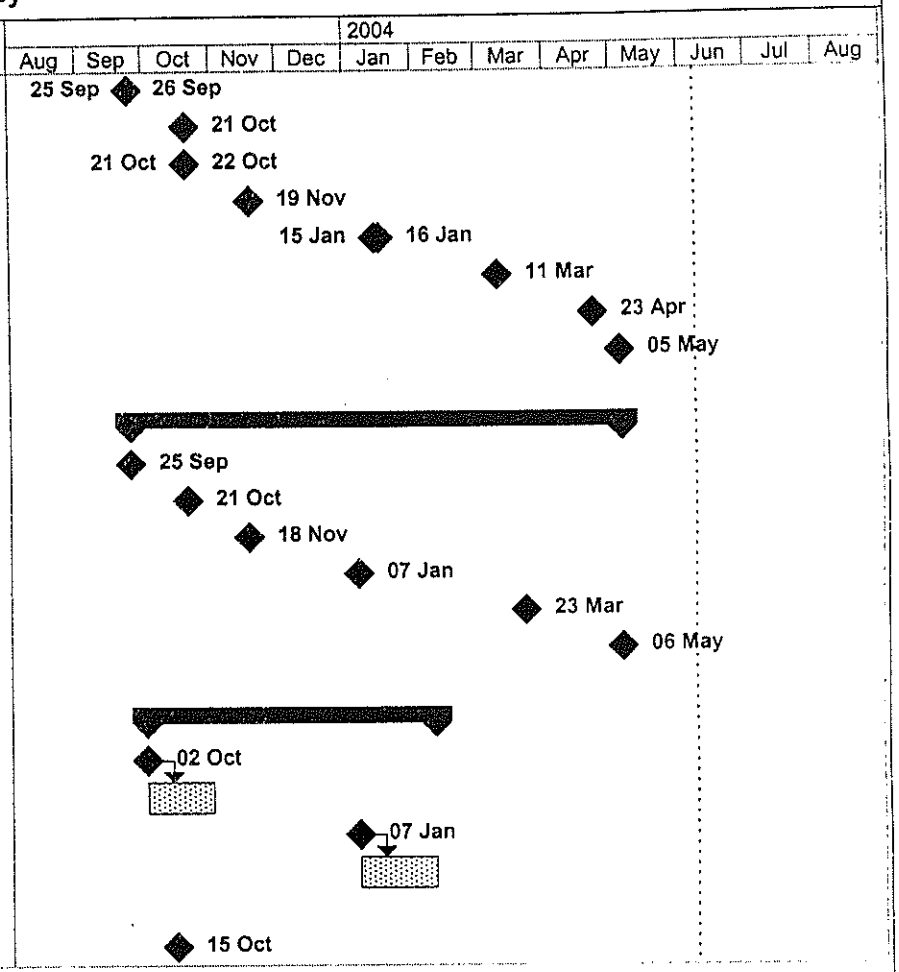
Hong Kong- Zhuhai - Macao Bridge: Hong Kong Section and the North Lantau Highway Connection
Ecological Baseline Survey

ID	Task Name
216	2nd Wet Season Survey - HKS/NLHC excluding Tung Chung/Sham Wat Bay
217	3rd Wet Season Survey - HKS/NLHC including Tung Chung Bay
218	4th Wet Season Survey - Tung Chung Bay and Sham Wat Bay only
219	1st Dry Season Survey
220	2nd Dry Season Survey
221	3rd Dry Season Survey - extra 3 month survey period.
222	5th Wet Season Survey - extra 3 month survey period. (Sham Wat Bay Only)
223	6th Wet Season Survey - extra 3 month survey period. (Tung Chung Bay Only)
224	
225	**Long Term NLHC Study Area including Tai Ho Wan - Horseshoe Crabs**
226	1st Wet Season Survey - Long Term NLHC excluding Tai Ho Wan
227	2nd Wet Season Survey - Tai Ho Wan only
228	1st Dry Season Survey
229	2nd Dry Season Survey
230	3rd Dry Season Survey - extra 3 month survey period.
231	2nd Wet Season Survey - extra 3 month survey period.
232	
233	**HKS, NLHC & Long Term NLHC Study Areas - Benthic Survey**
234	Wet Season Survey
235	Sample Analysis
236	Dry Season Survey
237	Sample Analysis
238	
239	**HKS, NLHC & Long Term NLHC Study Areas - Coral Survey**



Indicative Ecological Survey Programme - 6 Month Surveys plus Further 3 Month Surveys

Appendix B

List of Recorded Freshwater and Estuarine Fish Species

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Freshwater Fish

Date of survey: 25 and 27 September 2003

Fish Species \ Location			Sham Wat							San Shek Wan								Sha Lo Wan									Hau Hok Wan							San Tau									Tung Chung								North Lantau Highway							Pak Mong				Tai Ho							
No.	Species Name	Frequency	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SS1	SS2	SS3	SS4	SS5	SS6	SS9	SS10	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10	HH1	HH2	HH3	HH5	HH6	HH7	ST1	ST4	ST5	ST6	ST7	ST8	ST9	ST12	ST13	ST14	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	NLH1	NLH2	NLH3	NLH4	NLH5	NLH6	NLH7	NLH8	PM1	PM3	PM4	PM6	PM7	TH1	TH3	TH4	TH5	TH6	TH7	TH8	TH9
1	*Anguilla japonica* (Temminck & Schlegel, 1846)	2	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
2	*Anguilla marmorata* (Quoy & Gaimard, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
3	*Pisodonophis boro* (Hamilton, 1822)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
4	*Pisodonophis cancrivorus* (Richardson, 1848)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
5	*Liniparhomaloptera disparis disparis* (Lin, 1934)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w				+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
6	*Pseudogastromyzon myersi* (Herre, 1932)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w				+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
7	*Oreonectes platycephalus* (Günther, 1868)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
8	*Misgurnus anguillicaudatus* (Cantor, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
9	*Schistura fasciolata* (Nichols & Pope, 1927)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w				+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
10	*Parazacco spilurus* (Günther, 1868)	5		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w				+	+	+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
11	*Nicholsicypris normalis* (Nichols & Pope, 1927)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
12	*Capoeta semifasciolata* (Günther, 1868)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
13	*Acrossocheilus beijiangensis* (Wu & Lin, 1977)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
14	*Cirrhinus molitorella* (Valenciennes, 1844)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
15	*Silurus cochinchinensis* (Valenciennes, 1840)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
16	*Clarias fuscus* (Lacepède, 1803)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
17	*Plotosus anguillaris* (Bloch, 1794)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
18	*Gambusia affinis affinis* (Baird & Girard, 1853)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
19	*Xiphophorus hellerii* (Heckel, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
20	*Xiphophorus variatus* (Meek, 1904)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
21	*Onzias curvirostus* (Nichols & Pope, 1927)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
22	*Tylosurus strongylurus* (van Hasselt, 1823)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
23	*Rhynchorhamphus georgii* (Valenciennes, 1847)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
24	*Monopterus albus* (Zuiew, 1793)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
25	*Mugil cephalus* (Linnaeus, 1758)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
26	*Chelon subviridis* (Valenciennes, 1836)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
27	*Ambassys gymnocephalus* (Lacepède, 1802)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
28	*Lates calcarifer* (Bloch, 1790)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
29	*Lateolabrax japonicus* (Temminck & Schlegel, 1843)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
30	*Sillago japonica* (Temminck & Schlegel, 1843)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
31	*Sillago shihama* (Forsskål, 1775)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
32	*Gerres poeti* (Cuvier, 1829)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
33	*Gerres filamentosus* (Cuvier, 1829)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
34	*Lutjanus argentimaculatus* (Forsskål, 1775)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
35	*Lutjanus russellii* (Bleeker, 1849)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
36	*Acanthopagrus berda* (Forsskål, 1775)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
37	*Acanthopagrus latus* (Houttuyn, 1782)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
38	*Terapon jarbua* (Forsskål, 1775)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
39	*Scatophagus argus* (Linnaeus, 1766)	3	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
40	*Oreochromis mossambicus* (Peters, 1852)	3		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
41	*Butis butis* (Hamilton, 1822)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
42	*Butis koilomatodon* (Bleeker, 1849)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
43	*Eleotris oxycephala* (Temminck & Schlegel, 1845)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
44	*Eleotris acantopoma acanthopoma* (Bleeker, 1853)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
45	*Eleotris melanosoma* (Bleeker, 1852)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
46	*Luciogobius guttatus* (Gill, 1859)	2	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
47	*Tridentiger bifasciatus* (Steindachner, 1881)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
48	*Tridentiger trigonocephalus* (Gill, 1859)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
49	*Mugilogobius abei* (Jordan & Snyder, 1901)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
50	*Mugilogobius chulae* (Smith, 1932)	3	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
51	*Mugilogobius obliquifasciatus* (Wu & Ni, 1985)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+	+		n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
52	*Pseudogobius javanicus* (Bleeker, 1856)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
53	*Bathygobius meggetti* (Hora & Mukerji, 1936)	4	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
54	*Rhinogobius duospilus* (Herre, 1935)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
55	*Rhinogobius giurinus* (Rutter, 1897)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
56	*Acentrogobius caninus* (Valenciennes, 1837)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
57	*Acentrogobius viridipunctatus* (Valenciennes, 1837)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
58	*Glossogobius giuris* (Hamilton, 1822)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
59	*Glossogobius olivaceus* (Temminck & Schlegel, 1845)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
60	*Siganus fuscescens* (Houttuyn, 1782)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
61	*Macropodus opercularis* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
62	*Channa asiatica* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
63	*Paralichthys olivaceus* (Temminck & Schlegel, 1846)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
64	*Takifugu obscurus* (Abe, 1949)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
65	*Takifugu ocellatus* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w
66	*Takifugu niphobles* (Jordan & Snyder, 1901)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w											n/w	n/w	n/w			n/w	n/w		n/w	n/w	n/w	n/w

n/w no permanent water

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Freshwater Fish

Date of survey: 22 and 23 October 2003

Fish Species / Location			Sham Wat							San Shek Wan								Sha Lo Wan									
No.	Species Name	Frequency	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SS1	SS2	SS3	SS4	SS5	SS6	SS9	SS10	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10
1	*Anguilla japonica* (Temminck & Schlegel, 1846)	6	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
2	*Anguilla marmorata* (Quoy & Gaimard, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
3	*Pisodonophis boro* (Hamilton, 1822)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
4	*Pisodonophis cancrivorus* (Richardson, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
5	*Liniparhomaloptera disparis disparis* (Lin, 1934)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
6	*Pseudogastromyzon myersi* (Herre, 1932)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
7	*Oreonectes platycephalus* (Günther, 1868)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
8	*Misgurnus anguillicaudatus* (Cantor, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
9	*Schistura fasciolata* (Nichols & Pope, 1927)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
10	*Parazacco spilurus* (Günther, 1868)	6		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
11	*Nicholsicypris normalis* (Nichols & Pope, 1927)	1	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
12	*Capoeta semifasciolata* (Günther, 1868)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
13	*Acrossocheilus beijiangensis* (Wu & Lin, 1977)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
14	*Cirrhinus molitorella* (Valenciennes, 1844)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
15	*Silurus cochinchinensis* (Valenciennes, 1840)	4	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
16	*Clarias fuscus* (Lacepède, 1803)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
17	*Plotosus anguillaris* (Bloch, 1794)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
18	*Gambusia affinis affinis* (Baird & Girard, 1853)	5		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
19	*Xiphophorus hellerii* (Heckel, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
20	*Xiphophorus variatus* (Meek, 1904)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
21	*Orizias curvinotus* (Nichols & Pope, 1927)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
22	*Tylosurus strongylurus* (van Hasselt, 1823)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
23	*Rhynchorhamphus georgii* (Valenciennes, 1847)	3		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
24	*Momopterus albus* (Zuiew, 1793)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
25	*Mugil cephalus* (Linneaus, 1758)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
26	*Chelon subviridis* (Valenciennes, 1836)	5		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
27	*Ambassys gymnocephalus* (Lacepède, 1802)	5	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
28	*Lates calcarifer* (Bloch, 1790)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
29	*Lateolabrax japonicus* (Temminck & Schlegel, 1843)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
30	*Sillago japonica* (Temminck & Schlegel, 1843)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
31	*Sillago shihama* (Forsskål, 1775)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
32	*Gerres poeti* (Cuvier, 1829)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
33	*Gerres filamentosus* (Cuvier, 1829)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
34	*Lutjanus argentimaculatus* (Forsskål, 1775)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
35	*Lutjanus russellii* (Bleeker, 1849)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
36	*Acanthopagrus berda* (Forsskål, 1775)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
37	*Acanthopagrus latus* (Houttuyn, 1782)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
38	*Terapon jarbua* (Forsskål, 1775)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
39	*Scatophagus argus* (Linnaeus, 1766)	2	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
40	*Oreochromis mossambicus* (Peters, 1852)	5		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
41	*Butis butis* (Hamilton, 1822)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
42	*Butis koilomatodon* (Bleeker, 1849)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
43	*Eleotris oxycephala* (Temminck & Schlegel, 1845)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
44	*Eleotris acantopoma acanthopoma* (Bleeker, 1853)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
45	*Eleotris melanosoma* (Bleeker, 1852)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
46	*Luciogobius guttatus* (Gill, 1859)	7	+	n/w	n/w	n/w	n/w	n/w		+				n/w	+	n/w	n/w			+					n/w		
47	*Tridentiger bifasciatus* (Steindachner, 1881)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
48	*Tridentiger trigonocephalus* (Gill, 1859)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
49	*Mugilogobius abei* (Jordan & Snyder, 1901)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w	+	n/w	n/w			+					n/w		
50	*Mugilogobius chulae* (Smith, 1932)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
51	*Mugilogobius obliquifasciatus* (Wu & Ni, 1985)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
52	*Pseudogobius javanicus* (Bleeker, 1856)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
53	*Bathygobius meggetti* (Hora & Mukerji, 1936)	12	+	n/w	n/w	n/w	n/w	n/w	+	+		+	+	n/w	+	n/w	n/w			+					n/w		
54	*Rhinogobius duospilus* (Herre, 1935)	9		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
55	*Rhinogobius giurinus* (Rutter, 1897)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
56	*Acentrogobius caninus* (Valenciennes, 1837)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
57	*Acentrogobius viridipunctatus* (Valenciennes, 1837)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
58	*Glossogobius giuris* (Hamilton, 1822)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
59	*Glossogobius olivaceus* (Temminck & Schlegel, 1845)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
60	*Siganus fuscescens* (Houttuyn, 1782)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
61	*Macropodus opercularis* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
62	*Channa asiatica* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
63	*Paralichthys olivaceus* (Temminck & Schlegel, 1846)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
64	*Takifugu obscurus* (Abe, 1949)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
65	*Takifugu ocellatus* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
66	*Takifugu niphobles* (Jordan & Snyder, 1901)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		

	Hau Hok Wan						San Tau														Tung Chung								
No.	HH1	HH2	HH3	HH5	HH6	HH7	ST1	ST4	ST5	ST6	ST7	ST8	ST9	ST12	ST13	ST14	ST16	ST18	ST19	ST20	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9
1	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
2	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
3	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
4	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
5	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
6	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
7	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
8	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
9	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
10	n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
11	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
12	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
13	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
14	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
15	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
16	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
17	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
18	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+	+	+	n/w	n/w	n/w	n/w	n/w	n/w
19	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
20	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
21	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
22	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
23	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
24	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
25	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
26	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
27	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
28	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
29	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
30	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
31	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
32	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
33	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
34	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
35	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
36	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
37	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
38	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
39	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
40	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w					+	+	+	n/w	n/w	n/w	n/w	n/w	n/w
41	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
42	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
43	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
44	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
45	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
46	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
47	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
48	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
49	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
50	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
51	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
52	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
53	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
54	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
55	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
56	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
57	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
58	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w					+			n/w	n/w	n/w	n/w	n/w	n/w
59	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
60	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
61	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
62	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
63	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
64	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
65	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w
66	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w								n/w	n/w	n/w	n/w	n/w	n/w

	North Lantau Highway								Pak Mong					Tai Ho							
No.	NLH1	NLH2	NLH3	NLH4	NLH5	NLH6	NLH7	NLH8	PM1	PM3	PM4	PM6	PM7	TH1	TH3	TH4	TH5	TH6	TH7	TH8	TH9
1	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
2	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
3	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
4	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
5	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
6	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
7	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
8	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
9	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
10	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
11	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
12	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
13	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
14	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
15	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
16	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
17	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
18	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
19	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
20	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
21	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
22	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
23	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
24	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
25	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
26	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
27	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
28	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
29	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
30	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
31	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
32	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
33	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
34	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
35	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
36	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
37	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
38	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
39	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
40	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
41	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
42	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
43	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
44	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
45	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
46	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
47	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
48	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
49	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
50	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
51	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
52	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
53	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
54	n/w	n/w	n/w	+	+	+	+	+	+		n/w	n/w	n/w	+	n/w	n/w	+	n/w	n/w	n/w	n/w
55	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
56	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
57	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
58	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
59	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
60	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
61	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
62	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
63	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
64	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
65	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
66	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w

n/w no permanent water

Freshwater Fish

Date of survey: 15 and 16 December 2003

Fish Species / Location			Sham Wat							San Shek Wan								Sha Lo Wan									
No.	Species Name	Frequency	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SS1	SS2	SS3	SS4	SS5	SS6	SS9	SS10	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10
1	*Anguilla japonica* (Temminck & Schlegel, 1846)	7	+	n/w	n/w	n/w	n/w	n/w					+	n/w		n/w	n/w			+					n/w		
2	*Anguilla marmorata* (Quoy & Gaimard, 1842)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
3	*Pisodonophis boro* (Hamilton, 1822)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
4	*Pisodonophis cancrivorus* (Richardson, 1848)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
5	*Liniparhomaloptera disparis disparis* (Lin, 1934)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
6	*Pseudogastromyzon myersi* (Herre, 1932)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
7	*Oreonectes platycephalus* (Günther, 1868)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
8	*Misgurnus anguillicaudatus* (Cantor, 1842)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
9	*Schistura fasciolata* (Nichols & Pope, 1927)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
10	*Parazacco spilurus* (Günther, 1868)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
11	*Nicholsicypris normalis* (Nichols & Pope, 1927)	2	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
12	*Capoeta semifasciolata* (Günther, 1868)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
13	*Acrossocheilus beijiangensis* (Wu & Lin, 1977)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
14	*Cirrhinus molitorella* (Valenciennes, 1844)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
15	*Silurus cochinchinensis* (Valenciennes, 1840)	4	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
16	*Clarias fuscus* (Lacepède, 1803)	4	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
17	*Plotosus anguillaris* (Bloch, 1794)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
18	*Gambusia affinis affinis* (Baird & Girard, 1853)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
19	*Xiphophorus hellerii* (Heckel, 1848)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
20	*Xiphophorus variatus* (Meek, 1904)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
21	*Orizias curvinotus* (Nichols & Pope, 1927)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
22	*Tylosurus strongylurus* (van Hasselt, 1823)	2		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
23	*Rhynchorhamphus georgii* (Valenciennes, 1847)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
24	*Monopterus albus* (Zuiew, 1793)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
25	*Mugil cephalus* (Linneaus, 1758)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
26	*Chelon subviridis* (Valenciennes, 1836)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
27	*Ambassys gymnocephalus* (Lacepède, 1802)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
28	*Lates calcarifer* (Bloch, 1790)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
29	*Lateolabrax japonicus* (Temminck & Schlegel, 1843)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
30	*Sillago japonica* (Temminck & Schlegel, 1843)	3	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
31	*Sillago shihama* (Forsskål, 1775)	3	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
32	*Gerres poeti* (Cuvier, 1829)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
33	*Gerres filamentosus* (Cuvier, 1829)	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
34	*Lutjanus argentimaculatus* (Forsskål, 1775)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
35	*Lutjanus russellii* (Bleeker, 1849)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
36	*Acanthopagrus berda* (Forsskål, 1775)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
37	*Acanthopagrus latus* (Houttuyn, 1782)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
38	*Terapon jarbua* (Forsskål, 1775)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
39	*Scatophagus argus* (Linnaeus, 1766)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
40	*Oreochromis mossambicus* (Peters, 1852)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
41	*Butis butis* (Hamilton, 1822)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
42	*Butis koilomatodon* (Bleeker, 1849)	3	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
43	*Eleotris oxycephala* (Temminck & Schlegel, 1845)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
44	*Eleotris acantopoma acanthopoma* (Bleeker, 1853)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
45	*Eleotris melanosoma* (Bleeker, 1852)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w		
46	*Luciogobius guttatus* (Gill, 1859)	13	+	n/w	n/w	n/w	n/w	n/w	+	+		+	+	n/w	+	n/w	n/w			+					n/w		
47	*Tridentiger bifasciatus* (Steindachner, 1881)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
48	*Tridentiger trigonocephalus* (Gill, 1859)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
49	*Mugilogobius abei* (Jordan & Snyder, 1901)	12	+	n/w	n/w	n/w	n/w	n/w	+			+	+	n/w	+	n/w	n/w			+					n/w		
50	*Mugilogobius chulae* (Smith, 1932)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
51	*Mugilogobius obliquifasciatus* (Wu & Ni, 1985)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
52	*Pseudogobius javanicus* (Bleeker, 1856)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
53	*Bathygobius meggetti* (Hora & Mukerji, 1936)	10	+	n/w	n/w	n/w	n/w	n/w	+	+		+	+	n/w	+	n/w	n/w			+					n/w		
54	*Rhinogobius duospilus* (Herre, 1935)	16		n/w	n/w	n/w	n/w	n/w	+		+	+	+	n/w	+	n/w	n/w			+					n/w		
55	*Rhinogobius giurinus* (Rutter, 1897)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
56	*Acentrogobius caninus* (Valenciennes, 1837)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
57	*Acentrogobius viridipunctatus* (Valenciennes, 1837)	1	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
58	*Glossogobius giuris* (Hamilton, 1822)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
59	*Glossogobius olivaceus* (Temminck & Schlegel, 1845)	8	+	n/w	n/w	n/w	n/w	n/w	+	+				n/w		n/w	n/w			+					n/w		
60	*Siganus fuscescens* (Houttuyn, 1782)	3	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w		
61	*Macropodus opercularis* (Linnaeus, 1758)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w		
62	*Channa asiatica* (Linnaeus, 1758)	1		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
63	*Paralichthys olivaceus* (Temminck & Schlegel, 1846)	2		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
64	*Takifugu obscurus* (Abe, 1949)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
65	*Takifugu ocellatus* (Linnaeus, 1758)	5		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		
66	*Takifugu niphobles* (Jordan & Snyder, 1901)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w		

Fish Species / Location		Hau Hok Wan						San Tau										Tung Chung								
No.	Species Name	HH1	HH2	HH3	HH5	HH6	HH7	ST1	ST4	ST5	ST6	ST7	ST8	ST9	ST12	ST13	ST14	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9
1	*Anguilla japonica*	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
2	*Anguilla marmorata*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
3	*Pisodonophis boro*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
4	*Pisodonophis cancrivorus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
5	*Liniparhomaloptera disparis disparis*	n/w	n/w	n/w		n/w		n/w			+	+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
6	*Pseudogastromyzon myersi*	n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
7	*Oreonectes platycephalus*	n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
8	*Misgurnus anguillicaudatus*	n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
9	*Schistura fasciolata*	n/w	n/w	n/w		n/w		n/w			+	+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
10	*Parazacco spilurus*	n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
11	*Nicholsicypris normalis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
12	*Capoeta semifasciolata*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
13	*Acrossocheilus beijiangensis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
14	*Cirrhinus molitorella*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
15	*Silurus cochinchinensis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
16	*Clarias fuscus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+		+	n/w	n/w	n/w	n/w	n/w	n/w
17	*Plotosus anguillaris*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w		+		n/w	n/w	n/w	n/w	n/w	n/w
18	*Gambusia affinis affinis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w
19	*Xiphophorus hellerii*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
20	*Xiphophorus variatus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
21	*Orizias curvinotus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
22	*Tylosurus strongylurus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
23	*Rhynchorhamphus georgii*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
24	*Monopterus albus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
25	*Mugil cephalus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
26	*Chelon subviridis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
27	*Ambassys gymnocephalus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
28	*Lates calcarifer*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
29	*Lateolabrax japonicus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
30	*Sillago japonica*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
31	*Sillago shihama*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
32	*Gerres poeti*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
33	*Gerres filamentosus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
34	*Lutjanus argentimaculatus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
35	*Lutjanus russellii*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
36	*Acanthopagrus berda*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
37	*Acanthopagrus latus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
38	*Terapon jarbua*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
39	*Scatophagus argus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
40	*Oreochromis mossambicus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w
41	*Butis butis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
42	*Butis koilomatodon*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
43	*Eleotris oxycephala*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
44	*Eleotris acantopoma acanthopoma*	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
45	*Eleotris melanosoma*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
46	*Luciogobius guttatus*	n/w	n/w	n/w	+	n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
47	*Tridentiger bifasciatus*	n/w	n/w	n/w	+	n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
48	*Tridentiger trigonocephalus*	n/w	n/w	n/w	+	n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
49	*Mugilogobius abei*	n/w	n/w	n/w	+	n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
50	*Mugilogobius chulae*	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
51	*Mugilogobius obliquifasciatus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+	+		n/w	n/w	n/w	n/w	n/w	n/w
52	*Pseudogobius javanicus*	n/w	n/w	n/w	+	n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
53	*Bathygobius meggetti*	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
54	*Rhinogobius duospilus*	n/w	n/w	n/w	+	n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
55	*Rhinogobius giurinus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
56	*Acentrogobius caninus*	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
57	*Acentrogobius viridipunctatus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
58	*Glossogobius giuris*	n/w	n/w	n/w	+	n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
59	*Glossogobius olivaceus*	n/w	n/w	n/w	+	n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
60	*Siganus fuscescens*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
61	*Macropodus opercularis*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
62	*Channa asiatica*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
63	*Paralichthys olivaceus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
64	*Takifugu obscurus*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
65	*Takifugu ocellatus*	n/w	n/w	n/w		n/w		n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
66	*Takifugu niphobles*	n/w	n/w	n/w		n/w		n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w

Fish Species / Location		North Lantau Highway								Pak Mong					Tai Ho							
No.	Species Name	NLH1	NLH2	NLH3	NLH4	NLH5	NLH6	NLH7	NLH8	PM1	PM3	PM4	PM6	PM7	TH1	TH3	TH4	TH5	TH6	TH7	TH8	TH9
1	*Anguilla japonica*	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
2	*Anguilla marmorata*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
3	*Pisodonophis boro*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
4	*Pisodonophis cancrivorus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
5	*Liniparhomaloptera disparis disparis*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
6	*Pseudogastromyzon myersi*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
7	*Oreonectes platycephalus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
8	*Misgurnus anguillicaudatus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
9	*Schistura fasciolata*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
10	*Parazacco spilurus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
11	*Nicholsicypris normalis*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
12	*Capoeta semifasciolata*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
13	*Acrossocheilus beijiangensis*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
14	*Cirrhinus molitorella*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
15	*Silurus cochinchinensis*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
16	*Clarias fuscus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
17	*Plotosus anguillaris*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
18	*Gambusia affinis affinis*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
19	*Xiphophorus hellerii*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
20	*Xiphophorus variatus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
21	*Orizias curvinotus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
22	*Tylosurus strongylurus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
23	*Rhynchorhamphus georgii*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
24	*Monopterus albus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
25	*Mugil cephalus*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
26	*Chelon subviridis*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
27	*Ambassys gymnocephalus*	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
28	*Lates calcarifer*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
29	*Lateolabrax japonicus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
30	*Sillago japonica*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
31	*Sillago shihama*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
32	*Gerres poeti*	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
33	*Gerres filamentosus*	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
34	*Lutjanus argentimaculatus*	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
35	*Lutjanus russellii*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
36	*Acanthopagrus berda*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
37	*Acanthopagrus latus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
38	*Terapon jarbua*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
39	*Scatophagus argus*	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
40	*Oreochromis mossambicus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
41	*Butis butis*	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
42	*Butis koilomatodon*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
43	*Eleotris oxycephala*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
44	*Eleotris acantopoma acanthopoma*	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
45	*Eleotris melanosoma*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
46	*Luciogobius guttatus*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
47	*Tridentiger bifasciatus*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
48	*Tridentiger trigonocephalus*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
49	*Mugilogobius abei*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
50	*Mugilogobius chulae*	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
51	*Mugilogobius obliquifasciatus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
52	*Pseudogobius javanicus*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
53	*Bathygobius meggetti*	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
54	*Rhinogobius duospilus*	n/w	n/w	n/w	+	+	+	+	+	+	+	n/w	n/w	n/w	+	n/w	n/w	+	n/w	n/w	n/w	n/w
55	*Rhinogobius giurinus*	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
56	*Acentrogobius caninus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
57	*Acentrogobius viridipunctatus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
58	*Glossogobius giuris*	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
59	*Glossogobius olivaceus*	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
60	*Siganus fuscescens*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
61	*Macropodus opercularis*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
62	*Channa asiatica*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
63	*Paralichthys olivaceus*	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
64	*Takifugu obscurus*	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
65	*Takifugu ocellatus*	n/w	n/w	n/w							+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
66	*Takifugu niphobles*	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w

n/w no permanent water

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Freshwater Fish

Date of survey: 17 and 18 February 2004

Fish Species / Location			Sham Wat							San Shek Wan							
No.	Species Name	Frequency	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SS1	SS2	SS3	SS4	SS5	SS6	SS9	SS10
1	*Anguilla japonica* (Temminck & Schlegel, 1846)	5	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
2	*Anguilla marmorata* (Quoy & Gaimard, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
3	*Pisodonophis boro* (Hamilton, 1822)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
4	*Pisodonophis cancrivorus* (Richardson, 1848)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
5	*Liniparhomaloptera disparis disparis* (Lin, 1934)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
6	*Pseudogastromyzon myersi* (Herre, 1932)	3		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
7	*Oreonectes platycephalus* (Günther, 1868)	2	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
8	*Misgurnus anguillicaudatus* (Cantor, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
9	*Schistura fasciolata* (Nichols & Pope, 1927)	7	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
10	*Parazacco spilurus* (Günther, 1868)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
11	*Nicholsicypris normalis* (Nichols & Pope, 1927)	1	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
12	*Capoeta semifasciolata* (Günther, 1868)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
13	*Acrossocheilus beijiangensis* (Wu & Lin, 1977)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
14	*Cirrhinus molitorella* (Valenciennes, 1844)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
15	*Silurus cochinchinensis* (Valenciennes, 1840)	4	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
16	*Clarias fuscus* (Lacepède, 1803)	2	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
17	*Plotosus anguillaris* (Bloch, 1794)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
18	*Gambusia affinis affinis* (Baird & Girard, 1853)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
19	*Xiphophorus hellerii* (Heckel, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
20	*Xiphophorus variatus* (Meek, 1904)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
21	*Orizias curvinotus* (Nichols & Pope, 1927)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
22	*Tylosurus strongylurus* (van Hasselt, 1823)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
23	*Rhynchorhamphus georgii* (Valenciennes, 1847)	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
24	*Momopterus albus* (Zuiew, 1793)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
25	*Mugil cephalus* (Linneaus, 1758)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
26	*Chelon subviridis* (Valenciennes, 1836)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
27	*Ambassys gymnocephalus* (Lacepède, 1802)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
28	*Lates calcarifer* (Bloch, 1790)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
29	*Lateolabrax japonicus* (Temminck & Schlegel, 1843)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
30	*Sillago japonica* (Temminck & Schlegel, 1843)	2	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
31	*Sillago shihama* (Forsskål, 1775)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
32	*Gerres poeti* (Cuvier, 1829)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
33	*Gerres filamentosus* (Cuvier, 1829)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
34	*Lutjanus argentimaculatus* (Forsskål, 1775)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
35	*Lutjanus russellii* (Bleeker, 1849)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
36	*Acanthopagrus berda* (Forsskål, 1775)	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
37	*Acanthopagrus latus* (Houttuyn, 1782)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
38	*Terapon jarbua* (Forsskål, 1775)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
39	*Scatophagus argus* (Linnaeus, 1766)	2	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
40	*Oreochromis mossambicus* (Peters, 1852)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
41	*Butis butis* (Hamilton, 1822)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
42	*Butis koilomatodon* (Bleeker, 1849)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
43	*Eleotris oxycephala* (Temminck & Schlegel, 1845)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
44	*Eleotris acantopoma acanthopoma* (Bleeker, 1853)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
45	*Eleotris melanosoma* (Bleeker, 1852)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
46	*Luciogobius guttatus* (Gill, 1859)	8	+	n/w	n/w	n/w	n/w	n/w		+				n/w	+	n/w	n/w
47	*Tridentiger bifasciatus* (Steindachner, 1881)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
48	*Tridentiger trigonocephalus* (Gill, 1859)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
49	*Mugilogobius abei* (Jordan & Snyder, 1901)	10	+	n/w	n/w	n/w	n/w	n/w	+					n/w	+	n/w	n/w
50	*Mugilogobius chulae* (Smith, 1932)	8		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
51	*Mugilogobius obliquifasciatus* (Wu & Ni, 1985)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
52	*Pseudogobius javanicus* (Bleeker, 1856)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
53	*Bathygobius meggetti* (Hora & Mukerji, 1936)	12	+	n/w	n/w	n/w	n/w	n/w	+	+		+	+	n/w	+	n/w	n/w
54	*Rhinogobius duospilus* (Herre, 1935)	16		n/w	n/w	n/w	n/w	n/w	+		+	+	+	n/w	+	n/w	n/w
55	*Rhinogobius giurinus* (Rutter, 1897)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
56	*Acentrogobius caninus* (Valenciennes, 1837)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
57	*Acentrogobius viridipunctatus* (Valenciennes, 1837)	1	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
58	*Glossogobius giuris* (Hamilton, 1822)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
59	*Glossogobius olivaceus* (Temminck & Schlegel, 1845)	5	+	n/w	n/w	n/w	n/w	n/w	+	+				n/w		n/w	n/w
60	*Siganus fuscescens* (Houttuyn, 1782)	4	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
61	*Macropodus opercularis* (Linnaeus, 1758)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
62	*Channa asiatica* (Linnaeus, 1758)	2		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
63	*Paralichthys olivaceus* (Temminck & Schlegel, 1846)	2		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
64	*Takifugu obscurus* (Abe, 1949)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
65	*Takifugu ocellatus* (Linnaeus, 1758)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
66	*Takifugu niphobles* (Jordan & Snyder, 1901)	5		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w

	Sha Lo Wan										Hau Hok Wan						San Tau									
No.	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10	HH1	HH2	HH3	HH5	HH6	HH7	ST1	ST4	ST5	ST6	ST7	ST8	ST9	ST12	ST13	ST14
1								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w		+	n/w	n/w	n/w
2								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
3								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
4								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
5			+					n/w		+	n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
6			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
7								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
8								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
9			+					n/w		+	n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
10			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
11								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
12								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
13								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
14								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
15			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
16								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
17								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
18			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
19								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
20								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
21								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
22								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
23			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
24								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
25			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
26			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
27			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
28								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
29								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
30								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
31			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
32			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
33			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
34			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
35								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
36								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
37								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
38			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
39								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
40			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
41			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
42			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
43			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
44			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
45			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
46			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
47			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
48			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
49			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
50			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
51								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
52			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
53			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
54			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w			n/w	n/w	n/w
55								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
56								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
57								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
58			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
59			+					n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
60			+					n/w			n/w	n/w	n/w	+	n/w		n/w			n/w	n/w			n/w	n/w	n/w
61								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
62								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
63								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
64								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w
65								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w	+		n/w	n/w	n/w
66								n/w			n/w	n/w	n/w		n/w		n/w			n/w	n/w			n/w	n/w	n/w

	Tung Chung									North Lantau Highway								Pak Mong					Tai Ho							
No.	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	NLH1	NLH2	NLH3	NLH4	NLH5	NLH6	NLH7	NLH8	PM1	PM3	PM4	PM6	PM7	TH1	TH3	TH4	TH5	TH6	TH7	TH8	TH9
1	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
2				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
3				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
4	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
5				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
6				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
7				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
8				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
9				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
10	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
11				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
12	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
13				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
14				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
15	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
16	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
17				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
18	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
19				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
20				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
21	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
22				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
23	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
24				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
25	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
26	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
27	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
28				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
29				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
30				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
31				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
32	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
33	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
34	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
35				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
36		+		n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
37				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
38	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
39				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
40	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
41				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
42				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
43				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
44				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
45	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
46	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
47	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
48	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
49	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
50	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
51	+	+		n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
52	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
53	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
54				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	+	+	+	+	+	+	+	n/w	n/w	n/w	+	n/w	n/w	+	n/w	n/w	n/w	n/w
55				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
56				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
57				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
58	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
59	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
60				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
61	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
62	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
63	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
64				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
65				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
66	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w

n/w No permanent water

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Freshwater Fish

Date of survey: 12 and 13 April 2004

Fish Species / Location			Sham Wat							San Shek Wan							Sha Lo Wan										Hau Hok Wan							San Tau									Tung Chung							North Lantau Highway								Pak Mong				Tai Ho							
No.	Species Name	Frequency	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SS1	SS2	SS3	SS4	SS5	SS6	SS9	SS10	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10	HH1	HH2	HH3	HH5	HH6	HH7	ST1	ST4	ST5	ST6	ST7	ST8	ST9	ST12	ST13	ST14	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	NLH1	NLH2	NLH3	NLH4	NLH5	NLH6	NLH7	NLH8	PM1	PM3	PM4	PM6	PM7	TH1	TH3	TH4	TH5	TH6	TH7	TH8	TH9
1	*Anguilla japonica* Temminck & Schlegel, 1846	3		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
2	*Anguilla marmorata* Quoy & Gaimard, 1842	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
3	*Pisodonophis boro* (Hamilton, 1822)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
4	*Pisodonophis cancrivorus* (Richardson, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
5	*Linipatticmalopiera disparis disparis* Lin, 1934	6		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w			+	+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
6	*Pseudogastromyzon myersi* Herre, 1932	5		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
7	*Oreonectes platycephalus* Günther, 1868	5	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
8	*Misgurnus anguillicaudatus* (Cantor, 1842)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
9	*Schistura fasciolata* (Nichols & Pope, 1927)	6	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
10	*Parazacco spilurus* (Günther, 1868)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
11	*Nicholsicypris normalis* (Nichols & Pope, 1927)	1	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
12	*Capoeta semilasciolata* (Günther, 1868)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
13	*Acrossocheilus beijiangensis* Wu & Lin, 1977	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
14	*Cirrhinus molitorella* (Valenciennes, 1844)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
15	*Silurus cochinchinensis* Valenciennes, 1840	3	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
16	*Clarias fuscus* (Lacepède, 1803)	2	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
17	*Plotosus anguillaris* (Bloch, 1794)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
18	*Gambusia affinis affinis* (Baird & Girard, 1853)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
19	*Xiphophorus hellerii* Heckel, 1848	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
20	*Xiphophorus variatus* (Meek, 1904)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
21	*Oryzias curvinotus* (Nichols & Pope, 1927)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
22	*Tylosurus strongylurus* (van Hassell, 1823)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
23	*Rhynchorhamphus georgii* (Valenciennes, 1847)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
24	*Momopterus albus* (Zuiew, 1793)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
25	*Mugil cephalus* Linneaus, 1758	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
26	*Chelon subviridis* (Valenciennes, 1836)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
27	*Ambassys gymnocephalus* (Lacepède, 1802)	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
28	*Lates calcarifer* (Bloch, 1790)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
29	*Lateolabrax japonicus* (Temminck & Schlegel, 1843)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
30	*Sillago japonica* Temminck & Schlegel, 1843	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
31	*Sillago shihama* (Forsskål, 1775)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
32	*Gerres poeti* Cuvier, 1829	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
33	*Gerres filamentosus* Cuvier, 1829	5		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
34	*Lutjanus argentimaculatus* (Forsskål, 1775)	5		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
35	*Lutjanus russelli* (Bleeker, 1849)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
36	*Acanthopagrus berda* (Forsskål, 1775)	3		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
37	*Acanthopagrus latus* (Houttuyn, 1782)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
38	*Terapon jarbua* (Forsskål, 1775)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
39	*Scatophagus argus* (Linnaeus, 1766)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
40	*Oreochromis mossambicus* (Peters, 1852)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
41	*Butis butis* (Hamilton, 1822)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w				+				n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
42	*Butis koilomatodon* (Bleeker, 1849)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
43	*Electris oxycephala* Temminck & Schlegel, 1845	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
44	*Electris acantopoma acanthopoma* Bleeker, 1853	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w					+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
45	*Electris melanosoma* Bleeker, 1852	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
46	*Luciogobius guttatus* Gill, 1859	5		n/w	n/w	n/w	n/w	n/w		+				n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
47	*Tridentiger bifasciatus* Steindachner, 1881	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
48	*Tridentiger trigonocephalus* Gill, 1859	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
49	*Mugilogobius abei* (Jordan & Snyder, 1901)	10	+	n/w	n/w	n/w	n/w	n/w	+					n/w	+	n/w	n/w			+					n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
50	*Mugilogobius chulae* (Smith, 1932)	8		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
51	*Mugilogobius obliquifasciatus* Wu & Ni, 1985	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+	+		n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
52	*Pseudogobius javanicus* (Bleeker, 1856)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
53	*Bathygobius meggetti* (Hora & Mukerji, 1936)	11	+	n/w	n/w	n/w	n/w	n/w	+	+			+	n/w	+	n/w	n/w			+					n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
54	*Rhinogobius duospilus* (Herre, 1935)	16		n/w	n/w	n/w	n/w	n/w	+		+	+	+	n/w	+	n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w					+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	+	+	+	+	n/w	n/w		n/w	n/w	n/w	n/w
55	*Rhinogobius giurinus* (Rutter, 1897)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
56	*Acentrogobius caninus* (Valenciennes, 1837)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
57	*Acentrogobius viridipunctatus* (Valenciennes, 1837)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
58	*Glossogobius giuris* (Hamilton, 1822)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w	+	n/w		n/w					+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w					+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
59	*Glossogobius olivaceus* (Temminck & Schlegel, 1845)	3	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
60	*Siganus fuscescens* (Houttuyn, 1782)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
61	*Macropodus opercularis* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
62	*Channa asiatica* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
63	*Paralichthys olivaceus* (Temminck & Schlegel, 1846)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
64	*Takifugu obscurus* (Abe, 1949)	5		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w			+					n/w			n/w	n/w	n/w		n/w		n/w					+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
65	*Takifugu ocellatus* (Linnaeus, 1758)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w					+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
66	*Takifugu niphobles* (Jordan & Snyder, 1901)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w								n/w			n/w	n/w	n/w		n/w		n/w						n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w	n/w							n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w

n/w No permanent water

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Freshwater Fish

Date of survey: 12 May 2004

Fish Species / Location			Sham Wat							San Shek Wan							
No.	Species Name	Frequency	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SS1	SS2	SS3	SS4	SS5	SS6	SS9	SS10
1	*Anguilla japonica* (Temminck & Schlegel, 1846)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
2	*Anguilla marmorata* (Quoy & Gaimard, 1842)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
3	*Pisodonophis boro* (Hamilton, 1822)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
4	*Pisodonophis cancrivorus* (Richardson, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
5	*Plecoglossus altivelis altivelis* (Temminck et Schlegel, 1846)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
6	*Liniparhomaloptera disparis disparis* (Lin, 1934)	7		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
7	*Pseudogastromyzon myersi* (Herre, 1932)	6		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
8	*Oreonectes platycephalus* (Günther, 1868)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
9	*Misgurnus anguillicaudatus* (Cantor, 1842)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
10	*Schistura fasciolata* (Nichols & Pope, 1927)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
11	*Parazacco spilurus* (Günther, 1868)	8		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
12	*Nicholsicypris normalis* (Nichols & Pope, 1927)	1	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
13	*Capoeta semifasciolata* (Günther, 1868)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
14	*Acrossocheilus beijiangensis* (Wu & Lin, 1977)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
15	*Cirrhinus molitorella* (Valenciennes, 1844)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
16	*Silurus cochinchinensis* (Valenciennes, 1840)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
17	*Clarias fuscus* (Lacepède, 1803)	5		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
18	*Plotosus anguillaris* (Bloch, 1794)	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
19	*Gambusia affinis affinis* (Baird & Girard, 1853)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
20	*Xiphophorus hellerii* (Heckel, 1848)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
21	*Xiphophorus variatus* (Meek, 1904)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
22	*Oryzias curvinotus* (Nichols & Pope, 1927)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
23	*Tylosurus strongylurus* (van Hasselt, 1823)	2		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
24	*Rhynchorhamphus georgii* (Valenciennes, 1847)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
25	*Monopterus albus* (Zuiew, 1793)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
26	*Mugil cephalus* (Linneaus, 1758)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
27	*Chelon subviridis* (Valenciennes, 1836)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
28	*Ambassys gymnocephalus* (Lacepède, 1802)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
29	*Lates calcarifer* (Bloch, 1790)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
30	*Lateolabrax japonicus* (Temminck & Schlegel, 1843)	3		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
31	*Sillago japonica* (Temminck & Schlegel, 1843)	6	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
32	*Sillago shihama* (Forsskål, 1775)	5	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
33	*Gerres poeti* (Cuvier, 1829)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
34	*Gerres filamentosus* (Cuvier, 1829)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
35	*Lutjanus argentimaculatus* (Forsskål, 1775)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
36	*Lutjanus russellii* (Bleeker, 1849)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
37	*Acanthopagrus berda* (Forsskål, 1775)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
38	*Acanthopagrus latus* (Houttuyn, 1782)	6		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
39	*Terapon jarbua* (Forsskål, 1775)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
40	*Scatophagus argus* (Linnaeus, 1766)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
41	*Oreochromis mossambicus* (Peters, 1852)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
42	*Butis butis* (Hamilton, 1822)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
43	*Butis koilomatodon* (Bleeker, 1849)	1		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
44	*Eleotris oxycephala* (Temminck & Schlegel, 1845)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
45	*Eleotris acantopoma acanthopoma* (Bleeker, 1853)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
46	*Eleotris melanosoma* (Bleeker, 1852)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
47	*Luciogobius guttatus* (Gill, 1859)	8	+	n/w	n/w	n/w	n/w	n/w	+	+				n/w		n/w	n/w
48	*Tridentiger bifasciatus* (Steindachner, 1881)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
49	*Tridentiger trigonocephalus* (Gill, 1859)	4		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
50	*Mugilogobius abei* (Jordan & Snyder, 1901)	10	+	n/w	n/w	n/w	n/w	n/w	+					n/w	+	n/w	n/w
51	*Mugilogobius chulae* (Smith, 1932)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
52	*Mugilogobius obliquifasciatus* (Wu & Ni, 1985)	2		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
53	*Pseudogobius javanicus* (Bleeker, 1856)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
54	*Bathygobius meggetti* (Hora & Mukerji, 1936)	12	+	n/w	n/w	n/w	n/w	n/w	+	+			+	n/w	+	n/w	n/w
55	*Rhinogobius duospilus* (Herre, 1935)	16		n/w	n/w	n/w	n/w	n/w	+		+	+	+	n/w	+	n/w	n/w
56	*Rhinogobius giurinus* (Rutter, 1897)	7		n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
57	*Acentrogobius caninus* (Valenciennes, 1837)	6		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
58	*Acentrogobius viridipunctatus* (Valenciennes, 1837)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
59	*Glossogobius giuris* (Hamilton, 1822)	9	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
60	*Glossogobius olivaceus* (Temminck & Schlegel, 1845)	5	+	n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
61	*Siganus fuscescens* (Houttuyn, 1782)	6		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
62	*Macropodus opercularis* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
63	*Channa asiatica* (Linnaeus, 1758)	4		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
64	*Paralichthys olivaceus* (Temminck & Schlegel, 1846)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
65	*Takifugu obscurus* (Abe, 1949)	7	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w
66	*Takifugu ocellatus* (Linnaeus, 1758)	0		n/w	n/w	n/w	n/w	n/w						n/w		n/w	n/w
67	*Takifugu niphobles* (Jordan & Snyder, 1901)	8	+	n/w	n/w	n/w	n/w	n/w	+					n/w		n/w	n/w

	Sha Lo Wan										Hau Hok Wan					
No.	SL1	SL2	SL3	SL4	SL5	SL6	SL7	SL8	SL9	SL10	HH1	HH2	HH3	HH5	HH6	HH7
1			+					n/w			n/w	n/w	n/w		n/w	
2								n/w			n/w	n/w	n/w		n/w	
3								n/w			n/w	n/w	n/w		n/w	
4								n/w			n/w	n/w	n/w		n/w	
5								n/w			n/w	n/w	n/w		n/w	
6			+					n/w			n/w	n/w	n/w		n/w	
7			+					n/w			n/w	n/w	n/w		n/w	
8			+					n/w			n/w	n/w	n/w		n/w	
9			+					n/w			n/w	n/w	n/w		n/w	
10			+					n/w			n/w	n/w	n/w		n/w	
11			+					n/w			n/w	n/w	n/w		n/w	
12								n/w			n/w	n/w	n/w		n/w	
13			+					n/w			n/w	n/w	n/w		n/w	
14								n/w			n/w	n/w	n/w		n/w	
15								n/w			n/w	n/w	n/w		n/w	
16			+					n/w			n/w	n/w	n/w		n/w	
17			+					n/w			n/w	n/w	n/w		n/w	
18			+					n/w			n/w	n/w	n/w		n/w	
19			+					n/w			n/w	n/w	n/w		n/w	
20								n/w			n/w	n/w	n/w		n/w	
21								n/w			n/w	n/w	n/w		n/w	
22								n/w			n/w	n/w	n/w		n/w	
23								n/w			n/w	n/w	n/w		n/w	
24			+					n/w			n/w	n/w	n/w		n/w	
25								n/w			n/w	n/w	n/w		n/w	
26			+					n/w			n/w	n/w	n/w		n/w	
27			+					n/w			n/w	n/w	n/w		n/w	
28			+					n/w			n/w	n/w	n/w		n/w	
29			+					n/w			n/w	n/w	n/w		n/w	
30								n/w			n/w	n/w	n/w		n/w	
31								n/w			n/w	n/w	n/w		n/w	
32			+					n/w			n/w	n/w	n/w		n/w	
33			+					n/w			n/w	n/w	n/w		n/w	
34			+					n/w			n/w	n/w	n/w		n/w	
35			+					n/w			n/w	n/w	n/w		n/w	
36			+					n/w			n/w	n/w	n/w		n/w	
37			+					n/w			n/w	n/w	n/w		n/w	
38			+					n/w			n/w	n/w	n/w		n/w	
39			+					n/w			n/w	n/w	n/w		n/w	
40			+					n/w			n/w	n/w	n/w		n/w	
41			+					n/w			n/w	n/w	n/w		n/w	
42			+					n/w			n/w	n/w	n/w		n/w	
43								n/w			n/w	n/w	n/w		n/w	
44			+					n/w			n/w	n/w	n/w		n/w	
45			+					n/w			n/w	n/w	n/w		n/w	
46								n/w			n/w	n/w	n/w		n/w	
47								n/w			n/w	n/w	n/w		n/w	
48			+					n/w			n/w	n/w	n/w	+	n/w	
49								n/w			n/w	n/w	n/w		n/w	
50			+					n/w			n/w	n/w	n/w	+	n/w	
51			+					n/w			n/w	n/w	n/w	+	n/w	
52								n/w			n/w	n/w	n/w		n/w	
53			+					n/w			n/w	n/w	n/w	+	n/w	
54			+					n/w			n/w	n/w	n/w	+	n/w	
55			+					n/w			n/w	n/w	n/w		n/w	
56			+					n/w			n/w	n/w	n/w		n/w	
57			+					n/w			n/w	n/w	n/w		n/w	
58								n/w			n/w	n/w	n/w		n/w	
59			+					n/w			n/w	n/w	n/w	+	n/w	
60			+					n/w			n/w	n/w	n/w		n/w	
61			+					n/w			n/w	n/w	n/w		n/w	
62								n/w			n/w	n/w	n/w		n/w	
63			+					n/w			n/w	n/w	n/w		n/w	
64								n/w			n/w	n/w	n/w		n/w	
65			+					n/w			n/w	n/w	n/w		n/w	
66								n/w			n/w	n/w	n/w		n/w	
67			+					n/w			n/w	n/w	n/w		n/w	

	San Tau										Tung Chung								
No.	ST1	ST4	ST5	ST6	ST7	ST8	ST9	ST12	ST13	ST14	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9
1	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
2	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
3	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
4	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
5	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
6	n/w			+	+	+	+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
7	n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
8	n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
9	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
10	n/w			+	+	+		n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
11	n/w			+	+	+		n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
12	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
13	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
14	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
15	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
16	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
17	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
18	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
19	n/w							n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w
20	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
21	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
22	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
23	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
24	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
25	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
26	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
27	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
28	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
29	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
30	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
31	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
32	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
33	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
34	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
35	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
36	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
37	n/w						+	n/w	n/w	n/w	+	+		n/w	n/w	n/w	n/w	n/w	n/w
38	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
39	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
40	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
41	n/w							n/w	n/w	n/w	+	+	+	n/w	n/w	n/w	n/w	n/w	n/w
42	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
43	n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
44	n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
45	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
46	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
47	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
48	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
49	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
50	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
51	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
52	n/w							n/w	n/w	n/w	+	+		n/w	n/w	n/w	n/w	n/w	n/w
53	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
54	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
55	n/w						+	n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
56	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
57	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
58	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
59	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
60	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
61	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
62	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
63	n/w							n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
64	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
65	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w
66	n/w							n/w	n/w	n/w				n/w	n/w	n/w	n/w	n/w	n/w
67	n/w						+	n/w	n/w	n/w	+			n/w	n/w	n/w	n/w	n/w	n/w

	North Lantau Highway								Pak Mong					Tai Ho							
No.	NLH1	NLH2	NLH3	NLH4	NLH5	NLH6	NLH7	NLH8	PM1	PM3	PM4	PM6	PM7	TH1	TH3	TH4	TH5	TH6	TH7	TH8	TH9
1	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
2	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
3	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
4	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
5	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
6	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
7	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
8	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
9	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
10	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
11	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
12	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
13	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
14	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
15	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
16	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
17	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
18	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
19	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
20	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
21	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
22	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
23	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
24	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
25	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
26	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
27	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
28	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
29	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
30	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
31	n/w	n/w	n/w						+	+	n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
32	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
33	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
34	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
35	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
36	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
37	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
38	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
39	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
40	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
41	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
42	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
43	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
44	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
45	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
46	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
47	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
48	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
49	n/w	n/w	n/w						+		n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
50	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
51	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
52	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
53	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
54	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
55	n/w	n/w	n/w	+	+	+	+	+	+	+	n/w	n/w	n/w	+	n/w	n/w	+	n/w	n/w	n/w	n/w
56	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
57	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
58	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
59	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
60	n/w	n/w	n/w								n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
61	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
62	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
63	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
64	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
65	n/w	n/w	n/w						+		n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w
66	n/w	n/w	n/w								n/w	n/w	n/w		n/w	n/w		n/w	n/w	n/w	n/w
67	n/w	n/w	n/w						+	+	n/w	n/w	n/w	+	n/w	n/w		n/w	n/w	n/w	n/w

n/w No permanent water

Appendix C

List of Recorded Freshwater Macroinvertebrate Species

Freshwater Macroinvertebrates

Date of Survey: 18, 25 and 26 September 2003

Hong Kong Zhuhai Macao Bridge: Hong Kong Section and North Lantau Highway Connection					
Ecological Baseline Survey: Stream Macrofauna Survey (Wet Season)					
		Date:	18-Sep-03	25-Sep-03	26-Sep-03
Family	Order	Common Name	Sha Lo Wan	San Tau	Tai Ho
Perlidae	Plecoptera	Stoneflies	1		No stream suitable for
Baetidae	Ephemeroptera	Mayflies	5	1	quantitative sampling
Amphipterygidae	Zygoptera	Dragonflies	1		
Philopotamidae	Trichoptera	Caddisflies	1		
Chironomidae	Diptera	Non-biting midge	1	24	
Gammaridae (suborder)	Amphipodae	Amphipod		5	
Method:	Five 3 minutes standard kick sampling.				

Date of Survey: 7, 15 and 16 January 2004

Hong Kong Zhuhai Macao Bridge: Hong Kong Section and North Lantau Highway Connection						
Ecological Baseline Survey: Stream Macrofauna Survey (Dry Season)						
		Date:	07-Jan-04	15-Jan-04	16-Jan-04	16-Jan-04
Family	Order	Common Name	Pak Mon	Hau Hok Wan	Sha Lo Wan	San Shek Wan
Gammaridae (suborder)	Amphipodae	Amphipod	1			
Gyrinidae	Coleoptera	Water Beetle				3
Psephenidae	Coleoptera	Water Beetle				6
Grapsidae	Decapoda	Small Shore Crab	1			
Chironomidae	Diptera	Non-biting midge	14		7	4
Nematocera (suborder)	Diptera	Trueflies		1		
Baetidae	Ephemeroptera	Mayflies				9
Euphemeridae	Ephemeroptera	Mayflies				1
Leptophlebiidae	Ephemeroptera	Mayflies				24
Corydalidae	Megaloptera	Fishflies				1
Euphaeidae	Odonata	Damselflies				1
Libellulidae	Odonata	Dragonflies				3
	Odonata (anterior fragment)	Damselflies/Dragonflies				7
Hydropsychidae	Trichoptera	Caddisflies				1
Method:	Five 3 minutes standard kick sampling.					
Note:	1. Water levels of most streams were lower than during the wet season.					
	2. The stream at San Tau dried up and quantitative survey was no fesible.					
	The stream was also recently channellised.					

Appendix D1

List of Recorded Marine Benthic Macrofauna Species

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Marine Benthic Macrofauna

Date of survey: 2 October 2003

Abundance (Counts)	HKS1	HKS2	HKS3	HKS4	HKS5	NLHC1	NLHC2	NLHC3	NLHC4	NLHC5	THW1	THW2	THW3	THW4	THW5	Total
Aglaophamus dibranchis	2	2			1			1		3			3		1	13
Amphioplus laevis	1			1	1										1	4
Ancistrosyllis pilargiformis			3		1						1			2		7
Apionsoma trichocephalus						1										1
Callianassa sp.	1															1
Capitella capitata										1						1
Cirratulus sp.					1	2					4	1	1		1	10
Corophium sp.			1	2	1		1				2	3	2	1	2	15
Cossurella dimorpha			1	1	1	6										9
Dasybranchus caducus					2											2
Gattyana sp.					1									1	1	3
Glycera onomichiensis											1	2			3	6
Hexapus granuliforus												1				1
Laonice cirrata						1						2	1		2	6
Leocrates chinensis				2	1											3
Lumbrineris latreilli														1		1
Lumbrineris sp.											2	2				4
Macoma candida				1												1
Magelona pacifica											1					1
Mediomastus californiensis			5	7	12	1	1	2	2	5			3	11	2	51
Metapenaeus sp.											1					1
Micropodarke dubia			1													1
Nassarius sunninctus	2	3		3												8
Nassarius sp.				1												1
Neoxenophthalmus obscurus	2		7	12	7					1				1		30
Nereis sp.											2				2	4
Notomastus latericens													2	1		3
Paraprionospio pinnata			1			1					2	1			1	6
Poecilochaetus serpens											19	3			1	23
Phyllodoce (A.) chinensis												1	1	1		3
Polydora sp.							1									1
Prionospio cirrifera			18	15	6	1			2		3		1	8	1	55
Prionospio queenslandica											13				3	16
Processa sp.		1										1				2
Protankyra sp.														1		1
Pseudopythina maipoensis					1											1
Pseudopolydora sp.												1				1
Scyllis sp.					1											1
Sigambra hanaokai		1	9	3	4	2	4	2	2	2	8	3	10	6		56
Solen sp.															1	1
Terebellides stroemii															1	1
Theora lata					1	1										2
Typhlocarcinus villosa	1		1										1		1	4
Total	*9*	*7*	*47*	*48*	*42*	*16*	*7*	*5*	*6*	*12*	*59*	*21*	*25*	*34*	*24*	362

Marine Benthic Macrofauna

Date of survey: 2 October 2003

Biomass (mg)	HKS1	HKS2	HKS3	HKS4	HKS5	NLHC1	NLHC2	NLHC3	NLHC4	NLHC5	THW1	THW2	THW3	THW4	THW5	Total
Aglaophamus dibranchis	18.9	7.6			4.2			4.1		12.4			24.6		1.3	**73.1**
Amphioplus laevis	1.5			2.3	14.1										39.8	**57.7**
Ancistrosyllis pilargiformis			1.6		0.4						0.4			0.6		**3**
Apionsoma trichocephalus						0.3										**0.3**
Callianassa sp.	0.8															**0.8**
Capitella capitata										0.3						**0.3**
Cirratulus sp.					1.8	1.4					1.2	0.8	0.2		0.2	**5.6**
Corophium sp.			0.8	1.7	0.5		0.2				1.5	4.2	0.9	0.2	0.3	**10.3**
Cossurella dimorpha			0.2	5.8	3.3	1.8										**11.1**
Dasybranchus caducus					501.5											**501.5**
Gattyana sp.					0.8									3.8	0.4	**5**
Glycera onomichiensis											87.3	51.7			27.2	**166.2**
Hexapus granuliforus												152.4				**152.4**
Laonice cirrata						0.5						8.1	3.8		0.7	**13.1**
Leocrates chinensis				7.9	0.6											**8.5**
Lumbrineris latreilli														121.5		**121.5**
Lumbrineris sp.											0.7	2.2				**2.9**
Macoma candida				354.3												**354.3**
Magelona pacifica											2.1					**2.1**
Mediomastus californiensis			7.3	6.7	33.1	0.3	0.5	4.3	3	23			1.4	36.5	2.4	**118.5**
Metapenaeus sp.											108.2					**108.2**
Micropodarke dubia			2.6													**2.6**
Nassarius sunninctus	410.9	438.9		287												**1136.8**
Nassarius sp.				857.7												**857.7**
Neoxenophthalmus obscurus	387.6		495.5	2057.2	1366.1					145.9				171.2		**4623.5**
Nereis sp.											3.2				4.5	**7.7**
Notomastus latericens													5.4	17.4		**22.8**
Paraprionospio pinnata			0.3			0.7					0.9	0.6			0.9	**3.4**
Poecilochaetus serpens											17.4	8.9			1	**27.3**
Phyllodoce (A.) chinensis												0.9	1.4	1.6		**3.9**
Polydora sp.							0.2									**0.2**
Prionospio cirrifera			3.1	3	2.1	0.2			0.5		0.3		0.4	1.4	0.1	**11.1**
Prionospio queenslandica											34.3				4.4	**38.7**
Processa sp.		0.6										0.4				**1**
Protankyra sp.														2537.6		**2537.6**
Pseudopythina maipoensis					1.1											**1.1**
Pseudopolydora sp.												5.1				**5.1**
Scyllis sp.					0.2											**0.2**
Sigambra hanaokai		0.9	5.8	1.8	1.9	0.9	5.5	2.7	8.7	0.6	2.7	1.7	7.6	3.4		**44.2**
Solen sp.															32.7	**32.7**
Terebellides stroemii															0.8	**0.8**
Theora lata					8.2	7.4										**15.6**
Typhlocarcinus villosa	114.4		45.4										71.4		178.7	**409.9**
Total	***934.1***	***448***	***562.6***	***3585.4***	***1939.9***	***13.5***	***6.4***	***11.1***	***12.2***	***182.2***	***260.2***	***237***	***117.1***	***2895.2***	***295.4***	**11500**

Marine Benthic Macrofauna

Date of survey: 7 January 2004

Abundance (counts)	HKS1	HKS2	HKS3	HKS4	HKS5	NLHC1	NLHC2	NLHC3	NLHC4	NLHC5	THW1	THW2	THW3	THW4	THW5	Total
Actinia sp.							1					1				2
Aglaophamus dibranchis		2		1	3		2	2	1	1	4		1	2		19
Alpheus sp.							3	5						2		10
Amphinome rostrata	1															1
Amphioplus laevis	1		1	2						1		1	1		2	9
Ancistrosyllis pilargiformis					2											2
Apionsoma trichocephalus								1								1
Aricidea fragilis								1								1
Bhawania goodei								1								1
Callianassa sp.																0
Capitella capitata																0
Charybdis hellerii								1						1	1	3
Cirratulus sp.						1				1					1	3
Corophium sp.							2	9	1		4	1		1	7	25
Cossurella dimorpha																0
Cycladicama sp.								1								1
Dasybranchus caducus																0
Euclymene sp.							1									1
Eucrate haswelli								2								2
Eocuma lata	1															1
Eunice indica					1		31	21						1		54
Gattyana sp.								1								1
Glycera onomichiensis							3	9							7	19
Goniada sp.					1		1			1						3
Heterospio sinica									1	1						2
Hexapus granuliforus				1	1											2
Laonice cirrata													1		1	2
Leocrates chinensis				1										1	1	3
Lepidonotus sp.			1					3								4
Loimia medusa															1	1
Lucifer sp.	1															1
Lumbrineris latreilli																0
Lumbrineris sp.			1	1						1	2	1	1	3	2	12
Lygdamis giardi								1								1
Macoma candida																0
Magelona pacifica							1								2	3
Marphysa sanguinea								1								1
Mediomastus californiensis	10	5	2	8	9		4	11	3	2	3		1	2	2	62
Melinna sp.												1				1
Metapenaeus sp.																0
Micropodarke dubia					1		1	4								6
Moerella cutler															1	1
Murex sp.					1											1
Nassarius sunninctus																0
Nassarius sp.																0
Nectoneanthes ijimai							1									1
Neoxenophthalmus obscurus	3	12	2	4	8			4								33
Nereis sp.																0
Notomastus latericens							1	2				1	1	4		9
Onuphis eremita							1									1
Ophelina grandis					1											1
Ophiodromus obscura								2								2
Paphia undulata			2									1				3
Paralacydonia paradoxa								1								1
Paramphicondrius sp.							1									1
Paranursia abbrevista							1									1
Paraprionospio pinnata				2								1			6	9
Phascolosoma sp.							1									1
Phyllodoce (A.) chinensis							1	3								4
Poecilochaetus serpens								2				1				3
Polydora sp.																0
Potamilla sp.								1								1
Prionospio cirrifera	1	1	1						1	3		1	1		4	13
Prionospio queenslandica		1			1		14	23	1		3	1			11	55
Processa sp.																0
Protankyra sp.																0
Pseudopolydora sp.																0
Pseudopythina inaipoensis																0
Raphidopus ciliatus							1	2								3
Ruditapes philippinarum								2								2
Schistomeringos sp.														1		1
Scoloplos sp.					1			3				1				5
Syllis sp.							1		1							2
Sigambra hanaokai	3	1		2	2	4			1	5	4	3	1	1		27
Siphopatella sp.							3									3
Solen sp.																0
Sternaspis sculata				1												1
Sthenolepis japonica							1									1
Stylochus sp.	1															1
Temnopleurus sp.		2				1		1								4
Terebellides stroemii																0
Thalassema sabinum							1									1
Theora lata					1											1
Trigonothracia jinxingae															1	1
Typhlocarcinus villosa							1						1		2	4
Virgularia gustaviana					1											1
Total	22	24	10	23	34	6	79	120	10	16	20	15	9	19	52	459

Marine Benthic Macrofauna

Date of survey: 7 January 2004

Biomass (mg)	HKS1	HKS2	HKS3	HKS4	HKS5	NLHC1	NLHC2	NLHC3	NLHC4	NLHC5	THW1	THW2	THW3	THW4	THW5	Total
Actinia sp.							8.1					64.2				72.3
Aglaophamus dibranchis		15.1		4.3	22.1		1.6	1.3	28.7	0.4	7.4		0.6	5.6		87.1
Alpheus sp.							296.8	364.6						62.7		724.1
Amphinome rostrata	4.7															4.7
Amphioplus laevis	33		2.7	13.5						0.6		106.2	10.7		165.2	331.9
Ancistrosyllis pilargiformis					0.5											0.5
Apionsoma trichocephalus								1.3								1.3
Aricidea fragilis								0.5								0.5
Bhawania goodei								2								2
Callianassa sp.																0
Capitella capitata																0
Charybdis hellerii								416.4						99	5.4	520.8
Cirratulus sp.						0.3				0.3					0.5	1.1
Corophium sp.							2.8	7.3	0.4		2.3	0.7		1.1	5.5	20.1
Cossurella dimorpha																0
Cycladicama sp.								485.2								485.2
Dasybranchus caducus																0
Euclymene sp.							1.9									1.9
Eucrate haswelli								110.2								110.2
Eocuma lata	0.3															0.3
Eunice indica					14.8		295.9	419.9						1.3		731.9
Gattyana sp.								0.5								0.5
Glycera onomichiensis							29.5	127.3							106.7	263.5
Goniada sp.					1.9		1.1			0.5						3.5
Heterospio sinica									0.7	0.9						1.6
Hexapus granuliforus				231.2	66.5											297.7
Laonice cirrata													5.8		0.9	6.7
Leocrates chinensis				5.8										4.9	4.7	15.4
Lepidonotus sp.			1.1					24.8								25.9
Loimia medusa															35.6	35.6
Lucifer sp.	0.5															0.5
Lumbrineris latreilli																0
Lumbrineris sp.			146.3	26.6						43.5	6.1	11.8	2.7	8.4	22.1	267.5
Lygdamis giardi								34.5								34.5
Macoma candida																0
Magelona pacifica							0.8								3.4	4.2
Marphysa sanguinea								32.9								32.9
Mediomastus californiensis	29.3	5.8	1.5	15	25.9		16.2	52.9	8.2	3	5.9		1.5	1.7	2.2	169.1
Melinna sp.												33.4				33.4
Metapenaeus sp.																0
Micropodarke dubia					0.5		0.5	4.6								5.6
Moerella cutler															11.2	11.2
Murex sp.					8266.7											8266.7
Nassarius sunninctus																0
Nassarius sp.																0
Nectoneanthes ijimai							1.3									1.3
Neoxenophthalmus obscurus	314.7	1275.9	362.4	681.3	1304.8			3194.5								7133.6
Nereis sp.																0
Notomastus latericens							153.7	86				46.7	51.4	16.8		354.6
Onuphis eremita							1									1
Ophelina grandis					125.5											125.5
Ophiodromus obscura								12.9								12.9
Paphia undulata			7401.1									1125.2				8526.3
Paralacydonia paradoxa								0.6								0.6
Paramphicondrius sp.							0.4									0.4
Paranursia abbrevista							17.3									17.3
Paraprionospio pinnata				7.3								4.2			29.1	40.6
Phascolosoma sp.							10.7									10.7
Phyllodoce (A.) chinensis							1.7	7.8								9.5
Poecilochaetus serpens								6.6				5.6				12.2
Polydora sp.																0
Potamilla sp.								7								7
Prionospio cirrifera	0.3	0.9	0.5						0.8	1.5		0.5	0.5		1.2	6.2
Prionospio queenslandica		3.4			2.2		56.6	57.5	2.2		2.5	5.2			123.9	253.5
Processa sp.																0
Protankyra sp.																0
Pseudopolydora sp.																0
Pseudopythina maipoensis																0
Raphidopus ciliatus							22.3	72.8								95.1
Ruditapes philippinarum								405.8								405.8
Schistomeringos sp.														0.8		0.8
Scoloplos sp.					0.3			1.7				7				9
Syllis sp.							0.7		1.1							1.8
Sigambra hanaokai	3.1	0.8		3.8	1.3	1.6			1.2	2	2.3	2.2	0.8	1.5		20.6
Siphopatella sp.							58.9									58.9
Solen sp.																0
Sternaspis sculata				8.9												8.9
Sthenolepis japonica							22.2									22.2
Stylochus sp.	14															14
Temnopleurus sp.		45.1				51.5		5.4								102
Terebellides stroemii																0
Thalassema sabinum							604.9									604.9
Theora lata					3.1											3.1
Trigonothracia jinxingae															8.6	8.6
Typhlocarcinus villosa							170.3						28.3		432	630.6
Virgularia gustaviana					4.4											4.4
Total	*399.9*	*1347*	*7915.6*	*997.7*	*9840.5*	*53.4*	*1777.2*	*5944.8*	*43.3*	*52.7*	*26.5*	*1412.9*	*102.3*	*203.8*	*958.2*	31076

Appendix D2

ANOVA Analysis for Marine Benthic Macro-Infauna

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 2 October 2003

Number of Species

Between-Subjects Factors

		N
Area	HKS	5
	NLH	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Number of Species

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	146.533[a]	2	73.267	6.601	.012
Intercept	1179.267	1	1179.267	106.240	.000
AREA	146.533	2	73.267	6.601	.012
Error	133.200	12	11.100		
Total	1459.000	15			
Corrected Total	279.733	14			

a. R Squared = .524 (Adjusted R Squared = .444)

Number of Species

Student-Newman-Keuls[a,b]

Area	N	Subset 1	Subset 2
NLH	5	4.80	
HKS	5		9.40
THW	5		12.40
Sig.		1.000	.180

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 11.100.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 2 October 2003

Abundance

Between-Subjects Factors

		N
Area	HKS	5
	NLH	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Abundance

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1682.533[a]	2	841.267	3.635	.058
Intercept	8736.267	1	8736.267	37.749	.000
AREA	1682.533	2	841.267	3.635	.058
Error	2777.200	12	231.433		
Total	13196.000	15			
Corrected Total	4459.733	14			

a. R Squared = .377 (Adjusted R Squared = .273)

Abundance

Student-Newman-Keuls[a,b]

Area	N	Subset 1
NLH	5	9.20
HKS	5	30.60
THW	5	32.60
Sig.		.075

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 231.433.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 2 October 2003

Biomass

Between-Subjects Factors

		N
Area	HKS	5
	NLH	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Biomass (mg)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5248667.161[a]	2	2624333.581	2.503	.123
Intercept	8817126.673	1	8817126.673	8.409	.013
AREA	5248667.161	2	2624333.581	2.503	.123
Error	12582998.656	12	1048583.221		
Total	26648792.490	15			
Corrected Total	17831665.817	14			

a. R Squared = .294 (Adjusted R Squared = .177)

Biomass (mg)

Student-Newman-Keuls[a,b]

Area	N	Subset 1
NLH	5	45.08000
THW	5	760.98000
HKS	5	1494.0000
Sig.		.105

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 1048583.221.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 2 October 2003

Diversity Index

Between-Subjects Factors

		N
Area	HKS	5
	NLH	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Diversity

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.343[a]	2	.171	7.295	.008
Intercept	8.886	1	8.886	378.223	.000
AREA	.343	2	.171	7.295	.008
Error	.282	12	2.349E-02		
Total	9.510	15			
Corrected Total	.625	14			

a. R Squared = .549 (Adjusted R Squared = .473)

Diversity

Student-Newman-Keuls[a,b]

Area	N	Subset 1	Subset 2
NLH	5	.57838	
HKS	5	.78264	.78264
THW	5		.94798
Sig.		.057	.114

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 2.349E-02.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 7 January 2004

Univariate Analysis of Variance

Between-Subjects Factors

		N
Area	HKS	5
	NLHC	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Number of Species

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	70.933[a]	2	35.467	.668	.531
Intercept	2112.267	1	2112.267	39.804	.000
AREA	70.933	2	35.467	.668	.531
Error	636.800	12	53.067		
Total	2820.000	15			
Corrected Total	707.733	14			

a. R Squared = .100 (Adjusted R Squared = -.050)

Post Hoc Tests

Area

Homogeneous Subsets

Number of Species

Student-Newman-Keuls[a,b]

Area	N	Subset 1
HKS	5	9.60
THW	5	11.20
NLHC	5	14.80
Sig.		.516

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 53.067.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Hong Kong - Zhuhai - Macro Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 7 January 2004

Univariate Analysis of Variance

Between-Subjects Factors

		N
Area	HKS	5
	NLHC	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Abundance

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1825.600[a]	2	912.800	.930	.421
Intercept	14045.400	1	14045.400	14.310	.003
AREA	1825.600	2	912.800	.930	.421
Error	11778.000	12	981.500		
Total	27649.000	15			
Corrected Total	13603.600	14			

a. R Squared = .134 (Adjusted R Squared = -.010)

Post Hoc Tests

Area

Homogeneous Subsets

Abundance

Student-Newman-Keuls[a,b]

Area	N	Subset 1
HKS	5	22.60
THW	5	23.00
NLHC	5	46.20
Sig.		.480

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 981.500.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Hong Kong - Zhuhai - Macro Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 7 January 2004

Univariate Analysis of Variance

Between-Subjects Factors

		N
Area	HKS	5
	NLHC	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Biomass (g)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	33.529[a]	2	16.765	1.897	.192
Intercept	64.380	1	64.380	7.287	.019
AREA	33.529	2	16.765	1.897	.192
Error	106.026	12	8.836		
Total	203.936	15			
Corrected Total	139.555	14			

a. R Squared = .240 (Adjusted R Squared = .114)

Post Hoc Tests

Area

Homogeneous Subsets

Biomass (g)

Student-Newman-Keuls[a,b]

Area	N	Subset 1
THW	5	.540740
NLHC	5	1.574280
HKS	5	4.100140
Sig.		.183

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 8.836.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Hong Kong - Zhuhai - Macro Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

ANOVA Analysis for Marine Benthic Macro-Infauna

Date of Survey: 7 January 2004

Univariate Analysis of Variance

Between-Subjects Factors

		N
Area	HKS	5
	NLHC	5
	THW	5

Tests of Between-Subjects Effects

Dependent Variable: Diversity

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6.443E-02[a]	2	3.222E-02	.763	.488
Intercept	11.690	1	11.690	276.889	.000
AREA	6.443E-02	2	3.222E-02	.763	.488
Error	.507	12	4.222E-02		
Total	12.261	15			
Corrected Total	.571	14			

a. R Squared = .113 (Adjusted R Squared = -.035)

Post Hoc Tests

Area

Homogeneous Subsets

Diversity

Student-Newman-Keuls[a,b]

Area	N	Subset 1
HKS	5	.815060
NLHC	5	.861900
THW	5	.971460
Sig.		.474

Means for groups in homogeneous subsets are displayed.
Based on Type III Sum of Squares
The error term is Mean Square(Error) = 4.222E-02.

a. Uses Harmonic Mean Sample Size = 5.000.

b. Alpha = .05.

Appendix E

List of Intertidal (hard and soft shores) Species

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Intertidal

Date of survey: 18 September 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																					Summary		
Date:	18-Sep-03																					Transect	TST1	TST2
Weather:	Sunny					Level:	1 mCD											Level:	1.3 mCD			Level (mCD)	1	1.3
Site:	San Tau	Transect: TST1										Transect: TST2										Substrate	Pebble	Pebble
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)		
Crab	*Charybdis japonica*														1								0	0.4
Small Shore Crab	*Hemigrapsus sanguineus*		1			2	1				3								3	1	1		2.8	2
Small Shore Crab	*Sphaerozius nitidus*									1	1												0.8	0
Hermit Crab								1															0.4	0
Acorn Barnacle	*Balanus* sp.											14	3	3	5	4	6	1					0	14.4
Sea Anemone							2																0.8	0
Limpet	*Cellana* sp.							1	1														0.8	0
Mud Snail	*Cerithidea rhizophorarum*	27	30	2	12	12	13	12	19	2	1	85	70	81	53	63	63	52	35	8	2		52	204.8
Freshwater Nerite	*Clithon* cf. *faba*											5	5	15	1	28	18	22	4				0	39.2
	Dostia violacea	1																					0.4	0
Rough Periwinkle	*Littoraria articulata*																		5	23			0	11.2
Top Shell	*Monodonta labio*	29		16	20	3	2	42	17	4	15	3			8			6	18		17		59.2	20.8
	Nerita polita	3			5			2		1							1				2		4.4	1.2
Smooth Limpet	*Notoacmoea schrenkii*					1	1																0.8	0
																		Total Density (individuals per m^2)					122.4	294
																					Number of Species		10	8
Method:	10m line transect and 0.25m^2 quadrat.																							
Note:	No horseshoe crabs or trails observed.																							
General Description:	Gentle exposed shore with sand, pebble and oyster shell.																							
Other Observation:	Fishermen deploying gill nets; local villager collecting clams (*Tapes philippinarum*) on shoreline.																							
	Abandoned gill nets in the stream channel.																							
	Reef Egret and Little Egret (~5) foraging on the shore.																							

Intertidal

Date of survey: 25 September 2003

Project:	**Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study**
Date:	25-Sep-03
Weather:	Sunny
Site:	**San Shek Wan**

Transect: 1 — Level: 1.5 mCD

Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Small Shore Crab	*Hemigrapsus sanguineus*										
Hermit Crab			5								
Sea Slater	*Ligia exotica*										
	Nerita polita	9	26	1	4						
	Nodilittorina vidua	6		124		52	112	88	4	28	1
	Echinolittorina trochoides					8	52	24	12	20	
Common Whelk	*Thais clavigera*										

Transect: 2 — Level: 1 mCD

Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Small Shore Crab	*Hemigrapsus sanguineus*					2				1	
Hermit Crab									2		1
Sea Slater	*Ligia exotica*						1				
	Nerita polita	6	60	6	8	9	16	52	8	5	7
	Nodilittorina vidua	30	8	19	24						
	Echinolittorina trochoides										
Common Whelk	*Thais clavigera*				8	3		10	3		1

Transect: 3 — Level: 0.5 mCD

Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Small Shore Crab	*Hemigrapsus sanguineus*		4		4	2		1	2		4
Hermit Crab						2		8		2	
Sea Slater	*Ligia exotica*						4				
	Nerita polita	44	84	28	36	12	40	67	14	26	32
	Nodilittorina vidua										
	Echinolittorina trochoides										
Common Whelk	*Thais clavigera*	12	24		4	2		4	5		24

Summary

Transect	1	2	3
Level (mCD)	1.5	1	0.5
Substrate	Mudflat	Mudflat	Mudflat
Average Density (individuals per m^2)			
Hemigrapsus sanguineus	0	1.2	6.8
Hermit Crab	2	1.2	4.8
Ligia exotica	0	0.4	1.6
Nerita polita	16	70.8	153.2
Nodilittorina vidua	166	32.4	0
Echinolittorina trochoides	46.4	0	0
Thais clavigera	0	10	30
Total Density (individuals per m^2)	230.4	116	196.4
Number of Species	4	6	5

Method:	10m line transect and 0.25m^2 quadrat.
Note:	No horseshoe crabs.
General Description:	Gentle exposed shore with rocks and pebble.
Other Observation:	A demersal trawler operating in the bay caused sediment resuspension.

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Intertidal

Date of survey: 25 September 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																														Summary			
Date:	25-Sep-03																														Transect	1	2	3
Weather:	Sunny					Level:	0.4	mCD								Level:	1	mCD							Level:	1.5	mCD				Level (mCD)	0.4	1	1.5
Site:	Sha Lo Wan	Transect:	1									Transect:	2									Transect:	3								Substrate	Rocky	Rocky	Rocky
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)			
Small Shore Crab	*Hemigrapsus sanguineus*	2	2			8		2	2		6										1											8.8	0.4	0
Hermit Crab								3																								1.2	0	0
Sea Anemone		1						1	3												2											2	0.8	0
Black Mussel	*Septifer virgatus*				1																1											0.4	0.4	0
Limpet	*Cellana* sp.	1		1	12	8																										8.8	0	0
	Nerita polita					4		1		1		22	13	4		20	11				8											2.4	31.2	0
	Nodilittorina vidua											1	15	8	16	24	112	52	1	7		20	12	8	56	104	220	184	100	84	40	0	94.4	331.2
	Echinolittorina trochoides																					64	40	68	128	28	132	180	44	64	48	0	0	318.4
Common Whelk	*Thais clavigera*	7	7	13	20	36	12		14	4			8								4											45.2	4.8	0
																															Total Density (individuals per m^2)	68.8	132	649.6
																															Number of Species	7	6	2
Method:	10m line transect and 0.25m^2 quadrat.																																	
Note:	No horseshoe crabs.																																	
General Description:	Exposed steep rocky shore.																																	
Other Observation:	Garbage deposit along the shore.																																	

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Intertidal

Date of survey: 26 September 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study
Date:	26-Sep-03
Weather:	Sunny
Site:	Tai Ho Wan

Summary			
Transect	1	2	3
Level (mCD)	2	1	0.5
Substrate	Rocky	Pebble	Pebble

Transect: 1 — Level: 2 mCD; Transect: 2 — Level: 1 mCD; Transect: 3 — Level: 0.5 mCD

Common Name	Species	T1 Q1	T1 Q2	T1 Q3	T1 Q4	T1 Q5	T1 Q6	T1 Q7	T1 Q8	T1 Q9	T1 Q10	T2 Q1	T2 Q2	T2 Q3	T2 Q4	T2 Q5	T2 Q6	T2 Q7	T2 Q8	T2 Q9	T2 Q10	T3 Q1	T3 Q2	T3 Q3	T3 Q4	T3 Q5	T3 Q6	T3 Q7	T3 Q8	T3 Q9	T3 Q10	Average Density (individuals per m^2) Transect 1	Transect 2	Transect 3
Small Shore Crab	*Hemigrapsus sanguineus*															7	1	2	1		3			3				3			7	0	5.6	5.2
Acorn Barnacle	*Balanus* sp.		1									4	7	16	7	2	3	10	1			12	5	23	7	7		4		1	5	0.4	20	25.6
Hammer Oyster	*Isognomon isognomon*																										1					0	0	0.4
Rock Oyster	*Saccostrea cucullata*																1															0	0.4	0
	Striarca symmetrica													2	2	6		1				2		1		1		4	3		4	0	4.4	6
	Terebralia sulcata											1	2				1															0	1.6	0
	Batillaria zonalis											5	3	1	1			4		4	1											0	7.6	0
	Cerithidea microptera											12	5	2	6	2	3	3	2	3		16	10	2	10	2	1	2		2	9	0	15.2	21.6
Littorinid	*Littoraria articulata*										1																					0.4	0	0
Common Top Shell	*Monodonta labio*					1								1	9	3	2	5	2		3											0.4	10	0
	Nerita polita											1	16	1	3	1	2	2				11	13	2	7	1	8	16	16		2	0	10.4	30.4
Common Whelk	*Thais clavigera*																											1	1			0	0	0.8
																															Total Density (individuals per m^2)	1.2	75.2	90
																															Number of Species	3	9	7

Method:	10m line transect and $0.25m^2$ quadrat.
Note:	No horseshoe crabs.
General Description:	Sheltered rocky shore with steep slope.
Other Observation:	1. A black-capped kingfisher (*Halcyon pileata*) seen in the bay.
	2. High Water Mark coverved with fine sediments.

Half-day Additional Survey
Date of Survey: 2 October 2003
Site: San Shek Wan, Sha Lo Wan, Hau Hok Wan, San Tau

No special fauna found.

Intertidal

Date of survey: 21 October 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																Summary			
Date:	21-Oct-03																																Transect	THW1	THW2	THW3
Weather:	Sunny					Level:	1.5	mCD								Level:	1	mCD								Level:	0.5	mCD					Level (mCD)	1.5	1	0.5
Site:	Tai Ho Wan	Transect:	THW1 (Mudflat)									Transect:	THW2 (Mudflat)									Transect:	THW3 (Mudflat)									Substrate	Mudflat	Mudflat	Mudflat
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)			
Crab	*Helice tientsinensis*	1	2	1	2	1	1	1			1				2	1	1			1												4	2	0
Acorn Barnacle	*Balanus* sp.	6	9	6	5							12	4	17		4	4															10.4	16.4	0
Rock Oyster	*Saccostrea cucullata*													7																		0	2.8	0
	Terebralia sulcata	1								1	1																					1.2	0	0
Sand Snail	*Batillaria zonalis*					1	1	2		1	1	4	1	2	2	1		2	6	4	1	1	1	2	1	3		1	1	2	2	2.4	9.2	5.6
Mud Snail	*Cerithidea diadjariensis*	28	68	76	96	88	44	64	84	80	88	52	56	64	64	36	20	32	24	84	56	56	84	64	116	80	116	116	156	208	88	286.4	195.2	433.6
Mud Snail	*Cerithidea rhizophorarum*												2		1		4															0	2.8	0
Fresh Water Nerites	*Clithon* sp.														1							2		1	2		3	7	3	2	4	0	0.4	9.6
Scavenging Snail	*Nassarius* sp.																											1				0	0	0.4
																												Total Density (individuals per m^2)				304.4	228.8	449.2
																															Number of Species	5	7	4
Method:	10m line transect and 0.25m^2 quadrat.																																		
Note:	No horseshoe crab observed although a villager indicated juvenile were occasionally caught in gill nets.																																		
General Description:	Gentle sheltered mudflat with mangrove.																																		

Intertidal

Date of survey: 21 October 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																		
Date:	21-Oct-03																																		
Weather:	Sunny						Level:	0.7	mCD									Level:	1	mCD								Level:	1.3	mCD						
Site:	Tung Chung Wan	Transect:		TC1 (Sandflat)								Transect:		TC2 (Sandflat)								Transect:		TC3 (Sandflat)											
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				
Small Shore Crab	*Hemigrapsus sanguineus*																										1								
Acorn Barnacle	*Balanus* sp.																17																		
Ark Shell	*Barbatia virescens*																3																		
	Terebralia sulcata																2	1																	
Sand Snail	*Batillaria zonalis*	2	3	2	3	2	2	1																											
Mud Snail	*Cerithidea diadjariensis*	3	7	4	5	9	23	6	8	27	12	1	4	35	25	42	2	9	7	0	1	3	0	5	6	4	1	7	10	1	13				
Sand Snail	*Cerithidea* sp.																	1																	
																												Total Density (individuals per m^2)					47.6	60.0	20.4
																														Number of Species		2	5	2
Method:	10m line transect and 0.25m^2 quadrat.																																		
Note:	No horseshoe crab observed.																																		
General Description:	Gentle sheltered bay with extensive sandflat. Mangrove at higher level.																																		
Other Observation:	Local Villager collecting clams on shoreline.																																		

Summary			
Transect	TC1	TC2	TC3
Level (mCD)	0.7	1	1.3
Substrate	Sandflat	Sandflat	Sandflat
Average Density (individuals per m^2)			
	0	0	0.4
	0	6.8	0
	0	1.2	0
	0	1.2	0
	6	0	0
	41.6	50.4	20
	0	0.4	0
Total Density (individuals per m^2)	47.6	60.0	20.4
Number of Species	2	5	2

Intertidal

Date of survey: 22 October 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																Summary			
Date:	22-Oct-03																																Transect	SW1	SW2	SW3
Weather:	Sunny						Level:	1.2	mCD							Level:	0.9	mCD										Level:	0.6	mCD				Level (mCD)	1.2	0.9	0.6
Site:	Sham Wat	Transect:		SW1 (Pebble)								Transect:			SW2 (Pebble)								Transect:		SW3 (mudflat)								Substrate	Pebble	Pebble	Mudflat
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)			
Small Shore Crab	*Hemigrapsus sanguineus*	2	6				3	8	4	4		2		5			2	2															10.8	4.4	0
Hermit Crab								1							1						1												0.4	0.8	0
Acorn Barnacle	*Balanus* sp.	6				3		1		1			2							2													4.4	1.6	0
Ark Shell	*Barbatia virescens*													2	3		2	2	3		2												0	5.6	0
Rock Oyster	*Saccostrea cucullata*				14	8				5	6	14	12	18	16	4	10	12	16	24	34												13.2	64	0
Bivalve	*Striarca symmetrica*														1	5		4	3														0	5.2	0
Mud Snail	*Cerithidea diadjariensis*																					8	1	32	20	30	38	42	30	24	14		0	0	95.6
Sand Snail	*Cerithidea* sp.									1																							0.4	0	0
Fresh Water Nerite	*Clithon* sp.	4	1	1	1	16	4		7		8	3					1	2															16.8	2.4	0
Nerite	*Dostia violacea*			1																													0.4	0	0
Littorina	*Littoraria articulata*	204	160	103	44	9	6	1	80	100	2																						283.6	0	0
Scavenging Snail	*Nassarius festivus*											1			1																		0	0.8	0
Nerite	*Nerita costata*											2									1												0	1.2	0
Nerite	*Nerita polita*	16	24	2	7	4		3	1	7	3	1	6	11	12	8	10	22	6	4	6								3				26.8	34.4	1.2
Common Whelk	*Thais clavigera*														2			1															0	1.2	0
																												Total Density (individuals per m^2)					356.8	121.6	96.8
																																Number of Species		9	11	2
Method:	10m line transect and 0.25m^2 quadrat.																																			
Note:	Freshwater ecologist report observing some juvenile horseshoe crabs on the mudflat.																																			
General Description:	Sheltered gentle shore with mangrove. Rock/ pebble at the higher level and mudflat at the lower level.																																			

Intertidal

Date of survey: 18 November 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																					Summary		
Date:	18-Nov-03																					Transect	KL1	KL1
Weather:	Cloudy					Level	0.8	mCD									Level	1.2	mCD			Level (mCD)	0.8	1.2
Site:	Kau Liu	Transect:		1	(Rocky/pebble)							Transect:		2	(Rocky)							Substrate	Rocky	Rocky
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)		
Small Shore Crab	*Hemigrapsus sanguineus*	1	1	1	4	1																	3.2	0
Hermit Crab											1												0.4	0
Rock Oyster	*Saccostrea cucullata*	96	76	20	52	40	14	36	16	13													145.2	0
Littorinid Snail	*Littoraria articulata*											7	6	9	16	14	14	6	6	36	2		0	46.4
Common Topshell	*Monodonta labio*	8	6	12	44	2	1	2		8	6		12					7					35.6	7.6
Nerite	*Nerita polita*	27	52	12	20	20	19	6	3	2	6												66.8	0
Periwinkle	*Echinolittorina trochoides*																1						0	0.4
																						Total Density (individuals per m^2)	251.2	54.4
																						Number of Species	5	3
Method:	10m line transect and 0.25m^2 quadrat.																							
Note:	No horseshoe crab observed.																							
General Description:	Exposed rocky shore with sand at the bottom.																							

Intertidal

Date of survey: 18 November 2003

Project:	**Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study**																					**Summary**		
Date:	18-Nov-03																					Transect	TH1	TH2
Weather:	Cloudy					Level:	0.9	mCD								Level:	1.1	mCD				Level (mCD)	0.9	1.1
Site:	**Tai Ho Wan**	Transect:		1	(mud/sand)							Transect:		2	(mud/sand)							Substrate	Mudy	Mudy
Common Name	**Species**	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	**Average Density (individuals per m^2)**		
Acorn Barnacle	*Balanus* sp.	4		8	18	4				9	22							8	5				26	5.2
Bivalve	*Terebralia sulcata*		2	2	2				1			3	1					1	1	2			2.4	1.6
Sand Snail	*Batillaria zonalis*																						0.4	1.6
Mud Snail	*Cerithidea diadjariensis*	16	8	32	12	7	5	4	8	7	7	4	4	4	8	3	4	12	9	5	10		42.4	25.2
Mud Snail	*Cerithidea rhizophorarum*					1	1	3			2		1		2								2.8	1.2
Sand Snail	*Cerithidea* sp.			2	1																		1.2	0
Nerite	*Dostia violacea*															1							0	0.4
Nerite	*Nerita polita*				1																		0.4	0
																						Total Density (individuals per m^2)	**75.6**	**35.2**
																						Number of Species	**7**	6
Method:	10m line transect and 0.25m^2 quadrat.																							
Note:	No horseshoe crab observed.																							
General Description:	Gentle sheltered mudflat with mangrove.																							

Intertidal

Date of survey: 19 November 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																		
Date:	19-Nov-03						Level:	0.6	mCD									Level:	1	mCD								Level:	1.4	mCD					
Weather:	Sunny																																		
Site:	Sha Lo Wan	Transect:			1	(rock)						Transect:			2	(rocky)						Transect:			3	(rocky)									
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				
Small Shore Crab	*Hemigrapsus sanguineus*								6	2	2				2	1		2																	
Hermit Crab		1			1		1														1														
Ark Shell	*Barbatia virescens*								2																										
Clam	*Cardita leana*						1																												
Rock Oyster[1]	*Saccostrea cucullata*					100%	25%	100%	50%											80%	90%														
Common Topshell	*Monodonta labio*									4																									
Nerite	*Nerita polita*	11	13	2	2	12	2	8	7	20	2	9	1	8	15	20	14	14	3	18	22		116	88	36	28	20		32	56	1				
Periwinkle	*Nodilittorina radiata*																					2	4	16	20	8	4	24	40	24					
Periwinkle	*Echinolittorina trochoides*																1			1	2														
Common Whelk	*Thais clavigera*	1	1		1	11	5	8	8	2	1																								
Method:	10m line transect and 0.25m^2 quadrat.																																		
Note:	1. Rock oyster expressed as percentage of cover and not included in the abundance and density calculation.																																		
	2. No horseshoe crab observed.																																		
General Description:	Exposed steep rocky shore.																																		

Summary			
Transect	SLW1	SLW2	SLW3
Level (mCD)	0.6	1.0	1.4
Substrate	Rocky	Rocky	Rocky
Average Density (individuals per m^2)			
	4	2	0
	1.2	0	0
	0.8	0.4	0
	0.4	0	0
	28%	17%	0%
	1.6	0	0
	31.6	49.6	0
	0	0	150.8
	0	0	56.8
	15.2	1.6	0
Total Density (individuals per m^2)	54.8	53.6	207.6
Number of Species	8	5	2

Intertidal

Date of survey: 19 November 2003

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																					Summary		
Date:	19-Nov-03																					Transect	SW1	SW2
Weather:	Sunny						Level:	1	mCD									Level:	1.1	mCD			Level (mCD)	1.2	0.9
Site:	Sham Wat	Transect:		1	(pebble)							Transect:		2	(pebble)								Substrate	Pebble	Pebble
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)		
Small Shore Crab	*Hemigrapsus sanguineus*	4	2	2	3	6					4							4	8		6		8.4	7.2
Hermit Crab							1																0.4	0
Acorn Barnacle	*Balanus* sp.											1						1					0	0.8
Ark Shell	*Barbatia virescens*		1				2		1	1						1							2	0.4
Rock Oyster[1]	*Saccostrea cucullata*	20%	5%	5%	10%		5%	5%	10%	40%	30%			10%		10%		5%		10%			13%	4%
Bivalve	*Terebralia sulcata*																1	2	1	1	1		0	2.4
Mud Snail	*Cerithidea diadjariensis*														6	1				1			0	3.2
Fresh Water Nerites	*Clithon* sp.	52	24	120	88	36	100	72	16		20	68	40	44	100	60	28	56	36	14	24		211.2	188
Nerite	*Dostia violacea*												1										0	0.4
Littorinid Snail	*Littoraria articulata*															5		6	47	20	17		0	38
Common Topshell	*Monodonta labio*	8		2		1																	4.4	0
Scavenging snail	*Nassarius festivus*									1													0.4	0
Nerite	*Nerita polita*				1		6		4	36	4		3			2	2					Total Density (individuals per m^2)	20.4	2.8
																							247.2	243.2
																						Number of Species	8	10
Method:	10m line transect and 0.25m^2 quadrat.																							
Note:	1. Rock oyster expressed as percentage of cover and not included in the abundance and density calculation.																							
	2. No horseshoe crab observed.																							
General Description:	Sheltered gentle shore with mangrove. Rocky / Pebble on the higher level with mudflat on the lower level.																							

Intertidal

Date of survey: 7 January 2004

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																		
Date:	07-Jan-2004																																		
Weather:	Sunny						Level:	1.2	mCD								Level:	1.4	mCD								Level:	1.8	mCD							
Site:	Tai Ho Wan	Transect:		TH1	(muddy)							Transect:		TH2	(muddy)							Transect:		TH3	(muddy)										
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				
Small Shore Crab	*Hemigrapsus sanguineus*										1	1			1																				
Acorn Barnacle	*Balanus* sp.							30									38		17		15		1	1	2			2							
Sand Snail	*Batillaria zonalis*			3	1	3		2					5	1			3	4	2	2	1			1	2		1		1						
Mud Snail	*Cerithidea diadjariensis*	112	56	56	104	88	44	120	60	80	68	112	88	80	120	76	76	72	56	40	80	52	84	96	116	84	76	152	156	136	124				
Fresh Water Nerite	*Clithon* sp.	16	8	8	8	9	5	6	11	1	7					1			1					1			1								
Method:	10m line transect and 0.25m^2 quadrat.																																		
Note:	No horseshoe crab observed.																																		
General Description:	Gentle sheltered mudflat with mangrove.																																		

Summary			
Transect	TH1	TH2	TH3
Level (mCD)	1.2	1.6	1.8
Substrate	Muddy	Muddy	Muddy
Average Density (individuals per m^2)			
	0.4	0.8	0
	12	28	2.4
	3.6	7.2	2
	315.2	320	430.4
	31.6	0.8	0.8
Total Density (individuals per m^2)	362.8	356.8	435.6
Number of Species	5	5	4

Intertidal

Date of survey: 15 January 2004

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																			
Date:	15-Jan-2004																																			
Weather:	Sunny, Windy						Level:	0.7	mCD								Level:	0.9	mCD								Level:	1.1	mCD								
Site:	Hau Hok Wan	Transect:		HHW1	(muddy)							Transect:		HHW2	(sandy)							Transect:		HHW3	(rocky)											
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10					
Small Shore Crab	*Hemigrapsus sanguineus*																														1					
Hermit Crab									1				1																		2					
Acorn Barnacle	*Balanus* sp.							1				9			4		6											2								
Sea Anemone					1																															
Ark Shell	*Barbatia virescens*				1																															
Rock Oyster[1]	*Saccostrea cucullata*	2%		5%	50%						10%				1%							10%	5%	10%	5%	5%	5%	15%	10%	5%	20%					
Mud Snail	*Cerithidea rhizophorarum*									3												1	1			3	9		3							
Fresh Water Nerite	*Clithon* sp.	13	2	7		4	2	6		1	5	32	44	84	128	68	100	48	60	21	9	1			2	4		3	26	4	8					
Common Topshel	*Monodonta labio*																						1	1					1	2						
Nerite	*Nerita polita*				3																	10	5	4	3	3	2	1	2	2	4					
																													Total Density (individuals per m^2)							
																															Number of Species					
Method:	10m line transect and 0.25m^2 quadrat.																																			
Note:	1. Rock oyster expressed as percentage of cover and not included in the abundance and density calculation.																																			
	2. No horseshoe crab observed.																																			
General Description:	Sheltered sandy shore.																																			

Summary:			
Transect	HHW1	HHW2	HHW3
Level (mCD)	0.7	0.9	1.1
Substrate	muddy	sandy	rocky
Average Density (individuals per m^2)			
	0	0	0.4
	0.4	0.4	0.8
	0.4	7.6	0.8
	0.4	0	0
	0.4	0	0
	7%	0%	9%
	1.2	0	6.8
	16	237.6	19.2
	0	0	2
	1.2	0	14.4
Total Density (individuals per m^2)	20.0	245.6	44.4
Number of Species	7	4	7

Intertidal

Date of survey: 15 January 2004

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																															Summary			
Date:	15-Jan-2004																															Transect	KL1	KL2	KL3
Weather:	Sunny, Windy						Level:	1	mCD								Level:	1.2	mCD								Level:	1.4	mCD			Level (mCD)	1	1.2	1.4
Site:	Kau Liu	Transect:		KL1	(sandy)							Transect:		KL2	(sandy)							Transect:		KL3	(rocky)							Substrate	sandy	sandy	rocky
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Average Density (individuals per m^2)			
Acorn Barnacle	*Balanus* sp.	22	3					8									1																13.2	0.4	0
Sea Anemone			2																														0.8	0	0
Rock Oyster[1]	*Saccostrea cucullata*				2%		5%	2%								5%	1%	1%	5%			5%											1%	1%	1%
Sand Snail	*Batillaria zonalis*							1																									0.4	0	0
Mud Snail	*Cerithidea rhizophorarum*			1	1			2	15	13	46			4	46	4	14	3	1	5	2												31.2	31.6	0
Fresh Water Nerite	*Clithon* sp.														1	3	25				1												0	12	0
Nerite	*Dostia violacea*								1																								0.4	0	0
Littorinid Snail	*Littoraria articulata*											3						1	3	5		4	2		7	12	7		2		1		0	4.8	14
Common Topshel	*Monodonta labio*																		3			6							2				0	1.2	3.2
Nerite	*Nerita albicilla*																						1					4	6	3			0	0	5.6
Nerite	*Nerita polita*						4									2	6	1	5	2	1												1.6	6.8	0
																																Total Density (individuals per m^2)	47.6	56.8	22.8
																																Number of Species	7	7	4
Method:	10m line transect and 0.25m^2 quadrat.																																		
Note:	1. Rock oyster expressed as percentage of cover and not included in the abundance and density calculation.																																		
	2. No horseshoe crab observed.																																		
General Description:	Exposed rocky shore with sand at the bottom.																																		

Intertidal

Date of survey: 16 January 2004

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																		
Date:	16-Jan-2004																																		
Weather:	Overcast with shower						Level:		1	mCD								Level:	1.2	mCD								Level:	1.4	mCD						
Site:	San Shek Wan	Transect:		SSW1	(pebble)							Transect:		SSW2	(pebble)								Transect:		SSW3	(pebble)									
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				
Small Shore Crab	*Hemigrapsus sanguineus*												1	3	1	4	1			1														
Small Shore Crab	*Sphaerozius nitidus*																1																	
Sea Slater	*Ligia exotica*																									3	1				1			
Sea Anemone			1			1					2																							
Ark Shell	*Barbatia virescens*																																	
Rock Oyster[1]	*Saccostrea cucullata*	30%		10%	20%	25%		30%	5%		20%																							
Littorinid Snail	*Littoraria articulata*																						1	11	11	1	15	35	24	31	12			
Common Topshel	*Monodonta labio*	1		1																1														
Nerite	*Nerita polita*	12	9	3	19	13	12	13	2	23	18	3		3	8	10	7	7	27	12	14										1			
Periwinkle	*Nodilittorina radiata*																					7	13						6					
Common Whelk	*Thais clavigera*				4	4	2		1		3																							
																													Total Density (individuals per m^2)					
																													Number of Species				
Method:	10m line transect and 0.25m^2 quadrat.																																	
Note:	1. Rock oyster expressed as percentage of cover and not included in the abundance and density calculation.																																	
	2. No horseshoe crab observed.																																	
General Description:	Gentle exposed shore with rocks and pebble.																																	

Summary			
Transect	SSW1	SSW2	SSW3
Level (mCD)	1	1.2	1.4
Substrate	pebble	pebble	pebble
Average Density (individuals per m^2)			
	0	4.4	0
	0	0.4	0
	0	0	2
	0.8	0	0
	0.8	0	0
	14%	0%	0%
	0	0	56.4
	0.8	0.4	0
	49.6	36.4	0.4
	0	0	10.4
	5.6	0	0
Total Density (individuals per m^2)	57.6	41.6	69.2
Number of Species	6	4	4

Intertidal

Date of survey: 16 January 2004

Project:	Hong Kong - Zhuhai - Macao Bridge: Ecological Baseline Study																																	
Date:	16-Jan-2004																																	
Weather:	Overcast with shower						Level:	0.8	mCD									Level:	1	mCD															
Site:	Sha Lo Wan	Transect:		SLW1	(pebble)							Transect:		SLW2	(pebble)								Transect:		SLW3	(pebble)				Level:	1.2	mCD			
Common Name	Species	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10			
Hermit Crab			1		1	1												1																
Sea Slater	*Ligia exotica*												1	1	2																			
Sea Anemone		3	2	2					2																									
Rock Oyster[1]	*Saccostrea cucullata*											10%	5%	20%	10%	5%	2%	2%	10%	2%	2%													
Bivalve	*Striarca symmetrica*										1											37	76	40	96	48	64	72	56	32	27			
Littorinid Snail	*Littoraria articulata*											7	7	6	3	10	8	2	3	2	7	6	8	4	9	3	4	1	8	4				
Nerite	*Nerita polita*	1							4					1		3			1															
Common Whelk	*Thais clavigera*	1		1	1				2		1																							
Method:	10m line transect and 0.25m^2 quadrat.																																	
Note:	1. Rock oyster expressed as percentage of cover and not included in the abundance and density calculation.																																	
	2. No horseshoe crab observed.																																	
General Description:	Sheltered sandy / pebble shore.																																	

Summary			
Transect	SLW1	SLW2	SLW3
Level (mCD)	0.8	1.0	1.2
Substrate	pebble	pebble	pebble
Average Density (individuals per m^2)			
	1.2	0	0
	0	0.4	0
	3.6	1.6	0
	0*	0*	0*
	0.4	0	0
	0	0	219.2
	2	22	18.8
	2.4	2	0
Total Density (individuals per m^2)	9.6	26	238
Number of Species	5	5	2

Appendix F

Coral Survey Report

THE OCEANWAY CORPORATION LTD

REPORT

FIELD DIVING SURVEYS OF CORALS FOR THE HONG KONG – ZHUHAI – MACAU BRIDGE

AGREEMENT NO: MW 01/2003

October 2003

EXECUTIVE SUMMARY

- Twentry-seven spot dives were conducted within the areas of potential landfall of the Hong Kong – Zhuhai – Macua Bridge and North Lantau Highway Connection.
- Visibility was extremely low and this made the dive surveys inefficient with relatively small distances covered on each dive. Should further quantitative surveys be required methodologies should be revised to take account of the adverse conditions.
- For this report the area was split into four sub-areas based on geographical and zoological distinctions:
    - Sham Wat / San Shek Wan
    - West Chek Lap Kok Channel
    - East Chek Lap Kok Channel
    - East Tung Chung
- No corals were observed in the east or west Chek Lap Kok Channel. An ahermatypic cup coral, i.e., *Balanophyllia*, and a gorgonian soft coral, i.e., *Echinomuricea*, were observed, however, on hard substrate to the east and west of Chek Lap Kok. Abundance was, however, low (cover <5%) and in particular *Echinomuricea* suffered high levels of partial mortality.
- The results of the spot dives suggested it was unnecessary to carry out further in-depth surveys.

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MATERIALS AND METHODS

The survey technique used was a tiered methodology employed to assess sub-littoral benthic communities, in particular, hard and soft corals within the identified potential impact zones. It consists of a suite of three standardized 'nested' survey methods: spot-check dives, Rapid Ecological Assessment (REA) and video transects. In an effort to increase survey efficiency the spot-check dives are used to identify sites where more detailed quantitative surveys, i.e., REA and video assessments, are appropriate. Following the spot dives it was, however, unnecessary to carry out further surveys and, furthermore, due to extremely low visibility in the study area the reliability of such methods would have been questionable.

SPOT-CHECK RECONNAISSANCE DIVES

A SCUBA diver assessed the substrate and other marine benthos for the presence of coral communities. These 'spot-check' dives were distributed in and around each survey area at a density that was sufficient to locate any major coral areas and to reliably assess the type of benthos existing in each survey area. The starting location and direction were chosen to ensure most of the area within the specified depth zone (to the end of the hard substrate) was examined. For each dive the following information was recorded:

- location (GPS);
- depth range;
- visibility;
- estimate of % hard coral and soft coral cover;
- substrate type;
- distance surveyed;
- coral species and other invertebrates present.
- health of any corals located.

In this way, areas with significant quantities of corals were located and suitable locations to carry out further surveys determined. In order to decide upon areas where REA and video surveys were required, the estimate of hard and soft coral is classified into one of four levels; no coral cover, less than 5% cover, between 5% and 10% cover and over 10% cover.

Sample spot dive data sheets can be found in Appendix 3.

RESULTS

A total of 27 spot dives were carried out in the Tung Chung and Chek Lap Kok areas (Figure 1 and Table A1.1: Appendix 1). The study area was broken down into four sub areas and these are shown in Figures A – D. Spot dives were distributed amongst the areas in an attempt to find any corals such that any area with little hard substrate received less attention.

A short description of each area is now given. Raw data maybe found in Appendix 2.

Sham Wat / San Shek Wan

Figures A & B show the locations of each spot dive conducted within the Sham Wat / San Shek Wan area. Ten spot dives (SD 1-10) were conducted within this area. In total 9 taxa were observed during the spot dives conducted within this area. Of these one hard coral and one soft coral were observed. The most ubiquitous taxa were barnacles and the oysters. Of note, the hard ahermatypic coral *Balanophyllia* spp. and the soft coral *Echinomuricea* spp. were also found but these were patchily distributed and overall percentage cover was <5%. Whilst *Balanophyllia* was found on a variety of hard substrate the soft coral *Echinomuricea* was only found on the tops of large boulders and suffered considerable partial mortality. The majority of the corals were found in extremely shallow water, i.e., 1.5 m.

West Chek Lap Kok Channel

Figure B gives the locations of each spot dive within the west Chek Lap Kok area. Eight spot dives (SD 11-18) were conducted within this area. In total 6 taxa were observed during the spot dives conducted within this area. No hard coral or soft corals were however located. Ubiquitous taxa were the green mussel *Perna viridis*, barnacles and oysters. The water on the north side of Lantau was extremely shallow and quickly became mud and sand. The south side of Chek Lap Kok was made up of a quarry rock artificial seawall and had very little sessile fauna.

East Chek Lap Kok Channel

Figure C gives the locations of each spot dive within the East Chek Lap Kok area. Four spot dives (SD 19-22) were conducted within this area. In total 8 taxa were observed during the spot dives conducted within this area. No hard coral or soft corals were however located. Ubiquitous taxa were the green mussel *Perna viridis*, barnacles and oysters. The water on the north side of Lantau in particular Tung Chung Wan was extremely shallow. The south side of Chek Kap Kok was made up of a quarry rock artificial seawall was very little sessile fauna. Outside of the channel SD22 was located on the east of Chek Lap Kok. Some natural rocky substrate was present here and the hard ahermatypic coral *Balanophyllia* spp. and the soft coral *Echinomuricea* spp. were found. Abundance was, however, low with percentage cover of <5%.

East Tung Chung

Figure D gives the locations of each spot dive within the Tung Chung and East Tung Chung area. Five spot dives (SD 23 - 27) were conducted within this area. In total 7 taxa were observed during the spot dives conducted within this area. Of these one soft coral was observed. The most ubiquitous taxa were barnacles and the green mussel *Perna viridis*. The soft coral *Echinomuricea* spp. were also found but were patchily distributed and overall percentage cover was <5%. Extensive reclamation has occurred in this area and very little natural / original substrate was found in the subtidal zone. Artificial quarry rock seawall was therefore the dominant substrate. The majority of the corals were found in extremely shallow water, i.e., 1.5 - 2 m.

SUMMARY AND CONCLUSIONS

Twentry-seven spot dives were conducted on October 15th, 2003 in the surrounding areas of Tung Chung, Chek Lap Kok, Sham Wat and San Shek Wan. These areas were assessed for coral communities that may potentially be impacted by the Hong Kong Section of the Hong Kong – Zhuhai – Macau Bridge and the North Lantau Highway Connection.

During these spot dives surveys underwater visibility was extremely low and this made the surveys inefficient: only relatively small distances covered on each dive. Due to the limited visibility, all ambient light was extinguished below 4 -5 m. Generally, the hard substrate ended at around 3 m water depth and after this, the substrate was sand and mud. Should any further surveys be required in these areas it is suggested that methodologies are revised to take account of these adverse conditions.

The area was split into four sub areas based on geographical and zoological distinctions, i.e., Sham Wat / San Shek Wan, West Chek Lap Kok Channel, East Chek Lap Kok Channel and East Tung Chung. No corals were found in the Chek Lap Kok Channel. An ahermatypic cup coral, i.e., *Balanophyllia*, and a gorgonian soft coral, i.e., *Echinomuricea*, were observed, however, on hard substrate to the east and west of Chek Lap Kok. Abundance was low (cover <5%) and *Echinomuricea* in particular suffered high levels of partial mortality.

The results of the spot dives suggest that it is unnecessary to carry out further in-depth surveys. Since corals are not abundant and patchily distributed, furthermore only two common species were recorded.

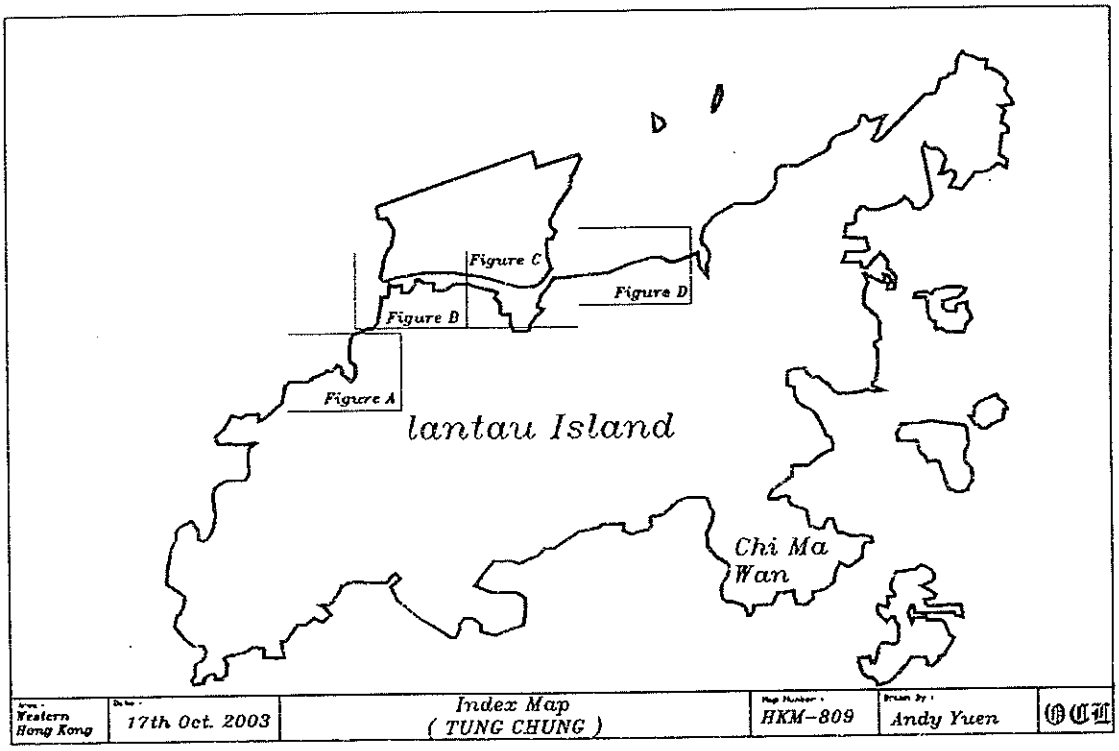


Figure 1. A map showing the 4 areas within which the coral surveys were carried out.

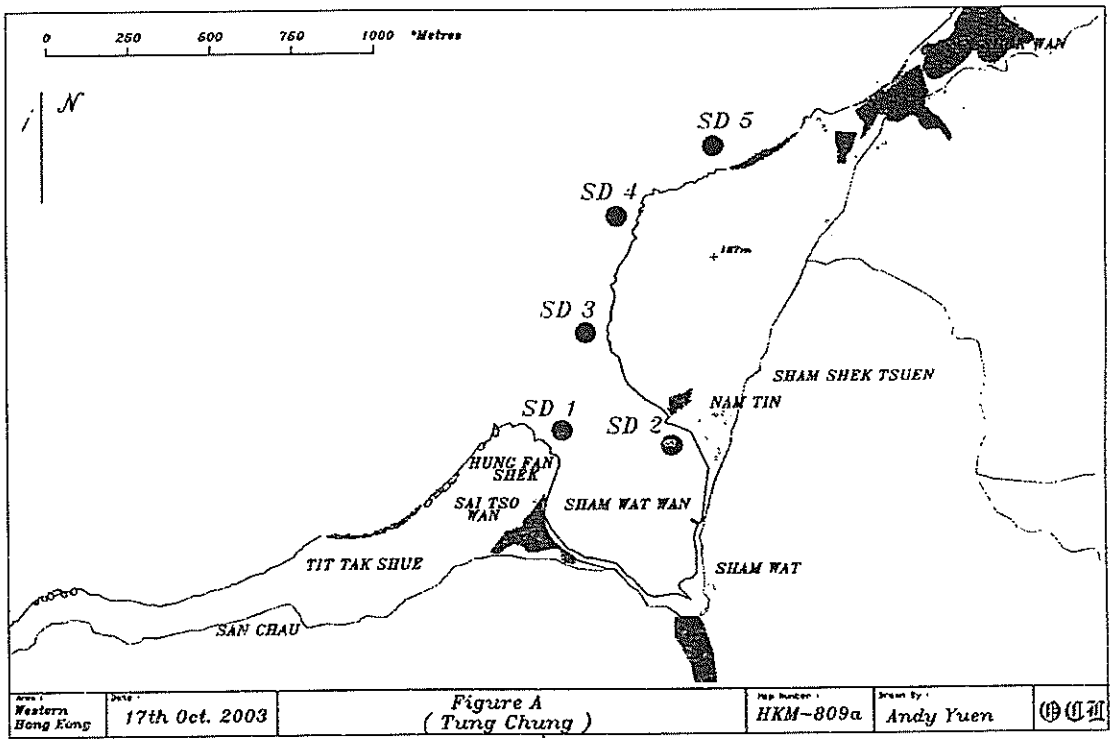


Figure 1. A map showing the 4 areas within which the coral surveys were carried out.

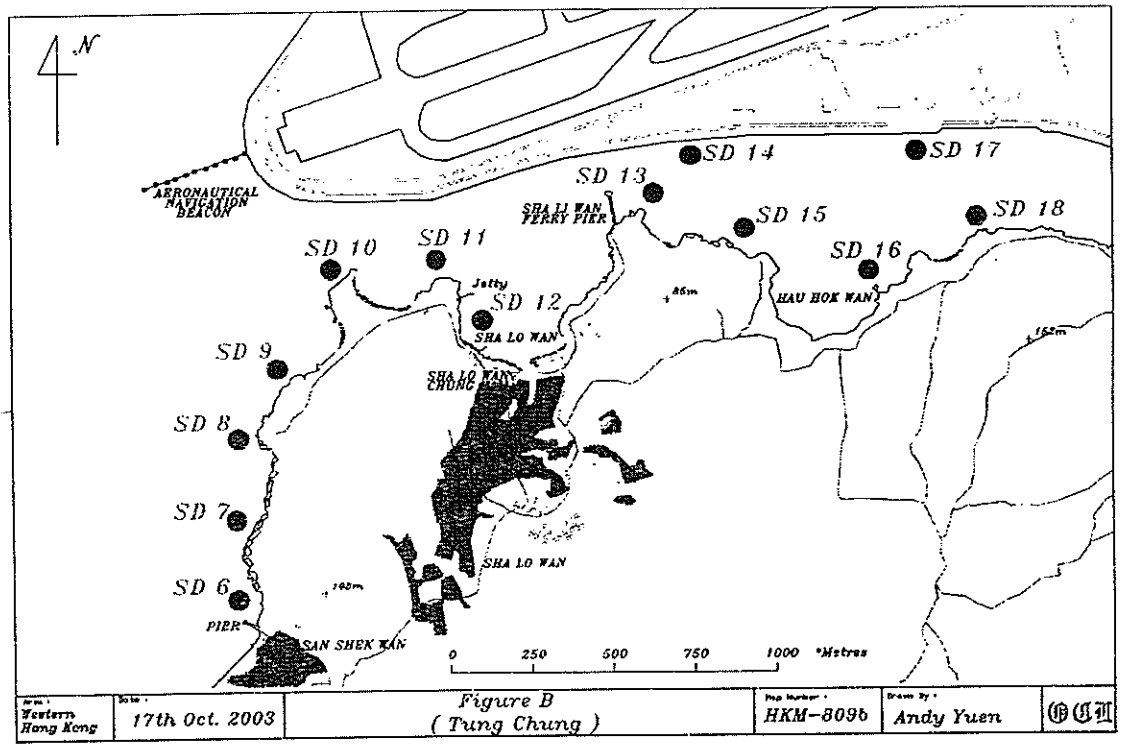


Figure B. A map showing the spot dive locations within the Chek Lap Kok west area.

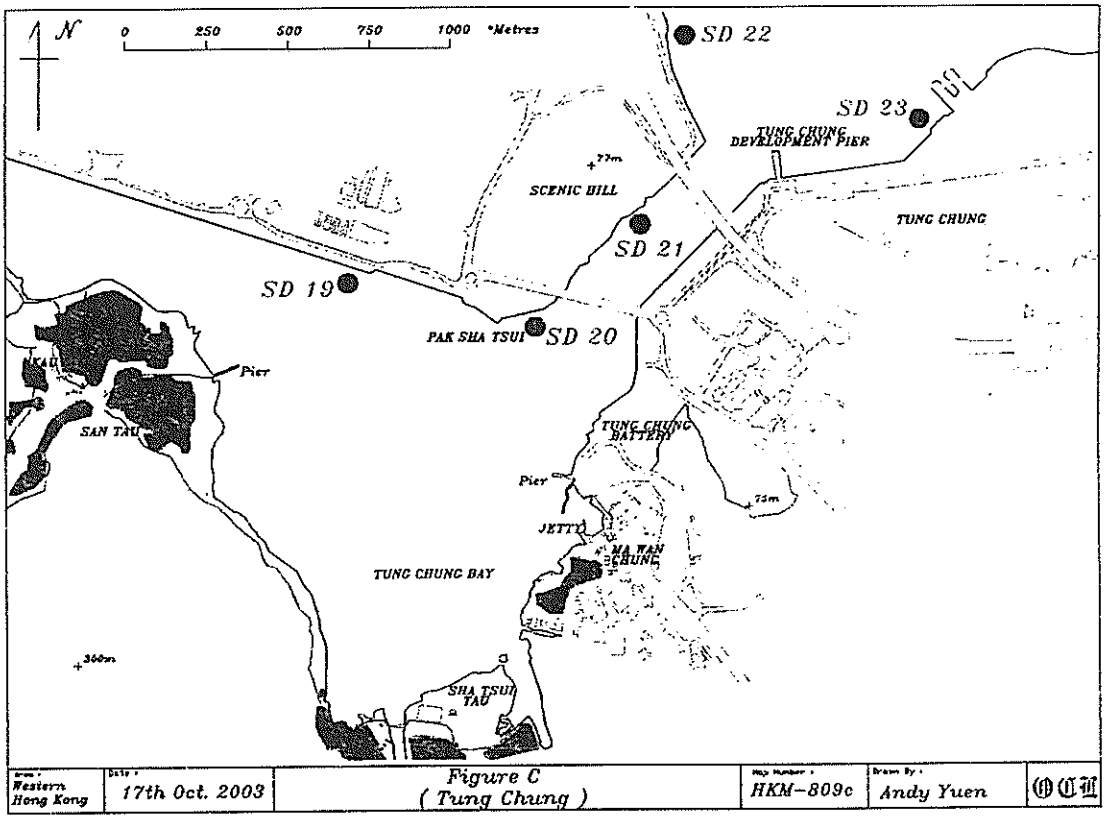


Figure C. A map showing the spot dive locations within the Chek Lap Kok east area.

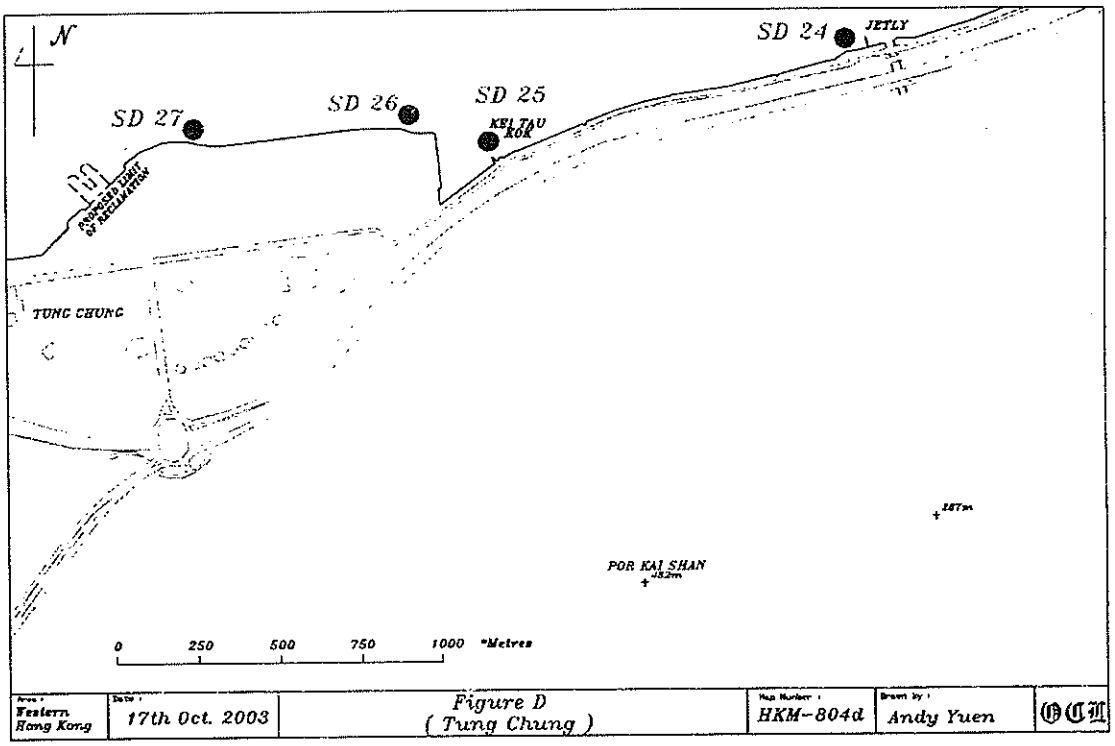


Figure D. A map showing the spot dive locations within the Tung Chung and Tung Chung East area.

APPENDIX 1: GPS COORDINATES

Table A1.1. GPS coordinates of spot dives.

Spot dive Number	GPS coordinate	
	N	E
1	16.468	52.850
2	16.538	52.976
3	16.786	53.060
4	16.829	53.190
5	16.917	53.313
6	17.073	53.491
7	17.190	53.485
8	17.334	53.500
9	17.444	53.578
10	17.568	53.624
11	17.585	53.816
12	17.533	53.853
13	17.690	54.105
14	17.775	54.145
15	17.653	54.277
16	17.568	54.533
17	17.794	54.613
18	17.637	54.942
19	17.608	55.483
20	17.496	55.857
21	17.672	56.062
22	17.982	56.113
23	17.801	56.542
24	18.062	57.867
25	17.892	57.259
26	17.928	57.150
27	17.918	57.679

APPENDIX 2: SPOT DIVE RAW DATA

Table A2.1. Spot dive site information

Dive	Date	Map	Depth		Substrate	Coral	Part.
			Min	Max		Cover	Mort.
S01	15.10.03	A	1.1	3.1	R, M	<5%	50%
S02	15.10.03	A	1	3.4	R, M	<5%	50%
S03	15.10.03	A	0.9	3.2	R, M	<5%	n/a
S04	15.10.03	A	1	4.6	R, M	<5%	50%
S05	15.10.03	A	1.1	3.2	R, M	<5%	50%
S06	15.10.03	A	1.2	3.4	R, M	<1%	50%
S07	15.10.03	A	0.8	3.6	R, M	<1%	50%
S08	15.10.03	A	0.4	3.8	R, M	<1%	50%
S09	15.10.03	A	1.1	4.2	R, M	<1%	50%
S10	15.10.03	A	0.9	3.1	R, M	<1%	50%
S11	15.10.03	B	0.8	3.1	R, M	0	n/a
S12	15.10.03	B	0.8	2.9	R, M	0	n/a
S13	15.10.03	B	1	2.4	R, M	0	n/a
S14	15.10.03	B	1.2	5.6	art SW	0	n/a
S15	15.10.03	B	1	3.1	R, M	0	n/a
S16	15.10.03	B	0.9	3.4	R, M	0	n/a
S17	15.10.03	B	0.8	5.8	art SW	0	n/a
S18	15.10.03	B	0.6	3.2	R, M	0	n/a
S19	15.10.03	C	0.8	5.2	art SW	0	n/a
S20	15.10.03	C	0.9	5.6	art SW	0	n/a
S21	15.10.03	C	0.6	5.8	R, M	0	n/a
S22	15.10.03	C	0.7	6.1	R, M	<5%	50%
S23	15.10.03	D	0.9	5.4	R, M	<1%	50%
S24	15.10.03	D	0.6	6.2	art SW	<1%	50%
S25	15.10.03	D	0.4	4.2	art SW	<1%	50%
S26	15.10.03	D	0.9	6.1	art SW	<1%	50%
S27	15.10.03	D	1.1	6.8	art SW	<1%	50%

Table A2.2 Spot dive species information

Dive	**Hard Coral**	**Ahermatypic**	*Balanophyllia*	Other	**Soft corals**	*Echinomuricea sp.*	Others	**Other Sessile organisms**	*Schizoporella errata*	*Bugula*	Encrusting Red Bryozoan	Anemones	Barnacles	Oysters	*Perna*	Sponges	Tube worms
S01	0		X	0		X	0		X	0	0	0	X	X	0	0	X
S02	0		X	0		X	0		0	0	X	X	X	X	0	0	X
S03	0		X	0		X	0		0	0	X	X	X	X	0	0	0
S04	0		X	0		X	0		0	0	X	X	X	X	X	0	0
S05	0		X	0		X	0		X	0	X	0	X	X	X	0	X
S06	0		0	0		X	0		0	0	0	0	X	X	0	0	0
S07	0		X	0		X	0		0	0	X	X	X	X	X	0	0
S08	0		X	0		X	0		0	0	0	0	0	0	X	0	0
S09	0		X	0		X	0		0	0	0	0	0	0	X	0	0
S10	0		0	0		X	0		0	0	0	0	0	0	X	0	0
S11	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S12	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S13	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S14	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S15	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S16	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S17	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S18	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S19	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S20	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S21	0		0	0		0	0		0	0	X	X	X	X	X	0	X
S22	0		X	0		X	0		0	0	X	X	X	X	X	0	X
S23	0		0	0		X	0		0	0	X	X	X	X	X	0	X
S24	0		0	0		X	0		0	0	X	X	X	X	X	0	X
S25	0		0	0		X	0		0	0	X	X	X	X	X	0	X
S26	0		0	0		X	0		0	0	X	X	X	X	X	0	X
S27	0		0	0		X	0		0	0	X	X	X	X	X	0	X

APPENDIX 3: SAMPLE DATA SHEETS

Table A3.1 Data sheet used to record observations in the spot dives

Dive Location		Taxa observed:
Date		
Team		
Start Time		
Depth Min		
Max		
Distance		Notes:
Substrate		
Coral cover		
Part. Mort.		

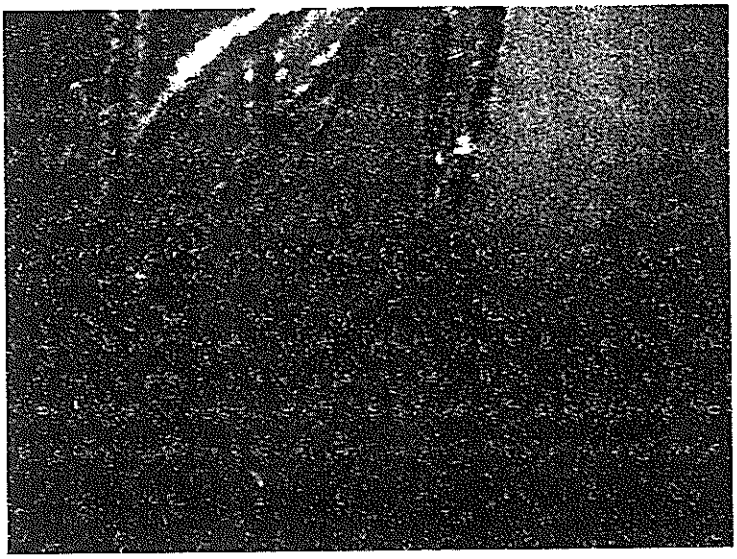
Dive Location		Taxa observed:
Date		
Team		
Start Time		
Depth Min		
Max		
Distance		Notes:
Substrate		
Coral cover		
Part. Mort.		

Dive Location		Taxa observed:
Date		
Team		
Start Time		
Depth Min		
Max		
Distance		Notes:
Substrate		
Coral cover		
Part. Mort.		

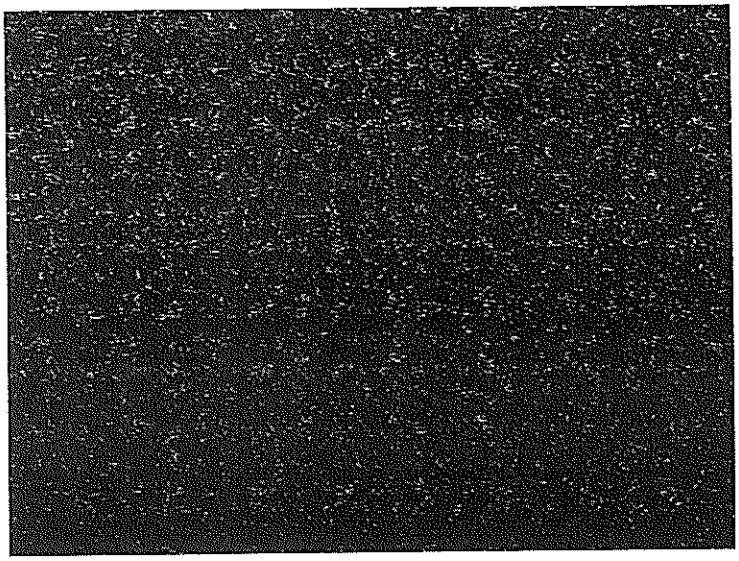
Dive Location		Taxa observed:
Date		
Team		
Start Time		
Depth Min		
Max		
Distance		Notes:
Substrate		
Coral cover		
Part. Mort.		

APPENDIX 4: SELECTED PHOTOGRAPHS

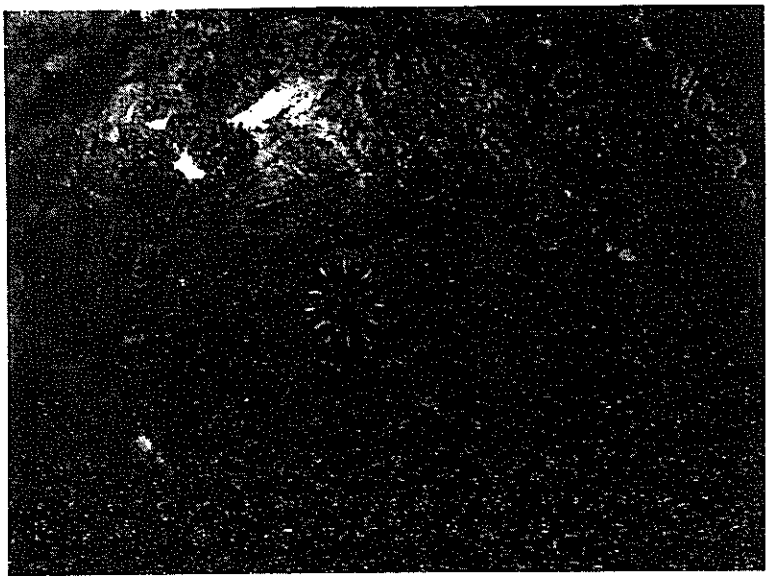
The soft coral *Echinomuricea.* This soft coral was present to the west and east of Chek Lap Kok but was small in size and suffered high levels of partial mortality.



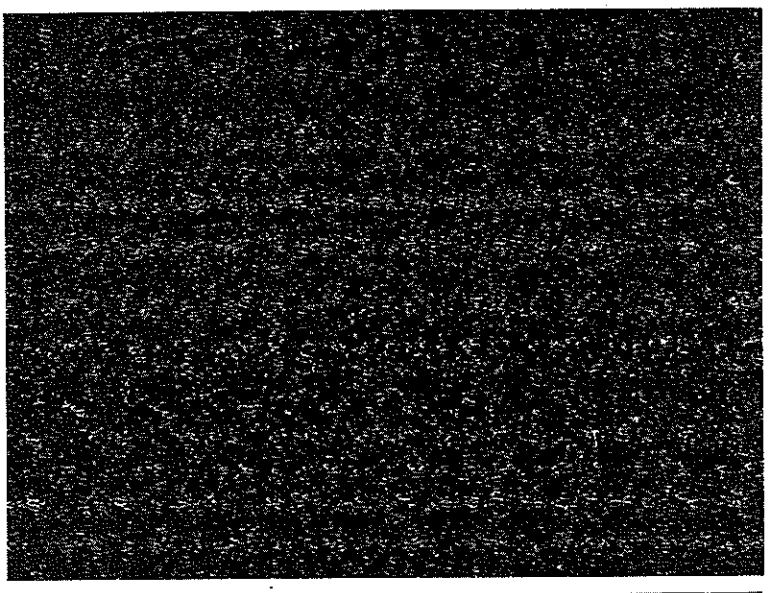
High levels of partial mortality were recorded on the soft coral *Echinomuricea.*



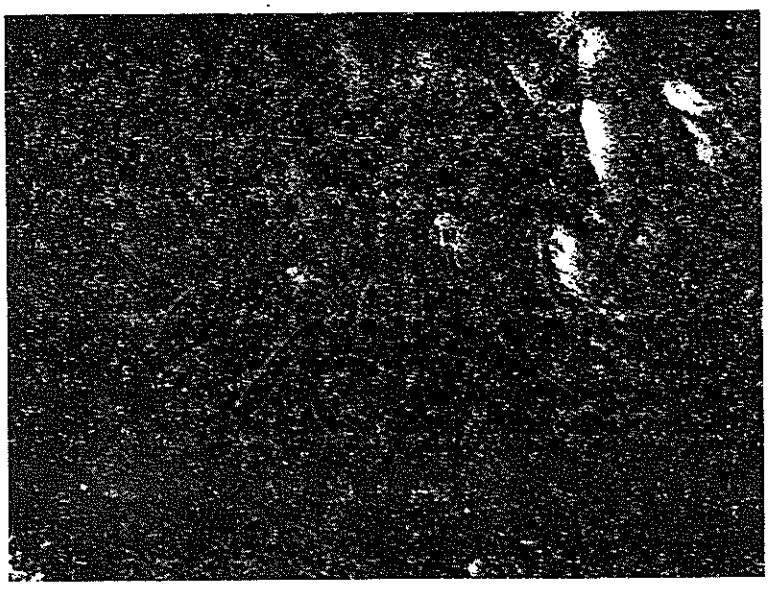
The ahermatypic coral *Balanophyllia* was found in the Sham Wat / San Shek Wan area



To get a clear photograph for identification due to extremely poor visibility a rock was removed to allow a shot to be taken on the boat.



Oysters and mussels (below) were common taxa observed during the diving surveys



Appendix G

List of Recorded Horseshoe Crab Species

Horseshoe Crab Survey Results

Date	Area	Species	No of individuals	Prosoma width (cm)
18-Sep-03	Hau Hok Wan, San Tau, Sha Lo Wan, Tung Chung Bay	No horseshoe crabs or trails.		
25-Sep-03	Hau Hok Wan, San Shek Wan, San Tau, Sha Lo Wan	No horseshoe crabs or trails.		
26-Sep-03	Pak Mong, Tai Ho Wan	No horseshoe crabs or trails.		
* 2-Oct-03	Hau Hok Wan, San Shek Wan, San Tau, Sha Lo Wan	No horseshoe crabs or trails.		
21-Oct-03	Pak Mong, Pak Sha Tsui, Tai Ho Wan, Tung Chung Bay, Tung Chung Town	No horseshoe crabs or trails.		
22-Oct-03	Hau Hok Wan, San Shek Wan, Sha Lo Wan, Sham Wat Wan	More than 10 juveniles observed at Sham Wat		
* 25-Oct-03	Sham Wat Wan	No horseshoe crabs or trails.		
18-Nov-03	San Tau	*Tachypleus tridentatus*	2	<2
		Tachypleus tridentatus	1	3.7
		Tachypleus tridentatus	2	3.8
		Tachypleus tridentatus	1	3.9
		Tachypleus tridentatus	2	4
		Tachypleus tridentatus	1	5.2
		Tachypleus tridentatus	1	7.2
		Carcinoscorpius rotundicauda	1	5.6
	Total	***Tachypleus tridentatus***	10	
		Carcinoscorpius rotundicauda	1	
	Tai Ho Wan, Pak Mong, Tung Chung Bay	No horseshoe crabs or trails.		
19-Nov-03	Hau Hok Wan	*Tachypleus tridentatus*	1	1.4
		Tachypleus tridentatus	1	3.7
		Carcinoscorpius rotundicauda	1	4.5
	Total	***Tachypleus tridentatus***	2	
		Carcinoscorpius rotundicauda	1	
	Sha Lo Wan, San Shek Wan, Sham Wat Wan	No horseshoe crabs or trails.		
07-Jan-04	Pak Mong, Tai Ho Wan	No horseshoe crabs or trails.		
15-Jan-04	Hau Hok Wan, San Tau, Sha Lo Wan, Tung Chung Bay	No horseshoe crabs or trails.		
16-Jan-04	San Shek Wan, Sha Lo Wan, Sham Wat Wan	No horseshoe crabs or trails.		
# 25-Jan-04	Hau Hok Wan	No horseshoe crabs or trails.		
# 17-Feb-04	San Tau	No horseshoe crabs or trails.		
11-Mar-04	San Shek Wan, Sha Lo Wan, Sham Wat Wan	No horseshoe crabs or trails.		
23-Mar-04	Hau Hok Wan, Pak Mong, San Tau, Tai Ho Wan, Tung Chung Bay	No horseshoe crabs or trails.		
23-Apr-04	Sham Wat Wan (West)	*Tachypleus tridentatus*	1	4.0
		Tachypleus tridentatus (molt)	1	3.9
		Tachypleus tridentatus (molt)	1	3.5
		Tachypleus tridentatus (molt)	1	3.0
	Total	***Tachypleus tridentatus***	1	
05-May-04	Tung Chung Bay (West)	*Tachypleus tridentatus*	2	3.3
		Tachypleus tridentatus	2	3.8
		Tachypleus tridentatus	4	4.0
		Tachypleus tridentatus	1	4.8
		Tachypleus tridentatus	1	4.9
		Tachypleus tridentatus	2	5.0
		Tachypleus tridentatus	1	5.1
		Tachypleus tridentatus	1	5.3
		Tachypleus tridentatus	1	5.4
	Total	***Tachypleus tridentatus***	15	
	Tung Chung Bay - San Tau	*Tachypleus tridentatus*	1	3.9
		Tachypleus tridentatus	1	4.9
		Tachypleus tridentatus	1	5.2
		Tachypleus tridentatus	1	5.4
		Tachypleus tridentatus	1	5.5
		Tachypleus tridentatus	1	7.4
	Total	***Tachypleus tridentatus***	6	
	San Tau	*Tachypleus tridentatus*	1	4.9
		Tachypleus tridentatus	3	5.2
		Tachypleus tridentatus	1	6.3
	Total	***Tachypleus tridentatus***	5	
06-May-04	Tai Ho Wan	*Carcinoscorpius rotundicauda*	1	1.7
		Carcinoscorpius rotundicauda	1	3.0
		Carcinoscorpius rotundicauda	1	3.1
		Carcinoscorpius rotundicauda	2	3.3
		Carcinoscorpius rotundicauda	1	3.4
		Carcinoscorpius rotundicauda	1	3.5
		Carcinoscorpius rotundicauda	1	3.6
		Carcinoscorpius rotundicauda	3	3.7
		Carcinoscorpius rotundicauda	1	5.0
		Carcinoscorpius rotundicauda	2	5.3
		Carcinoscorpius rotundicauda (molt)	1	2.7
		Carcinoscorpius rotundicauda (molt)	1	3.6
		Carcinoscorpius rotundicauda (molt)	1	4.0
	Total	***Carcinoscorpius rotundicauda***	14	

* Half-day Additional Survey
# Short Visit - 25-Jan-04: ~30 minutes
- 17-Feb-04: 12:00 - 12:30

Appendix H

List of Recorded Avifauna Species

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Summary of Avifauna Survey Results

Type of survey	Species name	Common name	Date of survey: 24-Sep-03	30-Sep-03	2-Oct-03	20-Oct-03	21-Oct-03	23-Oct-03 (Night)	24-Oct-03	28-Oct-03	29-Oct-03	30-Oct-03 (Night)	5-Nov-03	5-Nov-03 (Night)	19-Nov-03	27-Nov-03 (Night)	28-Nov-03	19-Dec-03	22-Dec-03	22-Jan-04	26-Jan-04	27-Jan-04	17-Feb-04 (Night)	18-Feb-04	19-Feb-04 (Night)	23-Feb-04	17-Mar-04	31-Mar-04	15-Apr-04	19-Apr-04 (Night)	27-Apr-04 (Night)	30-Apr-04	11-May-04	12-May-04	27-May-04 (Day and Night)	Sighting Locations: Sham Wat Bay	Sham Shek Tauen	San Shek Wan	San Shek Wan Tunnel Option	Sha Lo Wan	Ferry Pier	Hau Hok Wan	Chek Lap Kok	Kau Lia	Tin Sam	San Tau	Tung Chung Bay	Hau Wong Temple	Ma Wan Chung	Tung Chung Battery	Cheung Tung Road Hill	Pak Mong	Ngau Kwu Long	Tai Ho Bay	Hok Tsui Wan	Habitat
Avifauna	*Accipiter gularis*	Japanese Sparrowhawk											✔																																					WL
(118 species)	*Accipiter trivirgatus*	Crested Goshawk				✔																						✔							✔			✔	✔				✔									WL
	Accipiter virgatus	Besra																															✔					✔													WL
	Acridotheres cristatellus	Crested Myna	✔		✔	✔									✔		✔	✔	✔			✔				✔		✔	✔			✔	✔			✔		✔	✔		✔		✔		✔	✔	✔		✔	C,DA
	Acrocephalus bistrigiceps	Black-browed Reed Warbler				✔	✔																												✔											✔					SHG
	Actitis hypoleucos	Common Sandpiper	✔		✔	✔	✔								✔			✔			✔					✔			✔			✔			✔			✔				✔		✔	✔	✔				✔	CT
	Aethopyga christinae	Fork-tailed Sunbird															✔												✔							✔								✔							WL
	Alcedo atthis	Common Kingfisher			✔	✔													✔			✔			✔			✔														✔								S, CT
	Amaurornis phoenicurus	White-breasted Waterhen				✔															✔					✔	✔	✔				✔	✔								✔			✔						✔	S, CT, C
	Anthus hodgsoni	Olive-backed Pipit								✔					✔		✔	✔	✔		✔	✔		✔		✔	✔	✔	✔							✔	✔				✔	✔	✔	✔	✔		✔	✔	✔		✔	C, SHG, DA, TS, PW
	Anthus richardi	Richard's Pipit	✔																															✔				✔													W,C
	Apus affinis	Little Swift																									✔		✔				✔	✔				✔						✔							WL, SHG, TS
	Apus pacificus	Pacific Swift																									✔		✔				✔	✔			✔				✔	✔	✔	✔	✔			✔			WL, SHG, TS
	Ardea cinerea	Grey Heron			✔	✔	✔										✔								✔																			✔	✔					✔	CT
	Ardeola bacchus	Chinese Pond Heron	✔		✔		✔		✔						✔				✔		✔	✔				✔			✔	✔	✔				✔		✔	✔				✔		✔	✔	✔					✔	CT
	Bambusicola thoracica	Chinese Bamboo Partridge																															✔							✔										TS
	Bubo bubo	Eurasian Eagle Owl																													✔																✔		SHG
	Bubulcus ibis	Cattle Egret	✔																																															CT
	Butastur indicus	Grey-faced Buzzard																								✔											✔													TS
	Buteo buteo	Common Buzzard				✔												✔			✔							✔											✔												WL, SHG, TS
	Butorides striatus	Striated Heron							✔							✔																✔	✔					✔												✔	S
	Caprimulgus affinis	Savanna Nightjar																													✔							✔											✔	SHG,TS
	Centropus bengalensis	Lesser Coucal																				✔					✔	✔	✔						✔		✔	✔										✔		✔	WL, SHG
	Centropus sinensis	Greater Coucal	✔			✔													✔	✔		✔			✔			✔				✔	✔		✔		✔	✔	✔		✔	✔				✔		✔	✔	✔	WL, SHG, TS
	Cettia diphone	Japanese Bush Warbler															✔	✔			✔	✔							✔							✔		✔	✔	✔		✔	✔					✔	✔	✔	DA, SHG
	Cettia fortipes	Brownish-flanked Bush Warbler																				✔																												✔	SHG
	Chalcophaps indica	Emerald Dove																															✔																	WL
	Cisticola juncidis	Zitting Cisticola					✔																												✔																SHG
	Clamator coromandus	Chestnut-winged Cuckoo																													✔																				WL
	Copsychus saularis	Oriental Magpie Robin	✔	✔	✔	✔	✔								✔		✔	✔	✔		✔	✔		✔	✔		✔		✔				✔	✔	✔	✔	✔	✔			✔	✔		✔		✔	✔	✔	✔	✔	✔	✔	CT
	Corvus macrorhynchus	Large-billed Crow			✔						✔				✔		✔	✔	✔		✔	✔				✔							✔		✔	✔		✔	✔	✔	✔	✔				✔	✔	✔	✔	✔		✔	WL, CT
	Cuculus micropterus	Indian Cuckoo																													✔	✔	✔													✔						WL, TS
	Cyanoptila cyanomelana	Blue-and-white Flycatcher																✔																																		WL
	Delichon dasypus	Asian House Martin																									✔																								WL,TS
	Dendrocitta formosae	Grey Treepie		✔																																															WL
	Dicaeum cruentatum	Scarlet-backed Flowerpecker															✔																																			WL, TS
	Dicrurus hottentotus	Hair-crested Drongo				✔																											✔					✔		✔		✔		✔							WL
	Dicrurus macrocercus	Black Drongo	✔	✔	✔																										✔	✔					✔				✔			✔				✔				CT, WL, SHG, TS
	Egretta alba	Great Egret	✔				✔		✔													✔				✔	✔				✔					✔	✔		✔					✔						✔	CT
	Egretta eulophotes	Swinhoe's Egret																									✔																								CT
	Egretta garzetta	Little Egret	✔	✔	✔	✔	✔		✔	✔					✔		✔	✔			✔	✔		✔	✔	✔	✔	✔	✔				✔	✔			✔		✔	✔	✔	✔		✔		✔	✔		✔		✔	CT
	Egretta intermedia	Intermediate Egret	✔																																																CT
	Egretta sacra	Pacific Reef Egret	✔		✔	✔													✔							✔			✔		✔														✔	✔		✔			✔	CT
	Emberiza aureola	Yellow-breasted Bunting				✔																																									✔					SHG
	Emberiza fucata	Chestnut-eared Bunting																										✔																								CT
	Emberiza pusilla	Little Bunting																									✔								✔															TS
	Emberiza rutila	Chestnut Bunting					✔						✔																✔						✔	✔		✔													SHG
	Emberiza spodocephala	Black-faced Bunting													✔			✔	✔		✔					✔	✔	✔								✔				✔	✔	✔		✔	✔	✔		✔	✔	✔	WL, C, SHG
	Eudynamys scolopacea	Common Koel													✔							✔							✔					✔	✔							✔		✔		✔			✔	✔	✔	CT, WL, DA, TS, C
	Eurystomus orientalis	Dollarbird																											✔																						WL
	Falco peregrinus	Peregrine Falcon				✔																																												SHG
	Falco tinnunculus	Common Kestrel								✔					✔			✔	✔			✔														✔			✔								✔	✔		✔	SHG
	Ficedula mugimaki	Mugimaki Flycatcher								✔																										✔															WL
	Ficedula parva	Red-breasted Flycatcher				✔																														✔															WL
	Francolinus pintadeanus	Chinese Francolin																												✔		✔	✔	✔	✔		✔		✔									✔	✔		✔	TS, SHG
	Garrulax canorus	Hwamei													✔		✔					✔					✔	✔	✔							✔		✔									✔	✔			SHG, WL
	Garrulax perspicillatus	Masked Laughingthrush	✔						✔						✔		✔	✔	✔			✔			✔		✔	✔	✔				✔	✔				✔	✔	✔		✔					✔	✔		✔	✔	SHG, , DA, TS
	Halcyon pileata	Black-capped Kingfisher				✔	✔		✔				✔		✔		✔		✔		✔				✔				✔	✔					✔	✔	✔									✔				✔	CT
	Halcyon smyrnensis	White-throated Kingfisher				✔	✔		✔						✔	✔			✔			✔				✔	✔			✔		✔			✔		✔	✔	✔		✔					✔			✔			CT, S
	Haliaeetus leucogaster	White-bellied Sea Eagle				✔											✔						✔								✔						✔			✔												WL
	Heteroscelus brevipes	Grey-tailed Tattler																															✔	✔														✔			CT
	Hieraaetus fasciatus	Bonelli's Eagle								✔																									✔																SHG
	Hierococcyx sparverioides	Large Hawk Cuckoo																									✔	✔	✔				✔	✔	✔		✔				✔	✔		✔	✔	✔		✔	✔	✔	WL
	Himantopus himantopus	Black-winged Stilt	✔																														✔																	CT
	Hirundapus cochinchinensis	White-vented Needletail																									✔																								TS
	Hirundo rustica	Barn Swallow																									✔	✔					✔			✔											✔		✔	✔	DA,C
	Hypsipetes castanonotus	Chestnut Bulbul															✔	✔			✔	✔														✔							✔		✔						WL
	Ketupa zeylonensis	Brown Fish Owl*							✔				✔		✔																																					S, CT, WL
	Lanius cristatus	Brown Shrike																				✔					✔																							✔	✔	TS
	Lanius schach	Long-tailed Shrike	✔	✔	✔	✔	✔				✔				✔		✔	✔			✔	✔				✔	✔	✔	✔						✔	✔		✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	WL, W, C, SHG
	Lonchura punctulata	Scaly-breasted Munia	✔			✔											✔					✔													✔									✔					✔		W, C, SHG, DA
	Luscinia calliope	Siberian Rubythroat				✔	✔			✔		✔			✔		✔	✔	✔		✔	✔		✔		✔	✔	✔	✔							✔	✔		✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	CT, WL, SHG, TS
	Luscinia sibilans	Rufous-tailed Robin																✔			✔																														WL, TS, SHG
	Milvus migrans	Black Kite	✔			✔	✔			✔		✔						✔	✔			✔				✔	✔	✔						✔	✔				✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	WL, TS, SHG, CT
	Monticola solitarius	Blue Rock Thrush																	✔		✔														✔																✔	CT
	Motacilla alba	White Wagtail	✔		✔	✔	✔										✔	✔	✔		✔	✔		✔	✔	✔	✔							✔				✔	✔	✔		✔	✔	✔		✔	✔	✔	✔	✔	C, DA, S, CT
	Motacilla cinerea	Grey Wagtail	✔														✔	✔				✔							✔		✔				✔				✔	✔			✔	✔			✔	✔	✔	✔	✔	C, S
	Motacilla flava	Yellow Wagtail																											✔																				✔	CT
	Muscicapa dauurica	Asian Brown Flycatcher	✔	✔		✔																																												WL, TS
	Myophonus caeruleus	Blue Whistling Thrush		✔					✔						✔		✔		✔		✔			✔		✔									✔									✔	✔		✔	✔	✔	✔	WL, S, CT
	Nycticorax nycticorax	Black-crowned Night Heron							✔				✔	✔	✔								✔			✔																									✔	S, CT
	Orthotomus sutorius	Common Tailorbird	✔			✔									✔		✔	✔	✔		✔	✔		✔			✔	✔	✔				✔	✔	✔			✔			✔	✔	✔	✔		✔		✔	✔	✔	✔	✔	W, C, SHG, DA, TS
	Otus bakkamoena	Collared Scops Owl					✔		✔		✔									✔									✔	✔						✔		✔	✔	✔				✔					✔		WL
	Parus major	Great Tit	✔			✔									✔		✔				✔	✔		✔			✔	✔	✔				✔	✔			✔	✔			✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	CT, WL, C, DA, TS
	Passer montanus	Eurasian Tree Sparrow				✔									✔		✔																		✔																W, C, DA, S
	Phoenicurus auroreus	Daurian Redstart													✔		✔	✔	✔		✔	✔		✔												✔	✔			✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	WL, C, DA, TS
	Phylloscopus borealis	Arctic Warbler	✔			✔																																												WL, TS, CT
	Phylloscopus fuscatus	Dusky Warbler				✔	✔					✔			✔		✔		✔			✔			✔	✔	✔		✔				✔			✔	✔	✔	✔		✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	CT, WL, C, SHG, DA, TS
	Phylloscopus inornatus	Yellow-browed Warbler				✔						✔			✔		✔	✔	✔		✔	✔					✔	✔	✔							✔	✔	✔			✔	✔	✔			✔	✔	✔	✔	✔	✔	CT, WL, TS, C
	Phylloscopus proregulus	Pallas's Leaf Warbler															✔	✔	✔		✔			✔												✔					✔	✔		✔			✔		✔	✔	WL, TS, C
	Phylloscopus tenellipes	Pale-legged Leaf Warbler	✔	✔		✔	✔																													✔				✔					✔				✔		WL, TS
	Pica pica	Common Magpie				✔									✔		✔	✔			✔			✔		✔	✔	✔	✔	✔		✔		✔		✔	✔				✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	CT, WL, DA, TS
	Prinia flaviventris	Yellow-bellied Prinia																			✔			✔		✔										✔																SHG
	Prinia inornata	Plain Prinia																									✔																				✔				C
	Pycnonotus aurigaster	Sooty-headed Bulbul																									✔								✔	✔			✔	✔	✔										C
	Pycnonotus jocosus	Red-whiskered Bulbul	✔	✔	✔	✔			✔		✔		✔		✔		✔		✔		✔	✔		✔	✔				✔	✔	✔			✔		✔	✔	✔	✔	✔	✔		✔		✔	✔	✔	✔	✔	✔	✔	CT, WL, W, C, SHG, TS, S
	Pycnonotus sinensis	Chinese Bulbul	✔	✔		✔	✔		✔		✔		✔		✔	✔	✔		✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	CT, WL, W, C, SHG, TS, S
	Rallina eurizonoides	Slaty-legged Crake*																												✔	✔				✔																TS
	Saxicola torquata	Common Stonechat				✔												✔										✔																				✔				C, SHG, WL
	Scolopax rusticola	Eurasian Woodcock							✔					✔		✔							✔																											✔		WL
	Serinus mozambicus	Yellow-fronted Canary																															✔														✔				DA
	Spilornis cheela	Crested Serpent Eagle																											✔						✔																WL
	Streptopelia chinensis	Spotted Dove	✔			✔	✔	✔							✔		✔				✔	✔		✔		✔	✔				✔	✔		✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	CT, WL, W, C, SHG, TS, S
	Streptopelia orientalis	Oriental Turtle Dove																✔	✔		✔	✔		✔												✔									✔						✔	SHG, TS, C
	Sturnus nigricollis	Black-collared Starling	✔		✔	✔											✔	✔	✔			✔				✔		✔				✔		✔			✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	CT, WL, W, C, SHG, TS, S
	Sturnus sericeus	Red-billed Starling															✔	✔			✔																								✔		✔				CT, WL
	Sturnus sinensis	White-shouldered Starling																				✔							✔																			✔	✔			WL
	Tachybaptus ruficollis	Little Grebe					✔																																										✔			CT
	Tarsiger cyanurus	Red-flanked Bluetail															✔				✔	✔													✔													✔	✔	✔		WL, TS, C
	Tringa glareola	Wood Sandpiper																												✔					✔																CT
	Turdus cardis	Japanese Thrush																✔			✔	✔		✔												✔																✔	WL, TS, C
	Turdus hortulorum	Grey-backed Thrush															✔	✔			✔	✔		✔		✔	✔								✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	WL, TS, C
	Turdus merula	Common Blackbird					✔			✔					✔						✔														✔	✔	✔				✔										TS, C
	Turdus pallidus	Pale Thrush																			✔	✔																								✔		✔			✔	C, WL
	Urocissa erythrorhyncha	Blue Magpie					✔										✔	✔						✔					✔							✔																WL, TS
	Urosphena squameiceps	Asian Stubtail Warbler															✔				✔															✔																WL, TS
	Zoothera dauma	Scaly Thrush																✔			✔	✔		✔		✔										✔																WL, DA, TS, C
	Zosterops japonicus	Japanese White-eye		✔		✔							✔			✔	✔	✔			✔	✔		✔		✔	✔		✔			✔			✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	CT, WL, W, C, SHG, DA, TS, S

Habitat

C- Cultivated field/Orchard
CT-Coastal
DA- Developed Area
S- Stream/s/Riparian/Pond
PW- Plantation Woodland
ShG- Shrubby Grassland
TS- Tall Shrubland
W- Wasteland
WL-woodland

Avifauna

Date of Survey: 24 September 2003

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan
Cattle Egret	*Bubulcus ibis*	*700*			700				
Chinese Pond Heron	*Ardeola bacchus*	*41*			39	2			
Pacific Reef Egret	*Egretta sacra*	*2*			1			1	
Little Egret	*Egretta garzetta*	*784*			773	1	1	8	1
Intermediate Egret	*Egretta intermedia*	*10*			10				
Great Egret	*Egretta alba*	*9*			5			4	
Black Kite	*Milvus migrans*	*2*				1		1	
Black-winged Stilt	*Himantopus himantopus*	*1*				1			
Common Sandpiper	*Actitis hypoleucos*	*2*			1	1			
Spotted Dove	*Steptopelia chinensis*	*13*				8			5
Greater Coucal	*Centropus sinensis*	*1*					1		
Richard's Pipit	*Anthus richardi*	*4*						4	
Grey Wagtail	*Motacilla cinerea*	*2*			2				
White Wagtail	*Motacilla alba*	*4*		1	1	1			1
Red-whiskered Bulbul	*Pycnonotus jocosus*	*21*	10			8			3
Chinese Bulbul	*Pycnonotus sinensis*	*28*	10				12	6	
Oriental Magpie Robin	*Copsychus saularis*	*3*							3
Common Tailorbird	*Orthotomus sutorius*	*2*							2
Pale-legged Leaf Warbler	*Phylloscopus tenellipes*	*1*				1			
Arctic Warbler	*Phylloscopus borealis*	*6*				2	3	1	
Asian Brown Flycatcher	*Muscicapa dauurica*	*4*				1			3
Masked Laughingthrush	*Garrulax perspicillatus*	*18*				12	6		
Great Tit	*Parus major*	*5*				4			1
Long-tailed Shrike	*Lanius schach*	*4*	2			2			
Black Drongo	*Dicrurus macrocercus*	*1*	1						
Black-collared Starling	*Sturnus nigricollis*	*4*		2	2				
Crested Myna	*Acridotheres cristatellus*	*15*	15						
Scaly-breasted Munia	*Lonchura punctulata*	*6*	6						

Date of Survey: 30 September 2003

Common Name	Scientific name	*Total*	Tai Ho Wan	Cheung Tung Road Hill					
Little Egret	*Egretta garzetta*	*4*	4	34 in southern part of bay					
Red-whiskered Bulbul	*Pycnonotus jocosus*	*12*		12					
Chinese Bulbul	*Pycnonotus sinensis*	*5*		5					
Oriental Magpie Robin	*Copsychus saularis*	*3*		3					
Blue Whistling Thrush	*Myophonus caeruleus*	*2*		2					
Pale-legged Leaf Warbler	*Phylloscopus tenellipes*	*2*		2					
Asian Brown Flycatcher	*Muscicapa dauurica*	*1*		1					
Japanese White-eye	*Zosterops japonicus*	*12*		12					
Long-tailed Shrike	*Lanius schach*	*1*		1					
Black Drongo	*Dicrurus macrocercus*	*3*		3					
Grey Treepie	*Dendrocitta formosae*	*1*		1					

Date of Survey: 2 October 2003 (Half-day Additional Survey)

Common Name	Scientific name	*Total*	San Tau	Hau Hok Wan	Tung Chung Wan	Sha Lo Wan
Black Drongo	*Dicrurus macrocercus*	*1*				1
Black-collared Starling	*Sturnus nigricollis*	*1*			1	
Chinese Pond Heron	*Ardeola bacchus*	*2*	1	1		
Common Kingfisher	*Alcedo atthis*	*1*				1
Common Sandpiper	*Actitis hypoleucos*	*2*	1			1
Crested Myna	*Acridotheres cristatellus*	*1*		1		
Grey Heron	*Ardea cinerea*	*1*	1			
Large-billed Crow	*Corvus macrorhynchus*	*1*		1		
Little Egret	*Egretta garzetta*	*2*			1	1
Long-tailed Shrike	*Lanius schach*	*1*			1	
Oriental Magpie Robin	*Copsychus saularis*	*2*			1	1
Pacific Reef Egret	*Egretta sacra*	*1*				1
Red-whiskered Bulbul	*Pycnonotus jocosus*	*1*			1	
Spotted Dove	*Steptopelia chinensis*	*1*		1		1
White Wagtail	*Motacilla alba*	*1*				1

Avifauna

Date of Survey: 20 October 2003

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hau Hok Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen
Pacific Reef Egret	*Egretta sacra*	*1*							1	
Little Egret	*Egretta garzetta*	*29*			17				12	
Grey Heron	*Ardea cinerea*	*1*			1					
Black Kite	*Milvus migrans*	*2*					1	1		
White-bellied Sea Eagle	*Haliaeetus leucogaster*	*1*							1	
Crested Goshawk	*Accipiter trivirgatus*	*1*						1		
Common Buzzard	*Buteo buteo*	*4*						4		
Peregrine Falcon	*Falco peregrinus*	*1*							1	
White-breasted Waterhen	*Amaurornis phoenicurus*	*5*			3	2				
Common Sandpiper	*Actitis hypoleucos*	*6*			3		1		2	
Spotted Dove	*Steptopelia chinensis*	*10*	2	3			2	3		
Greater Coucal	*Centropus sinensis*	*5*				3			2	
White-throated Kingfisher	*Halcyon smyrnensis*	*1*			1					
Black-capped Kingfisher	*Halcyon pileata*	*1*			1					
Common Kingfisher	*Alcedo atthis*	*2*			1				1	
White Wagtail	*Motacilla alba*	*12*		4		3	2	1	2	
Red-whiskered Bulbul	*Pycnonotus jocosus*	*48*	5			12	9	6	6	10
Chinese Bulbul	*Pycnonotus sinensis*	*54*	9			25	5	12	3	
Siberian Rubythroat	*Luscinia calliope*	*1*					1			
Common Stonechat	*Saxicola torquata*	*1*				1				
Oriental Magpie Robin	*Copsychus saularis*	*12*	3		4				2	3
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	*1*			1					
Common Tailorbird	*Orthotomus sutorius*	*12*				6		3		3
Pale-legged Leaf Warbler	*Phylloscopus tenellipes*	*2*							1	1
Arctic Warbler	*Phylloscopus borealis*	*1*							1	
Yellow-browed Warbler	*Phylloscopus inornatus*	*8*			1	5				2
Dusky Warbler	*Phylloscopus fuscatus*	*29*	5		6	13			5	
Red-breasted Flycatcher	*Ficedula parva*	*1*							1	
Asian Brown Flycatcher	*Muscicapa dauurica*	*4*				1	1		2	
Great Tit	*Parus major*	*8*				4	1		3	
Japanese White-eye	*Zosterops japonicus*	*14*				14				
Long-tailed Shrike	*Lanius schach*	*2*	1						1	
Hair-crested Drongo	*Dicrurus hottentotus*	*2*				1	1			
Common Magpie	*Pica pica*	*4*				4				
Black-collared Starling	*Sturnus nigricollis*	*6*			6					
Crested Myna	*Acridotheres cristatellus*	*7*	7							
Eurasian Tree Sparrow	*Passer montanus*	*7*	7							
Scaly-breasted Munia	*Lonchura punctulata*	*4*							4	
Yellow-breasted Bunting	*Emberiza aureola*	*8*			2	6				

Date of Survey: 21 October 2003

Common Name	Scientific name	*Total*	Tung Chung Bay	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Chestnut Bunting	*Emberiza rutila*	*3*				3
Blue Magpie	*Urocissa erythrorhyncha*	*1*			1	
Long-tailed Shrike	*Lanius schach*	*1*			1	
Dusky Warbler	*Phylloscopus fuscatus*	*2*				2
Pale-legged Leaf Warbler	*Phylloscopus tenellipes*	*2*			2	
Black-browed Reed Warbler	*Acrocephalus bistrigiceps*	*1*				1
Zitting Cisticola	*Cisticola juncidis*	*1*				1
Common Blackbird	*Turdus merula*	*4*				4
Oriental Magpie Robin	*Copsychus saularis*	*2*				2
Siberian Rubythroat	*Luscinia calliope*	*2*			1	1
Chinese Bulbul	*Pycnonotus sinensis*	*6*				6
White Wagtail	*Motacilla alba*	*1*				1
Black-capped Kingfisher	*Halcyon pileata*	*2*	*1*			1
White-throated Kingfisher	*Halcyon smyrnensis*	*1*	*1*			
Spotted Dove	*Steptopelia chinensis*	*1*				1
Common Sandpiper	*Actitis hypoleucos*	*3*	2			1
Black Kite	*Milvus migrans*	*3*	1		1	1
Grey Heron	*Ardea cinerea*	*1*	1			
Great Egret	*Egretta alba*	*6*	*6*			
Little Egret	*Egretta garzetta*	*25*	*22*			3
Chinese Pond Heron	*Ardeola bacchus*	*2*				2
Little Grebe	*Tachybaptus ruficollis*	*1*		1		

Avifauna

Date of Survey: 23 October 2003 (Night)

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Collared Scops Owl	*Otus bakkamoena*	*2*								2	

Date of Survey: 24 October 2003

Common Name	Scientific name	*Total*	Tai Ho Wan
Chinese Pond Heron	*Ardeola bacchus*	*6*	6
Little Egret	*Egretta garzetta*	*12*	12
Great Egret	*Egretta alba*	*4*	4
White-throated Kingfisher	*Halcyon smymensis*	*1*	1
Black-capped Kingfisher	*Halcyon pileata*	*1*	1

Date of Survey: 28 October 2003

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Black-crowned Night Heron	*Nycticorax nycticorax*	*5*		5	
Striated Heron	*Butorides striatus*	*1*		1	
Little Egret	*Egretta garzetta*	*14*		14	
Eurasian Woodcock	*Scolopax rusticola*	*1*		1	
Collared Scops Owl	*Otus bakkamoena*	*1*	1		
Brown Fish Owl*	*Ketupa zeylonensis*	*2*		2	

Date of Survey: 29 October 2003

Common Name	Scientific name	*Total*	Pak Mong
Black Kite	*Milvus migrans*	*1*	1
Olive-backed Pipit	*Anthus hodgsoni*	*3*	3
Red-whiskered Bulbul	*Pycnonotus jocosus*	*7*	7
Chinese Bulbul	*Pycnonotus sinensis*	*12*	12
Siberian Rubythroat	*Luscinia calliope*	*2*	2
Blue Whistling Thrush	*Myophonus caeruleus*	*3*	3
Masked Laughingthrush	*Garrulax perspicillatus*	*6*	6
Long-tailed Shrike	*Lanius schach*	*2*	2
Large-billed Crow	*Corvus macrorhynchos*	*2*	2

Date of Survey: 30 October 2003 (Night)

Common Name	Scientific name	*Total*	Sam Shek Wan Tunnel Option
Collared Scops Owl	*Otus bakkamoena*	*4*	4

Avifauna

Date of Survey: 5 November 2003

Common Name	Scientific name	*Total*	San Shek Wan Tunnel Option
Black Kite	*Milvus migrans*	*3*	3
Japanese Sparrowhawk	*Accipiter gularis*	*1*	1
Bonelli's Eagle	*Hieraaetus fasciatus*	*1*	1
Common Kestrel	*Falco tinnunculus*	*1*	1
Black-capped Kinglisher	*Halcyon pileata*	*1*	1
Red-whiskered Bulbul	*Pycnonotus jocosus*	*5*	5
Chinese Bulbul	*Pycnonotus sinensis*	*20*	20
Siberian Rubythroat	*Luscinia calliope*	*8*	8
Common Blackbird	*Turdus merula*	*1*	1
Yellow-browed Warbler	*Phylloscopus inornatus*	*4*	4
Dusky Warbler	*Phylloscopus fuscatus*	*4*	4
Mugimaki Flycatcher	*Ficedula mugimaki*	*1*	1
Chestnut Bunting	*Emberiza rutila*	*4*	4

Date of Survey: 5 November 2003 (Night)

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Black-crowned Night Heron	*Nycticorax nycticorax*	*5*		5	
Brown Fish Owl	*Ketupa zeylonensis*	*1*		1	

Date of Survey: 19 November 2003

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Black-crowned Night Heron	*Nycticorax nycticorax*	*1*		1	
Chinese Pond Heron	*Ardeola bacchus*	*4*		4	
Little Egret	*Egretta garzetta*	*12*		12	
Common Kestrel	*Falco tinnunculus*	*2*	1		1
Common Sandpiper	*Actitis hypoleucos*	*1*		1	
Spotted Dove	*Steptopelia chinensis*	*7*	4		3
Common Koel	*Eudynamys scolopacea*	*2*	2		
Black-capped Kingfisher	*Halcyon pileata*	*2*		2	
Olive-backed Pipit	*Anthus hodgsoni*	*7*	2		5
Red-whiskered Bulbul	*Pycnonotus jocosus*	*9*	7		2
Chinese Bulbul	*Pycnonotus sinensis*	*30*	8	2	20
Siberian Rubythroat	*Luscinia calliope*	*6*	4		2
Daurian Redstart	*Phoenicurus auroreus*	*2*	1		1
Oriental Magpie Robin	*Copsychus saularis*	*3*	2		1
Blue Whistling Thrush	*Myophonus caeruleus*	*3*	3		
Common Tailorbird	*Orthotomus sutorius*	*5*	3		2
Yellow-browed Warbler	*Phylloscopus inornatus*	*11*	8		3
Dusky Warbler	*Phylloscopus fuscatus*	*4*	2	1	1
Masked Laughingthrush	*Garrulax perspicillatus*	*6*	4		2
Hwamei	*Garrulax canorus*	*2*	2		
Great Tit	*Parus major*	*3*	3		
Japanese White-eye	*Zosterops japonicus*	*35*	25		10
Long-tailed Shrike	*Lanius schach*	*2*	1		1
Common Magpie	*Pica pica*	*4*	4		
Large-billed Crow	*Corvus macrorhynchos*	*2*	2		
Crested Myna	*Acridotheres cristatellus*	*20*	12		8
Eurasian Tree Sparrow	*Passer montanus*	*4*	4		
Black-faced Bunting	*Emberiza spodocephala*	*2*	2		

Avifauna

Date of Survey: 27 November 2003 (Night)

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Black-crowned Night Heron	*Nycticorax nycticorax*	4		4	
Striated Heron	*Butorides striatus*	1		1	
Eurasian Woodcock	*Scolopax rusticola*	3		3	
Brown Fish Owl	*Ketupa zeylonensis*	1		1	

Date of Survey: 28 November 2003

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Little Egret	*Egretta garzetta*	20			18		1		1		
Grey Heron	*Ardea cinerea*	2			2						
Black Kite	*Milvus migrans*	3							1	2	
White-bellied Sea Eagle	*Haliaeetus leucogaster*	1								1	
Spotted Dove	*Streptopelia chinensis*	16	2		8	6					
White-throated Kingfisher	*Halcyon smyrnensis*	2	1	1							
Black-capped Kingfisher	*Halcyon pileata*	1									1
Olive-backed Pipit	*Anthus hodgsoni*	11	3		1	4			3		
Grey Wagtail	*Motacilla cinerea*	1			1						
White Wagtail	*Motacilla alba*	4		3							1
Red-whiskered Bulbul	*Pycnonotus jocosus*	84	4		20	25	5	12	10	8	
Chinese Bulbul	*Pycnonotus sinensis*	89	12		20	10	20	5	10	12	
Chestnut Bulbul	*Hypsipetes castanonotus*	4								4	
Siberian Rubythroat	*Luscinia calliope*	29	4		5	5	8		4	3	
Red-flanked Bluetail	*Tarsiger cyanurus*	4						3		1	
Daurian Redstart	*Phoenicurus auroreus*	5			2					3	
Oriental Magpie Robin	*Copsychus saularis*	9	2		3	4					
Blue Whistling Thrush	*Myophonus caeruleus*	2			1		1				
Common Blackbird	*Turdus merula*	2	1		1						
Grey-backed Thrush	*Turdus hortulorum*	2					2				
Dusky Thrush	*Turdus naumanni*	2			2						
Asian Stubtail Warbler	*Urosphena squameiceps*	4			1		2			1	
Japanese Bush Warbler	*Cettia diphone*	6			4	1			1		
Common Tailorbird	*Orthotomus sutorius*	4				2	2				
Pallas's Leaf Warbler	*Phylloscopus proregulus*	3	1		1	1					
Yellow-browed Warbler	*Phylloscopus inornatus*	14	3		3	4	3		1		
Dusky Warbler	*Phylloscopus fuscatus*	3					1		1	1	
Masked Laughingthrush	*Garrulax perspicillatus*	22			8	6		8			
Hwamei	*Garrulax canorus*	1			1						
Great Tit	*Parus major*	11	3		4	1	3				
Fork-tailed Sunbird	*Aethopyga christinae*	1				1					
Scarlet-backed Flowerpecker	*Dicaeum cruentatum*	1				1					
Japanese White-eye	*Zosterops japonicus*	50	3		20	12	5	10			
Long-tailed Shrike	*Lanius schach*	3			1			1	1		
Blue Magpie	*Urocissa erythrorhyncha*	5				1		4			
Common Magpie	*Pica pica*	6			6						
Large-billed Crow	*Corvus macrorhynchos*	2							2		
Black-collared Starling	*Sturnus nigricollis*	2			2						
Crested Myna	*Acridotheres cristatellus*	4			4						
Eurasian Tree Sparrow	*Passer montanus*	8	2		6						
Scaly-breasted Munia	*Lonchura punctulata*	7	5			2					

Avifauna

Date of Survey: 19 December 2003

Common Name	Scientific name	Total	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Little Egret	*Egretta garzetta*	1						1			
Black Kite	*Milvus migrans*	7						7			
Common Kestrel	*Falco tinnunculus*	1						1			
Eurasian Woodcock	*Scolopax rusticola*	1					1				
Common Sandpiper	*Actitis hypoleucos*	1				1					
Oriental Turtle Dove	*Streptopelia orientalis*	2					2				
White-throated Kingfisher	*Halcyon smyrnensis*	1				1					
Olive-backed Pipit	*Anthus hodgsoni*	22				7		15			
Grey Wagtail	*Motacilla cinerea*	1						1			
White Wagtail	*Motacilla alba*	3		2							1
Chinese Bulbul	*Pycnonotus sinensis*	125	20	5	5	5	50	20	5	15	
Chestnut Bulbul	*Hypsipetes castanonotus*	6				4				2	
Rufous-tailed Robin	*Luscinia sibilans*	1						1			
Siberian Rubythroat	*Luscinia calliope*	3						1		2	
Daurian Redstart	*Phoenicurus auroreus*	3			1		1	1			
Oriental Magpie Robin	*Copsychus saularis*	1					1				
Scaly Thrush	*Zoothera dauma*	3					1	1	1		
Japanese Thrush	*Turdus cardis*	1						1			
Grey-backed Thrush	*Turdus hortulorum*	12	2				7	2	1		
Japanese Bush Warbler	*Cettia diphone*	2					1	1			
Common Tailorbird	*Orthotomus sutorius*	19	3	2	2	5	2	4	1		
Pallas's Leaf Warbler	*Phylloscopus proregulus*	4			2		2				
Yellow-browed Warbler	*Phylloscopus inornatus*	8			3		3			2	
Blue-and-white Flycatcher	*Cyanoptila cyanomelana*	1					1				
Masked Laughingthrush	*Garrulax perspicillatus*	12				4	8				
Great Tit	*Parus major*	5				4		1			
Japanese White-eye	*Zosterops japonicus*	84	25	5		7	20	12	5	10	
Long-tailed Shrike	*Lanius schach*	1						1			
Blue Magpie	*Urocissa erythrorhyncha*	2				2					
Common Magpie	*Pica pica*	4				4					
Large-billed Crow	*Corvus macrorhynchos*	1			1						
Red-billed Starling	*Sturnus sericeus*	40				40					
Black-collared Starling	*Sturnus nigricollis*	6				6					
Crested Myna	*Acridotheres cristatellus*	2				2					
Black-faced Bunting	*Emberiza spodocephala*	2					1	1			

Date of Survey: 22 December 2003

Common Name	Scientific name	Total	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Chinese Pond Heron	*Ardeola bacchus*	3		3	
Pacific Reef Egret	*Egretta sacra*	1		1	
Common Buzzard	*Buteo buteo*	1		1	
Common Kestrel	*Falco tinnunculus*	4		4	
Oriental Turtle Dove	*Streptopelia orientalis*	4		4	
Black-capped Kingfisher	*Halcyon pileata*	1		1	
Common Kingfisher	*Alcedo atthis*	2		2	
Olive-backed Pipit	*Anthus hodgsoni*	2		2	
White Wagtail	*Motacilla alba*	1		1	
Red-whiskered Bulbul	*Pycnonotus jocosus*	28	1	15	12
Chinese Bulbul	*Pycnonotus sinensis*	45	20	5	20
Siberian Rubythroat	*Luscinia calliope*	1	1		
Daurian Redstart	*Phoenicurus auroreus*	1		1	
Common Stonechat	*Saxicola torquata*	1		1	
Oriental Magpie Robin	*Copsychus saularis*	4		4	
Blue Whistling Thrush	*Myophonus caeruleus*	1		1	
Common Tailorbird	*Orthotomus sutorius*	7	2	2	3
Pallas's Leaf Warbler	*Phylloscopus proregulus*	1	1		
Yellow-browed Warbler	*Phylloscopus inornatus*	1		1	
Dusky Warbler	*Phylloscopus fuscatus*	1		1	
Masked Laughingthrush	*Garrulax perspicillatus*	18	4	9	5
Japanese White-eye	*Zosterops japonicus*	23	5	10	8
Large-billed Crow	*Corvus macrorhynchos*	1			1
Black-collared Starling	*Sturnus nigricollis*	25		25	
Crested Myna	*Acridotheres cristatellus*	25		25	
Black-faced Bunting	*Emberiza spodocephala*	2		2	

Avifauna

Date of Survey: 26 January 2004

Common Name	Scientific name	Total	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Chinese Pond Heron	*Ardeola bacchus*	1								1	
Little Egret	*Egretta garzetta*	4			4						
Black Kite	*Milvus migrans*	6						4		2	
Common Buzzard	*Buteo buteo*	1								1	
White-breasted Waterhen	*Amaurornis phoenicurus*	2					2				
Common Sandpiper	*Actitis hypoleucos*	1					1				
Oriental Turtle Dove	*Streptopelia orientalis*	4								4	
Spotted Dove	*Steptopelia chinensis*	14	2	3			2	2		1	4
Greater Coucal	*Centropus sinensis*	1									1
White-throated Kingfisher	*Halcyon smyrnensis*	2					1				1
Black-capped Kingfisher	*Halcyon pileata*	1									1
Olive-backed Pipit	*Anthus hodgsoni*	20	4	2	4	7	2		1		
White Wagtail	*Motacilla alba*	2					1				1
Red-whiskered Bulbul	*Pycnonotus jocosus*	38	8		5			20		5	
Chinese Bulbul	*Pycnonotus sinensis*	227	25	20	5	8	25	10	50	80	4
Chestnut Bulbul	*Hypsipetes castanonotus*	13	3			4				6	
Rufous-tailed Robin	*Luscinia sibilans*	7			1		1	2	3		
Siberian Rubythroat	*Luscinia calliope*	16	2		2	2	2	2	4	2	
Red-flanked Bluetail	*Tarsiger cyanurus*	19		3	1	1	2	3	3	6	
Daurian Redstart	*Phoenicurus auroreus*	18	1		1	1	1	4	2	7	1
Oriental Magpie Robin	*Copsychus saularis*	13	3	1	1	2	2		2	2	
Blue Whistling Thrush	*Myophonus caeruleus*	6	1				4			1	
Scaly Thrush	*Zoothera dauma*	2							1	1	
Japanese Thrush	*Turdus cardis*	14			2	2	3	2	2	3	
Common Blackbird	*Turdus merula*	4			1					1	2
Grey-backed Thrush	*Turdus hortulorum*	75	4	2	10	10	10	9	9	20	1
Pale Thrush	*Turdus pallidus*	2				1	1				
Asian Stubtail Warbler	*Urosphena squameiceps*	8	1		1			1	5		
Japanese Bush Warbler	*Cettia diphone*	3				1	1			1	
Yellow-bellied Prinia	*Prinia flaviventris*	1								1	
Common Tailorbird	*Orthotomus sutorius*	18	4	3	2	1	1	2	3	2	
Pallas's Leaf Warbler	*Phylloscopus proregulus*	4					2			2	
Yellow-browed Warbler	*Phylloscopus inornatus*	3				1	2				
Dusky Warbler	*Phylloscopus fuscatus*	1				1					
Great Tit	*Parus major*	14				6	4			4	
Japanese White-eye	*Zosterops japonicus*	110	25	5	5	25	10	25	5	10	
Long-tailed Shrike	*Lanius schach*	2								2	
Common Magpie	*Pica pica*	7	3	2	2						
Large-billed Crow	*Corvus macrorhynchos*	5		2				1			2
Red-billed Starling	*Sturnus sericeus*	4			4						
Black-faced Bunting	*Emberiza spodocephala*	1						1			

Avifauna

Date of Survey: 27 January 2004

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Chinese Pond Heron	*Ardeola bacchus*	*1*		1	
Little Egret	*Egretta garzetta*	*6*		6	
Black Kite	*Milvus migrans*	*1*		1	
Common Kestrel	*Falco tinnunculus*	*1*			1
Oriental Turtle Dove	*Streptopelia orientalis*	*3*		3	
Spotted Dove	*Steptopelia chinensis*	*3*		3	
Greater Coucal	*Centropus sinensis*	*1*		1	
Lesser Coucal	*Centropus bengalensis*	*1*		1	
Common Kingfisher	*Alcedo atthis*	*1*		1	
Olive-backed Pipit	*Anthus hodgsoni*	*3*		1	2
Grey Wagtail	*Motacilla cinerea*	*1*	1		
White Wagtail	*Motacilla alba*	*2*		2	
Red-whiskered Bulbul	*Pycnonotus jocosus*	*25*	4	12	9
Chinese Bulbul	*Pycnonotus sinensis*	*40*	5	20	15
Chestnut Bulbul	*Hypsipetes castanonotus*	*10*			10
Siberian Rubythroat	*Luscinia calliope*	*13*	4	7	2
Red-flanked Bluetail	*Tarsiger cyanurus*	*2*	2		
Daurian Redstart	*Phoenicurus auroreus*	*2*		2	
Oriental Magpie Robin	*Copsychus saularis*	*2*			2
Blue Rock Thrush	*Monticola solitarius*	*1*		1	
Scaly Thrush	*Zoothera dauma*	*1*		1	
Japanese Thrush	*Turdus cardis*	*1*		1	
Grey-backed Thrush	*Turdus hortulorum*	*9*		7	2
Pale Thrush	*Turdus pallidus*	*1*		1	
Japanese Bush Warbler	*Cettia diphone*	*2*	1	1	
Brownish-flanked Bush Warbler	*Cettia fortipes*	*1*		1	
Common Tailorbird	*Orthotomus sutorius*	*1*		1	
Yellow-browed Warbler	*Phylloscopus inornatus*	*1*		1	
Masked Laughingthrush	*Garrulax perspicillatus*	*6*		6	
Great Tit	*Parus major*	*5*		5	
Japanese White-eye	*Zosterops japonicus*	*6*	6		
Brown Shrike	*Lanius cristatus*	*1*		1	
Long-tailed Shrike	*Lanius schach*	*2*	1		1
Large-billed Crow	*Corvus macrorhynchos*	*2*	2		
Black-collared Starling	*Sturnus nigricollis*	*25*		25	
Crested Myna	*Acridotheres cristatellus*	*40*		40	
Scaly-breasted Munia	*Lonchura punctulata*	*3*			3

Date of Survey: 17 February 2004 (Night)

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
White-bellied Sea Eagle	*Haliaeetus leucogaster*	*1*								1	
Collared Scops Owl	*Otus bakkamoena*	*1*						1			

Avifauna

Date of Survey: 18 February 2004

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Little Egret	*Egretta garzetta*	*15*	1		12			1			1
Great Egret	*Egretta alba*	*3*	1		1						1
Black Kite	*Milvus migrans*	*2*			1				1		
Oriental Turtle Dove	*Streptopelia orientalis*	*1*								1	
Spotted Dove	*Steptopelia chinensis*	*2*		2							
Common Koel	*Eudynamys scolopacea*	*1*		1							
Greater Coucal	*Centropus sinensis*	*1*		1							
White-throated Kingfisher	*Halcyon smyrnensis*	*1*									1
Black-capped Kingfisher	*Halcyon pileata*	*1*									1
Common Kingfisher	*Alcedo atthis*	*1*		1							
Olive-backed Pipit	*Anthus hodgsoni*	*3*								3	
White Wagtail	*Motacilla alba*	*1*								1	
Red-whiskered Bulbul	*Pycnonotus jocosus*	*18*			8					10	
Chinese Bulbul	*Pycnonotus sinensis*	*26*			12	5				9	
Siberian Rubythroat	*Luscinia calliope*	*1*						1			
Daurian Redstart	*Phoenicurus auroreus*	*2*					1	1			
Oriental Magpie Robin	*Copsychus saularis*	*2*				2					
Blue Rock Thrush	*Monticola solitarius*	*2*	1								1
Blue Whistling Thrush	*Myophonus caeruleus*	*2*					2				
Scaly Thrush	*Zoothera dauma*	*1*								1	
Japanese Thrush	*Turdus cardis*	*4*				3		1			
Grey-backed Thrush	*Turdus hortulorum*	*7*			1			3		3	
Yellow-bellied Prinia	*Prinia flaviventris*	*1*								1	
Common Tailorbird	*Orthotomus sutorius*	*7*				3		1		3	
Pallas's Leaf Warbler	*Phylloscopus proregulus*	*3*								3	
Dusky Warbler	*Phylloscopus fuscatus*	*1*				1					
Masked Laughingthrush	*Garrulax perspicillatus*	*7*				2		5			
Hwamei	*Garrulax canorus*	*1*								1	
Great Tit	*Parus major*	*2*						1		1	
Japanese White-eye	*Zosterops japonicus*	*10*								10	
Blue Magpie	*Urocissa erythrorhyncha*	*2*			2						
Common Magpie	*Pica pica*	*11*						5		6	
White-shouldered Starling	*Sturnus sinensis*	*1*						1			

Date of Survey: 19 February 2004 (Night)

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Black-crowned Night Heron	*Nycticorax nycticorax*	*3*		3	
Little Egret	*Egretta garzetta*	*1*		1	
Grey Heron	*Ardea cinerea*	*1*		1	
Eurasian Woodcock	*Scolopax rusticola*	*1*		1	
Oriental Magpie Robin	*Copsychus saularis*	*1*		1	

Date of Survey: 23 February 2004

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Crested Myna	*Acridotheres cristatellus*	*6*	6		
Black-collared Starling	*Sturnus nigricollis*	*1*	1		
Large-billed Crow	*Corvus macrorhynchos*	*1*	1		
Common Magpie	*Pica pica*	*4*		2	2
Long-tailed Shrike	*Lanius schach*	*1*	1		
Japanese White-eye	*Zosterops japonicus*	*1*	1		
Masked Laughingthrush	*Garrulax perspicillatus*	*2*	2		
Dusky Warbler	*Phylloscopus fuscatus*	*1*	1		
Yellow-bellied Prinia	*Prinia flaviventris*	*1*	1		
Grey-backed Thrush	*Turdus hortulorum*	*1*	1		
Blue Whistling Thrush	*Myophonus caeruleus*	*2*		1	1
Siberian Rubythroat	*Luscinia calliope*	*1*		1	
Chinese Bulbul	*Pycnonotus sinensis*	*12*	12		
White Wagtail	*Motacilla alba*	*2*	2		
Olive-backed Pipit	*Anthus hodgsoni*	*3*	3		
Common Kingfisher	*Alcedo atthis*	*1*			1
Spotted Dove	*Steptopelia chinensis*	*1*	1		
Black Kite	*Milvus migrans*	*1*	1		
Little Egret	*Egretta garzetta*	*1*		1	
Chinese Pond Heron	*Ardeola bacchus*	*2*		2	

Avifauna

Date of Survey: 17 March 2004

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Pacific Reef Egret	*Egretta sacra*	*1*						1			
Little Egret	*Egretta garzetta*	*8*			3			1			4
Black Kite	*Milvus migrans*	*8*					1		6		1
Crested Goshawk	*Accipiter trivirgatus*	*1*							1		
Grey-faced Buzzard	*Butastur indicus*	*1*					1				
White-breasted Waterhen	*Amaurornis phoenicurus*	*2*			2						
Spotted Dove	*Steptopelia chinensis*	*15*					2		3	3	7
Large Hawk Cuckoo	*Hierococcyx sparveroides*	*1*			1						
Greater Coucal	*Centropus sinensis*	*2*				1	1				
Lesser Coucal	*Centropus bengalensis*	*1*								1	
White-vented Needletail	*Hirundapus cochinchinensis*	*5*					2		3		
Pacific Swift	*Apus pacificus*	*150*						50	100		
Little Swift	*Apus affinis*	*15*							15		
White-throated Kingfisher	*Halcyon smyrnensis*	*1*			1						
Barn Swallow	*Hirundo rustica*	*1*								1	
Asian House Martin	*Delichon dasypus*	*2*							2		
Olive-backed Pipit	*Anthus hodgsoni*	*1*									1
White Wagtail	*Motacilla alba*	*1*							1		
Chinese Bulbul	*Pycnonotus sinensis*	*36*					6	10	5	5	10
Sooty-headed Bulbul	*Pycnonotus aurigaster*	*41*					6	9	6	12	8
Siberian Rubythroat	*Luscinia calliope*	*2*					1				1
Oriental Magpie Robin	*Copsychus saularis*	*4*				4					
Scaly Thrush	*Zoothera dauma*	*1*					1				
Grey-backed Thrush	*Turdus hortulorum*	*2*						2			
Plain Prinia	*Prinia inornata*	*1*	1								
Common Tailorbird	*Orthotomus sutorius*	*4*	2			1	1				
Yellow-browed Warbler	*Phylloscopus inornatus*	*1*	1								
Dusky Warbler	*Phylloscopus fuscatus*	*2*							2		
Masked Laughingthrush	*Garrulax perspicillatus*	*17*	5		2	10					
Great Tit	*Parus major*	*9*				1	2	2	2		2
Japanese White-eye	*Zosterops japonicus*	*9*	4			5					
Long-tailed Shrike	*Lanius schach*	*2*	1					1			
Common Magpie	*Pica pica*	*6*		4							2
Black-faced Bunting	*Emberiza spodocephala*	*8*	3		4					1	
Little Bunting	*Emberiza pusilla*	*1*									1

Date of Survey: 31 March 2004

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Chinese Pond Heron	*Ardeola bacchus*	*1*		1	
Little Egret	*Egretta garzetta*	*1*		1	
White-breasted Waterhen	*Amaurornis phoenicurus*	*1*		1	
Common Sandpiper	*Actitis hypoleucos*	*1*		1	
Spotted Dove	*Steptopelia chinensis*	*3*	1	1	1
Large Hawk Cuckoo	*Hierococcyx sparveroides*	*1*			1
Lesser Coucal	*Centropus bengalensis*	*1*			1
White-throated Kingfisher	*Halcyon smyrnensis*	*2*		2	
Common Kingfisher	*Alcedo atthis*	*3*	1	2	
Barn Swallow	*Hirundo rustica*	*12*	10	2	
Olive-backed Pipit	*Anthus hodgsoni*	*2*	2		
White Wagtail	*Motacilla alba*	*1*	1		
Red-whiskered Bulbul	*Pycnonotus jocosus*	*10*	4	2	4
Chinese Bulbul	*Pycnonotus sinensis*	*9*	1	4	4
Siberian Rubythroat	*Luscinia calliope*	*2*	1		1
Common Stonechat	*Saxicola torquata*	*1*		1	
Common Tailorbird	*Orthotomus sutorius*	*4*	2	2	
Yellow-browed Warbler	*Phylloscopus inornatus*	*1*			1
Masked Laughingthrush	*Garrulax perspicillatus*	*17*	10	2	5
Hwamei	*Garrulax canorus*	*3*	1		2
Great Tit	*Parus major*	*5*	2	1	2
Brown Shrike	*Lanius cristatus*	*1*	1		
Long-tailed Shrike	*Lanius schach*	*3*	1	2	
Common Magpie	*Pica pica*	*2*			2
Black-collared Starling	*Sturnus nigricollis*	*2*		2	
Crested Myna	*Acridotheres cristatellus*	*4*		4	
Black-faced Bunting	*Emberiza spodocephala*	*4*	2	1	1
Chestnut-eared Bunting	*Emberiza fucata*	*1*		1	

Avifauna

Date of Survey: 15 April 2004

Common Name	Scientific name	Total	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Chinese Pond Heron	*Ardeola bacchus*	3					3				
Swinhoe's Egret	*Egretta eulophotes*	3			3						
Little Egret	*Egretta garzetta*	7			4			1			2
Great Egret	*Egretta alba*	10			10						
Black Kite	*Milvus migrans*	5				1	2		2		
Crested Serpent Eagle	*Spilornis cheela*	1								1	
Crested Goshawk	*Accipiter trivirgatus*	2				1				1	
Common Buzzard	*Buteo buteo*	1			1						
White-breasted Waterhen	*Amaurornis phoenicurus*	2				2					
Common Sandpiper	*Actitis hypoleucos*	2					1				1
Spotted Dove	*Steptopelia chinensis*	8				6				2	
Large Hawk Cuckoo	*Hierococcyx sparveroides*	4				3				1	
Common Koel	*Eudynamys scolopacea*	1			1						
Greater Coucal	*Centropus sinensis*	2				2					
Lesser Coucal	*Centropus bengalensis*	1							1		
Pacific Swift	*Apus pacificus*	4								4	
Little Swift	*Apus affinis*	2				2					
Black-capped Kingfisher	*Halcyon pileata*	2								1	1
Dollarbird	*Eurystomus orientalis*	1							1		
Olive-backed Pipit	*Anthus hodgsoni*	7				3	4				
Yellow Wagtail	*Motacilla flava*	1			1						
Grey Wagtail	*Motacilla cinerea*	1					1				
White Wagtail	*Motacilla alba*	1				1					
Red-whiskered Bulbul	*Pycnonotus jocosus*	53	12	10	6	10	10			5	
Chinese Bulbul	*Pycnonotus sinensis*	31	5	5		7			2	12	
Siberian Rubythroat	*Luscinia calliope*	2	1			1					
Oriental Magpie Robin	*Copsychus saularis*	17	3	2		6	6				
Common Tailorbird	*Orthotomus sutorius*	19	3	5	1	4	2		2	2	
Yellow-browed Warbler	*Phylloscopus inornatus*	1							1		
Dusky Warbler	*Phylloscopus fuscatus*	1			1						
Masked Laughingthrush	*Garrulax perspicillatus*	8				3	3		1	1	
Hwamei	*Garrulax canorus*	1								1	
Great Tit	*Parus major*	37	3	2	1	4	3	10	4	10	
Fork-tailed Sunbird	*Aethopyga christinae*	1								1	
Japanese White-eye	*Zosterops japonicus*	26	7	5		3	1			10	
Long-tailed Shrike	*Lanius schach*	3	1	1	1						
Blue Magpie	*Urocissa erythrorhyncha*	3							1	2	
Common Magpie	*Pica pica*	1					1				
White-shouldered Starling	*Sturnus sinensis*	2							2		
Crested Myna	*Acridotheres cristatellus*	19	12	3	2					2	
Black-faced Bunting	*Emberiza spodocephala*	8	1		6	1					
Chestnut Bunting	*Emberiza rutila*	1								1	

Date of Survey: 19 April 2004 (Night)

Common Name	Scientific name	Total	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Chinese Pond Heron	*Ardeola bacchus*	1									1
Little Egret	*Egretta garzetta*	1									1
Great Egret	*Egretta alba*	1									1
White-bellied Sea Eagle	*Haliaeetus leucogaster*	1								1	
Chinese Francolin	*Francolinus pintadeanus*	2								2	
Slaty-legged Crake*	*Rallina eurizonoides*	3				2				1	
Wood Sandpiper	*Tringa glareola*	1									1
Collared Scops Owl	*Otus bakkamoena*	6				2			3	1	
Black-capped Kingfisher	*Halcyon pileata*	1									1
Hwamei	*Garrulax canorus*	6								6	
Common Magpie	*Pica pica*	1								1	

Avifauna

Date of Survey: 27 April 2004 (Night)

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Pacific Reef Egret	*Egretta sacra*	*1*		1	
Slaty-legged Crake	*Rallina eurizonoides*	*1*		1	
Collared Scops Owl	*Otus bakkamoena*	*2*	2		
Eurasian Eagle Owl	*Bubo bubo*	*1*	1		
Savanna Nightjar	*Caprimulgus affinis*	*2*	1	1	
White-throated Kingfisher	*Halcyon smymensis*	*2*		2	
Grey Wagtail	*Motacilla cinerea*	*1*		1	

Date of Survey: 30 April 2004

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Chinese Francolin	*Francolinus pintadeanus*	*2*		2	
Common Sandpiper	*Actitis hypoleucos*	*2*		2	
Spotted Dove	*Steptopelia chinensis*	*1*	1		
Chestnut-winged Cuckoo	*Clamator coromandus*	*1*		1	
Large Hawk Cuckoo	*Hierococcyx sparveroides*	*1*		1	
Indian Cuckoo	*Cuculus micropterus*	*1*		1	
Red-whiskered Bulbul	*Pycnonotus jocosus*	*2*	1	1	
Chinese Bulbul	*Pycnonotus sinensis*	*3*	1	1	1
Oriental Magpie Robin	*Copsychus saularis*	*1*		1	
Common Tailorbird	*Orthotomus sutorius*	*2*	1	1	
Dusky Warbler	*Phylloscopus fuscatus*	*1*	1		
Masked Laughingthrush	*Garrulax perspicillatus*	*3*	1	1	1
Japanese White-eye	*Zosterops japonicus*	*1*		1	
Common Magpie	*Pica pica*	*1*		1	
Large-billed Crow	*Corvus macrorhynchos*	*2*	2		
Black-collared Starling	*Sturnus nigricollis*	*1*			1
Crested Myna	*Acridotheres cristatellus*	*1*		1	

Date of Survey: 11 May 2004

Common Name	Scientific name	*Total*	Pak Mong	Tai Ho Wan	Cheung Tung Road Hill
Striated Heron	*Butorides striatus*	*1*		1	
Little Egret	*Egretta garzetta*	*3*		3	
Black Kite	*Milvus migrans*	*1*	1		
Chinese Francolin	*Francolinus pintadeanus*	*2*	1		1
White-breasted Waterhen	*Amaurornis phoenicurus*	*1*		1	
Grey-tailed Tattler	*Heteroscelus brevipes*	*3*		3	
Spotted Dove	*Steptopelia chinensis*	*4*		4	
Large Hawk Cuckoo	*Hierococcyx sparveroides*	*2*	1		1
Indian Cuckoo	*Cuculus micropterus*	*1*	1		
Common Koel	*Eudynamys scolopacea*	*2*	1	1	
Greater Coucal	*Centropus sinensis*	*1*	1		
White-throated Kingfisher	*Halcyon smymensis*	*1*		1	
Red-whiskered Bulbul	*Pycnonotus jocosus*	*4*			4
Chinese Bulbul	*Pycnonotus sinensis*	*13*	7		6
Oriental Magpie Robin	*Copsychus saularis*	*1*		1	
Blue Whistling Thrush	*Myophonus caeruleus*	*2*		2	
Common Tailorbird	*Orthotomus sutorius*	*1*	1		
Masked Laughingthrush	*Garrulax perspicillatus*	*2*		2	
Great Tit	*Parus major*	*1*		1	
Black Drongo	*Dicrurus macrocercus*	*1*			1
Crested Myna	*Acridotheres cristatellus*	*6*	6		

Avifauna

Date of Survey: 12 May 2004

Common Name	Scientific name	*Total*	Chek Lap Kok	Tung Chung Battery	Tung Chung Bay	Tin Sam	Hok Tau Wan	Ferry Pier	Sha Lo Wan	Sham Shek Tsuen	Sham Wat Wan
Striated Heron	*Butorides striatus*	*3*			2		1				
Chinese Pond Heron	*Ardeola bacchus*	*3*							2		1
Little Egret	*Egretta garzetta*	*8*		1	4			1	2		
Black Kite	*Milvus migrans*	*4*							1	3	
Besra	*Accipiter virgatus*	*1*							1		
Chinese Francolin	*Francolinus pintadeanus*	*3*								3	
White-breasted Waterhen	*Amaurornis phoenicurus*	*1*							1		
Common Sandpiper	*Actitis hypoleucos*	*4*							1		3
Grey-tailed Tattler	*Heteroscelus brevipes*	*9*			9						
Spotted Dove	*Steptopelia chinensis*	*28*	1	2		10	6		3	5	1
Emerald Dove	*Chalcophaps indica*	*1*			1						
Large Hawk Cuckoo	*Hierococcyx sparveroides*	*9*		1	4	2		1	1		
Indian Cuckoo	*Cuculus micropterus*	*2*				1			1		
Common Koel	*Eudynamys scolopacea*	*2*	1					1			
Greater Coucal	*Centropus sinensis*	*7*	2			1			4		
Pacific Swift	*Apus pacificus*	*21*	1	2		10	6		2		
Little Swift	*Apus affinis*	*2*				2					
White-throated Kingfisher	*Halcyon smymensis*	*4*	1		1			2			
Barn Swallow	*Hirundo rustica*	*22*		2					20		
Grey Wagtail	*Motacilla cinerea*	*2*									2
White Wagtail	*Motacilla alba*	*1*								1	
Red-whiskered Bulbul	*Pycnonotus jocosus*	*38*	4	10		6	4		10	4	
Chinese Bulbul	*Pycnonotus sinensis*	*21*	2	10		5					4
Sooty-headed Bulbul	*Pycnonotus aurigaster*	*2*							2		
Oriental Magpie Robin	*Copsychus saularis*	*5*	2	1					1		1
Common Tailorbird	*Orthotomus sutorius*	*4*				4					
Masked Laughingthrush	*Garrulax perspicillatus*	*36*	5			6	8		4	13	
Hwamei	*Garrulax canorus*	*2*								2	
Great Tit	*Parus major*	*22*	3				4	4	7	4	
Japanese White-eye	*Zosterops japonicus*	*8*	2				6				
Long-tailed Shrike	*Lanius schach*	*3*	1	1					1		
Black Drongo	*Dicrurus macrocercus*	*5*	2			1			2		
Hair-crested Drongo	*Dicrurus hottentotus*	*2*			1			1			
Common Magpie	*Pica pica*	*3*		1			2				
Large-billed Crow	*Corvus macrorhynchos*	*8*							8		
White-shouldered Starling	*Sturnus sinensis*	*2*							2		
Black-collared Starling	*Sturnus nigricollis*	*9*	2		1	2			2		2
Eurasian Tree Sparrow	*Passer montanus*	*1*							1		
Scaly-breasted Munia	*Lonchura punctulata*	*4*							4		
Chinese Bamboo Partridge	*Bambusicola thoracica*	*1*						1			
Yellow-fronted Canary	*Serinus mozambiqus*	*1*			1						

Date of Survey: 27 May 2004 (Day and Night)

Common Name	Scientific name	*Total*	San Shek Wan
Chinese Francolin	*Francolinus pintadeanus*	*3*	3
Lesser Coucal	*Centropus bengalensis*	*2*	2
Pacific Swift	*Apus pacificus*	*1*	1
Little Swift	*Apus affinis*	*2*	2
Richard's Pipit	*Anthus richardi*	*1*	1
Chinese Bulbul	*Pycnonotus sinensis*	*4*	4
Hwamei	*Garrulax canorus*	*3*	3
Long-tailed Shrike	*Lanius schach*	*3*	3
Large-billed Crow	*Corvus macrorhynchos*	*2*	2

Appendix I

List of Recorded Terrestrial Mammal Species

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Mammal

Date of survey 20 and 25 September 2003

Original Study Area

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Cervidae							
Muntiacus muntjac	Indian Muntjac	1	Sha Lo Wan	49Q GE 983675	Tall shrubland	25.09.03	Common

*After Reels (1996)

Infrared-triggered cameras	Location	UTM ref.	Habitat	No. events	Results
Camera set 1	Kau Liu	49Q HE 007680	Tall shrubland	14	No mammal photos obtained
Camera set 2	Hau Hok Wan	49Q GE 996680	Tall shrubland	1	No mammal photos obtained

Date of survey 22 and 25 September 2003 (Night)

Original Study Area
No species recorded

Date of survey: 2 and 8 October 2003
5 and 8 October 2003 (Night)

Additional Study Area
No species recorded

Date of survey: 23 October 2003 (Night)

Sham Wat and Sham Shek Tsuen headland

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status
Soricidae							
Suncus murinus	Brown Musk Shrew	1	Sham Wat	49Q GE 976655	Village	23.10.03	Probably common

Date of survey: 24 October 2003
27 October 2003 (Day and Night)

Sham Wat and Sham Shek Tsuen headland
No species recorded

Date of survey: 28 October 2003

West of Tai Ho Wan
No species recorded

Date of survey: 5 November 2003 (Day and Night)

Inland study area for San Shek Wan tunnel option
No species recorded

Mammals

Date of survey: 25 November 2003

Chek Lap Kok to Sham Wat
No species recorded

Date of survey: 26 November 2003

Tai Ho Wan
No species recorded

Date of survey: 10 December 2003 (Night)

Chek Lap Kok to Sham Wat
No species observed; infrared-triggered cameras set up for five days

Infrared-triggered cameras	Location	UTM ref.	Habitat	No. events	Results
Camera set 1	Sham Shek Tsuen headland	49Q GE 978663	Secondary woodland	5	Nil
Camera set 2	Sham Shek Tsuen headland	49Q GE 979665	Secondary woodland	1	Nil

Date of survey: 15 December 2003 (Night)

Tai Ho Wan
No species recorded

Date of survey: 22 January 2004

Chek Lap Kok to Sham Wat
No species observed; infrared-triggered cameras set up for five days

Infrared-triggered cameras	Location	UTM ref.	Habitat	No. events	Results
Camera set 1	Sham Shek Tsuen headland	49Q GE 978663	Secondary woodland	2	Nil
Camera set 2	Sha Lo Wan headland	49Q GE 985677	Secondary woodland	0	Nil

Date of survey: 27 January 2004

Tai Ho Wan
No species recorded

Date of Survey: 17 February 2004 (Night)

Chek Lap Kok to Sham Wat
No species observed
(several unidentified insectivorous bats across Study Area)

Date of Survey: 19 February 2004 (Night)

Tai Ho Wan
No species observed
(several unidentified insectivorous bats across Study Area)

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Mammals

Date of survey: 16 March 2004

Chek Lap Kok to Sham Wat
No species observed

Date of survey: 17 March 2004

Tai Ho Wan
No species observed

Date of survey: 20 April 2004 (Night)

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Muntiacus muntjak	Barking Deer	1	Sham Shek Tsuen	49Q GE 975662	Tall shrubland	Common

Note: Barking Deer heard in almost same location (49Q GE 976661) by PJL on 17th March

(several unidentified insectivorous bats across Study Area)

*after Reels, 1996

Date of survey: 27 April 2004 (Night)

Tai Ho Wan
No species observed
(several unidentified insectivorous bats across Study Area)

Date of survey: 9 May 2004

Tai Ho Wan
No species observed

Date of survey: 9 May 2004 (Night)

Tai Ho Wan
No species observed
(several unidentified insectivorous bats across Study Area)

Date of survey: 12 May 2004

Chek Lap Kok to Sham Wat
No species observed

Date of survey: 18 May 2004 (Night)

Chek Lap Kok to Sham Wat
No species observed
(several unidentified insectivorous bats across Study Area)

Date of survey: 18 May 2004 (Day and Night)

Additional Study Area for tunnel portal option
No species observed
(several unidentified insectivorous bats across Study Area)

Appendix J

List of Recorded Dragonfly Species

Dragonflies

Date of survey: 20 and 25 September 2003

Original Study Area

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Libellulidae							
Orthetrum glaucum	Common Blue Skimmer	1	Hau Hok Wan	49Q GE 9967	Stream	25.09.03	Abundant
Orthetrum pruinosum	Common Red Skimmer	2	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20.09.03	Abundant
Orthetrum pruinosum	Common Red Skimmer	2	Kau Liu	49Q HE 0068	Tall shrubland	25.09 03	Abundant
Orthetrum sabina	Green Skimmer	1	San Tau	49Q HE 0167	Secondary woodland	25.09.03	Abundant
Orthetrum sabina	Green Skimmer	1	Kau Liu	49Q HE 0068	Tall shrubland	25.09.03	Abundant
Orthetrum sabina	Green Skimmer	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.09.03	Abundant
Pantala flavescens	Wandering Glider	7	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20.09.03	Abundant
Pantala flavescens	Wandering Glider	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	20.09.03	Abundant
Pantala flavescens	Wandering Glider	1	Ma Wan Chung	49Q HE 0267	Village	20.09.03	Abundant
Pantala flavescens	Wandering Glider	5	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20.09.03	Abundant
Pantala flavescens	Wandering Glider	4	San Tau	49Q HE 0167	Secondary woodland	20.09.03	Abundant
Pantala flavescens	Wandering Glider	1	Kau Liu	49Q HE 0068	Tall shrubland	20.09.03	Abundant
Pantala flavescens	Wandering Glider	40	Tung Chung Battery	49Q HE 0267	Secondary woodland	25.09.03	Abundant
Pantala flavescens	Wandering Glider	12	Ma Wan Chung	49Q HE 0267	Village	25.09.03	Abundant
Pantala flavescens	Wandering Glider	50	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25.09.03	Abundant
Pantala flavescens	Wandering Glider	60	San Tau	49Q HE 0167	Secondary woodland	25.09.03	Abundant
Pantala flavescens	Wandering Glider	120	Kau Liu	49Q HE 0068	Tall shrubland	25.09.03	Abundant
Pantala flavescens	Wandering Glider	30	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.09.03	Abundant
Pantala flavescens	Wandering Glider	50	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.09.03	Abundant
Tramea virginia	Saddlebag Glider	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20.09.03	Common

*After Wilson (1997)

Date of survey: 2 and 8 October 2003

Additional Study Area

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Platycnemididae							
Copera marginipes	Yellow Featherlegs	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Abundant
Copera marginipes	Yellow Featherlegs	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Abundant
Libellulidae							
Acisoma panorpoides	Asian Pintail	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Common
Crocothemis servilia	Crimson Darter	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Abundant
Diplacodes trivialis	Blue Percher	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Abundant
Orthetrum glaucum	Common Blue Skimmer	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Abundant
Orthetrum pruinosum	Common Red Skimmer	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Abundant
Orthetrum sabina	Green Skimmer	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Common
Orthetrum sabina	Green Skimmer	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Pantala flavescens	Wandering Glider	3	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Abundant
Pantala flavescens	Wandering Glider	25	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	02.10.03	Abundant
Pantala flavescens	Wandering Glider	5	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Abundant
Pantala flavescens	Wandering Glider	5	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Abundant
Pantala flavescens	Wandering Glider	50+	West of Pak Mong	49Q HE 0568	Shrubby grassland	08.10.03	Abundant
Trithemis festiva	Indigo Dropwing	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Abundant
Trithemis festiva	Indigo Dropwing	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Abundant
Trithemis festiva	Indigo Dropwing	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Abundant
Trithemis festiva	Indigo Dropwing	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Abundant

*After Wilson (2003)

Date of survey: 23 October 2003 (Night)

Sham Wat and Sham Shek Tsuen headland
No species observed

Date of survey: 24, 27, 28 October and 5 November 2003

Sham Wat and Sham Shek Tsuen headland

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Libellulidae							
Orthetrum glaucum	Common Blue Skimmer	2	Sham Wat	49Q GE 9765	Stream	24.10.02	Abundant
Orthetrum pruinosum	Common Red Skimmer	2	Sham Wat	49Q GE 9765	Stream	27.10.03	Abundant
Orthetrum sabina	Green Skimmer	3	Sham Wat	49Q GE 9765	Coastal grass/shrub	27.10.03	Common
Pantala flavescens	Wandering Glider	7	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.02	Abundant
Pantala flavescens	Wandering Glider	3	Sham Wat	49Q GE 9765	Coastal grass/shrub	27.10.03	Abundant
Pantala flavescens	Wandering Glider	4	Sham Shek Tsuen	49Q GE 9766	Disused agricultural fields	27.10.03	Abundant
Trithemis festiva	Indigo Dropwing	1	Sham Wat	49Q GE 9765	Stream	24.10.02	Abundant

West of Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Aeshnidae							
Anax immaculifrons	Fiery Emperor	1	West of Tai Ho Wan	49Q HE 0468	Stream	28.10.03	Common
Libellulidae							
Pantala flavescens	Wandering Glider	2	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Abundant

Inland study area for San Shek Wan tunnel option

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Aeshnidae							
Anax immaculifrons	Fiery Emperor	1	S of Hau Hok Wan	49Q GE 9967	Stream	05.11.03	Common
Libellulidae							
Orthetrum glaucum	Common Blue Skimmer	1	SW of San Tau	49Q HE 0067	Stream	05.11.03	Abundant
Orthetrum sabina	Green Skimmer	3	SW of San Tau	49Q HE 0067	Shrubby grassland/tall shrubland	05.11.03	Common
Pantala flavescens	Wandering Glider	12	SW of San Tau	49Q HE 0067	Shrubby grassland/tall shrubland	05.11.03	Abundant
Pantala flavescens	Wandering Glider	7	S of Hau Hok Wan	49Q GE 9967	Shrubby grassland/tall shrubland	05.11.03	Abundant
Pantala flavescens	Wandering Glider	2	E of San Shek Wan	49Q GE 9966	Shrubby grassland/tall shrubland	05.11.03	Abundant
Trithemis aurora	Crimson Dropwing	3	S of Hau Hok Wan	49Q GE 9967	Stream	05.11.03	Abundant
Trithemis festiva	Indigo Dropwing	3	S of Hau Hok Wan	49Q GE 9967	Stream	05.11.03	Abundant

*After Wilson (2003)

Dragonflies

Date of survey: 25 and 26 November 2003

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Libellulidae							
Orthetrum sabina	Green Skimmer	1	Tin Sam	49Q HE 0167	Shrubby grassland	25.11.03	Common
Orthetrum sabina	Green Skimmer	1	Kau Liu	49Q HE 0068	Tall shrubland	25.11.03	Common
Orthetrum sabina	Green Skimmer	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	25.11.03	Common
Trithemis festiva	Indigo Dropwing	1	San Tau	49Q HE 0167	Stream	25.11.03	Abundant
Trithemis festiva	Indigo Dropwing	1	Sham Wat	49Q GE 9765	Stream	25.11.03	Abundant
Pantala flavescens	Wandering Glider	3	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25.11.03	Abundant
Pantala flavescens	Wandering Glider	1	Ma Wan Chung	49Q HE 0267	Village	25.11.03	Abundant
Pantala flavescens	Wandering Glider	5	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25.11.03	Abundant
Pantala flavescens	Wandering Glider	2	San Tau	49Q HE 0167	Secondary woodland	25.11.03	Abundant
Pantala flavescens	Wandering Glider	7	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.11.03	Abundant
Pantala flavescens	Wandering Glider	8	Sham Wat	49Q GE 9765	Coastal grass/shrub	25.11.03	Abundant
Pantala flavescens	Wandering Glider	2	Sham Shek Tsuen	49Q GE 9766	Disused agricultural fields	25.11.03	Abundant

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Platycnemididae							
Copera marginipes	Yellow Featherlegs	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Pond	26.11.03	Abundant
Libellulidae							
Trithemis festiva	Indigo Dropwing	1	Tai Ho Wan	49Q HE 0768	Stream	26.11.03	Abundant
Pantala flavescens	Wandering Glider	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Abundant
Pantala flavescens	Wandering Glider	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Abundant
Pantala flavescens	Wandering Glider	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Abundant
Pantala flavescens	Wandering Glider	3	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Abundant

*After Wilson (2003)

Date of survey: 10 December 2003 (Night)

Chek Lap Kok to Sham Wat
No species recorded

Date of survey: 15 December 2003 (Night)

Tai Ho Wan
No species recorded

Date of survey: 22 January 2004

Chek Lap Kok to Sham Wat
No species recorded

Date of survey: 27 January 2004

Tai Ho Wan
No species recorded

Date of survey: 17 February 2004 (Night)

Chek Lap Kok to Sham Wat
No species observed

Date of survey: 19 February 2004 (Night)

Tai Ho Wan
No species observed

Dragonflies

Date of survey 16 March 2004

Chek Lap Kok to Sham Wat
No species observed

Date of survey 17 March 2004

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Platycnemididae						
Copera marginipes	Yellow Featherlegs	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Stream	Abundant
Copera marginipes	Yellow Featherlegs	2	Tai Ho Wan	49Q HE 0768	Stream	Abundant

*After Wilson, 2003

Date of survey: 20 April 2004 (Night)

Chek Lap Kok to Sham Wat
No species observed

Date of survey: 27 April 2004 (Night)

Tai Ho Wan
No species observed

Date of Survey: 9 May 2004

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Chlorocyphidae						
Rhinocypha perforata	Common Blue Jewel	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Euphaeidae						
Euphaea decorata	Black-banded Gossamerwing	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Platycnemididae						
Copera marginipes	Yellow Featherlegs	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Copera marginipes	Yellow Featherlegs	1	West of Tai Ho Wan	49Q HE 0568	Stream	Abundant
Protoneuridae						
Prodasineura autumnalis	Black Threadtail	8	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Gomphidae						
Leptogomphus elegans	Elegant Clubtail	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Secondary woodland	Common
Libellulidae						
Crocothemis servilia	Crimson Darter	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Lyriothemis elegantissima	Forest Chaser	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Secondary woodland	Common
Orthetrum chrysis	Red-faced Skimmer	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Common
Orthetrum glaucum	Common Blue Skimmer	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Orthetrum sabina	Green Skimmer	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland	Common
Orthetrum sabina	Green Skimmer	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Common
Pantala flavescens	Wandering Glider	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Developed area	Abundant
Trithemis aurora	Crimson Dropwing	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Trthemis festiva	Indigo Dropwing	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Stream	Abundant
Trthemis festiva	Indigo Dropwing	1	West of Tai Ho Wan	49Q HE 0568	Stream	Abundant

Date of Survey: 9 May 2004 (Night)

Tai Ho Wan
No species observed

Dragonflies

Date of Survey: 12 May 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Chlorocyphidae						
Rhinocypha perforata	Common Blue Jewel	5	San Tau	49Q HE 0067	Stream	Abundant
Rhinocypha perforata	Common Blue Jewel	2	Sha Lo Wan	49Q GE 9867	Stream	Abundant
Euphaeidae						
Euphaea decorata	Black-banded Gossamerwing	7	San Tau	49Q HE 0067	Stream	Abundant
Euphaea decorata	Black-banded Gossamerwing	3	Sha Lo Wan	49Q GE 9867	Stream	Abundant
Protoneuridae						
Prodasineura autumnalis	Black Threadtail	1	San Tau	49Q HE 0067	Stream	Abundant
Prodasineura autumnalis	Black Threadtail	2	Sha Lo Wan	49Q GE 9867	Stream	Abundant
Gomphidae						
Melligomphus moluanis	Small Hooktail	1	San Tau	49Q HE 0067	Stream	Uncommon
Libellulidae						
Brachydiplax chalybea	Blue Dasher	2	Tung Chung Bay	49Q HE 0166	Pond	Common
Neurothemis tullia	Pied Percher	2	Tung Chung Bay	49Q HE 0166	Pond	Common
Orthetrum glaucum	Common Blue Skimmer	1	San Tau	49Q HE 0067	Village/orchard	Abundant
Orthetrum glaucum	Common Blue Skimmer	1	Sha Lo Wan	49Q GE 9867	Stream	Abundant
Orthetrum glaucum	Common Blue Skimmer	1	Shan Shek Wan	49Q GE 9866	Stream	Abundant
Orthetrum luzonicum	Marsh Skimmer	2	Sha Lo Wan	49Q GE 9867	Stream	Abundant
Pantala flavescens	Wandering Glider	4	San Tau	49Q HE 0067	Village/orchard	Abundant
Pantala flavescens	Wandering Glider	1	Kau Liu to Hau Hok Wan	49Q HE 0068	Tall shrubland	Abundant
Rhyothemis triangularis	Sapphire Flutterer	3	Tung Chung Bay	49Q HE 0166	Pond	Uncommon
Trithemis aurora	Crimson Dropwing	4	Tung Chung Bay	49Q HE 0166	Pond	Abundant
Trithemis aurora	Crimson Dropwing	1	Sha Lo Wan	49Q GE 9867	Stream	Abundant

Date of Survey: 13 May 2004 (Day and Night)

Additional Study Area for tunnel portal option

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Chlorocyphidae						
Rhinocypha perforata	Common Blue Jewel	4	San Tau	49Q HE 0067	Stream	Abundant
Rhinocypha perforata	Common Blue Jewel	2	Sha Lo Wan	49Q GE 9867	Shrubby grassland/Secondary woodland	Abundant
Euphaeidae						
Euphaea decorata	Black-banded Gossamerwing	1	Ngau Au	49Q HE 0166	Small stream	Abundant
Euphaea decorata	Black-banded Gossamerwing	5	San Tau	49Q HE 0067	Stream	Abundant
Euphaea decorata	Black-banded Gossamerwing	5	Sha Lo Wan	49Q GE 9867	Shrubby grassland/Secondary woodland	Abundant
Platycnemididae						
Coeliccia cyanomelas	Blue Forest Damsel	2	San Tau	49Q HE 0067	Stream	Common
Protoneuridae						
Prodasineura autumnalis	Black Threadtail	3	San Tau	49Q HE 0067	Stream	Abundant
Prodasineura autumnalis	Black Threadtail	4	Sha Lo Wan	49Q GE 9867	Shrubby grassland/Secondary woodland	Abundant
Libellulidae						
Orthetrum glaucum	Common Blue Skimmer		Ngau Au	49Q HE 0166	Shrubby grassland	Abundant
Orthetrum sabina	Green Skimmer		Sha Lo Wan	49Q GE 9867	Shrubby grassland/Secondary woodland	Common
Pantala flavescens	Wandering Glider		Ngau Au	49Q HE 0166	Shrubby grassland	Abundant
Pantala flavescens	Wandering Glider		Sha Lo Wan	49Q GE 9867	Shrubby grassland/Secondary woodland	Abundant

Date of Survey: 16 May 2004 (Night)

Chek Lap Kok to Sham Wat
No species observed

Appendix K

List of Recorded Butterfly Species

Butterflies

Date of survey 20 and 25 September 2003

Original Study Area

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Papilionidae							
Graphium agamemnon	Tailed Jay	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20 09 03	Very common
Graphium agamemnon	Tailed Jay	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Very common
Graphium agamemnon	Tailed Jay	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Graphium agamemnon	Tailed Jay	1	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Graphium doson	Common Jay	1	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Uncommon
Graphium sarpedon	Common Bluebottle	1	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Graphium sarpedon	Common Bluebottle	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 09 03	Very common
Graphium sarpedon	Common Bluebottle	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Papilio clytia	Common Mime	4	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Common
Papilio clytia	Common Mime	5	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 09 03	Common
Papilio clytia	Common Mime	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	20 09 03	Common
Papilio clytia	Common Mime	2	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 09 03	Common
Papilio clytia	Common Mime	1	Tin Sam	49Q HE 0167	Shrubby grassland	25 09 03	Common
Papilio demoleus	Lime Butterfly	1	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Common
Papilio demoleus	Lime Butterfly	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Common
Papilio demoleus	Lime Butterfly	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 09 03	Common
Papilio demoleus	Lime Butterfly	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25 09 03	Common
Papilio memnon	Great Mormon	2	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Very common
Papilio memnon	Great Mormon	1	Sha Lo Wan	49Q GE 9967	Abandoned/disused agriculture	25 09 03	Very common
Papilio memnon	Great Mormon	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Papilio polytes	Common Mormon	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20 09 03	Very common
Papilio polytes	Common Mormon	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Papilio polytes	Common Mormon	2	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Papilio polytes	Common Mormon	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Very common
Papilio polytes	Common Mormon	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Very common
Papilio polytes	Common Mormon	7	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Very common
Papilio polytes	Common Mormon	3	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25 09 03	Very common
Papilio polytes	Common Mormon	1	Sha Lo Wan	49Q GE 9967	Abandoned/disused agriculture	25 09 03	Very common
Papilio polytes	Common Mormon	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Papilio protenor	Spangle	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	20 09 03	Very common
Papilio protenor	Spangle	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20 09 03	Very common
Papilio protenor	Spangle	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Very common
Pathysa antiphates	Five-bar Swordtail	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Common
Pathysa antiphates	Five-bar Swordtail	3	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Common
Pathysa antiphates	Five-bar Swordtail	1	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Common
Pieridae							
Catopsilia pomona	Lemon Emigrant	2	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Common
Catopsilia pomona	Lemon Emigrant	1	Ma Wan Chung	49Q HE 0267	Village	25 09 03	Common
Catopsilia pomona	Lemon Emigrant	2	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Common
Catopsilia pyranthe	Mottled Emigrant	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20 09 03	Common
Catopsilia pyranthe	Mottled Emigrant	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Common
Eurema brigitta	Small Grass Yellow	1	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Uncommon
Eurema hecabe	Common Grass Yellow	1	Ma Wan Chung	49Q HE 0267	Village	20 09 03	Very common
Eurema hecabe	Common Grass Yellow	2	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20 09 03	Very common
Eurema hecabe	Common Grass Yellow	3	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Eurema hecabe	Common Grass Yellow	2	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Very common
Eurema hecabe	Common Grass Yellow	2	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Very common
Ixias pyrene	Yellow Orange Tip	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Uncommon
Pieris canidia	Indian Cabbage White	1	Tin Sam	49Q HE 0167	Shrubby grassland	25 09 03	Very common
Nymphalidae							
Cupha erymanthis	Rustic	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Very common
Cupha erymanthis	Rustic	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Cupha erymanthis	Rustic	12	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Cupha erymanthis	Rustic	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Very common
Cupha erymanthis	Rustic	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 09 03	Very common
Cupha erymanthis	Rustic	3	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Very common
Cupha erymanthis	Rustic	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Euploea core	Common Indian Crow	3	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Very common
Euploea core	Common Indian Crow	4	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 09 03	Very common
Euploea core	Common Indian Crow	1	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Euploea core	Common Indian Crow	4	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 09 03	Very common
Euploea core	Common Indian Crow	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Very common
Euploea core	Common Indian Crow	4	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Very common
Euploea core	Common Indian Crow	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Euploea midamus	Blue-spotted Crow	1	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Euploea midamus	Blue-spotted Crow	1	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Euploea midamus	Blue-spotted Crow	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Very common
Euploea midamus	Blue-spotted Crow	3	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Very common
Hypolimnas bolina	Great Eggfly	2	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Very common
Hypolimnas bolina	Great Eggfly	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Hypolimnas misippus	Danaid Eggfly	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Uncommon
Ideopsis similis	Ceylon Blue Glassy Tiger	1	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 09 03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 09 03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	3	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	1	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Junonia almana	Peacock Pansy	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 09 03	Common
Junonia hierta	Yellow Pansy	2	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Uncommon
Kaniska canace	Blue Admiral	1	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Common
Melanitis leda	Common Evening Brown	1	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Very common
Neptis hylas	Common Sailer	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Very common
Neptis hylas	Common Sailer	1	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Very common
Lycaenidae							
Abisara echerius	Plum Judy	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25 09 03	Very common
Abisara echerius	Plum Judy	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Very common
Acytolepis puspa	Common Hedge Blue	3	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Common
Iraota timoleon	Silver Streak Blue	1	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Uncommon
Jamides bochus	Dark Cerulean	3	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Common
Zizeeria maha	Pale Grass Blue	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	20 09 03	Very common
Zizeeria maha	Pale Grass Blue	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	20 09 03	Very common
Zizeeria maha	Pale Grass Blue	10	San Tau	49Q HE 0167	Secondary woodland	20 09 03	Very common
Zizeeria maha	Pale Grass Blue	1	Kau Liu	49Q HE 0068	Tall shrubland	20 09 03	Very common
Zizeeria maha	Pale Grass Blue	3	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20 09 03	Very common
Zizeeria maha	Pale Grass Blue	3	San Tau	49Q HE 0167	Secondary woodland	25 09 03	Very common
Zizeeria maha	Pale Grass Blue	1	Kau Liu	49Q HE 0068	Tall shrubland	25 09 03	Very common
Hesperiidae							
Parnara guttata	Common Straight Swift	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 09 03	Common

* After Young & Yiu (2002)

Butterflies

Date of survey 2 and 8 October 2003

Additional Study Area

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Papilionidae							
Graphium agamemnon	Tailed Jay	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Graphium agamemnon	Tailed Jay	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Graphium agamemnon	Tailed Jay	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	08.10.03	Very common
Graphium sarpedon	Common Bluebottle	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Very common
Graphium sarpedon	Common Bluebottle	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Very common
Papilio clytia	Common Mime	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Papilio clytia	Common Mime	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Common
Papilio clytia	Common Mime	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Common
Papilio demoleus	Lime Butterfly	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Common
Papilio helenus	Red Helen	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Papilio memnon	Great Mormon	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	02.10.03	Very common
Papilio paris	Paris Peacock	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Very common
Papilio polytes	Common Mormon	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Very common
Papilio polytes	Common Mormon	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Papilio polytes	Common Mormon	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	08.10.03	Very common
Papilio protenor	Spangle	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Papilio protenor	Spangle	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Very common
Pathysa antiphates	Five-bar Swordtail	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Common
Pathysa antiphates	Five-bar Swordtail	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Common
Pieridae							
Catopsilia pomona	Lemon Emigrant	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Common
Catopsilia pyranthe	Mottled Emigrant	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Common
Eurema hecabe	Common Grass Yellow	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Very common
Eurema hecabe	Common Grass Yellow	4	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Very common
Eurema hecabe	Common Grass Yellow	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Very common
Hebomoia glaucippe	Great Orangetip	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	02.10.03	Common
Nymphalidae							
Athyma perius	Common Sergeant	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Athyma perius	Common Sergeant	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Common
Athyma selenophora	Staff Sergeant	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Charaxes bernardus	Tawny Rajah	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Common
Cupha erymanthis	Rustic	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Very common
Cupha erymanthis	Rustic	6	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Cupha erymanthis	Rustic	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Very common
Danaus genutia	Common Tiger	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Very common
Euploea midamus	Blue-spotted Crow	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Euploea midamus	Blue-spotted Crow	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Hypolimnas bolina	Great Eggfly	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	02.10.03	Very common
Hypolimnas bolina	Great Eggfly	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Hypolimnas bolina	Great Eggfly	2	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Very common
Junonia almana	Peacock Pansy	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Common
Melanitis leda	Common Evening Brown	1	Tai Ho Wan	49Q HE 0768	Tall shrubland	02.10.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Very common
Neptis hylas	Common Sailer	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Polyura nepenthes	Shan Nawab	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	02.10.03	Uncommon
Polyura nepenthes	Shan Nawab	1	NE of Tai Ho Wan	49Q HE 0769	Tall shrubland	08.10.03	Uncommon
Polyura nepenthes	Shan Nawab	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Uncommon
Vanessa indica	Indian Red Admiral	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	08.10.03	Common
Ypthima baldus	Common Five-ring	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Very common
Ypthima baldus	Common Five-ring	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Very common
Ypthima baldus	Common Five-ring	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Ypthima baldus	Common Five-ring	5	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Very common
Ypthima baldus	Common Five-ring	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Very common
Ypthima lisandra	Straight Five-ring	1	Tai Ho Wan	49Q HE 0768	Tall shrubland	02.10.03	Common
Lycaenidae							
Abisara echerius	Plum Judy	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Very common
Abisara echerius	Plum Judy	4	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Abisara echerius	Plum Judy	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Very common
Abisara echerius	Plum Judy	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	08.10.03	Very common
Acytolepis puspa	Common Hedge Blue	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Common
Acytolepis puspa	Common Hedge Blue	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Common
Chilades lajus	Lime Blue	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Very common
Everes lacturnus	Tailed Cupid	5	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Common
Everes lacturnus	Tailed Cupid	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Everes lacturnus	Tailed Cupid	4	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Common
Lampides boeticus	Long-tailed Blue	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Common
Zizeeria maha	Pale Grass Blue	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	02.10.03	Very common
Zizeeria maha	Pale Grass Blue	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Zizeeria maha	Pale Grass Blue	7	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Very common
Zizeeria maha	Pale Grass Blue	5	West of Pak Mong	49Q HE 0568	Shrubby grassland	08.10.03	Very common
Hesperiidae							
Ampittia dioscorides	Bush Hopper	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Uncommon
Ampittia dioscorides	Bush Hopper	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Uncommon
Astictopterus jame	Forest Hopper	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Common
Astictopterus jame	Forest Hopper	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	08.10.03	Common
Pamara guttata	Common Straight Swift	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Pamara guttata	Common Straight Swift	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	08.10.03	Common
Suastus gremius	Indian Palm Bob	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	08.10.03	Common

*After Young & Yiu (2002)

Butterflies

Date of survey 23 October 2003 (Night)

Sham Wat and Sham Shek Tsuen headland
No species observed

Date of survey 24, 27, 28 October and 5 November 2003

Sham Wat and Sham Shek Tsuen headland

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Papilionidae							
Graphium agamemnon	Tailed Jay	1	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Graphium sarpedon	Common Bluebottle	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	24.10.03	Very common
Graphium sarpedon	Common Bluebottle	1	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Papilio clytia	Common Mime	2	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Common
Papilio clytia	Common Mime	1	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Common
Papilio helenus	Red Helen	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	24.10.03	Very common
Papilio helenus	Red Helen	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	27.10.03	Very common
Papilio polytes	Common Mormon	4	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Very common
Papilio polytes	Common Mormon	2	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Papilio polytes	Common Mormon	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	24.10.03	Very common
Papilio polytes	Common Mormon	2	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Papilio xuthus	Swallowtail	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	27.10.03	Uncommon
Pieridae							
Catopsilia pomona	Lemon Emigrant	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Common
Eurema hecabe	Common Grass Yellow	10	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Very common
Eurema hecabe	Common Grass Yellow	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	24.10.03	Very common
Eurema hecabe	Common Grass Yellow	4	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Eurema hecabe	Common Grass Yellow	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	27.10.03	Very common
Nymphalidae							
Cupha erymanthis	Rustic	1	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Cupha erymanthis	Rustic	1	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Danaus chrysippus	Plain Tiger	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Uncommon
Danaus genutia	Common Tiger	2	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Very common
Danaus genutia	Common Tiger	3	Sham Wat	49Q GE 9765	Coastal grass/shrub	27.10.03	Very common
Euploea midamus	Blue-spotted Crow	5	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Euploea midamus	Blue-spotted Crow	2	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	2	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Ideopsis similis	Ceylon Blue Glassy Tiger	1	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Mycalesis zonata	South China Bush Brown	2	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Common
Neptis hylas	Common Sailer	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	27.10.03	Very common
Lycaenidae							
Abisara echerius	Plum Judy	2	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Abisara echerius	Plum Judy	2	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common
Acytolepis puspa	Common Hedge Blue	2	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Common
Acytolepis puspa	Common Hedge Blue	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	27.10.03	Common
Chilades lajus	Lime Blue	2	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Very common
Chilades lajus	Lime Blue	5	Sham Wat	49Q GE 9765	Coastal grass/shrub	27.10.03	Very common
Jamides bochus	Dark Cerulean	4	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Common
Lampides boeticus	Long-tailed Blue	7	Sham Wat	49Q GE 9765	Coastal grass/shrub	24.10.03	Common
Zizeeria maha	Pale Grass Blue	8	Sham Wat	49Q GE 9765	Secondary woodland	24.10.03	Very common
Zizeeria maha	Pale Grass Blue	1	Sham Wat	49Q GE 9765	Secondary woodland	27.10.03	Very common

West of Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Pieridae							
Eurema hecabe	Common Grass Yellow	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Very common
Nymphalidae							
Mycalesis mineus	Dark Brand Bush Brown	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Very common
Ypthima baldus	Common Five-ring	3	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Very common
Lycaenidae							
Abisara echerius	Plum Judy	12	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Very common
Euchrysops cnejus	Gram Blue Cupid	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Common
Spindasis lohita	Long-banded Silverline	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Uncommon
Zizina otis	Lesser Grass Blue	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	28.10.03	Common

Inland study area for San Shek Wan tunnel option

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Papilionidae							
Graphium sarpedon	Common Bluebottle	1	SW of San Tau	49Q HE 0067	Shrubby grassland/Tall shrubland	05.11.03	Very common
Papilio paris	Paris Peacock	1	S of Hau Hok Wan	49Q GE 9967	Shrubby grassland/Tall shrubland	05.11.03	Very common
Papilio polytes	Common Mormon	2	SW of San Tau	49Q HE 0067	Shrubby grassland/Tall shrubland	05.11.03	Very common
Pieridae							
Catopsilia pomona	Lemon Emigrant	2	E of San Shek Wan	49Q GE 9966	Shrubby grassland/Tall shrubland	05.11.03	Common
Eurema hecabe	Common Grass Yellow	6	S of Hau Hok Wan	49Q GE 9967	Shrubby grassland/Tall shrubland	05.11.03	Very common
Nymphalidae							
Euploea midamus	Blue-spotted Crow	4	S of Hau Hok Wan	49Q GE 9967	Shrubby grassland/Tall shrubland	05.11.03	Very common
Hypolimnas bolina	Great Egg-fly	1	SW of San Tau	49Q HE 0067	Shrubby grassland/Tall shrubland	05.11.03	Very common
Ypthima baldus	Common Five-ring	7	S of Hau Hok Wan	49Q GE 9967	Shrubby grassland/Tall shrubland	05.11.03	Very common
Lycaenidae							
Abisara echerius	Plum Judy	3	SW of San Tau	49Q HE 0067	Shrubby grassland/Tall shrubland	05.11.03	Very common
Abisara echerius	Plum Judy	2	S of Hau Hok Wan	49Q GE 9967	Shrubby grassland/Tall shrubland	05.11.03	Very common
Abisara echerius	Plum Judy	2	E of San Shek Wan	49Q GE 9966	Shrubby grassland/Tall shrubland	05.11.03	Very common
Acytolepis puspa	Common Hedge Blue	2	E of San Shek Wan	49Q GE 9966	Shrubby grassland/Tall shrubland	05.11.03	Common

* After Young & Yiu (2002)

Butterflies

Date of survey 25 November 2003

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Papilionidae							
Graphium sarpedon	Common Bluebottle	1	Kau Liu	49Q HE 0068	Tall shrubland	25 11 03	Very common
Graphium sarpedon	Common Bluebottle	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 11 03	Very common
Graphium sarpedon	Common Bluebottle	1	Sham Wat	49Q GE 9765	Secondary woodland	25 11 03	Very common
Papilio clytia	Common Mime	2	San Tau	49Q HE 0167	Secondary woodland	25 11 03	Common
Papilio clytia	Common Mime	1	Tin Sam	49Q HE 0167	Shrubby grassland	25 11 03	Common
Papilio clytia	Common Mime	1	Sham Wat	49Q GE 9765	Secondary woodland	25 11 03	Common
Papilio polytes	Common Mormon	1	Kau Liu	49Q HE 0068	Tall shrubland	25 11 03	Common
Papilio polytes	Common Mormon	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25 11 03	Common
Papilio polytes	Common Mormon	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 11 03	Common
Papilio polytes	Common Mormon	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25 11 03	Very common
Papilio polytes	Common Mormon	1	Sham Wat	49Q GE 9765	Secondary woodland	25 11 03	Very common
Pieridae							
Delias pasithoe	Red-base Jezebel	3	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	1	Ma Wan Chung	49Q HE 0267	Developed area	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	5	San Tau	49Q HE 0167	Secondary woodland	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	2	Tin Sam	49Q HE 0167	Shrubby grassland	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	3	Kau Liu	49Q HE 0068	Tall shrubland	25 11 03	Very common
Delias pasithoe	Red-base Jezebel	2	Sham Wat	49Q GE 9765	Secondary woodland	25 11 03	Very common
Eurema hecabe	Common Grass Yellow	2	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 11 03	Very common
Eurema hecabe	Common Grass Yellow	1	Tung Chung Battery	49Q HE 0267	Secondary woodland	25 11 03	Very common
Eurema hecabe	Common Grass Yellow	4	San Tau	49Q HE 0167	Secondary woodland	25 11 03	Very common
Eurema hecabe	Common Grass Yellow	2	Tin Sam	49Q HE 0167	Shrubby grassland	25 11 03	Very common
Eurema hecabe	Common Grass Yellow	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25 11 03	Very common
Eurema hecabe	Common Grass Yellow	5	Sham Wat	49Q GE 9765	Secondary woodland	25 11 03	Very common
Eurema laeta	Spotless Grass Yellow	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25 11 03	Uncommon
Nymphalidae							
Cupha erymanthis	Rustic	3	Kau Liu	49Q HE 0068	Tall shrubland	25 11 03	Very common
Cupha erymanthis	Rustic	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25 11 03	Very common
Cupha erymanthis	Rustic	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	25 11 03	Very common
Cupha erymanthis	Rustic	3	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25 11 03	Very common
Cupha erymanthis	Rustic	1	Sham Wat	49Q GE 9765	Secondary woodland	25 11 03	Very common
Danaus chrysippus	Plain Tiger	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	25 11 03	Uncommon
Danaus genutia	Common Tiger	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25 11 03	Very common
Danaus genutia	Common Tiger	2	Tin Sam	49Q HE 0167	Shrubby grassland	25 11 03	Very common
Danaus genutia	Common Tiger	6	Sham Wat	49Q GE 9765	Coastal grass/shrub	25 11 03	Very common
Melanitis leda	Common Evening Brown	2	San Tau	49Q HE 0167	Secondary woodland	25 11 03	Very common
Melanitis leda	Common Evening Brown	1	Kau Liu	49Q HE 0068	Tall shrubland	25 11 03	Very common
Melanitis leda	Common Evening Brown	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25 11 03	Very common
Mycalesis mineus	Dark Brand Bush Brown	6	San Tau	49Q HE 0167	Secondary woodland	25.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	5	Kau Liu	49Q HE 0068	Tall shrubland	25.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	4	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	Sham Wat	49Q GE 9765	Secondary woodland	25.11.03	Very common
Mycalesis zonata	South China Bush Brown	2	Kau Liu	49Q HE 0068	Tall shrubland	25.11.03	Common
Mycalesis zonata	South China Bush Brown	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25.11.03	Common
Neptis hylas	Common Sailer	1	San Tau	49Q HE 0167	Secondary woodland	25.11.03	Very common
Neptis hylas	Common Sailer	1	Kau Liu	49Q HE 0068	Tall shrubland	25.11.03	Very common
Neptis hylas	Common Sailer	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25.11.03	Very common
Lycaenidae							
Abisara echerius	Plum Judy	3	San Tau	49Q HE 0167	Secondary woodland	25.11.03	Very common
Abisara echerius	Plum Judy	2	Tin Sam	49Q HE 0167	Shrubby grassland	25.11.03	Very common
Abisara echerius	Plum Judy	4	Kau Liu	49Q HE 0068	Tall shrubland	25.11.03	Very common
Abisara echerius	Plum Judy	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.11.03	Very common
Abisara echerius	Plum Judy	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.11.03	Very common
Abisara echerius	Plum Judy	1	Sham Wat	49Q GE 9765	Secondary woodland	25.11.03	Very common
Acytolepis puspa	Common Hedge Blue	2	Sham Wat	49Q GE 9765	Coastal grass/shrub	25.11.03	Common
Heliophorus epicles	Purple Sapphire	1	Tin Sam	49Q HE 0167	Shrubby grassland	25.11.03	Common
Lampides boeticus	Long-tailed Blue	1	Tin Sam	49Q HE 0167	Shrubby grassland	25.11.03	Common
Lampides boeticus	Long-tailed Blue	2	Sham Wat	49Q GE 9765	Coastal grass/shrub	25.11.03	Common
Zizeeria maha	Pale Grass Blue	2	Tung Chung Battery	49Q HE 0267	Secondary woodland	25.11.03	Very common
Zizeeria maha	Pale Grass Blue	3	Ma Wan Chung	49Q HE 0267	Developed area	25.11.03	Very common
Zizeeria maha	Pale Grass Blue	2	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25.11.03	Very common
Zizeeria maha	Pale Grass Blue	5	Sham Wat	49Q GE 9765	Secondary woodland	25.11.03	Very common
Hesperiidae							
Ampittia dioscorides	Bush Hopper	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.11.03	Uncommon
Astictopterus jama	Forest Hopper	1	San Tau	49Q HE 0167	Secondary woodland	25.11.03	Common
Astictopterus jama	Forest Hopper	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	25.11.03	Common
Pamara guttata	Common Straight Swift	1	Tin Sam	49Q HE 0167	Shrubby grassland	25.11.03	Common

*After Young & Yiu (2002)

Butterflies

Date of survey: 26 November 2003

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Papilionidae							
Graphium sarpedon	Common Bluebottle	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	26.11.03	Very common
Papilio clytia	Common Mime	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Common
Papilio clytia	Common Mime	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	26.11.03	Common
Papilio helenus	Red Helen	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	26.11.03	Very common
Papilio polytes	Common Mormon	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Papilio polytes	Common Mormon	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Very common
Pieridae							
Delias pasithoe	Red-base Jezebel	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Delias pasithoe	Red-base Jezebel	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Delias pasithoe	Red-base Jezebel	4	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Very common
Delias pasithoe	Red-base Jezebel	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Very common
Eurema hecabe	Common Grass Yellow	3	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Eurema hecabe	Common Grass Yellow	2	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Very common
Eurema hecabe	Common Grass Yellow	5	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Nymphalidae							
Athyma perius	Common Sergeant	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Common
Cupha erymanthis	Rustic	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Cupha erymanthis	Rustic	4	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	26.11.03	Very common
Cupha erymanthis	Rustic	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Danaus genutia	Common Tiger	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Danaus genutia	Common Tiger	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Very common
Hypolimnas bolina	Great Eggfly	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Very common
Junonia almana	Peacock Pansy	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Common
Junonia atlites	Grey Pansy	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Common
Junonia atlites	Grey Pansy	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Common
Junonia lemonias	Lemon Pansy	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Uncommon
Melanitis leda	Common Evening Brown	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Very common
Melanitis leda	Common Evening Brown	1	Tai Ho Wan	49Q HE 0768	Tall shrubland	26.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	4	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	26.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Mycalesis mineus	Dark Brand Bush Brown	4	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Very common
Mycalesis zonata	South China Bush Brown	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	26.11.03	Common
Mycalesis zonata	South China Bush Brown	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Common
Neptis hylas	Common Sailer	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	26.11.03	Very common
Ypthima baldus	Common Five-ring	3	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Ypthima baldus	Common Five-ring	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	26.11.03	Very common
Ypthima baldus	Common Five-ring	3	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Very common
Lycaenidae							
Abisara echerius	Plum Judy	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Abisara echerius	Plum Judy	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	26.11.03	Very common
Abisara echerius	Plum Judy	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Abisara echerius	Plum Judy	2	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Very common
Acytolepis puspa	Common Hedge Blue	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	26.11.03	Common
Acytolepis puspa	Common Hedge Blue	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Common
Zizeeria maha	Pale Grass Blue	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	26.11.03	Very common
Zizeeria maha	Pale Grass Blue	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	26.11.03	Very common
Zizeeria maha	Pale Grass Blue	3	West of Pak Mong	49Q HE 0568	Shrubby grassland	26.11.03	Very common
Hesperiidae							
Astictopterus jama	Forest Hopper	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	26.11.03	Common

Date of survey: 10 December 2003 (Night)

Chek Lap Kok to Sham Wat
No species recorded

Date of survey: 15 December 2003 (Night)

Tai Ho Wan
No species recorded

Date of survey: 22 and 27 January 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Pieridae							
Delias pasithoe	Red-base Jezebel	1	Kau Liu	49Q HE 0068	Tall shrubland	22.01.04	Very common
Pieris canidia	Indian Cabbage White	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	22.01.04	Very common
Nymphalidae							
Cupha erymanthis	Rustic	1	San Tau	49Q HE 0167	Secondary woodland	22.01.04	Very common

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Pieridae							
Delias pasithoe	Red-base Jezebel	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Shrubby grassland	27.01.04	

Date of survey: 17 February 2004 (Night)

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Nymphalidae							
Melanitis leda	Common Evening Brown	1	Sham Wat	49Q GE 9765	Secondary woodland	17.02.04	Very common
Lycaenidae							
Abisara echerius	Plum Judy	1	Sham Wat	49Q GE 9765	Coastal grass/shrub	17.02.04	Very common

*After Young & Yiu, 2002

Date of survey: 19 February 2004 (Night)

Tai Ho Wan
No species observed

Butterflies

Date of survey: 16 March 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Papilionidae						
Graphium agamemnon	Tailed Green Jay	2	San Tau	49Q HE 0167	Secondary woodland	Very common
Graphium sarpedon	Common Bluebottle	1	San Tau	49Q HE 0167	Secondary woodland	Very common
Graphium sarpedon	Common Bluebottle	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	Very common
Papilio clytia	Common Mime	2	San Tau	49Q HE 0167	Secondary woodland	Common
Papilio clytia	Common Mime	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	Common
Papilio clytia	Common Mime	1	Kau Liu	49Q HE 0068	Tall shrubland	Common
Papilio demoleus	Lime Butterfly	1	San Tau	49Q HE 0167	Cultivated fields	Common
Papilio demoleus	Lime Butterfly	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	Common
Papilio helenus	Red Helen	2	San Tau	49Q HE 0167	Secondary woodland	Very common
Papilio helenus	Red Helen	1	Kau Liu	49Q HE 0068	Tall shrubland	Very common
Papilio helenus	Red Helen	2	Sham Wat	49Q GE 9765	Secondary woodland	Very common
Papilio helenus	Red Helen	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Papilio paris	Paris Peacock	1	San Tau	49Q HE 0167	Secondary woodland	Very common
Papilio paris	Paris Peacock	1	Kau Liu	49Q HE 0068	Tall shrubland	Very common
Papilio polytes	Common Mormon	4	San Tau	49Q HE 0167	Cultivated fields	Very common
Papilio polytes	Common Mormon	2	Kau Liu	49Q HE 0068	Tall shrubland	Very common
Papilio polytes	Common Mormon	3	Sham Wat	49Q GE 9765	Secondary woodland	Very common
Papilio polytes	Common Mormon	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Papilio protenor	Spangle	2	San Tau	49Q HE 0167	Secondary woodland	Very common
Pathysa antiphates	Fivebar Swordtail	2	San Tau	49Q HE 0167	Secondary woodland	Common
Pathysa antiphates	Fivebar Swordtail	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	Common
Pieridae						
Appias albina	Common Albatross	1	San Tau	49Q HE 0167	Cultivated fields	Rare
Eurema hecabe	Common Grass Yellow	3	San Tau	49Q HE 0167	Cultivated fields	Very common
Eurema hecabe	Common Grass Yellow	2	Sham Wat	49Q GE 9765	Secondary woodland	Very common
Eurema hecabe	Common Grass Yellow	4	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Eurema hecabe	Common Grass Yellow	3	Sham Wat	49Q GE 9765	Coastal grass/shrub	Very common
Pieris canidia	Indian Cabbage White	5	San Tau	49Q HE 0167	Cultivated fields	Very common
Pieris canidia	Indian Cabbage White	3	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	Very common
Pieris canidia	Indian Cabbage White	2	Kau Liu	49Q HE 0068	Tall shrubland	Very common
Pieris canidia	Indian Cabbage White	2	Chek Lap Kok	49Q HE 0268	Shrubby grassland	Very common
Pieris canidia	Indian Cabbage White	8	Sha Lo Wan	49Q GE 9867	Tall shrubland	Very common
Nymphalidae						
Cupha erymanthis	Rustic	1	San Tau	49Q HE 0167	Secondary woodland	Very common
Cupha erymanthis	Rustic	2	Sham Wat	49Q GE 9765	Secondary woodland	Very common
Cupha erymanthis	Rustic	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Faunis eumeus	Common Faun	4	San Tau	49Q HE 0167	Secondary woodland	Common
Faunis eumeus	Common Faun	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Common
Junonia iphita	Chocolate Pansy	1	San Tau	49Q HE 0167	River	Uncommon
Kaniska canace	Blue Admiral	1	San Tau	49Q HE 0167	River	Common
Kaniska canace	Blue Admiral	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	Common
Lethe confusa	Common White-banded Brown	1	San Tau	49Q HE 0167	Secondary woodland	Very common
Lethe confusa	Common White-banded Brown	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Lethe confusa	Common White-banded Brown	1	Kau Liu	49Q HE 0068	Tall shrubland	Very common
Mycalesis mineus	Dark Brand Bush Brown	4	San Tau	49Q HE 0167	Secondary woodland	Very common
Mycalesis mineus	Dark Brand Bush Brown	3	Sham Wat	49Q GE 9765	Secondary woodland	Very common
Mycalesis mineus	Dark Brand Bush Brown	6	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Mycalesis zonata	South China Bush Brown	1	San Tau	49Q HE 0167	Secondary woodland	Common
Neptis hylas	Common Sailer	1	San Tau	49Q HE 0167	Secondary woodland	Very common
Neptis hylas	Common Sailer	1	Kau Liu	49Q HE 0068	Tall shrubland	Very common
Parathyma sulpitia	Five-dot Sergeant	1	San Tau	49Q HE 0167	Secondary woodland	Common
Lycaenidae						
Abisara echerius	Plum Judy	2	San Tau	49Q HE 0167	Secondary woodland	Very common
Abisara echerius	Plum Judy	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	Very common
Abisara echerius	Plum Judy	3	Sham Wat	49Q GE 9765	Secondary woodland	Very common
Abisara echerius	Plum Judy	3	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	Very common
Zemeros flegyas	Punchinello	1	San Tau	49Q HE 0167	Secondary woodland	Common
Zemeros flegyas	Punchinello	1	Sham Wat	49Q GE 9765	Secondary woodland	Common
Zizeeria maha	Pale Grass Blue	7	San Tau	49Q HE 0167	Cultivated fields	Very common
Zizeeria maha	Pale Grass Blue	5	Sham Wat	49Q GE 9765	Coastal grass/shrub	Very common
Zizeeria maha	Pale Grass Blue	3	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	Very common
Hesperiidae						
Odontoptilum angulatum	Chestnut Angle	1	San Tau	49Q HE 0167	River	Common
Odontoptilum angulatum	Chestnut Angle	1	Sham Wat	49Q GE 9765	Secondary woodland	Common

Date of survey: 17 March 2004

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Papilionidae						
Graphium sarpedon	Common Bluebottle	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Very common
Graphium sarpedon	Common Bluebottle	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Graphium sarpedon	Common Bluebottle	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	Very common
Papilio bianor	Chinese Peacock	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Papilio helenus	Red Helen	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Very common
Papilio helenus	Red Helen	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Papilio helenus	Red Helen	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	Very common
Papilio paris	Paris Peacock	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Very common
Papilio paris	Paris Peacock	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Papilio polytes	Common Mormon	3	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Papilio polytes	Common Mormon	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Papilio polytes	Common Mormon	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	Very common
Papilio protenor	Spangle	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Very common
Pathysa antiphates	Fivebar Swordtail	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Pieridae						
Eurema hecabe	Common Grass Yellow	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Eurema hecabe	Common Grass Yellow	4	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Pieris canidia	Indian Cabbage White	5	Pak Mong to Ngau Kwu Long	49Q HE 0668	Developed area	Very common
Pieris canidia	Indian Cabbage White	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Nymphalidae						
Athyma selenophora	Staff Sergeant	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Cupha erymanthis	Rustic	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Very common
Cupha erymanthis	Rustic	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Cupha erymanthis	Rustic	2	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Faunis eumeus	Common Faun	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Faunis eumeus	Common Faun	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Common
Mycalesis mineus	Dark Brand Bush Brown	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Very common
Mycalesis mineus	Dark Brand Bush Brown	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	Very common
Neptis hylas	Common Sailer	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Neptis hylas	Common Sailer	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Common
Rohana parisatis	Black Prince	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Lycaenidae						
Abisara echerius	Plum Judy	4	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Abisara echerius	Plum Judy	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Abisara echerius	Plum Judy	3	West of Pak Mong	49Q HE 0568	Shrubby grassland	Very common
Acytolepis puspa	Common Hedge Blue	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common
Acytolepis puspa	Common Hedge Blue	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Common
Zizeeria maha	Pale Grass Blue	3	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Zizeeria maha	Pale Grass Blue	4	Tai Ho Wan	49Q HE 0768	Shrubby grassland	Very common
Zizeeria maha	Pale Grass Blue	6	West of Pak Mong	49Q HE 0568	Shrubby grassland	Very common
Hesperiidae						
Odontoptilum angulatum	Chestnut Angle	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	Common

Butterflies

Date of survey: 20 April 2004 (Night)

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Hesperiidae						
Erionota torus	Banana Skipper	1	Sham Wat	49Q GE 9765	Cultivated field	Common

Date of Survey: 27 April 2004 (Night)

Tai Ho Wan
No species observed

Date of Survey: 9 May 2004

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Papilionidae						
Graphium doson	Common Jay	4	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Uncommon
Graphium sarpedon	Common Bluebottle	7	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Graphium sarpedon	Common Bluebottle	1	East of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Papilio bianor	Chinese Peacock	4	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Papilio clytia	Common Mime	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Papilio paris	Paris Peacock	9	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Papilio paris	Paris Peacock	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Papilio helenus	Red Helen	5	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Papilio memnon	Great Mormon	7	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Papilio polytes	Common Mormon	16	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Papilio polytes	Common Mormon	3	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Papilio polytes	Common Mormon	1	East of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Papilio protenor	Spangle	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Pathysa antiphates	Fivebar Swordtail	4	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Pieridae						
Cepora nerissa	Common Gull	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Catopsilia pyranthe	Mottled Emigrant	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Eurema blanda	Three-spot Grass Yellow	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Uncommon
Eurema hecabe	Common Grass Yellow	12	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Eurema hecabe	Common Grass Yellow	4	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Eurema hecabe	Common Grass Yellow	3	East of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Eurema laeta	Spotless Grass Yellow	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Uncommon
Ixias pyrene	Yellow Orangetip	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Uncommon
Pieris canidia	Indian Cabbage White	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Nymphalidae						
Athyma nefte	Colour Sergeant	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Athyma selenophora	Staff Sergeant	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Charaxes bernardus	Tawny Rajah	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Cupha erymanthis	Rustic	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Cyrestis thyodamas	Mapwing	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Euploea midamus	Blue-spotted Crow	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Euploea midamus	Blue-spotted Crow	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Hestina assimilis	Red Ring-skirt	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Mycalesis mineus	Dark Brand Bush Brown	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Mycalesis mineus	Dark Brand Bush Brown	2	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Mycalesis mineus	Dark Brand Bush Brown	1	East of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Mycalesis zonata	South China Bush Brown	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Neptis hylas	Common Sailer	7	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Neptis hylas	Common Sailer	2	East of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Phaedyma columella	Short-banded Sailer	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Uncommon
Symbrenthia lilaea	Jester	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Ypthima baldus	Common Five-ring	3	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Ypthima baldus	Common Five-ring	4	East of Tai Ho Wan	49Q HE 0769	Shrubby grassland	Very common
Lycaenidae						
Abisara echerius	Plum Judy	2	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Very common
Acytolepis puspa	Common Hedge Blue	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Acytolepis puspa	Common Hedge Blue	1	West of Tai Ho Wan	49Q HE 0568	Shrubby grassland	Common
Heliophorus epicles	Purple Sapphire	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Jamides bochus	Dark Cerulean	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Common
Nacaduba kurava	Rounded Six-line Blue	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common
Rapala manea	Slate Flash	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Uncommon
Zizeeria maha	Pale Grass Blue	7	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/Secondary woodland	Very common

Date of Survey: 9 May 2004 (Night)

Tai Ho Wan
No species observed

*After Young & Yiu, 2002

Butterflies

Date of Survey: 12 May 2004

Chek Lap Kok to Sham Wat

Species	Common name	Location	Habitat	Hong Kong status*
Hesperiidae				
Erionota torus	Banana Skipper	Sham Wat	Village banana plantation	Common

Chek Lap Kok to Sham Wat

Species	Common name	Location	Habitat	Hong Kong status*
Papilionidae				
Graphium agamemnon	Tailed Green Jay	Tung Chung Bay	Developed area	Very common
Graphium agamemnon	Tailed Green Jay	San Tau	Village/orchard	Very common
Graphium agamemnon	Tailed Green Jay	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Graphium doson	Common Jay	Tung Chung Bay	Developed area	Uncommon
Graphium doson	Common Jay	Tung Chung Bay	Shrubby grassland/Secondary woodland	Uncommon
Graphium doson	Common Jay	San Tau	Village/orchard	Uncommon
Graphium doson	Common Jay	Kau Liu to Hau Hok Wan	Tall shrubland	Uncommon
Graphium doson	Common Jay	Sha Lo Wan	Village/orchard	Uncommon
Graphium sarpedon	Common Bluebottle	Tung Chung Bay	Developed area	Very common
Graphium sarpedon	Common Bluebottle	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Graphium sarpedon	Common Bluebottle	San Tau	Village/orchard	Very common
Graphium sarpedon	Common Bluebottle	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Papilio bianor	Chinese Peacock	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Papilio bianor	Chinese Peacock	San Tau	Village/orchard	Common
Papilio clytia	Common Mime	San Tau	Village/orchard	Common
Papilio clytia	Common Mime	Kau Liu to Hau Hok Wan	Tall shrubland	Common
Papilio clytia	Common Mime	Sha Lo Wan	Village/orchard	Common
Papilio demoleus	Lime Butterfly	Tung Chung Bay	Developed area	Common
Papilio helenus	Red Helen	Tung Chung Bay	Developed area	Very common
Papilio helenus	Red Helen	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Papilio helenus	Red Helen	San Tau	Village/orchard	Very common
Papilio helenus	Red Helen	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Papilio helenus	Red Helen	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Very common
Papilio memnon	Great Mormon	Tung Chung Bay	Developed area	Very common
Papilio memnon	Great Mormon	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Papilio memnon	Great Mormon	San Tau	Village/orchard	Very common
Papilio paris	Paris Peacock	Tung Chung Bay	Developed area	Very common
Papilio paris	Paris Peacock	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Papilio paris	Paris Peacock	San Tau	Village/orchard	Very common
Papilio paris	Paris Peacock	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Papilio paris	Paris Peacock	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Very common
Papilio paris	Paris Peacock	Sha Lo Wan	Village/orchard	Very common
Papilio polytes	Common Mormon	Tung Chung Bay	Developed area	Very common
Papilio polytes	Common Mormon	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Papilio polytes	Common Mormon	San Tau	Village/orchard	Very common
Papilio polytes	Common Mormon	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Papilio polytes	Common Mormon	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Very common
Papilio polytes	Common Mormon	Sha Lo Wan	Village/orchard	Very common
Papilio polytes	Common Mormon	San Tau	Village/orchard	Very common
Papilio protenor	Spangle	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Very common
Papilio protenor	Spangle	San Tau	Village/orchard	Rare
Papilio xuthus	Swallowtail	San Shek Wan	Developed area	Rare
Papilio xuthus	Swallowtail	Tung Chung Bay	Developed area	Common
Pathysa antiphates	Fivebar Swordtail	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Pathysa antiphates	Fivebar Swordtail	San Tau	Village/orchard	Common
Pieridae				
Catopsilia pomona	Lemon Emigrant	Tung Chung Bay	Developed area	Common
Catopsilia pomona	Lemon Emigrant	Kau Liu to Hau Hok Wan	Tall shrubland	Common
Catopsilia pyranthe	Mottled Emigrant	San Tau	Village/orchard	Common
Cepora nerissa	Common Gull	Kau Liu to Hau Hok Wan	Tall shrubland	Common
Cepora nerissa	Common Gull	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Common
Cepora nerissa	Common Gull	Sha Lo Wan	Village/orchard	Common
Delias pasithoe	Red-base Jezebel	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Eurema brigitta	Small Grass Yellow	Kau Liu to Hau Hok Wan	Tall shrubland	Uncommon
Eurema hecabe	Common Grass Yellow	Tung Chung Bay	Developed area	Very common
Eurema hecabe	Common Grass Yellow	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Eurema hecabe	Common Grass Yellow	San Tau	Village/orchard	Very common
Eurema hecabe	Common Grass Yellow	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Eurema hecabe	Common Grass Yellow	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Very common
Eurema hecabe	Common Grass Yellow	Tung Chung Bay	Shrubby grassland/Secondary woodland	Uncommon
Eurema laeta	Spotless Grass Yellow	Tung Chung Bay	Developed area	Common
Hebomoia glaucippe	Great Orangetip	San Tau	Village/orchard	Common
Hebomoia glaucippe	Great Orangetip	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Common
Hebomoia glaucippe	Great Orangetip	Sha Lo Wan	Village/orchard	Common
Hebomoia glaucippe	Great Orangetip	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Uncommon
Ixias pyrene	Yellow Orangetip	Sha Lo Wan	Village/orchard	Uncommon
Ixias pyrene	Yellow Orangetip	Tung Chung Bay	Developed area	Very common
Pieris canidia	Indian Cabbage White	San Tau	Village/orchard	Very common
Pieris canidia	Indian Cabbage White	Sha Lo Wan	Village/orchard	Very common
Nymphalidae				
Athyma nefte	Colour Sergeant	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Athyma nefte	Colour Sergeant	San Tau	Village/orchard	Common
Athyma selenophora	Staff Sergeant	San Tau	Village/orchard	Common
Cethosia biblis	Hong Kong Lacewing	Tung Chung Bay	Shrubby grassland/Secondary woodland	Rare
Cethosia biblis	Hong Kong Lacewing	San Tau	Village/orchard	Rare
Charaxes bernardus	Tawny Rajah	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Charaxes bernardus	Tawny Rajah	San Tau	Village/orchard	Common
Cupha erymanthis	Rustic	Tung Chung Bay	Developed area	Very common
Cupha erymanthis	Rustic	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Cupha erymanthis	Rustic	San Tau	Village/orchard	Very common
Cupha erymanthis	Rustic	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Cyrestis thyodamas	Mapwing	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Cyrestis thyodamas	Mapwing	San Tau	Village/orchard	Common
Cyrestis thyodamas	Mapwing	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Common
Danaus genutia	Common Tiger	Sham Wat	Developed area	Very common
Euthalia phemius	White-edged Blue Baron	San Tau	Village/orchard	Common
Faunis eumeus	Common Faun	San Tau	Village/orchard	Very common
Junonia iphita	Chocolate Pansy	San Tau	Stream	Uncommon
Lethe confusa	Common White-banded Brown	San Tau	Village/orchard	Very common
Lethe confusa	Common White-banded Brown	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Neptis hylas	Common Sailer	Tung Chung Bay	Developed area	Very common
Neptis hylas	Common Sailer	Tung Chung Bay	Shrubby grassland/Secondary woodland	Very common
Neptis hylas	Common Sailer	San Tau	Village/orchard	Very common
Neptis hylas	Common Sailer	Kau Liu to Hau Hok Wan	Tall shrubland	Very common
Neptis hylas	Common Sailer	Sha Lo Wan	Village/orchard	Very common
Parasarpa dudu	Commodore	Tung Chung Bay	Shrubby grassland/Secondary woodland	Uncommon
Parathyma sulpitia	Five-dot Sergeant	San Tau	Village/orchard	Common
Parathyma sulpitia	Five-dot Sergeant	Kau Liu to Hau Hok Wan	Tall shrubland	Common
Phaedyma columella	Short-banded Sailer	Sha Lo Wan	Village/orchard	Uncommon
Polyura nepenthes	Shan Nawab	San Tau	Village/orchard	Uncommon
Polyura nepenthes	Shan Nawab	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Uncommon
Rohana parisatis	Black Prince	San Tau	Village/orchard	Uncommon
Rohana parisatis	Black Prince	San Tau	Stream	Uncommon
Rohana parisatis	Black Prince	Kau Liu to Hau Hok Wan	Tall shrubland	Uncommon
Rohana parisatis	Black Prince	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Uncommon
Symbrenthia lilaea	Jester	Sha Lo Wan	Village/orchard	Common
Ypthima baldus	Common Five-ring	Hau Hok Wan to Sha Lo Wan	Shrubby grassland	Very common
Lycaenidae				
Abisara echerius	Plum Judy	San Tau	Village/orchard	Very common
Acytolepis puspa	Common Hedge Blue	Tung Chung Bay	Developed area	Common
Acytolepis puspa	Common Hedge Blue	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Acytolepis puspa	Common Hedge Blue	San Tau	Village/orchard	Common
Arhopala birmana	Burmese Bush Blue	San Tau	Village/orchard	Rare
Artipe eryx	Green Flash	Kau Liu to Hau Hok Wan	Tall shrubland	Uncommon
Mahathala amera	Falcate Oak Blue	Kau Liu to Hau Hok Wan	Tall shrubland	Uncommon
Neopithecops zalmora	Quaker	Tung Chung Bay	Developed area	Uncommon
Neopithecops zalmora	Quaker	Tung Chung Bay	Shrubby grassland/Secondary woodland	Uncommon
Zemeros flegyas	Punchinello	Tung Chung Bay	Shrubby grassland/Secondary woodland	Common
Zizeeria maha	Pale Grass Blue	Tung Chung Bay	Developed area	Very common
Zizeeria maha	Pale Grass Blue	San Tau	Village/orchard	Very common
Hesperiidae				
Bibasis gotama	Pale Awlet	San Tau	Village/orchard	Uncommon
Iambrix salsala	Chestnut Bob	Kau Liu to Hau Hok Wan	Tall shrubland	Uncommon

*After Young & Yiu, 2002

Butterflies

Date of Survey 13 May 2004 (Day and Night)

Additional Study Area for tunnel portal option

Species	Common name	Abundance	Location	UTM ref.	Habitat	Hong Kong status*
Papilionidae						
Lamproptera curius	Dragontail	5	San Tau	49Q HE 008675	Stream	Rare
Papilio bianor	Chinese Peacock	1	San Tau	49Q HE 0067	Stream	Common
Papilio helenus	Red Helen	3	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Papilio memnon	Great Mormon	1	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Papilio paris	Paris Peacock	3	San Tau	49Q HE 0067	Stream	Very common
Papilio polytes	Common Mormon	4	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Papilio polytes	Common Mormon	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common
Pieridae						
Catopsilia pyranthe	Mottled Emigrant	1	San Tau	49Q HE 0067	Stream	Common
Cepora nerissa	Common Gull	2	San Tau	49Q HE 0067	Stream	Common
Delias pasithoe	Red-base Jezebel	2	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Eurema hecabe	Common Grass Yellow	3	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Eurema hecabe	Common Grass Yellow	1	San Tau	49Q HE 0067	Stream	Very common
Eurema hecabe	Common Grass Yellow	4	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common
Eurema laeta	Spotless Grass Yellow	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Uncommon
Hebomoia glaucippe	Great Orangetip	1	Ngau Au	49Q HE 0166	Shrubby grassland	Common
Hebomoia glaucippe	Great Orangetip	1	San Tau	49Q HE 0067	Stream	Common
Hebomoia glaucippe	Great Orangetip	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Common
Ixias pyrene	Yellow Orangetip	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Uncommon
Nymphalidae						
Athyma nefte	Colour Sergeant	1	San Tau	49Q HE 0067	Stream	Common
Athyma selenophora	Staff Sergeant	1	San Tau	49Q HE 0067	Stream	Common
Cupha erymanthis	Rustic	3	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Cupha erymanthis	Rustic	2	San Tau	49Q HE 0067	Stream	Very common
Cupha erymanthis	Rustic	2	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common
Cyrestis thyodamas	Mapwing	1	San Tau	49Q HE 0067	Stream	Common
Cyrestis thyodamas	Mapwing	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Common
Junonia iphita	Chocolate Pansy	1	San Tau	49Q HE 0067	Stream	Uncommon
Lethe confusa	Common White-banded Brown	1	San Tau	49Q HE 0067	Stream	Very common
Neptis hylas	Common Sailer	3	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Neptis hylas	Common Sailer	1	San Tau	49Q HE 0067	Stream	Very common
Neptis hylas	Common Sailer	2	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common
Parathyma sulpitia	Five-dot Sergeant	1	San Tau	49Q HE 0067	Stream	Common
Rohana parisatis	Black Prince	5	San Tau	49Q HE 0067	Stream	Uncommon
Rohana parisatis	Black Prince	3	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Uncommon
Ypthima baldus	Common Five-ring	4	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Ypthima baldus	Common Five-ring	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common
Lycaenidae						
Abisara echerius	Plum Judy	2	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Abisara echerius	Plum Judy	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common
Acytolepis puspa	Common Hedge Blue	1	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Neopithecops zalmora	Quaker	1	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Uncommon
Zemeros flegyas	Punchinello	1	San Tau	49Q HE 0067	Stream	Common
Zizeeria maha	Pale Grass Blue	3	Ngau Au	49Q HE 0166	Shrubby grassland	Very common
Zizeeria maha	Pale Grass Blue	5	Sha Lo Wan	49Q GE 9867	Shrubby grassland/secondary woodland	Very common

Date of Survey: 18 May 2004 (Night)

Chek Lap Kok to Sham Wat
No species observed

Appendix L

List of Recorded Herpetofauna Species

Herpetofauna

Date of survey: 20 and 25 September 2003
22 and 25 September 2003 (Night)

Original Study Area

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Bufonidae							
Bufo melanostictus	Asian Common Toad	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	22.09.03	Very abundant
Bufo melanostictus	Asian Common Toad	1	Chek Lap Kok	49Q HE 0268	Shrubby grassland	25.09.03	Very abundant
Bufo melanostictus	Asian Common Toad	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.09.03	Very abundant
Bufo melanostictus	Asian Common Toad	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.09.03	Very abundant
Bufo melanostictus	Asian Common Toad	1	San Tau	49Q HE 0167	Secondary woodland	25.09.03	Very abundant
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	1	Kau Liu	49Q HE 002678	Stream	25.09.03	Common**
Microhylidae							
Kaloula pulchra	Asiatic Painted Frog	2	Kau Liu	49Q HE 0068	Tall shrubland	25.09.03	Common
Kaloula pulchra	Asiatic Painted Frog	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25.09.03	Common
Gekkonidae							
Gehyra mutilata	Four-clawed Gecko	1	San Tau	49Q HE 0167	Village buildings	25.09.03	Uncommon
Gekko chinensis	Chinese Gecko	2	San Tau	49Q HE 0167	Secondary woodland	22.09.03	Very common
Gekko chinensis	Chinese Gecko	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	22.09.03	Very common
Gekko chinensis	Chinese Gecko	2	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.09.03	Very common
Gekko chinensis	Chinese Gecko	1	Kau Liu	49Q HE 0068	Tall shrubland	25.09.03	Very common
Gekko chinensis	Chinese Gecko	2	San Tau	49Q HE 0167	Secondary woodland	25.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	22	Chek Lap Kok	49Q HE 0268	Pavilion	22.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	8	San Tau	49Q HE 0167	Secondary woodland	22.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	16	San Tau	49Q HE 0167	Village buildings	22.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	5	Kau Liu	49Q HE 0068	Tall shrubland	22.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	9	Sha Lo Wan	49Q GE 9867	Village buildings	22.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	25.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	25	San Tau	49Q HE 0167	Village buildings	25.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	10	San Tau	49Q HE 0167	Secondary woodland	25.09.03	Very common
Hemidactylus bowringii	Bowring's Gecko	19	Chek Lap Kok	49Q HE 0268	Pavilion	25.09.03	Very common
Agamidae							
Calotes versicolor	Changeable Lizard	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20.09.03	Common
Calotes versicolor	Changeable Lizard	1	Hau Wong Temple	49Q HE 0266	Disturbed / wasteland	25.09.03	Common
Calotes versicolor	Changeable Lizard	1	San Tau	49Q HE 0167	Secondary woodland	25.09.03	Common
Scincidae							
Ateuchosaurus chinensis	Chinese Forest Skink	1	San Tau	49Q HE 0167	Secondary woodland	20.09.03	Common on Lantau
Eumeces quadrilineatus	Blue-tailed Skink	3	Kau Liu	49Q HE 0068	Tall shrubland	20.09.03	Uncommon to abundant
Eumeces quadrilineatus	Blue-tailed Skink	1	Hau Hok Wan	49Q GE 9967	Shrubby grassland	20.09.03	Uncommon to abundant
Eumeces quadrilineatus	Blue-tailed Skink	1	Kau Liu	49Q HE 0068	Tall shrubland	25.09.03	Uncommon to abundant
Mabuya longicaudata	Long-tailed Skink	1	San Tau	49Q HE 0167	Secondary woodland	20.09.03	Fairly common and widespread

Date of survey: 2 and 8 October 2003
5 and 8 October 2003 (Night)

Additional Study Area
Herpetofauna

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Bufonidae							
Bufo melanostictus	Asian Common Toad	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very abundant
Bufo melanostictus	Asian Common Toad	1	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	05.10.03	Very abundant
Bufo melanostictus	Asian Common Toad	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	05.10.03	Very abundant
Bufo melanostictus	Asian Common Toad	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	05.10.03	Very abundant
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	1	Tai Ho Wan	49Q HE 073689	Stream	02.10.03	Common**
Rana limnocharis	Paddy Frog	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Rana limnocharis	Paddy Frog	2	NE of Tai Ho Wan	49Q HE 0769	Shrubby grassland	05.10.03	Very common
Rana limnocharis	Paddy Frog	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	05.10.03	Very common
Rhacophoridae							
Polypedates megacephalus	Brown Tree Frog	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	05.10.03	Common
Microhylidae							
Kaloula pulchra	Asiatic Painted Frog	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Common
Kaloula pulchra	Asiatic Painted Frog	1	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Common
Kaloula pulchra	Asiatic Painted Frog	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	05.10.03	Common
Gekkonidae							
Gekko chinensis	Chinese Gecko	4	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Gekko chinensis	Chinese Gecko	3	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Gekko chinensis	Chinese Gecko	6	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	05.10.03	Very common
Gekko chinensis	Chinese Gecko	3	Tai Ho Wan	49Q HE 0768	Shrubby grassland	05.10.03	Very common
Hemidactylus bowringii	Bowring's Gecko	16	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	02.10.03	Very common
Hemidactylus bowringii	Bowring's Gecko	8	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Hemidactylus bowringii	Bowring's Gecko	3	West of Pak Mong	49Q HE 0568	Shrubby grassland	02.10.03	Very common
Hemidactylus bowringii	Bowring's Gecko	2	West of Pak Mong	49Q HE 0568	Shrubby grassland	05.10.03	Very common
Hemidactylus bowringii	Bowring's Gecko	22	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	05.10.03	Very common
Hemidactylus bowringii	Bowring's Gecko	8	Tai Ho Wan	49Q HE 0768	Shrubby grassland	05.10.03	Very common
Agamidae							
Calotes versicolor	Changeable Lizard	2	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Common
Calotes versicolor	Changeable Lizard	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Common
Calotes versicolor	Changeable Lizard	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	08.10.03	Common
Scincidae							
Eumeces chinensis	Chinese Skink	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Eumeces chinensis	Chinese Skink	1	Tai Ho Wan	49Q HE 0768	Shrubby grassland	02.10.03	Very common
Scincella reevesii	Reeves' Smooth Skink	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Very common
Colubridae							
Oligodon formosanus	Taiwan Kukri Snake	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Secondary woodland	02.10.03	Not generally common

Date of Survey: 2 October 2003

Half-Day Additional Survey
Herpetofauna

Species	Common name	Abundance	Location	UTM ref.	Date	Hong Kong status*
Agamidae						
Calotes versicolor	Changeable Lizard	1	Sha Lo Wan	49Q HE 0668	02.10.03	Common
Calotes versicolor	Changeable Lizard	1	San Tau	49Q HE 0668	02.10.03	Common

* After Karsen *et al.* (1998)
** Conservation concern (Fellowes *et al.* 2002)

Herpetofauna

Date of survey: 24, 27, 28 October and 5 November 2003
23, 27 October and 5 November 2003 (Night)

Sham Wat and Sham Shek Tsuen headland

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*	Notes
Bufonidae								
Bufo melanostictus	Asian Common Toad	1	Sham Wat	49Q GE 9765	Developed area	27.10.03	Very abundant	
Rhacophoridae								
Polypedates megacephalus	Brown Tree Frog	3	Sham Wat	49Q GE 9765	Secondary woodland	23.10.03	Common/abundant	
Gekkonidae								
Gekko chinensis	Chinese Gecko	3	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	23.10.03	Very common	
Gekko chinensis	Chinese Gecko	3	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	27.10.03	Very common	
Hemidactylus bowringii	Bowring's Gecko	14	Sham Wat	49Q GE 9765	Developed area	23.10.03	Very common	
Hemidactylus bowringii	Bowring's Gecko	1	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	24.10.03	Very common	
Hemidactylus bowringii	Bowring's Gecko	17	Sham Wat	49Q GE 9765	Developed area	27.10.03	Very common	
Hemidactylus bowringii	Bowring's Gecko	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	27.10.03	Very common	
Elapidae								
Naja atra	Chinese Cobra	1	Sham Shek Tsuen headland	49Q GE 979664	Stream	23.10.03	Uncommon**	A freshly sloughed skin

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Viperidae							
Trimeresurus albolabris	Bamboo Snake	1	Pak Mong	49Q HE 0768	Developed area	28.10.03	Common

Inland study area for San Shek Wan tunnel option

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	1	S of Hok Tau	49Q GE 9967	Stream	05.11.03	Common**
Gekkonidae							
Gekko chinensis	Chinese Gecko	3	SW of San Tau	49Q HE 0067	Shrubby grassland/tall shrubland	05.11.03	Very common
Scincidae							
Eumeces quadrilineatus	Blue-tailed Skink	1	E of San Shek Wan	49Q GE 9966	Shrubby grassland/tall shrubland	05.11.03	Rare - abundant
Scincella reevesii	Reeves' Smooth Skink	2	SW of San Tau	49Q HE 0067	Shrubby grassland/tall shrubland	05.11.03	Abundant
Scincella reevesii	Reeves' Smooth Skink	1	E of San Shek Wan	49Q GE 9966	Shrubby grassland/tall shrubland	05.11.03	Abundant

Date of survey: 25 and 26 November 2003
10 and 15 December 2003 (Night)

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Gekkonidae							
Gekko chinensis	Chinese Gecko	1	San Tau	49Q HE 0167	Secondary woodland	25.11.03	Very common
Gekko chinensis	Chinese Gecko	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.11.03	Very common
Hemidactylus bowringii	Bowring's Gecko	3	San Tau	49Q HE 0167	Developed area	25.11.03	Very common
Hemidactylus bowringii	Bowring's Gecko	1	Sha Lo Wan	49Q GE 9867	Developed area	25.11.03	Very common
Hemidactylus bowringii	Bowring's Gecko	2	Sham Wat	49Q GE 9765	Developed area	25.11.03	Very common
Scincidae							
Eumeces quadrilineatus	Blue-tailed Skink	1	Sha Lo Wan	49Q GE 9867	Tall shrubland	25.11.03	Uncommon to abundant

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Gekkonidae							
Gekko chinensis	Chinese Gecko	2	Sham Shek Tsuen headland	49Q GE 9766	Tall shrubland	10.12.03	Very common
Gekko chinensis	Chinese Gecko	4	San Tau	49Q HE 0167	Secondary woodland	10.12.03	Very common
Hemidactylus bowringii	Bowring's Gecko	8	Chek Lap Kok	49Q HE 0268	Shrubby grassland	10.12.03	Very common
Hemidactylus bowringii	Bowring's Gecko	18	Sha Lo Wan	49Q GE 9867	Developed area	10.12.03	Very common

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Gekkonidae							
Gekko chinensis	Chinese Gecko	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	26.11.03	Very common
Scincidae							
Mabuya longicaudata	Long-tailed Skink	1	Tai Ho Wan	49Q HE 0768	Stream	26.11.03	Fairly common and widespread

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Gekkonidae							
Gekko chinensis	Chinese Gecko	6	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	15.12.03	Very common
Gekko chinensis	Chinese Gecko	2	Tai Ho Wan	49Q HE 0768	Shrubby grassland	15.12.03	Very common
Hemidactylus bowringii	Bowring's Gecko	23	Pak Mong to Ngau Kwu Long	49Q HE 0668	Developed area	15.12.03	Very common

Date of survey: 22 and 27 January 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*	Notes
Gekkonidae								
Gekko chinensis	Chinese Gecko	1	San Tau	49Q HE 0167	Secondary woodland	22.01.04	Very common	
Gekko chinensis	Chinese Gecko	1	Sha Lo Wan	49Q GE 9867	Secondary woodland	22.01.04	Very common	

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Gekkonidae							
Gekko chinensis	Chinese Gecko	1	Pak Mong to Ngau Kwu Long	49Q HE 0668	Village woodland	27.01.04	Very common

* After Karsen *et al.* (1998)
** Conservation concern (Fellowes *et al.* 2002)

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Herpetofauna

Date of survey: 17 and 19 February 2004 (Night)

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Bufonidae							
Bufo melanostictus	Asian Common Toad	5	Hau Wong Temple	49Q HE 0266	Streams/Riparian	17 02 04	Common
Gekkonidae							
Gekko chinensis	Chinese Gecko	1	San Tau	49Q HE 0167	Secondary woodland	17 02 04	Very common
Gekko chinensis	Chinese Gecko	5	Sha Lo Wan	49Q GE 9867	Tall shrubland	17 02 04	Very common
Hemidactylus bowringii	Bowring's Gecko	4	Sha Lo Wan	49Q GE 9867	Developed area	17 02 04	Very common

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Bufonidae							
Bufo melanostictus	Asian Common Toad	1	Pak Mong	49Q HE 0768	Shrubby grassland	19 02 04	Common

* After Karsen *et al.* (1998)

Date of survey: 16 March 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Gekkonidae							
Gekko chinensis	Chinese Gecko	3	San Tau	49Q HE 0167	Secondary woodland	16.03.04	Very common
Gekko chinensis	Chinese Gecko	2	Sha Lo Wan	49Q GE 9867	Tall shrubland	16.03.04	Very common

Date of survey: 17 March 2004

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Agamidae							
Calotes versicolor	Changeable Lizard	1	Pak Mong	49Q HE 0768	Shrubby grassland	17 03.04	Common

* After Karsen *et al.* (1998)

Date of survey: 20 April 2004 (Night)

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	1	Sham Wat	49Q GE 977656	Small stream	20.04.04	Common**
Rana exilispinosa	Lesser Spiny Frog	4	Hau Hok Wan	49Q GE 999677	Stream	20.04.04	Common**
Rana guentheri	Günther's Frog	5	Sham Wat	49Q GE 9765	Stream	20.04.04	Very common
Rana guentheri	Günther's Frog	8	Shan Shek Wan	49Q GE 9866	Disused farmland	20.04.04	Very common
Rana guentheri	Günther's Frog	27	Sha Lo Wan	49Q GE 9967	Disused farmland	20.04.04	Very common
Rana guentheri	Günther's Frog	3	San Tau	49Q HE 0167	Disused farmland	20.04.04	Very common
Rana limnocharis	Paddy Frog	3	Shan Shek Wan	49Q GE 9866	Disused farmland	20.04.04	Very common
Rana limnocharis	Paddy Frog	2	Sha Lo Wan	49Q GE 9967	Disused farmland	20.04.04	Very common
Rana limnocharis	Paddy Frog	3	San Tau	49Q HE 0167	Disused farmland	20.04.04	Very common
Rhacophoridae							
Polypedates megacephalus	Brown Tree Frog	1	Sham Wat	49Q GE 9765	Developed area	20.04.04	Very common
Polypedates megacephalus	Brown Tree Frog	8	Shan Shek Wan	49Q GE 9866	Disused farmland	20.04.04	Very common
Polypedates megacephalus	Brown Tree Frog	14	Sha Lo Wan	49Q GE 9967	Disused farmland	20.04.04	Very common
Polypedates megacephalus	Brown Tree Frog	5	San Tau	49Q HE 0167	Disused farmland	20.04.04	Very common
Microhylidae							
Kaloula pulchra	Asiatic Painted Frog	3	Shan Shek Wan	49Q GE 9866	Disused farmland	20.04.04	Common
Kaloula pulchra	Asiatic Painted Frog	3	Sha Lo Wan	49Q GE 9967	Disused farmland	20.04.04	Common
Kaloula pulchra	Asiatic Painted Frog	4	San Tau	49Q HE 0167	Disused farmland	20.04.04	Common
Microhyla pulchra	Marbled Pigmy Frog	3	Shan Shek Wan	49Q GE 9866	Disused farmland	20.04.04	Common
Gekkonidae							
Gekko chinensis	Chinese Gecko	5	Shan Shek Wan	49Q GE 9866	Secondary woodland	20.04.04	Very common
Gekko chinensis	Chinese Gecko	5	Sha Lo Wan	49Q GE 9867	Developed area	20.04.04	Very common
Gekko chinensis	Chinese Gecko	2	San Tau	49Q HE 0167	Developed area	20.04.04	Very common
Gekko gecko	Tokay Gecko	7	Sham Wat	49Q GE 978657	Shrubby grassland	20.04.04	Rare
Gekko gecko	Tokay Gecko	4	Shan Shek Wan	49Q GE 983667	Developed area ***	20.04.04	Rare
					***Single individual also observed here by PJL, 17th March		
Gekko gecko	Tokay Gecko	1	San Tau	49Q HE 011676	Developed area	20.04.04	Rare
Hemidactylus bowringii	Bowring's Gecko	23	Shan Shek Wan	49Q GE 9866	Developed area	20.04.04	Very common
Hemidactylus bowringii	Bowring's Gecko	4	Sha Lo Wan	49Q GE 9867	Developed area	20.04.04	Very common
Hemidactylus bowringii	Bowring's Gecko	12	San Tau	49Q HE 0167	Developed area	20.04.04	Very common

Date of survey: 27 April 2004 (Night)

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	1	West of Tai Ho Wan	49Q HE 051684	Stream	27.04.04	Common**
Rana exilispinosa	Lesser Spiny Frog	1	East of Tai Ho Wan	49Q HE 074694	Stream	27.04.04	Common**
Rana guentheri	Günther's Frog	3	Pak Mong	49Q HE 0768	Stream	27.04.04	Very common
Rana guentheri	Günther's Frog	4	East of Pak Mong	49Q HE 0668	Streams/Riparian	27.04.04	Very common
Rana guentheri	Günther's Frog	2	Tai Ho Wan	49Q HE 0668	Stream	27.04.04	Very common
Rana limnocharis	Paddy Frog	5	East of Pak Mong	49Q HE 0668	Streams/Riparian	27.04.04	Very common
Rhacophoridae							
Polypedates megacephalus	Brown Tree Frog	3	Pak Mong	49Q HE 0768	Secondary woodland	27.04.04	Very common
Polypedates megacephalus	Brown Tree Frog	1	East of Pak Mong	49Q HE 0668	Shrubby grassland	27.04.04	Very common
Polypedates megacephalus	Brown Tree Frog	1	Tai Ho Wan	49Q HE 0668	Shrubby grassland	27.04.04	Very common
Microhylidae							
Kaloula pulchra	Asiatic Painted Frog	1	Pak Mong	49Q HE 0768	Stream	27.04.04	Common
Kaloula pulchra	Asiatic Painted Frog	2	East of Pak Mong	49Q HE 0668	Streams/Riparian	27.04.04	Common
Gekkonidae							
Gekko chinensis	Chinese Gecko	3	Pak Mong	49Q HE 0768	Secondary woodland	27.04.04	Very common
Gekko chinensis	Chinese Gecko	2	Tai Ho Wan	49Q HE 0668	Shrubby grassland	27.04.04	Very common
Hemidactylus bowringii	Bowring's Gecko	11	Pak Mong	49Q HE 0768	Developed area	27.04.04	Very common
Hemidactylus bowringii	Bowring's Gecko	4	Tai Ho Wan	49Q HE 0668	Developed area	27.04.04	Very common

*After Karsen et al. 1998
**Conservation concern (Fellowes et al. 2002)

Herpetofauna

Date of Survey: 9 May 2004

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Colubridae							
Ptyas mucosus	Common Rat Snake	1	Pak Mong to Tai Ho Wan	49Q HE 0668	Shrubby grassland/secondary woodland	09.05.04	Common

Date of Survey: 9 May 2004 (Night)

Tai Ho Wan

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	1	West of Tai Ho Wan	49Q HE 051684	Stream	09.05.04	Common**
Rana guentheri	Günther's Frog	2	Pak Mong to Tai Ho Wan	49Q HE 0668	Marsh	09.05.04	Very common
Rana guentheri	Günther's Frog	2	East of Tai Ho Wan	49Q HE 0668	Stream	09.05.04	Very common
Rhacophoridae							
Polypedates megacephalus	Brown Tree Frog	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Secondary woodland	09.05.04	Very common
Polypedates megacephalus	Brown Tree Frog	1	East of Tai Ho Wan	49Q HE 0668	Shrubby grassland	09.05.04	Very common
Gekkonidae							
Gekko chinensis	Chinese Gecko	3	Pak Mong to Tai Ho Wan	49Q HE 0668	Secondary woodland	09.05.04	Very common
Hemidactylus bowringii	Bowring's Gecko	18	Pak Mong to Tai Ho Wan	49Q HE 0768	Developed area	09.05.04	Very common

Date of Survey: 12 May 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae							
Rana guentheri	Gunther's Frog	8	Sha Lo Wan	49Q GE 9867	Small pond	12.05.04	Very common
Scincidae							
Eumeces chinensis	Chinese Skink	2	Tung Chung Bay	49Q HE 0166	Developed area	12.05.04	Very common
Mabuya longicaudata	Long-tailed Skink	1	San Tau	49Q HE 0067	Village/orchard	12.05.04	Common
Agamidae							
Calotes versicolor	Changeable Lizard	1	Tung Chung Bay	49Q HE 0166	Developed area	12.05.04	Common
Colubridae							
Ptyas mucosus	Common Rat Snake	1	Tung Chung Bay	49Q HE 0166	Coastal mangrove	12.05.04	Common

Date of Survey: 18 May 2004

Chek Lap Kok to Sham Wat

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae							
Rana exilispinosa	Lesser Spiny Frog	2	Hau Hok Wan	49Q GE 999677	Stream	18.05.04	Common**
Rana guentheri	Günther's Frog	6	Sham Wat	49Q GE 9765	Stream	18.05.04	Very common
Rana guentheri	Günther's Frog	3	Shan Shek Wan	49Q GE 9868	Disused farmland	18.05.04	Very common
Rana guentheri	Günther's Frog	11	Sha Lo Wan	49Q GE 9967	Disused farmland	18.05.04	Very common
Rana guentheri	Günther's Frog	2	San Tau	49Q HE 0167	Disused farmland	18.05.04	Very common
Rana limnocharis	Paddy Frog	1	Shan Shek Wan	49Q GE 9866	Disused farmland	18.05.04	Very common
Rhacophoridae							
Polypedates megacephalus	Brown Tree Frog	3	Shan Shek Wan	49Q GE 9866	Disused farmland	18.05.04	Very common
Polypedates megacephalus	Brown Tree Frog	5	Sha Lo Wan	49Q GE 9967	Disused farmland	18.05.04	Very common
Polypedates megacephalus	Brown Tree Frog	2	San Tau	49Q HE 0167	Disused farmland	18.05.04	Very common
Microhylidae							
Kaloula pulchra	Asiatic Painted Frog	1	Sha Lo Wan	49Q GE 9967	Disused farmland	18.05.04	Common
Kaloula pulchra	Asiatic Painted Frog	2	San Tau	49Q HE 0167	Disused farmland	18.05.04	Common
Gekkonidae							
Gekko chinensis	Chinese Gecko	8	Shan Shek Wan	49Q GE 9866	Secondary woodland	18.05.04	Very common
Gekko chinensis	Chinese Gecko	11	Sha Lo Wan	49Q GE 9567	Developed area	18.05.04	Very common
Gekko chinensis	Chinese Gecko	3	San Tau	49Q HE 0167	Developed area	18.05.04	Very common
Hemidactylus bowringii	Bowring's Gecko	14	Shan Shek Wan	49Q GE 9866	Developed area	18.05.04	Very common
Hemidactylus bowringii	Bowring's Gecko	18	Sha Lo Wan	49Q GE 9867	Developed area	18.05.04	Very common
Hemidactylus bowringii	Bowring's Gecko	21	San Tau	49Q HE 0167	Developed area	18.05.04	Very common

Date of Survey: 18 May 2004 (Day and Night)

Additional Study Area for tunnel portal option

Species	Common name	Abundance	Location	UTM ref.	Habitat	Date	Hong Kong status*
Ranidae						18.05.04	
Rana exilispinosa	Lesser Spiny Frog	2	San Tau	49Q HE 005673	Stream	18.05.04	Common**
Rana exilispinosa	Lesser Spiny Frog	1	Sha Lo Wan	49Q GE 991668	Stream	18.05.04	Common**
Rana guentheri	Günther's Frog	3	Ngau Au	49Q HE 0166	Small stream	18.05.04	Very common
Rana guentheri	Günther's Frog	2	Sha Lo Wan	49Q GE 9867	Stream	18.05.04	Very common
Rhacophoridae							
Polypedates megacephalus	Brown Tree Frog	2	San Tau	49Q HE 0067	Tall shrubland	18.05.04	Very common
Polypedates megacephalus	Brown Tree Frog	3	Sha Lo Wan	49Q GE 9867	Tall shrubland	18.05.04	Very common
Gekkonidae							
Gekko chinensis	Chinese Gecko	2	Ngau Au	49Q HE 0166	Shrubby grassland	18.05.04	Very common
Hemidactylus bowringii	Bowring's Gecko	6	Ngau Au	49Q HE 0166	Developed area	18.05.04	Very common

*After Karsen et al. 1998
**Conservation concern (Fellowes et al. 2002)

Appendix M

List of Recorded Vegetation Species

Hong Kong - Zhuhai - Macao Bridge
Hong Kong Section and North Lantau Highway Connection
Ecological Baseline Survey

Vegetation

Date of survey: September 2003 to May 2004

Plant Species Recroded within the Study Area

Area	A	North Lantau (from Tung Chung to Sham Wat)
	B	North Lantau (from Tung Chung to Tai Ho Wan)
	C	Chap Lap Kok Area
Relative Abundance	1	rare
	2	uncommon
	3	common
	4	abundant
	5	very abundant

	Species list	Status	Plantation Woodland			Secondary Woodland			Tall Shurbland			Shrubby Grassland			Coastal			Developed Area			Wasteland			Salt Marsh		Cultivated Field/Orchard	
			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Tree	*Bambusa* sp.	n/a	2			2	2	2										2	2	2						2	2
Tree	*Acacia confusa*	c	3	3	4	2	2	2										2	2		1	1	2			2	2
Tree	*Acacia maginum*	p			3																						
Tree	*Aconychia pedunculata*	vc	2	2		3	3	2	3	3	2	1	1	2													
Tree	*Actinidia latifolia*	rest				1																					
Tree	*Adina pilulifera*	vc	2			2	2		2	2		1															
Tree	*Alangium chinense*	c	2	2	1	3	2	2	2	1		1	1														
Tree	*Antidesma bunius*	c				2	2																				
Tree	*Aporosa dioica*	vc	3	3	2	3	3	3			2	2	2	1													
Tree	*Aquilaria sinensis*	c #	1	1		1	1	1										1	1								
Tree	*Archidendron clypearia*	c	2	2		2		1																			1
Tree	*Archidendron lucida*	c	2	2		2	2		1	1																	
Tree	*Averrhoa carambola*	p																2	2							2	2
Tree	*Bauhinia* sp.	p			3																						
Tree	*Bischofia javanica*	c				1	1											1								1	
Tree	*Bridelia penangiana*	c				2	2																				
Tree	*Bridelia tomentosa*	vc	3	3	1	3	3	3	2	2	1							2	2								
Tree	*Callicarpa nudiflora*	c		1		1	1		1									1									
Tree	*Cassia surattensis*	p			3													1	1	2						1	
Tree	*Castanopsis fissa*	p					1																				
Tree	*Casuarina equisetifolia*	p	2	2	2	1	1											2	2	1			1				
Tree	*Celtis biondii*	rest				2	2		2																		
Tree	*Celtis tetrandra*	c	3	3	2	3	3	2	1	1	2							2	2		2					2	2
Tree	*Celtis timorensis*	rest	2			2	1		1									2	1		1					1	
Tree	*Cerbera manghas*	c	1			2	2	1	2	2	2			2	2	2											
Tree	*Cinnamomum parthenoxylon*	c																									
Tree	*Citrus* sp.	p																2	2							3	3
Tree	*Clausena lansium*	c						1										2	2							3	3
Tree	*Cleistocalyx operculata*	c				1	1	1													1	1					
Tree	*Cratoxylum cochinchinense*	vc	3	3	3	2	2	2	3	3	3	2	2	2													
Tree	*Cyclobalanopsis myrsinaefolia*	c										2															
Tree	*Delonix regia*	p																1									
Tree	*Dimocarpus longan*	rest*	3	3	3	2	2	2										2	2							4	4
Tree	*Diospyros erianthe*	vc				1																					
Tree	*Diospyros morrisiana*	vc							2	2																	
Tree	*Dodonaea viscosa*	r													1												
Tree	*Ehretia longiflora*	rest				1	1		2	2																	
Tree	*Eriobotrya japonica*	p																1								1	1
Tree	*Eucalyptus robusta*	p	1	2	3	1												1			1	1	1				
Tree	*Exoecarcia agallocha*	c													2	1											
Tree	*Ficus fistulosa*	c				2	2																				

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			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Tree	*Ficus hirta*	c	3	3	3	3	3	2	2												1	1				1	
Tree	*Ficus hispida*	c	2	2	2	2	2	2													1	1		1	1	1	1
Tree	*Ficus microcarpa*	c	2	2		2	2	1	2	2											1	1				1	1
Tree	*Ficus variegata*	c	2	2		3	3	2	2	2					1	1					1	1					
tree	*Ficus virens*	c				2	2	2										1									
Tree	*Glochidion hirsutum*	c				1	1		2	2											1			1	1	1	1
Tree	*Glochidion zeylancium*	c																1	1		1	1		1	1	1	1
Tree	*Gmelina chinensis*	c				1	1		1	1																	
Tree	*Gossampinus malabarica*	p																1									
Tree	*Hibiscus tiliaceous*	c	1	1	3	3	3	2	2	2	2	1	1	1	1	1		1	1								
Tree	*Homalium cochinchinensis*	c							2	2	1	2	2	2							1	1				1	1
Tree	*Hylocereus undatus*	p				1	1																				
Tree	*Lasianthus chinensis*	c				1	1																				
Tree	*Lasianthus wallichii*	rest	1	1		1	1	1										2	2	2	2	2	2			2	2
Tree	*Leucaena leucocephala*	vc	2	2				1										1	2		1	1				4	4
Tree	*Litchi chinensis*	rest*				2	2																				
Tree	*Litsea cubeba*	c	2	2		2	2	1	2	1																1	1
Tree	*Litsea glutinosa*	vc	3	3	3	3	3	3	2	2		1	1	1	1			1	1		1	1					
Tree	*Lophostemon conferta*	p			3																						
Tree	*Macaranga tanarius*	c	2	2	2	2	2	2										3	3		2	2	2	1			
Tree	*Mallotus apelta*	c	2	2		2	2	1	2			1	1														
Tree	*Mallotus paniculata*	vc	4	4	4	3	3	3	3	3	1	1	1													1	
Tree	*Mangifera indica*	c																1	1							2	
Tree	*Melaleuca leucadendron*	p	2	1	2																1						
Tree	*Melia azedarach*	c	2	2	2										1			1	1	2	2	2		1		1	1
Tree	*Melicope pteleifolia*	c				2			2													1					
Tree	*Microcos paniculata*	c	3	3	3	3	3	2	2	2	1			1													
Tree	*Nerium indicum*	p			2									1													
tree	*Ormosia emarginata*	c					2																				
Tree	*Phyllanthus emblica*	vc	2	1	2	1	1		2	2	3	2	2	2	1												
Tree	*Phyllanthus reticulatus*	c	1	2		3	2		2	1																	
Tree	*Pinus elliiottii*	c																1	1	1			1				
Tree	*Pinus massoniana*	c	2	3	2	3	3		2	2								2	2		2	2					
Tree	*Psidium guajava*	c																									
Tree	*Rapanea neriifolia*	c				2	2																				
Tree	*Rhus chinensis*	c	2	2	2	2	2	2	2	2	2			1													
Tree	*Rhus hypoleuca*	c				1	2		1	2	1																
Tree	*Rhus succedanea*	c	2	2	1	2	2	2	2	2	2		1	1							1	1				1	
Tree	*Sapium discolor*	vc	2	2	2	2	2	2	2	2	1							1	1	1							
tree	*Sapium sebiferum*	vc	2	2	2	2	2		2												1	1		1		1	
Tree	*Sarcandra glabra*	vc	1	1		2	2																				
Tree	*Saurauia tristyla*	c				1	1																				
Tree	*Scheffiera octophylla*	vc	3	2	2	3	3	3	3	3				1													
Tree	*Scolopia chinense*	c				1	1		1																		
Tree	*Scolopia saeva*	c	1	1		3	2	3	2	2		1	1								1	1					
Tree	*Sterculia lanceolata*	vc	2	2	2	3	3	3	2	2								1	1	1							
Tree	*Styrax suberifolia*	c				1	1		1																		
Tree	*Syzygium hencei*	c				2																					
Tree	*Syzygium jambos*	c	2	2	1	2	2	2	1	1								1	1					2	2		
Tree	*Syzygium levinei*	c				2	1																				
Tree	*Tarenna mollissima*	c				2	1		2	1																	
Tree	*Thespesia populnea*	rest													2	2											
Tree	*Thevetia peruviana*	vc			2													2	2								
Tree	*Trema orientalis*	c												1													
Tree	*Vitex negundo var cannabifolia*	rest	1		1	2	2		2	2								1			1	1					
Tree	*Vitex negundo var negundo*	c	3		3	3	3	2							3	3		2	2	1	1	1	1	1		2	2
Tree	*Vitex quinata*	c													3	3											
Tree	*Zanthoxylum avicennae*	c			1	2	2	1	1	1																	

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			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Shrub	*Abelmoschus moschatus*	rest																			1					1	
Shrub	*Acanthus ilicifolius*	c													3	3											
Shrub	*Aegiceras corniculatum*	c													3	3											
Shrub	*Albizia corniculata*	c							2	2																	
Shrub	*Alchornea trewioides*	vc				1			1			2	2	1				2	2		1	1	1				
Shrub	*Antirhea chinensis*	vc	1	1		2	1		2	2	2			2													
Shrub	*Ardisia crenata*	c	2	2		2	2	2	1	1																	
Shrub	*Ardisia quinquegona*	vc				2	2	1																			
Shrub	*Aster baccharoides*	vc	1						1	1		3	3		1												
Shrub	*Atalantia buxifolia*	c				1	1		3	2	2	3	2	2	2												
Shrub	*Avicennia marina*	c													3	3											
Shrub	*Baeckea frutescens*	vc	2	2					2	2	1	3	3	3													
Shrub	*Boehmeria nivea*	rest																			2	2					
Shrub	*Breynia fruticosa*	vc	2	2		2	2	1	3	3	2	3	3	3								1					
Shrub	*Brucea javanica*	c				1	2		1					2				1				1					
Shrub	*Bruguiera gymnorrhiza*	rest													3	3											
Shrub	*Callicarpa nudiflora*	c				1	1		1	1	1			1													
Shrub	*Cassia occidentalis*	vc												1													
Shrub	*Clerodendrum chinense*	c																2	2							1	1
Shrub	*Clerodendrum cyrtophyllum*	c																2	2							2	2
Shrub	*Clerodendrum fortunatum*	c				1			2	2	2	2	2	2							1						
Shrub	*Clerodendrum inerme*	c													3	3											
Shrub	*Crotolaria mucronata*	c																2	2		3	3	2				
Shrub	*Croton crassifolius*	vc							2	2		2	2	1													
Shrub	*Croton lachnocarpus*	vc				1			2	2																	
Shrub	*Daphniphyllum calycinum*	c				2	2		2	2		1															
Shrub	*Daphniphyllum oldhami*	c	2	2	1	2	2	1	2	2	2	1	1	1													
Shrub	*Desmodium gangeticum*	c			2																1	2	2				
Shrub	*Dichroa febrifuga*	c				1												1	1		1	1					
Shrub	*Diospyros morrisiana*	vc							2	2																	
Shrub	*Diospyros vaccinioides*	vc				1	1		2	2	1	2	2	2													
Shrub	*Diplospora dubia*	c				1	1		2	2	1	2	1	1													
shrub	*Euonymus laxiflorus*	c				1	1																				
Shrub	*Euonymus nitidus*	vc	2	2		2	2	1	1	1		1	1	1													
Shrub	*Eurya japonica*	vc					2		3	3	3	2	2	3													
Shrub	*Eurya nitida*	vc	1	1		1	1		1	1																	
Shrub	*Ficus variolosa*	vc						1	2	2	2	3	3	3													
Shrub	*Garcinia oblongifolia*	vc				1	1	1	3	3	1																
Shrub	*Gardenia jasminoides*	c					2	1	2	2	1	1	1	1													
Shrub	*Glochidion eriocarpum*	c	2	2	1	2	2	2	2	2	2	2	2	2				1	1	1				1		1	
Shrub	*Glochidion wrightii*	vc					1																			1	
Shrub	*Helicteres angustifolia*	vc	1	1				1	1	1		3	3	3							2	2	1				
Shrub	*Ilex asprella*	vc	3	3	1	3	3	3	3	3		2	2	1													
Shrub	*Ilex pubescens*	vc	1	1		2	2	2	2	2																	
Shrub	*Itea chinensis*	vc							2	2	2	2	2														
Shrub	*Kalanchoe pinnata*	c													3	2											
Shrub	*Kandelia candel*	c													3	3											
Shrub	*Lantana camara*	vc	1	1	1		1	1							1			2	2	3	3	3	3	1	1	3	3
Shrub	*Litsea rotundifolia*	vc	3	3	1	3	3	3	3	3	3	3	3	3													
Shrub	*Lumnitzera racemosa*	c													2	1											
Shrub	*Maesa perlarius*	c	2	1		2	2	2	2	2								1	1								
Shrub	*Melastoma candidum*	c	2	2		1			2	2	2	2	2	2				1	1		1	1		2	2	2	2
Shrub	*Melastoma sanguineum*	c	2	2			2		3	3	3	3	3	3													
Shrub	*Mesona chinensis*	c											2	1													
Shrub	*Osbeckia chinensis*	vc									1			1													
Shrub	*Paliurus ramosissimus*	c							1	1			1		1												
Shrub	*Pandanus tectorius*	vc			1	1	1	1	1	1	1	1	1	1	2	2	1							1	1	1	
Shrub	*Pandanus urophyllus*	vc	1	1	1	1	1	1	1																		

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			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Shrub	*Pavetta hongkongensis*	c +				1	1		1	1																	
Shrub	*Phoneix hanceana*	c							2	2	2	2	2	2													
Shrub	*Phyllanthus cochinchinensis*	vc	2	2	1	3	3	2	2	2	2	2	2	2													
Shrub	*Phyllanthus emblica*	vc				1	1		2	2	2	2	2	2													
Shrub	*Phyllanthus urinaria*	c																1	1		1	1					
Shrub	*Pittosporum glabratum var glabratum*	vc	1	1			2	2	2	2																	
Shrub	*Pluchea indica*	c													2	2											
Shrub	*Pogostemon auricularius*	c																			1			1			
Shrub	*Psychotria rubra*	vc	2	2	1	3	3	3	2	3	2	1	1	1				1	1								
Shrub	*Pteroloma triquetrum*	c										2	2	1				2	2	2	2	2	2			1	1
Shrub	*Rhamnus crenata*	c							2	2		1	1														
Shrub	*Rhaphiolepis indica*	vc	2	2	1	3	3	2	3	3	3	3	3	3													
Shrub	*Rhodomyrtus tomentosa*	vc	2	2	2	2	2	2	2	2	2	3	3	3													
Shrub	*Ricinus communis*	rest																1	1		1	1				1	
Shrub	*Sarcandra glabra*	vc				2	2	1	1	1																	
Shrub	*Scaevola taccada*	vc							2	2	1	2	2	1	2	2	2										
Shrub	*Senna occidentalis*	vc																1	1	1	1	1	1			1	1
Shrub	*Sesbania cannabina*	c																2	2	2	3	3	3				
Shrub	*Sida acuta*	c																1	1	1	3	3	3			3	3
Shrub	*side rhombifolia*	c																1	1	1	3	3	3			3	3
Shrub	*Sinosideroxylon wightianum*	c							2	2		1	1	2													
Shrub	*Solanum torvum*	c													3	3		1			1	1				1	1
Shrub	*Suaeda maritima*	c																									
Shrub	*Syzygium buxifolium*	c																									
Shrub	*Tarenna attenuata*	c							2	2																	
Shrub	*Triumfetta bartramia*	vc			1							2	2					2	2	2	2	2				1	1
Shrub	*Urena lobata*	c						1				2	2	2				2	2	2	2	2	2			2	2
Shrub	*Vitex rotundifolia*	c													3	2											
Shrub	*Wikstromeia indica*	c							2	2		2	2	2								1					
Shrub	*Wikstromeia nutans*	c				2	2		1						1												
Herb	*Acampe rigida*	c +										1															
Herb	*Acorus tatarinowii*	c				1	1																				
Herb	*Acrostichum aureum*	rest													2	2								1			
Herb	*Adenosma glutinosum*	vc										1	1	2							1	1	1				
Herb	*Adiantum flabellulatum*	c	2			2	2	2	1	1		1	1														
Herb	*Agave vivipara*	p															1										
Herb	*Ageratum conyzoides*	c										1	2	2				2	2	2	2	2	2			1	1
Herb	*Alocasia cucullata*	c																			1	1		3	3		
Herb	*Alocasia macrorrhiza*	vc	1	1	1	1	1	1										1	1		2	2		2	2	2	2
Herb	*Alopecurus aequalis*	c																			2	2	1				
Herb	*Alpinia stachyodes*	c				2	2		1																		
Herb	*Alpinia zerumbet*	vc		2		2	2		2																		
Herb	*Alpinia zerumbet*	vc					1														2	2		2	2	2	2
Herb	*Alternanthera philoxeroides*	c																1	1		2	2				1	
Herb	*Amaranthus viridis*	vc																			2			3	3	2	2
Herb	*Anisomeles indica*	c												2													
Herb	*Anisopappus chinensis*	c																2	1		3	3		3	3	3	
Herb	*Apluda mutica*	c										2	2	2	1												
Herb	*Aristida chinensis*	vc										1	1														
Herb	*Arundina chinensis*	c +										3	3	3	1	1											
Herb	*Arundinella setosa*	vc							1																		
Herb	*Asplenium neolaserpitiifoloium*	rest				2	2		2	2		3	3	3													
Herb	*Aster baccharoides*	vc													3	3											
Herb	*Avicennia marina*	c													2	2											
Herb	*Bacopa monnieri*	vc					1							1	1			2	2	2	2	2	2			2	2
Herb	*Bidens bipinnata*	vc																1	1	1							
Herb	*Blechnum orientale*	c	2	2	2	2	2	2	2	2	1																
Herb	*Bothriochloa bladhii*	vc					1					2	2	2				2	2	2	2	2	2				

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			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Herb	*Carex tristachya*	vr							1																		
Herb	*Caryopteris incana*	c										2	2		1					2							
Herb	*Celosia argentea*	vc																2	2	2	2	2	2	3	3	2	
Herb	*Cenchrus echinatus*	vc																			2	2	2			2	2
Herb	*Centella asiatica*	vc																2	2		2	2		2	2	2	2
Herb	*Centipeda minima*	c																			2	2					
Herb	*Chamaecrista mimosoides*	c																		2	2	2				2	2
Herb	*Chamaesyce hirta*	vc																			2	2	2			2	2
Herb	*Chamaesyce thymifolia*	vc																			2	2	2			2	2
Herb	*Cibotium barometz*	c				2	2								1	1											
Herb	*Cirsium japonicum*	c										1															
Herb	*Cleisostoma simondii*	c +																2			2						
Herb	*Clinopodium gracile*	c																						2	2	1	
Herb	*Coix lachryma-jobi*	c																1						3	3		
Herb	*Colocasia esculenta*	c																1	1					3	3	1	1
Herb	*Commelina nudiflora*	c																			2	2				2	
Herb	*Corchorus aestuans*	c																2	2		2	2				1	1
Herb	*Crassocephalum crepidioides*	c										1	1														
Herb	*Crinum asiaticum*	rest													2												
Herb	*Cyanotis vaga*	rest																						2	2		
Herb	*Cyclosorus acuminatus*	vc																						2	2		
Herb	*Cyclosorus interruptus*	c																									
Herb	*Cyclosorus parasiticus*	vc	2	2		2	2																				
Herb	*Cymbopogon* spp.	n/a	1	2					2	2		3	3	3	2	2				2	3	3	3			2	2
Herb	*Cynodon dactylon*	vc																2	2								
Herb	*Cyperus haspan*	c																						2	2		
Herb	*Cyperus imbricatus*	c													2	2								2		2	
Herb	*Cyperus malaccensis*	c																2	2	2	2	2					
Herb	*Cyperus pilosus*	c													1	1		2	2	3	2	2	2			2	2
Herb	*Cyperus rotundus*	vc				2	2														2						
Herb	*Cyrtococcum patens*	vc	1	1		1	1		1	1	1	2	2	2													
Herb	*Dianella ensifolia*	vc	2	2	2	2	2	2	2	2	2	2	3	3							2	2		2		1	
Herb	*Dicranopteris pedata*	vc										1	1														
Herb	*Digitaria ciliaris*	rest													1												
Herb	*Diplacrum caricinum*	vr										1	1														
Herb	*Drosera indica*	c																									
Herb	*Drosera spathulata var louriri*	c				1			1																		
Herb	*Dryopteris varia*	vc													2	2		1	1		2	2		2		2	2
Herb	*Echinochloa crusgalli*	c																2	2		2	2		2		2	2
Herb	*Eclipta prostrata*	c										2	2					2	2	2	2	2	2			2	2
Herb	*Elephantopus scaber*	c																			2	2	2			1	1
Herb	*Elephantopus tomemtosa*	c																2	2	2	3	3	3			2	2
Herb	*Eleusine indica*	vc																2		2	2	2	2			2	2
Herb	*Emilia sonchifolia*	vc										2	2	2	1												
Herb	*Eragrostis* sp.	n/a										3	3	3													
Herb	*Eremochloa ciliaris*	vc										2	2					2	2								
Herb	*Ericaulon merrillii*	c										2	2					2	2								
Herb	*Eriocaulon sexangulare*	vc										2	2		2												
Herb	*Eriocaulon* sp.	vc										3	3	3													
Herb	*Eulalia* spp.	c							1																		
Herb	*Eulophia graminea*	rest +													1	1											
Herb	*Fimbristylis cymosa*	vc																	2	2				2			
Herb	*Fimbristylis subbispicata*	c							2	2	2							2	2	2	2	2	2				
Herb	*Fimbristylis thomsonii*	vc					1																				
Herb	*Floscopa scandens*	c											1											2	1	3	3
Herb	*Fuinera umbellata*	c										3	3	3													
Herb	*Gahnia tristis*	vc																1	2		2	2				2	2
Herb	*Gnaphalium affine*	c																									

Vegetation

Date of survey: September 2003 to May 2004

	Species list	Status	Plantation Woodland			Secondary Woodland			Tall Shurbland			Shrubby Grassland			Coastal			Developed Area			Wasteland			Salt Marsh		Cultivated Field/Orchard	
			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
												1			1												
Herb	*Grewia biloba*	c										1	1								1	1	1				
Herb	*Gynura divaricata*	vc															1										
Herb	*Halophila beccarii*	r													1												
Herb	*Halophila ovata*	r							1	1		2	2	3													
Herb	*Hedyotis acutangular*	c																									
Herb	*Hedyotis auricularia*	c	2	2		3	3	1	2	2																	
Herb	*Hedyotis consanguinea*	c	2	2		3	3	1	2	2								2	2		2	2	2			2	
Herb	*Hedyotis corymbosa*	vc																1			1	1					
Herb	*Hedyotis diffusa*	c										2	2	2	2	2											
Herb	*Heteropogon contortus*	vc																1	1					2	2	2	2
Herb	*Hypericum japonicum*	vc																2	2	2	2	2	2			3	3
Herb	*Imperata cylindrica*	vc																			1						
Herb	*Indigofera spicata*	rest						2	2	2	2	2	2														
Herb	*Indocalamus longiauritus*	vc								2		3	3	3										2	2		
Herb	*Innula cappa*	c																1									
Herb	*Ipomoea aquatica*	vc	2	2	2										2			2	2	3	3	3	3	3	3	3	3
Herb	*Ipomoea cairica*	rest																			2	2				2	
Herb	*Ipomoea purpurea*	vc																						3	3	2	
Herb	*Isachne globosa*	c										2	2	2							2			2			
Herb	*Ischaemum aristatum*	vc										3	3	3													
Herb	*Ischaemum ciliare*	c										3	3	3	2	1						2		2	3	2	
Herb	*Ischaemum indicum*	c										3	3	3													
Herb	*Ischaemum rugosum*	c																			1						
Herb	*Juncus prismatocarpus*	c													1			2	2					2	2	2	2
Herb	*Kyllinga breviflora*	c																2	2								
Herb	*Kyllinga nemoralis*	vc										2	2														
Herb	*Lactuca repens*	c																						2	2		
Herb	*Leersia hexandra*	c										2	2														
Herb	*Lepidosperma chinense*	c																						1	1		
Herb	*Limnophila aromatica*	rest													2	2											
Herb	*Limonium sinense*	c																			1	1		1			
Herb	*Lindernia anagallis*	c																			1	1					
Herb	*Lindernia crustaceae*	rest																									
Herb	*Lindsaea ensifolia*	c				2	2																				
Herb	*Lindsaea heterophylla*	c				2	2																				
Herb	*Liriope spicata*	c	2	2		3	3	1	2	2	1													1	1		
Herb	*Lobelia chinensis*	c																1	1		2	2	2				
Herb	*Lophatherum gracile*	c	2	2	2	2	2	2	2	2														2	2		
Herb	*Ludwigia ascendens*	c																						2	2		
Herb	*Ludwigia octovalvis*	c													1			2	2	2	3	3	3			2	2
Herb	*Melinis repens*	vc																			2	2	2			2	2
Herb	*Microstegium ciliatum*	vc																2	2	3	2	2	2			2	2
Herb	*Mimosa pudica*	vc							1	1		2	2	1						2	2	2				2	2
Herb	*Miscanthus sinensis*	c																1	1		2	2				3	3
Herb	*Musa* sp.	vc										2	2	3							2	2	2			2	2
Herb	*Neyraudia reyraudiana*	vc				2	2		2																		
Herb	*Oplismenus compositus*	c													1												
Herb	*Opuntia dillenii*	vc					2											2	2		2	2	2	2		2	2
Herb	*Ottochloa nodosa var micrantha*	vc				1												2	2		2	2	2			2	2
Herb	*Oxalis corniculata*	vc				1												1	1	2	3	3	3			3	3
Herb	*Oxalis corymbosa*	vc																						2		2	
Herb	*Panicum maximum*	vc																			2	2		3	3	2	
Herb	*Panicum repens*	c																						3	3		
Herb	*Paspalum conjugatum*	c																1	1		2	2	2			2	
Herb	*Paspalum distichum*	c															2	2	2	2	2	2	2			2	
Herb	*Pennisetum alopecuroides*	c																1	1		2	2	2	1		2	2
Herb	*Pennisetum polystachyon*	vc																									

Vegetation

Date of survey: September 2003 to May 2004

	Species list	Status	Plantation Woodland			Secondary Woodland			Tall Shurbland			Shrubby Grassland			Coastal			Developed Area			Wasteland			Salt Marsh		Cultivated Field/Orchard	
			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Herb	*Pericampylus glaucus*	rest				1																					
Herb	*Philydrum lanuginosum*	rest																						1			
Herb	*Phragmites australis*	vc													2						2	2		2			
Herb	*Phragmites vallatoria*	vc													2						2	2		2			
Herb	*Phyla nodiflora*	c													2												
Herb	*Phyllodium pulchellum*	vc										2	2	2							2	2					
Herb	*Plantago major*	vc																2	2		2	2					
Herb	*Plumbago zeylanica*	rest																1			1					1	1
Herb	*Polygonum barbatum*	c																						2	2		
Herb	*Polygonum chinense*	vc																2			2	2		2	2		2
Herb	*Polygonum lapithifolium*	c																			1	1		1	1		
Herb	*Polygonum plebeium*	rest																			1	1		1	1		
Herb	*Pongamia pinnata*	c													1												
Herb	*Portulaca oleracea*	vc													2	2											
Herb	*Pteridium aquilinum*	c										2	2	2													
Herb	*Pteris dispar*	c				2	2		2	2																	
Herb	*Pteris multifida*	vc																2	2		1	1					
Herb	*Pycreus polystachyos*	c																2			2						
Herb	*Ranunculus sceleratus*	vc																			1			2	1	2	
Herb	*Rhynoscopa rubra*	vc										2	2	2	1	1					2	2					
Herb	*Rhynoscopa rugosa*	rest																						2			
Herb	*Rostellularia procumbens*	c																2	2								
Herb	*Schizachyrium sanguineum*	vc										2	2	3													
Herb	*Scleria ciliaris*	c							2	2			2	2													
Herb	*Scleria levis*	c										2	2	2	1												
Herb	*Scleria terrestris*	c				2	2		2	2																	
Herb	*Scoparia dulcis*	c																			2	2				1	
Herb	*Setaria pumila*	vc										2	2	2	2	2					2	2		2	2	2	2
Herb	*Sigesbeckia orientalis*	c																2	2		2	2					
Herb	*Siplanthes paniculata*	c																			1	1	1			1	
Herb	*Solanum americanum*	vc																2	2	2	2	2	2				
Herb	*Sonchus arvensis*	vc																			1	1	1			1	
Herb	*Spinifex littoreus*	c													2												
Herb	*Sporobolus indicus*	vc																2	2	2	2	2	2				
Herb	*Sporobolus virginicus*	vc										3	3														
Herb	*Stenoloma biflorum*	rest													1												
Herb	*Synedrella nodiflora*	vc													1			2	2	2	2	2	2			2	2
Herb	*Tadehagi triquetrum*	vc										2	2	2							1	1					
Herb	*Teuricum quadrifarium*	rest				1	1														1	1					
Herb	*Thysanolaena latifolia*	c										1	1	1													
Herb	*Tridax procumbens*	vc																2	2		2						
Herb	*Urochloa subquadripara*	c	2		2	2	2	2																			
Herb	*Utricularia bifida*	c										1	1					1									
Herb	*Utricularia caerulea*	rest										1	1														
Herb	*Utricularia striatula*	rest										1	1														
Herb	*Wedelia biflora*	c													2	2					2	2		2	2	2	2
Herb	*Wedelia chinensis*	c													2			2	2	2	3	3	2	2	2	2	2
Herb	*Wedelia prostrata*	c													2			2	2	2	3	3	2	2	2	2	2
Herb	*Xanthium strumarium*	c																2	2	2	2	2	2				
Herb	*Xyris pauciflora*	rest											1														
Herb	*Youngia japonica*	vc																			1	1					
Herb	*Zostera japonica*	r													1												
Herb	*Zoysia sinica*	c													3	3											
Climber	*Abrus mollis*	rest	1	1		2	2																				
Climber	*Alysicarpus vaginalis*	vc										2	2	2							2	2	2			2	
Climber	*Alyxia sinensis*	c				3	3	1	3	3	3	3	3	3	1												
Climber	*Asparagas cochinchinensis*	c							3	2	2	2	2	2												2	2
Climber	*Bauhinia championii*	c	2	2		3	3	2	3	3	2	2	2	2													

Vegetation

Date of survey: September 2003 to May 2004

	Species list	Status	Plantation Woodland			Secondary Woodland			Tall Shurbland			Shrubby Grassland			Coastal			Developed Area			Wasteland			Salt Marsh		Cultivated Field/Orchard	
			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Climber	*Bauhinia galuca*	vc				2	2		3	3																	
Climber	*Berchemia racecmosa*	c							2	2																	
Climber	*Bowringia callicarpa*	vc				2																					
Climber	*Byettnera aspera*	vc	2	2		3	3	2																			
Climber	*Caesaplinia bondou*	rest				2	2		2	2		2	2		2	2											
Climber	*Caesaplinia crista*	vc				2	2		2	2		2	2														
Climber	*Cajanus scarabaeoides*	c													2	2											
Climber	*Calamus tetradactylus*	c				2	2		2																		
Climber	*Calamus tetradactylus*	c				1	1																				
Climber	*Canavalia lineata*	c													2	2											
Climber	*Cansjera rheedii*	rest				2	2	2	2	2	2	2	2	2													
Climber	*Cassytha filiformis*	vc							3	3	3	3	3	3	2	1					2	2	2	2	2	2	2
Climber	*Cayratia corniculata*	vc				2																					
Climber	*Celastrus hindsii*	c	2	2		2	2	2	2	2	2																
Climber	*Cocculus orbiculatus*	c				2	2		2	2		2	2														
Climber	*Cuscuta sp.*	c																2	2		2	2		2			
Climber	*Cyclea hypoglauca*	c				2	2		2	2																	
Climber	*Dalbergia hancei*	c	2	2	1	3	3	2	3	3				2													
Climber	*Dalbergia milletti*	vc				2	2	1	2	2																	
Climber	*Dendrotrophe frutescens*	vc							2	2	2	2	2	2													
Climber	*Derris trifoliata*	c							2	2					2	2											
Climber	*Desmos chinensis*	c	2	2	1	3	3	2	2					3								2					
Climber	*Desomdium heterocarpon*	vc																									
Climber	*Dioscorea benthamii*	c					2		2	2																	
Climber	*Diploclisia glaucescens*	c	2	2	2	2	2	2	2	2																	
Climber	*Embelia laeta*	vc	3	3		2	2	2	2	2	2	3	3	3													
Climber	*Embelia ribes*	c				2	2		2	2																	
Climber	*Ficus pumila*	vc	2	1	2	3	3	1	2	2	1																
Climber	*Gnetum luofuense*	vc	2	2		2	2	2	2	2	1																
Climber	*Gymnema sylvestre*	vc				2	2	2	2	2	2	2	2	2												2	
Climber	*Hedyotis hedyotidea*	vc	2	2		3	3	2	2	2																	
Climber	*Heterosmilax japonica var. gaudichaudiana*	vc				3	3	2	2	2	2			2							2	2				2	
Climber	*Hypserpa nitida*	vc				2	2	2	2	2	2							2									
Climber	*Ipomoea batatas*	p													2						2	2				2	2
Climber	*Ipomoea carica*	vc	2	2	2										2						3	3	3	3	3	2	2
Climber	*Ipomoea imperati*	rest														2		2	2		2	2	2				
Climber	*Ipomoea nil*	c														1		2	2		2	2	2				
Climber	*Ipomoea obscura*	c													2	2											
Climber	*Ipomoea pes-caprae*	c				1	1		2	2																	
Climber	*Jasmanium lanceolata*	c				1				2																	
Climber	*Lonicera japonica*	vc			2	2	2	2	2																		
Climber	*Lygodium flexuosum*	vc	3	3	3	3	3	3	3	3	3	3	3	3							3	3	3	3	3	3	3
Climber	*Lygodium japonicum*	c	2	2	2	2	2	2	2	2	2	1	1	1							2	2	2	2	2	2	2
Climber	*Lygodium scandens*	c																					3				
Climber	*Macroptilium leucocephala*	c				2	2	2	2	2											2	2	2	2	2	2	2
Climber	*Melodinus suaveolens*	c																									
Climber	*Merremia hederacea*	rest				1	1		2	2											3	3	3	3	3	3	3
Climber	*Merremia umbellata*	c	2	2	2	2	2	1																			
Climber	*Mikania micrantha*	vc				1																					
Climber	*Milletia dielsiana*	vc				1	1																				
Climber	*Milletia reticulata*	c				1	1		1	1	1	1	1	1													
Climber	*Milletia speciosa*	c				2	2	2	2	2	2	3	3	3													
Climber	*Millettia nitida*	vc				1	1		2	2	2	3	3	3													
Climber	*Morinda umbellata*	c							2	2																	
Climber	*Mussendanea pubescens*	vc							2	2	2							2	2								
Climber	*Paederia scandens*	vc	2	2	3	1	1	3	2	2	2	1	1	1													
Climber	*Psychotria serpens*	vc	2	2	2	3	3	1	2	2	2	2	2	2				3	3	3	3	3	3	2	2	3	3
Climber	*Pueraria lobata*	vc	1	1	1	1	1	1	2	2	2	2	2	2													

Vegetation

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	Species list	Status	Plantation Woodland			Secondary Woodland			Tall Shurbland			Shrubby Grassland			Coastal			Developed Area			Wasteland			Salt Marsh		Cultivated Field/Orchard	
			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	A	B
Climber	*Pueraria phaseoloides*	vc																3	3	3	2	2	2	1	1	2	2
Climber	*Pyrrosia lingua*	c				3	3	3	2	2					2	2											
Climber	*Rosa laveigata*	c						1																			
Climber	*Rourea microphylla*	c						3	3	1	2	2	2	1													
Climber	*Rourea minor*	c							3	2		2	2														
Climber	*Rubus parvifolius*	c				1	2																				
Climber	*Rubus reflexus*	vc	2	2	2	2	2	2	1	1											1	1	1	1	1	1	1
Climber	*Sageretia thea*	vc				2	2	2	2	2																1	
Climber	*Senecio scandens*	c	1			1	1		2	1																	
Climber	*Smilax china*	vc	2				2	2	2	2	2	2	2														
Climber	*Smilax corbularia*	c				2			2																		
Climber	*Smilax glabra*	vc	1	2		2	2	1	2	2	2	2	2	2													
Climber	*Stephania longa*	c					2	2	1	2																	
Climber	*Strophanthus divaricatus*	c	2	2		2	2		2	2	2	2	2	2													
Climber	*Strychnos angustifolia*	c	3		1	2	2	2	3	3	2	2	2	2													
Climber	*Strychnos umbellata*	c			2	2	2	2	3	3	2	2	2	2												2	2
Climber	*Tetracera asiatica*	vc	2	2	2	3	3	3	3	3	3	2	2	3				2									
Climber	*Thunbergia grandiflora*	c																								2	2
Climber	*Toddalia asiatica*	rest				2	2		2	2																	
Climber	*Toxocarpus wightianus*	c				2	2		2	2	2																
Climber	*Tylophora ovata*	c				1	1	1	1	1		1	1	1												1	
Climber	*Uraria crinita*	c											1		1						1	1	1				
Climber	*Urceola rosea*	c					2	2				2	1	1							1	1	1			1	
Climber	*Uvaria grandiflora*	rest				2	2		2	2	2																
Climber	*Uvaria mic ocarpa*	c	2	2		3	3	2	2	2	2																
Climber	*Vitis bala sana*	rest								2																	
Climber	*Zanthoxylum nitidum*	vc	2	2	1	2	2	2	2	2	2	2	2								2	2					
Climber	*Zanthoxylum scandens*	c	2			2	2		2	2	2																

Total No. of Species : 475

Status (Based on Siu (2000), Wu and Lee (2000), Xing et al. (2000))

c: Common
vc: Very common
rest: Restricted
n/a: Not applicable
p: Planted
r: Rare
vr: Very rare
* Although the wild population of the species is catagorized as restricted in terms of abundance and distribution, it is widely planted in Hong Kong.
\# Regionally Protected
\+ Locally Protected

Volume 2

Marine Fisheries Review

1. Introduction

Construction of the proposed Hong Kong – Zhuhai - Macao Bridge (HZMB) will not be approved unless it can be demonstrated that no unacceptable environmental impacts will result to the ecological and fisheries resources present within the study area. As many of the marine fish species are known to undergo seasonal migration it is conceivable that any impact from the project could affect both fisheries resources and dolphins. The criteria described in the TM Annexes 9 (Criteria for Evaluating Fisheries Impact) and 17 (Guidelines for Fisheries Impact Assessment) have been followed when establishing the baseline.

2. Literature Review

The HZMB is located in the Northwestern waters that is considered to be a reasonably valuable fishing ground in terms of fisheries production and owing to the prevailing hydrological conditions, is also an important spawning and nursery ground for many species of fish and penaeid shrimps (Mouchel, 2001, 2002). An assessment of potential impacts to marine fisheries resources is, therefore, required. The most recent information on the capture fisheries is summarised in the AFCD Port Survey of 2001/2002 and the ongoing EM&A at East of Sha Chau (Mouchel, 2001, ongoing). There have been several recent fisheries assessments conducted in the wider study area and these include:

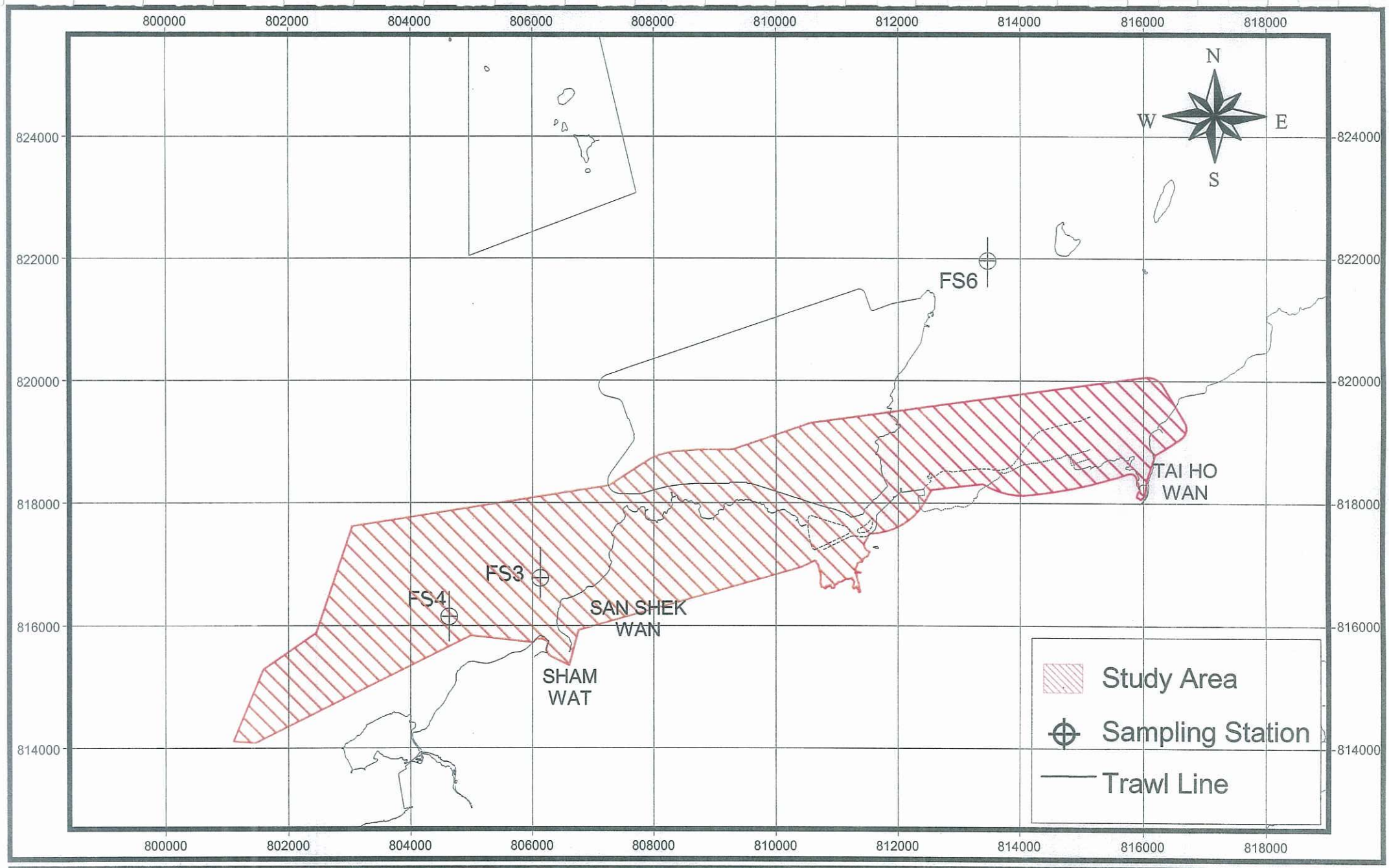
- EIA for the Proposed Sand Extraction from The Brothers' Marine Borrow Area (Hyder Consulting, 1998);
- Route 10 North Lantau to Yuen Long Highway Investigation and Preliminary Design EIA (Mott Connell, 1999);
- EIA for Permanent Aviation Fuel Facility (Mouchel, 2002);
- Hong Kong-Pearl River West Link Preliminary Environmental Review (Scott Wilson, 2002); and
- Environmental Monitoring and Audit for Contaminated Mud Pit IV at East of Sha Chau Mouchel, 2001, ongoing).

Reports from the ongoing environmental monitoring and audit at the contaminated mud pits at East of Sha Chau (Mouchel, 2001, ongoing), however, provide a large amount of relevant fisheries data and have been reviewed. The fisheries data provided in the aforementioned EM&A study provides the most up to date information on the fisheries resources of the study area.

3. Survey Methodology

3.1 Introduction

Trawling is conducted as part of the ongoing EM&A programme for the contaminated mud pits in locations (North of Tai Ho Wan, off San Shek Wan and Sham Wat) adjacent to the HZMB study area (Mouchel, 2001, 2004a,b; *Figure A1*). A local shrimp trawler and a minimum of 6 standard beam trawl nets was used for the demersal trawling. Six standard beam trawl nets were deployed in the daytime from the shrimp trawler equipped with dGPS for a tow of 10 minutes (5 tows per station). The tows at each station were shifted slightly to avoid repetitive harvesting along a single track. Further tows only began at a station after the elapse of at least two hours from the completion of the previous series of tows. On board the trawler, the contents from each of the six nets were pooled to form one sample, sorted and packed separately in labelled Ziploc plastic bags. The existing fisheries data covering both the wet (July-August 2003) and dry (January-February 2004) seasons from the Northwestern waters off Sham Wat, San Shek Wan and approximately 4km North of Tai Ho Wan have been used to establish the marine fisheries baseline.



Demersal Trawling Stations

Meinhardt Mouchel
Figure A1

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4. Baseline Conditions

4.1 Description of Physical Habitat

The HZMB is located within the Northwestern waters of Hong Kong that are highly influenced by the variable estuarine conditions of the Pearl River estuary. Owing to relatively slow tidal currents the hydrography is depositional and much of the seabed is predominantly made up of soft muds although where currents are stronger, scouring is evident and some seabed habitat is comprised of a muddy shell sand matrix (Mouchel, 2002, 2004a,b). The benthos is, therefore, highly sediment laden and the resident fauna are dominated by representatives that tolerate high ambient suspended solid loads (Mouchel, 2002). In terms of water quality, there are significant pollution inputs from the Pearl River catchment resulting in significant nutrient loading and generally eutrophic conditions (Mouchel, 2002, 2004a,b; Huang *et al.*, 2003). The predominantly estuarine fish inhabiting the study area are, therefore, naturally subjected to certain environmental stresses notably high suspended solid concentrations. Although many estuarine fish are tolerant of elevated suspended solid concentrations (e.g., CPCC, 2001) they may suffer sublethal stress (often associated with damage to the gills) when held in such conditions over prolonged periods (O'Connor *et al.*, 1977).

4.2 Capture Fisheries

Recent information on the capture fisheries is summarised in the Port Survey of 1996/97 and 2001/2002 (AFCD, 1998, 2003) and in the Report on Fisheries Resources and Fishing Operations in Hong Kong Waters (ERM, 1998). The HZMB passes through five fishing areas, namely, Shum Wat, Sha Lo Wan, Tung Chung, Chek Lap Kok and Pak Mong, as identified in the Port Survey Report (AFCD, 1998).

The total value and ranking of the fisheries resources in each of these fishing areas that lie within the study area are presented below in *Table 4.2a*. The Shum Wat and Chek Lap Kok fishing areas are of reasonably high value and rank quite highly in terms of adult fish biomass and overall value per hectare. The fishing area at Tung Chung is less productive and ranked 106 (of 189 fishing areas) in terms of adult fish production.

Table 4.2a Fisheries Production in Each Fishing Area (all fishing vessels)

AFCD Fishing Area (ha)	Total Production			Production (ha^{-1})			Rank Production (ha^{-1})		
	Adult Fish (kg)	Fry (tails)	Value (HK$)	Adult Fish (kg)	Fry (tails)	Value (HK$)	Adult Fish	Fry	Value
Shum Wat 528.41	135,069.68	-	3,410,552.23	255.61	-	6,454.33	34	-	34
Sha Lo Wan 961.00	132,449.64	-	3,335,986.19	137.82	-	3,471.35	75	-	77
Tung Chung 363.42	28,662.43	-	994,607.30	78.87	-	2,736.80	106	-	91
Chek Lap Kok 591.60	168,240.94	-	3,308,991.13	284.38	-	5,593.26	29	-	47
Pak Mong 533.22	66,410.08	-	1,210,254.17	124.55	-	2,269.72	78	-	100

Note: Based on the 189 fishing areas in Hong Kong waters (AFCD, 1998).

The five fishing areas are subunits of a wider sector (SE02) that occupies the sea around North Lantau (AFCD, 1998). It is conceivable that any impacts from the project could affect the wider regional areas and a summary of the fishery for the region is included below. In terms of adult production per hectare, the North Lantau region ranks quite highly (4th out of 12 sectors) and is relatively valuable, however, the fry fishery is not as productive (ranked 9 out of 12).

The AFCD Port Survey identified the highest species in terms of adult fish weight caught in the North Lantau sector as mixed fish, scad (*Caranx kalla*), gizzard shad (*Clupanodon punctatus*), sardine (*Sardinella jussieu*) and croaker (*Argyrosomus* spp.). These fish catches reflect the operations in the area, which are dominated by larger fishing vessels and notably hang trawlers fishing pelagic species (AFCD, 1998; Mouchel, 2002).

The recent Port Survey of commercial fisheries (AFCD, 2003) showed that maximum adult fish production (determined for all fishing vessels) ranged from 100-200 kg ha^{-1} for all fishing areas (Shum Wat, Sha Lo Wan, Tung Chung, Chek Lap Kok and Pak Mong). The fishing areas are of reasonably high value and the majority are valued at between HK$2000-5000 ha^{-1} for adult fish and fry. In terms of fisheries production, the major fisheries resources (expressed in terms of production >10-20 kg ha^{-1}) present include rabbitfish (siganidae), sardine (clupeidae), croaker (sciaenidae), shrimp and crab (AFCD, 2003).

Wet Season Trawls (July-August 2003)

The demersal trawl surveys conducted in locations near the study area at sites around Sham Wat, San Shek Wan and off Tai Ho Wan as part of the ongoing EM&A for the contaminated mud pits at East Sha Chau (Mouchel, 2004a,b) recorded a total of 159 different species. Of these faunal groups, crabs, fish, bivalves, gastropods, shrimps (including mantis shrimp) and prawns were the most abundant. The crabs were numerically dominant and 6320 individuals were trawled in July and August 2003, although not all these crabs are commercial species.

Fish were also abundant and 5067 individuals were recorded in July-August 2003 and were represented by 69 different species. In terms of numerical dominance, the most common fish recorded were the Shortnose pony fish *Leiognathus brevirostris* (common locally; Sadovy and Cornish, 2000); Asiatic glassfish *Ambassis gymnocephalus* (widely distributed and common in estuaries throughout the Indo-Pacific; Sadovy and Cornish, 2000; Lam, 2002); the croaker *Johnius macrorhynus* (distributed throughout the Indo-Pacific and South China Sea; Fishbase); Saddleback silver-biddy *Gerres lucidus* (=*limbatus*) which is distributed in tidal areas throughout the Indo-Pacific and South China Sea (Fishbase); and the flathead *Platycephalus indicus* which is common throughout the Indo-West Pacific and Hong Kong coastal waters (Fishbase; Ni and Kwok, 1999). The commercially important mantis shrimps (mostly *Oratosquilla interrupta*) and prawns (*Metapenaeus* spp. and *Penaeus* spp.) were also numerically abundant components of the trawls.

Dry Season Trawls (January-February 2004)

In the dry season trawls recently conducted during January and February 2004, a total of 129 different species were recorded. Of these faunal groups the gastropods and fish were the most abundant. The gastropods were numerically dominant and 1610 individuals were trawled in January and February 2004, although not all these gastropods are commercial species.

Fish were also abundant and 1292 individuals were recorded comprising 44 different species. In terms of numerical dominance, the most common fish recorded were the croakers *Johnius macrorhynus* and *Dendrophysa russelii* (widespread in coastal waters and estuaries throughout the Indo-Pacific; Fishbase) and the Shortnose pony fish *Leiognathus brevirostris*.

The species trawled from locations near to Sham Wat, San Shek Wan and Tai Ho Wan are presented below in *Table 4.2b*.

Table 4.2b Species Composition and Abundance (Total Counts) in the Wet (July-August 2003) and Dry (January-February 2004) Seasons (Mouchel, 2004a,b)

Group	Species	Wet season				Dry Season			
		FS3	FS4	FS6	Total	FS3	FS4	FS6	Total
Bivalve	*Anomia chinensis*			2	**2**				
	Chione calophylla	30	32	3	**65**	7	4		**11**
	Chlamys pica	3		31	**34**				
	Isognomon legumen		3		**3**			1	**1**
	Laternula sp.		12		**12**				
	Paphia undulata	94	11	309	**414**	51	133	39	**223**
	Perna viridis	2		86	**88**	1	1	10	**12**
	Pinctada chemnitzi					3			**3**
	Pinna pectinata	4		1	**5**	1			**1**
	Potiarca pilula	29	30	7	**66**	6	5		**11**
	Scapharca subcrenata	124	69	27	**220**		6	1	**7**
	Tapes philippinarum	2	577	1322	**1901**	3	1		**4**
Bivalve Total		**288**	**734**	**1788**	**2810**	**72**	**150**	**51**	**273**
Cephalopod	*Loligo* sp.	1	2	6	**9**	2	5	2	**9**
	Octopus sp.					1	1	3	**5**
	Sepia aculeata	2	2		**4**				
	Sepiella japonica	1		5	**6**		1		**1**
	Sepiella sp.			1	**1**				
Cephalopod Total		**4**	**4**	**12**	**20**	**3**	**7**	**5**	**15**
Coelenterata	*Guaiagorgia* sp.			8	**8**	2		6	**8**
	Jeliy fish	2	3		**5**				
	Sea anemone	16	19	3	**38**	7	4	7	**18**
	Sea pen 1	3	8	131	**142**	1	7	242	**250**
	Sea pen 2	25	41	260	**326**	14	31	502	**547**
	Sea pen 3	7	5	19	**31**	1	3	9	**13**
Coelenterata Total		**53**	**76**	**421**	**550**	**25**	**45**	**766**	**836**
Crab	*Calappa philargius*			8	**8**				
	Charybdis acuta	98	12	71	**181**	2	4	29	**35**
	Charybdis affinis					1	3	8	**12**
	Charybdis anisodon	3	8	1	**12**				
	Charybdis callianassa			4	**4**				
	Charybdis cruciata	2		8	**10**	18	10	5	**33**
	Charybdis japonica	2165	1841	701	**4707**	81	65	125	**271**
	Charybdis truncata	2		8	**10**			6	**6**
	Charybdis variegata	2			**2**	1		1	**2**
	Clibanarius sp.	59	63	38	**160**	18	11	4	**33**
	Diogenes sp.	31	3	3	**37**	1	1	1	**3**
	Doclea gracilipes			2	**2**		3		**3**
	Dorippe polita					1		1	**2**
	Eriochier rectus		8		**8**			1	**1**
	Ethusa indica	7	9	352	**368**		3	5	**8**
	Eucrate costata	38	20	80	**138**	2	5	12	**19**
	Eucrate crenata		136	16	**152**	3	1	4	**8**
	Eucrate solaris	2	22	12	**36**		1		**1**
	Galene bispinosa	25	15	9	**49**	1	4	2	**7**
	Goniohellenus vadorum	7	4	8	**19**	45	21	58	**124**
	Leucosia vittata	24	17	27	**68**	2	1	1	**4**
	Macrophthalmus japonicus	11	4	3	**18**	1	2	2	**5**
	Petrolisthes sp.						2		**2**
	Platylambrus validus	6	8	22	**36**	5	2	7	**14**
	Portunus hastatoides	6	16	15	**37**	10	34	66	**110**
	Portunus pelagicus	9	8	17	**34**			6	**6**
	Portunus		2		**2**			1	**1**

Group	Species	Wet season				Dry Season			
		FS3	FS4	FS6	Total	FS3	FS4	FS6	Total
	sanguinolentus								
	Porcelain crab							16	16
	Scylla serrata			2	2		1		1
	Thalamita sima	18		6	24			12	12
	Typhlocarcinus nudus	29	91	76	196	2		3	5
Crab Total		**2544**	**2287**	**1489**	**6320**	**194**	**174**	**376**	**744**
Echinoderm	*Acaudina molpadioides*	162	190	61	413			7	7
	Salamacis sphaeroides variegata			13	13				
	Sea urchin			4	4				
	unidentified sea cucumber					1	5	1	7
Echinoderm Total		**162**	**190**	**78**	**430**	**1**	**5**	**8**	**14**
Fish	*Acanthopagrus latus*		2		2				
	Acentrogobius caninus	52	16	23	91	23	26	15	64
	Ambassis gymnocephalus	5	984		989				
	Amblychaeturichthys hexanema					11	15	1	27
	Apogon kiensis	22	8	37	67	1	1	4	6
	Apogon lineatus		2	1	3				
	Arius maculatus			1	1				
	Arnoglossus tenuis							1	1
	Brachyamblyopus anotus	2	1	2	5				
	Brachyamblyopus brachysoma	1			1				
	Butis butis			2	2				
	Chaeturichthys stigmatias	1	6	4	11				
	Chrysochir aureus	2	1	2	5				
	Coilia grayii			6	6				
	Coilia nasus					1	2		3
	Collichthys lucidus	5	13	20	38			1	1
	Cryptocentrus filifer	1			1				
	Ctenotrypauchen microcephalus	1			1				
	Cynoglossus arel	19	25	77	121	5	3	44	52
	Cynoglossus itinus							1	1
	Cynoglossus joyneri	47	25	26	98	14	13	8	35
	Cynoglossus semilaevis	1			1	9	4	2	15
	Dasyatis zugei			1	1				
	Dendrophysa russelii	75	21	46	142	18	148	37	203
	Drepane punctata		1	28	29				
	Epinephelus morrhua		1		1				
	Gazza minuta							1	1
	Gerres lucidus	80	181	40	301	1	3	33	37
	Grammoplites scaber		1	20	21		4	1	5
	Gymnothorax reevesii			1	1				
	Harpadon microchir		1	25	26				
	Ilisha elongata		2	3	5				
	Inegocia japonica	2	3	14	19				
	Inimicus japonicus			1	1			1	1
	Johnius belangerii	12	9	115	136		27	4	31
	Johnius macrorhynus	103	76	141	320	131	184	39	354
	Lagocephalus gloveri	29	12	3	44				
	Lateolabrax japonicus						1	2	3
	Leiognathus	398	589	138	1125			75	75

Group	Species	Wet season				Dry Season			
		FS3	FS4	FS6	Total	FS3	FS4	FS6	Total
	brevirostris								
	Lutjanus russellii							1	1
	Muraenesox cinereus	1	1	1	3			1	1
	Nematalosa come						28		28
	Nematalosa japonica	12	6	1	19			1	1
	Nemipterus japonicus	102	74	29	205			5	5
	Nibea soldado			1	1				
	Otolithes ruber	2	5	1	8		14	1	15
	Oxyurichthys tentacularis	48	120	53	221	12	53	3	68
	Pagrus major			1	1				
	Pampus chinensis			1	1				
	Parachaeturichthys polynema	10	7	42	59	1	8	11	20
	Pennahia argentata	33	28	27	88			3	3
	Platycephalus indicus	49	147	97	293	13	18	14	45
	Plotosus lineatus							1	1
	Polydactylus sextarius	26	13	4	43	4	9	1	14
	Prionobutis koilomatodon							1	1
	Pseudorhombus arsius		7	7	14				
	Repomucenus richardsonii		2	1	3				
	Saurida elongata	10	11	6	27		3		3
	Sebastiscus marmoratus		1	8	9			5	5
	Secutor ruconius		2	9	11				
	Setipinna taty			1	1				
	Siganus canaliculatus			19	19				
	Sillago sihama	4	19	14	37		2	9	11
	Solea ovata	7	6	26	39	3	2	19	24
	Stolephorus indicus	2			2				
	Syngnathus acus	1	4	1	6	5	2	3	10
	Takifugu alboplumbeus			2	2		1		1
	Takifugu bimaculatus	1	1		2				
	Takifugu oblongus	1	6		7				
	Terapon jarbua	3	30	2	35				
	Terapon theraps		2		2				
	Thryssa chefuensis		1	5	6	1		1	2
	Thryssa hamiltonii					4		2	6
	Trachycephalus uranoscopa	4	7	21	32	1	3	18	22
	Trichiurus lepturus			2	2				
	Trypauchen vagina	51	25	137	213	14	20	26	60
	Uroconger lepturus		2		2				
	Valamugil formosae		26	1	27	16	8	2	26
	Vespicula trachinoides	2	3	6	11				
	Zebrias zebra			1	1		4		4
Fish Total		**1227**	**2536**	**1304**	**5067**	**288**	**606**	**398**	**1292**
Gastropod	*Architectonica* sp.						1		1
	Babylonia areolata		6	1	7				
	Brachytoma sp.	9	6	1	16	7	2	1	10
	Bufonaria rana	36	35		71	52	28	10	90
	Bullacta exarata	4		14	18	10	2	2	14
	Calyptraea sp.		2		2	14			14
	Cheilea sp.			6	6				
	Epitonium scalare			1	1				
	Gyrineum natator						1		1
	Hemifusus tube	6	6		12				
	Lataxiena sp.			3	3	1			1

Group	Species	Wet season				Dry Season			
		FS3	FS4	FS6	Total	FS3	FS4	FS6	Total
	Lophiotoma leucotropis	19	5		24	13	3		16
	Murex trapa	444	364	106	914	47	45	59	151
	Nassarius crematus	108	89	2	199	137	80	5	222
	Nassarius sp.	3		1	4				
	Natica lineata		8	1	9				
	Natica sp.		2		2				
	Natica sp. 1	6		1	7				
	Pleurobranchus sp.							4	4
	Polynices sp.	2		1	3		1		1
	Rapana bezoar	4		9	13	1			1
	Sea slug							2	2
	Tonna sp.			3	3				
	Turricula javana	12	9		21	5	4	3	12
	Turritella terebra	728	564	42	1334	662	402	6	1070
Gastropod Total		**1381**	**1096**	**192**	**2669**	**949**	**569**	**92**	**1610**
Mantis shrimp	*Clorida decorator*	3	4	1	8	1			1
	Dictyosquilla foveolata		7	3	10	1	1	3	5
	Harpiosquilla harpax	16	2	14	32	5	2	15	22
	Miyakea nepa					2			2
	Oratosquilla interrupta	238	192	215	645	50	38	13	101
	Oratosquilla oratoria	3	2	23	28	7	10	6	23
Mantis shrimp Total		**260**	**207**	**256**	**723**	**66**	**51**	**37**	**154**
Polychaete	Polychaete							1	1
Polychaete Total								1	1
Prawn or Shrimp	*Alpheus brevicristatus*			4	4	1			1
	Alpheus distinguendus			2	2	2			2
	Alpheus hoplocheles	1	2		3				
	Metapenaeopsis barbata							4	4
	Metapenaeus affinis	27	109	286	422	2	15	17	34
	Metapenaeus burkenroadi			1	1	4	11		15
	Metapenaeus ensis	63	80	61	204		3	6	9
	Metapenaeus joyneri	15	130	171	316	6	5	6	17
	Parapenaeopsis hardwickii	161	118	57	336	5	2	5	12
	Parapenaeopsis hungerfordi	191	238	59	488	14	9	22	45
	Parapenaeopsis tenella					33	2		35
	Penaeus monodon	2	1	1	4				
	Penaeus orientalis					6	14	45	65
	Penaeus penicillatus	118	238	347	703		1		1
	Scyllarus martensii							1	1
	Solenocera crassicornis			18	18	7	11	4	22
	Trachypenaeus fulvus					4		8	12
Prawn or Shrimp Total		**578**	**916**	**1007**	**2501**	**84**	**73**	**118**	**275**
Grand Total		**6497**	**8046**	**6547**	**21090**	**1682**	**1680**	**1852**	**5214**

5. Discussion

5.1 Fisheries Resources

The Report on Fisheries Resources and Fishing Operations in Hong Kong Waters (ERM, 1998) generally supports the information provided in both the Port Survey data and detailed above. In terms of seasonality, the data above support the conclusion that the wet summer months tend to record the highest abundance of fisheries resources when recruitment is higher (e.g., Mouchel, 2004c).

5.2 Culture Fisheries

The nearest culture fishery is the mariculture zone at Ma Wan located approximately 10km to the east of Tai Ho Wan (this represents the nearest point between the project and the FCZ). The Ma Wan FCZ consists of 138 licensed floating rafts and the main species cultured are spotted grouper (*Epinephelus chlorostigma*), goldlined seabream (*Rhabdosargus sarba*), mangrove snapper (*Lutjanus argentimaculatus*) and pompano (*Trachinotus blochii*) (Mott Connell, 1999; Mouchel, 2002).

5.3 Sensitive Receivers

The major sensitive receiver present is the mariculture zone at Ma Wan. The operators of capture fisheries and the spawning grounds may, however, also be affected by the project and will require assessment.

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